

Guide Published for Peer Reviewers of Research Manuscripts

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Despite the importance of peer review in evaluating and refining papers submitted to journals, the education of researchers generally includes little about what is expected of peer reviewers and how their contributions fit in. To help remedy this situation, a task force was convened in 1999 by the journal *Academic Medicine* and the Research in Medical Education Section of the Association of American Medical Colleges. The resulting report, "Review Criteria for Research Manuscripts", appeared in the September 2001 issue of *Academic Medicine* (76:897-978). Although intended mainly to aid reviewers, the report can serve as a resource for editors, too.

"The report grew from my concern that reviewers were not receiving the help they needed to do high-quality reviews for peer-reviewed journals", says task force cochair Addeane S Caelleigh, who retired as editor of *Academic Medicine* at the end of 2001. The task force, which worked intensively for 2 years, included medical-education researchers and *Academic Medicine* staff BARBARA GASTEL, a faculty member at Texas A&M University, is the editor of Science Editor.

members. "I have never worked with a group with so little ego and so much good will", Caelleigh says. "Hard work, open minds, and more hard work."

The hard work generated a report running some 80 published pages. "Review Criteria for Research Manuscripts" begins by describing the review process and explaining how decisions are made about publication; an accompanying flowchart shows the steps in review and publication of manuscripts submitted to peer-reviewed journals. The core of the report consists of sections presenting and discussing criteria for evaluating the parts of a scientific paper. Also included are sections on assessing presentation and documentation and on reviewing a manuscript with regard to issues of scientific conduct. The closing sections discuss preparing an overall recommendation and delineate the etiquette of reviewing.

The report contains three appendixes: a checklist of review criteria (see accompanying list), copies of sample review forms from journals, and a resource list. "This document is extremely thorough", says long-time CSE member Karen Potvin Klein, a research assistant in internal medi-

cine at Wake Forest University School of Medicine. "The bibliography alone makes this a valuable source document for years to come."

Klein notes that "Review Criteria" could be of use to new faculty members, graduate and medical students, training-grant programs, and editors. Caelleigh says that although the report was written primarily for reviewers of papers reporting social- and behavioral-science research about health-professions education, the task force strove to "cast the criteria and the document in as generic a form as possible so that they could be applied across disciplines."

The report is available online at the *Academic Medicine* Web site, www.academicmedicine.org; nonsubscribers can access it on a pay-per-view basis. Printed copies are for sale by the Section for Publications Orders, Association of American Medical Colleges, 2450 N Street NW, Washington, DC 20037-1134, telephone 202-828-0416, publications@aamc.org. Questions about the report can be directed to Ann Steinecke, staff editor, *Academic Medicine*, telephone 202-828-0512, asteineke@aamc.org. 

Checklist of Review Criteria for Research Manuscripts*

Problem Statement, Conceptual Framework, and Research Question

- The introduction builds a logical case and context for the problem statement.
- The problem statement is clear and well articulated.
- The conceptual framework is explicit and justified.
- The research question (research hypothesis where applicable) is clear, concise, and complete.
- The variables being investigated are clearly identified and presented.

Reference to the Literature and Documentation

- The literature review is up-to-date.
- The number of references is appropriate and their selection is judicious.
- The review of the literature is well integrated.
- The references are mainly primary sources.
- Ideas are acknowledged appropriately (scholarly attribution) and accurately.
- The literature is analyzed and critically appraised.

*Checklist continued***Relevance**

- The study is relevant to the mission of the journal or its audience.
- The study addresses important problems or issues; the study is worth doing.
- The study adds to the literature already available on the subject.
- The study has generalizability because of the selection of subjects, setting, and educational intervention or materials.

Research Design

- The research design is defined and clearly described, and is sufficiently detailed to permit the study to be replicated.
- The design is appropriate (optimal) for the research question.
- The design has internal validity; potential confounding variables or biases are addressed.
- The design has external validity, including subjects, settings, and conditions.
- The design allows for unexpected outcomes or events to occur.
- The design and conduct of the study are plausible.

Instrumentation, Data Collection, and Quality Control

- The development and content of the instrument are sufficiently described or referenced, and are sufficiently detailed to permit the study to be replicated.
- The measurement instrument is appropriate given the study's variables; the scoring method is clearly defined.
- The psychometric properties and procedures are clearly presented and appropriate.
- The data set is sufficiently described or referenced.
- Observers or raters were sufficiently trained.
- Data quality control is described and adequate.

Population and Sample

- The population is defined clearly, both for subjects (participants) and stimulus (intervention), and is sufficiently detailed to permit the study to be replicated.
- The sampling procedures are sufficiently described.
- Subject samples are appropriate to the research question.
- Stimulus samples are appropriate to the research question.
- Selection bias is addressed.

Data Analysis and Statistics

- Data analysis procedures are sufficiently described, and are sufficiently detailed to permit the study to be replicated.
- Data analysis procedures conform to the research design; hypotheses, models, or theory drives the data analyses.
- The assumptions underlying the use of statistics are fulfilled by the data, such as measurement properties of the data and normality of distributions.
- Statistical tests are appropriate (optimal).
- If statistical analysis involves multiple tests or comparisons,

proper adjustment of significance level for chance outcomes was applied.

- Power issues are considered in statistical studies with small sample sizes.
- In qualitative research that relies on words instead of numbers, basic requirements of data reliability, validity, trustworthiness, and absence of bias were fulfilled.

Reporting of Statistical Analyses

- The assumptions underlying the use of statistics are considered, given the data collected.
- The statistics are reported correctly and appropriately.
- The number of analyses is appropriate.
- Measures of functional significance, such as effect size or proportion of variance accounted for, accompany hypothesis-testing analyses.

Presentation of Results

- Results are organized in a way that is easy to understand.
- Results are presented effectively; the results are contextualized.
- The results are complete.
- The amount of data presented is sufficient and appropriate.
- Tables, graphs, or figures are used judiciously and agree with the text.

Discussion and Conclusion: Interpretation

- The conclusions are clearly stated; key points stand out.
- The conclusions follow from the design, methods, and results; justification of conclusions is well articulated.
- Interpretations of the results are appropriate; the conclusions are accurate (not misleading).
- The study limitations are discussed.
- Alternative interpretations for the findings are considered.
- Statistical differences are distinguished from meaningful differences.
- Personal perspectives or values related to interpretations are discussed.
- Practical significance or theoretical implications are discussed; guidance for future studies is offered.

Title, Authors, and Abstract

- The title is clear and informative.
- The title is representative of the content and breath of the study (not misleading).
- The title captures the importance of the study and the attention of the reader.
- The number of authors appears to be appropriate given the study.
- The abstract is complete (thorough); essential details are presented.
- The results in the abstract are presented in sufficient and specific detail.
- The conclusions in the abstract are justified by the information

in the abstract and the text.

- There are no inconsistencies in detail between the abstract and the text.
- All of the information in the abstract is present in the text.
- The abstract overall is congruent with the text; the abstract gives the same impression as the text.

Presentation and Documentation

- The text is well written and easy to follow.
- The vocabulary is appropriate.
- The content is complete and fully congruent.
- The manuscript is well organized.
- The data reported are accurate (e.g., numbers add up) and appropriate; tables and figures are used effectively and agree with the text.
- Reference citations are complete and accurate.

Scientific Conduct

- There are no instances of plagiarism.
- Ideas and materials of others are correctly attributed.
- Prior publication by the author(s) of substantial portions of the data or study is appropriately acknowledged.
- There is no apparent conflict of interest.
- There is an explicit statement of approval by an institutional review board (IRB) for studies directly involving human subjects or data about them.

*Excerpted from: Joint Task Force of *Academic Medicine* and the GEA-RIME Committee. (Bordage G, Caellegh AS, co-chairs.) Review criteria for research manuscripts. *Acad Med* 2001;76:897-978. Reprinted with permission.

From “Review Criteria for Research Manuscripts”

“The goal was not standardization but transparency.”

“Regrettably, the increase in research on peer review has not been accompanied by more teaching of peer review.”

“Reviewers make recommendations to editors—they do not have votes.”

“[T]he decision-making process [about whether to publish a given paper] is highly complex, multifactorial, and unique for each paper. It is subjective, but it is neither capricious nor uninformed.”

“A caveat for reviewers is to be wary of researchers who have not carried out a

thorough review of the literature.”

“When the description of the method of a study is incomprehensible to the reviewer, it may hint at the researcher’s own confusion about the elements of his or her study.”

“[T]he final decision belongs to the editor. That person almost always wants recommendations (not votes) from the reviewers—and a recommendation requires a judgment.”

“Reviewers do not have to—of course, should not—restrict themselves to negative comments!”

“If a reviewer goes into the process with the understanding that the goal is to be helpful to the editor and fair to the authors without being unduly critical, she or he will be poised to do a good job.”

“Conflicts of interest result from financial relationships . . . and from personal and professional relationships, academic competition, and intellectual passion.”

“The criteria themselves do not imply tougher or higher standards; the criteria simply make the standards more transparent.”