



Reviewing Scientific Manuscripts: A Comprehensive Guide for Peer Reviewers

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Journal editors rely on peer review from physicians, biomedical researchers, and biostatisticians to critically examine study aims, design, and methodology, and ensure that analyses and conclusions are accurate before manuscript publication. Given the importance of this process and clinician reliance on the published literature to guide clinical practice, we sought to provide peer reviewers guidance and a rubric for performing optimal reviews.

The Editorial Process

Following submission, the journal's editor selects peer reviewers, e-mails invitations, and uses the feedback to guide publication decisions. Journals set deadlines for reviewers to (1) respond to the invitation and (2) submit the review. A prompt response from reviewers is vital to moving the process forward. If the reviewer has a conflict of interest, she or he should decline the review and have the opportunity to state the reason for doing so. The peer reviewer is expected to make recommendations to the editor, based on his or her comprehensive assessment of the manuscript, as to acceptability for publication [1–3]. A thorough review can take approximately 3 hours, but varies with experience [1, 3]. Exceptional reviews provide the editor and author(s) clear, concise, insightful, and constructive feedback, which accurately reflect manuscript strengths and weaknesses. They also provide specific recommendations for revisions that should significantly improve the manuscript. The following provides a step-by-step approach to optimal review of scientific manuscripts (Table 1).

Title Page

The title, author list, institutional affiliations, prior presentation of the data, and corresponding author are universal components of the title page and should accurately and truthfully represent the contributions to the manuscript and the responsible parties. The title is an often overlooked but critical feature of each manuscript. An informative,

compelling title will entice readers into reading the paper whereas a bland or nondescript title may cause readers to skip over an otherwise excellent paper. The reviewer may guide authors to revise the title to descriptively capture the essence of the paper. Each journal has instructions for authors that provide guidelines regarding the required elements for the title page, including the number of words or characters allowed in the title and other details. These journal-specific instructions should be familiar to the reviewer and followed by the authors. Additional information may be requested on the title page, including statements of author contributions, conflicts of interest, word count, key words, acknowledgment of funding sources, and central or perspective messages. If these are incorrectly presented or missing, instructions to the authors to correct the errors will reduce time to publication by correcting them early in the revision process.

Abstract

The abstract provides the authors with an opportunity to summarize the objectives, methods, results, and conclusions for the journal readers. It is oftentimes the first, and perhaps only, section of the manuscript that will be read, as it is typically freely available through reference databases. The abstract should provide a clear statement of the study objectives, which must match what is stated in the introduction and other summary statements regarding the study. This is oftentimes not the case, and the astute reviewer will identify the discrepancy for the authors to correct. Although brief in length, the abstract methods must define the study group, stratification variables if any, and provide a general overview of the analysis plan. The results should provide data that directly address the stated objectives and support the abstract conclusions. Conclusions that are not directly supported by the data provided in the abstract results should not be included in the abstract; these conclusions belong in the manuscript discussion or the appropriate data added to the abstract results. It is often the case that the abstract is excessively wordy without added meaning. Authors often reply to reviewers that the word count

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Table 1. Key Elements of a Scientific Manuscript

Introduction: Briefly addresses
<ul style="list-style-type: none"> • Scope of the problem <ul style="list-style-type: none"> Gap in knowledge • Prior research <ul style="list-style-type: none"> Flaws in prior research • How does this study fill the knowledge gap <ul style="list-style-type: none"> Overcome prior research flaws Novel approach • Primary aim of the study <ul style="list-style-type: none"> Hypothesis
Methods
<ul style="list-style-type: none"> • Study design • Cohort <ul style="list-style-type: none"> Inclusion and exclusion criteria Time period • Define predictor variables • Define primary and secondary outcomes • Statistical analyses • Institutional review board statement
Results
<ul style="list-style-type: none"> • Cohort characteristics <ul style="list-style-type: none"> Table 1 • Results presented in same order as aims • Summarize results presented in tables without repeating them • Tables and Figures <ul style="list-style-type: none"> Present results in a clear, concise manner Clearly labeled Do not reiterate results in the text
Discussion
<ul style="list-style-type: none"> • Begin with summary of hypothesis and aims and primary and secondary findings • Compare and contrast with prior research • Relevance and context of findings <ul style="list-style-type: none"> External generalizability • Strengths and limitations • Future directions • Conclusion

restricts the information that can be provided, but this typically can be addressed through language simplification and removal of extraneous words. If this is the case, the reviewer will advise the authors to revise accordingly.

Introduction

The introduction succinctly defines the scope of the problem and justification for further investigation [4]. It should be no more than 2 to 3 paragraphs. Unfortunately, many authors attempt to “set the stage” with extraneous information not germane to the study hypothesis or aims, such as global statements about topics (epidemiology, survival, treatment) that are relevant to the disease but not under investigation in the current study. When

this is encountered, valuable reviews provide authors constructive feedback to revise and limit the introduction to a brief statement on the scope, importance, and context of the problem relevant to and congruent with the specific research question. The strengths and limitations of prior relevant studies are briefly introduced, but in-depth critique of them is reserved for the discussion section. The final paragraph of the introduction is a clear statement of the study aim(s) and hypothesis. For studies focusing on clinical questions, the aim should be testable and clearly identify the patient, population, or problem; the intervention, prognostic factor, or exposure of interest; the comparison groups or alternative intervention; and the outcome to be evaluated. Often when the methods, results, and discussion are confusing, it is because the study lacks clearly stated and testable aim(s).

Methods

The methods describe how the study aim(s) were tested and include the elements described in the following paragraphs. Effective reviews provide authors feedback when these requirements are not met, including sufficient information for each element such that independent investigators could replicate the study.

1. Type of research study and study participants: This includes type of study (Table 2), population, study setting, detailed inclusion and exclusion criteria, and study time frame/dates [5]. Critical evaluation of the appropriateness of the study design is a central feature of an outstanding review. It is important to query whether the design allows for the question(s) to be answered and whether the numbers of patients are sufficient. The reviewer will assess whether the inclusion and exclusion criteria are justified and allow for the study question to be evaluated.
2. Reporting guidelines: Reporting guidelines by study type are available and useful to both authors and reviewers as a checklist to ensure that all key elements of a study are included in the manuscript [6] (Table 3). For example, all clinical trials must have an accompanying CONSORT (Consolidated Standards of Reporting Trials) flow diagram that demonstrates the progress through the phases of a randomized clinical trial involving 2 groups [7]. These phases include enrollment, intervention allocation, follow-up, and data-analysis. The reviewer will assess these diagrams to make sure that the published protocol has not significantly deviated from the intended trial protocol.
3. Data source: The data source and methods for data collection should be succinctly but accurately described and referenced, including whether the data were prospectively versus retrospectively collected, who collected the data, and whether the data abstractors were blind to the study question or intervention.
4. Predictor variables: Any novel, complex, or key study predictor variables should be defined in detail,

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