Reviewing Manuscripts for Biomedical Journals

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Abstract

Writing for publication is a complex task. For many professionals, producing a well-executed manuscript conveying one's research, ideas, or educational wisdom is challenging. Authors have varying emotions related to the process of writing for scientific publication. Although not studied, a relationship between an author's enjoyment of the writing process and the product's outcome is highly likely. As with any skill, practice generally results in improvements. Literature focused on preparing manuscripts for publication and the art of reviewing submissions exists. Most journals guard their reviewers' anonymity with respect to the manuscript review process. This is meant to protect them from direct or indirect author demands, which may occur during the review process or in the future. It is generally accepted that author identities are masked in the peer-review process. However, the concept of anonymity for reviewers has been debated recently; many editors consider it problematic that reviewers are not held accountable to the public for their decisions. The review process is often arduous and underappreciated, one reason why biomedical journals acknowledge editors and frequently recognize reviewers who donate their time and expertise in the name of science. This article describes essential elements of a submitted manuscript, with the hopes of improving scientific writing. It also discusses the review process within the biomedical literature, the importance of reviewers to the scientific process, responsibilities of reviewers, and qualities of a good review and reviewer. In addition, it includes useful insights to individuals who read and interpret the medical literature.

Introduction

Writing for publication is a complex task. For many professionals, producing a well-executed manuscript conveying one's research, ideas, or educational wisdom is extremely challenging. Authors, clinicians, scientists, and researchers have varying emotions related to the process of writing for scientific publication. Although the issue has not been studied, a relationship between an author's enjoyment of the writing process and the outcome is highly likely. As with any skill, practice generally results in improvement, which in turn results in increased satisfaction and comfort with the process. In addition, authors can consult literature that focuses on manuscript preparation[1–9] and the art of reviewing manuscripts.[10–19] Accordingly, this article describes essential elements of a manuscript and the review process, in hopes of simplifying the creative and review process and improving scientific writing.

It is generally accepted that authors' identities are masked during the peer-review process.[20] Similarly, the majority of journals guard their reviewers' privacy during the process. This protects reviewers from direct or indirect author demands during the review or in the future. However, reviewer anonymity is under debate; many editors consider it problematic that reviewers are not held accountable to the public for their decisions about whether to recommend manuscripts for publication.[21–24]

The review process is often arduous and underappreciated, which is one reason biomedical journals acknowledge editors and frequently provide public recognition of reviewers who donate their time and expertise in the name of science. This article also discusses the importance of reviewers to the scientific process, reviewers' responsibilities, and qualities of a good review and reviewer. In addition, it includes insights useful to individuals who read and interpret the medical literature.

Definitions

According to the Uniform Requirements for Manuscripts Submitted to Biomedical Journals (Uniform Requirements), an *author* is someone who has made substantial intellectual contributions to a published study.[25] An *editor* of a journal is the person responsible for its entire content. These requirements state that editors must have full authority for determining the journal's

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editorial content.[25] Finally, the International Committee of Medical Journal Editors, which produced these requirements, describes the peer-review process as an intrinsic part of all scholarly work, including the scientific process. It is the critical assessment process of each manuscript submitted to a journal by unbiased, independent experts who are not part of the editorial staff.[25] For this article, the term *manuscript* is used for materials not yet published; *article* refers to published manuscripts.

Protections

Protection of an author's intellectual property (data, theories, conclusions) must be maintained at all times by those involved in the publication process. Author and reviewer confidentiality must be maintained for blinded peer review, although the editorial staff should be able to identify all parties if necessary. This is important if allegations of fraud or dishonesty occur or if there are accusations of professional misconduct by any (or an outside) party. In addition to the ongoing debate as to whether reviewers should remain anonymous, whether to publish their comments is also argued. Whatever details exist regarding these questions, they must be unambiguous and available in advance to authors and journal readers. Reviewers should be held accountable to these established guidelines.

Reviewer Responsibilities

Once reviewers agree to review a submitted manuscript, they generally agree to complete their work within a set time frame. Reviewers may either express interest in the manuscript and recommend publication or convey concern that the submission is not suitable for that particular journal (ie, they recommend that it be rejected). It has become more common for reviewers to encourage revisions from an author before committing to a publication decision, especially given the recent increase in submissions to English-language journals by researchers whose first language is not English. This is not unreasonable, although the reviewers' comments should be composed in a manner that is helpful to the author. This *nondecision* should neither falsely inflate an author's hopes for publication of an article within that journal nor delay an author's chances for publication elsewhere. Reviewers should seriously consider the manuscript after the author has made the suggested revisions.

All reviewers have personal biases. These must be acknowledged and limited as much as possible when reviewers consider manuscripts for publication. Reviewers are more likely to favor submissions with interesting titles likely to grab readers' attention. They are also more likely to prefer manuscripts that are clearly written with favorable results and meaningful, unique, or creative ideas. Conversely, reviewers may be more likely to reject manuscripts with negative results (referred to as publication bias); that neither describe nor discuss novel ideas or novel results; that contain numerous and/or egregious grammatical, syntax, or spelling errors; and that would not be interesting to readers. Because bias is impossible to exclude entirely from the decision (referee) process, editors-in-chief should work to build an editorial staff and establish a group of expert reviewers who consider submissions with thoughtfulness and reflection. Deliberate reviewers, editors, and staff who work well together and have discussed these issues in advance strengthen final manuscripts. This improves not only the quality of the journal but also the quality of medical literature in the aggregate.

It is important for authors to incorporate reviewers' suggested changes whenever possible. Ignoring suggestions by editorial staff or reviewers to improve a manuscript or to make it more appropriate for that journal without explanation is not recommended. Most reviewers see subsequent manuscript revisions and may review for other journals similar in scope. This may prove problematic for authors if they decide to pursue publication elsewhere. Depending on the number of submissions a journal receives, fewer manuscripts are accepted for publication than are rejected. It has been estimated that 1 in 5 manuscripts are accepted for publication, although it is difficult to know this with certainty because manuscripts are submitted to more than one journal once the initial decision to reject has been made. Authors who do not follow submission instructions carefully or who elect not to incorporate reviewers' comments or answer reviewers' queries provide legitimate reasons to reject even a good manuscript. A cover letter from the primary author addressing specific reviewer or editor queries, with explanations why some were not addressed, is appropriate, expected, and appreciated. This is especially true if the elapsed time between review and revision is months.

Numerous challenges are inherent with reviewing manuscripts for scientific publication. First, an editorial staff must have confidence in the abilities and skills of a reviewer. It is not always necessary for reviewers to have expertise in a particular area, because they can still submit useful comments.

It has become more common for reviewers to encourage revisions from an author before committing to a publication decision, … Reviewers should seriously consider the manuscript after the author has made the suggested revisions.

In this circumstance, however, the reviewer has an obligation to point out this lack of expertise to the editor-in-chief. Thorough reviews take time, and individuals qualified to review manuscripts likely have their own commitments and deadlines. Reviewers must be professional in their critiques, using comments that would be unlikely to offend an author. Often, reviewer comments are filtered through the editor-in-chief or one of the assistant or associate editors, providing an opportunity to soften negative criticisms and maintain the journal's professional reputation and integrity.

Despite donating their time, reviewers represent the journal for which they review. This also allows the editors to review the reviewers. Because manuscripts are not submitted to multiple journals at once, it is expected that once reviewers agree to review a manuscript, they adhere to a strict, predetermined timeline so that authors promptly learn if there is interest in their submission and how much revision is necessary. Often, it is difficult for administrative or editorial staff to identify appropriate reviewers for a submission. This may be due to a lack of available reviewers (especially common during the summer or the months before grant or national meeting deadlines) or to the nature of the topic (narrow in scope, advanced, or unique). It is possible that the journal's review board may not possess the requisite number of reviewers for a particular area of research. Occasionally, reviewers' recommendations differ to such an extent that additional reviewers are needed to evaluate a manuscript. When this occurs, a high-level editor must increase his or her involvement in the review process. In addition, authors may be asked by the editor-in-chief or editorial staff to suggest potential reviewers.

It is incumbent on the editor-in-chief to make final decisions about the articles published in a particular issue, including publication order within the journal, on the basis of content, timing, space availability, and numerous other issues. Often, editors choose to rush or hold manuscripts accepted for publication to produce theme issues, to get certain topics to press before competing journals do (especially for breaking medical news), or to improve balance within an issue given the subject matters of other manuscripts being published in that issue.

Essentials of the Review Process

A number of elements comprise a good review of a submitted manuscript. Reviewers are essential to editors, as they assist them with decisions about which articles to publish; to authors, as they provide expert advice about their ideas and the manner in which they are described; and to readers, as they are expected to help confirm scientific validity and research methodology rigor. Additionally, statistical reviewers may identify more appropriate statistical tests or methods—or even study designs—that better suit the data collected and the research question being investigated. Most reviewers are not statisticians; reviewers should, however, have some familiarity with common statistical measures and general concepts used in research.

Reviewers must have a sharp eye for detail. Generally, the editorial staff (and perhaps editors) will preview all submissions to make sure they possess appropriate merit to justify review. Editorial staff should make certain that tables, figures, font, layout, and submission rules have been followed. If not, they can quickly respond to the authors, asking them to resubmit their manuscript in the appropriate format. Tables and graphs should have legible labels, be numbered sequentially, and be of good quality for reproduction. Sections within the manuscript should follow each other in a sequence standard for that journal, with each section containing appropriate content. Although the references should be relevant and current (one of many responsibilities assumed by expert reviewers), editorial staff can perform a quick check to confirm that references are in the correct format.

Reviewers should be as specific as possible in their comments to the authors. These comments should include suggestions, requests for clarification, and statements that instruct authors to correct or change something. Comments should be detailed enough to assist authors in making necessary edits or modifications, but not so detailed that the manuscript is rewritten. Some journals have professional copy editors on staff; many use freelance copy editors. This allows reviewers to focus more on content, methodology, and conclusions than on grammar and syntax. This is especially important for manuscripts submitted in English by authors whose first language is not English. If a sentence, paragraph, or concept is unclear to an expert reviewer, it will likely be ambiguous to the journal's readers.

Reviewers should agree to provide a useful, quality, timely, and unbiased assessment of submitted manuscripts. The review does not have to be lengthy. However, it should be sufficiently detailed that authors can understand what the reviewer is looking for or expecting in the revision, and can thus

improve subsequent drafts of their manuscript. A useful manner in which to proceed includes providing general comments, both favorable and negative, related to the entire manuscript and the reviewer's overall impression, and then addressing each essential component of the manuscript (Table 1).

Components of Manuscript Reviews

Reviewers should consider each section individually on its own merit. It may not be necessary for reviewers to comment on each section; in fact, the absence of comments related to a section may indicate the absence of problematic issues in the reviewers' opinions. However, reviewers should address both information within these sections that requires correction and any lack of information.

The IMRAD (introduction, methods, results, and discussion) structure is a direct reflection of the scientific discovery process; thus, both observational and experimental manuscripts are encouraged to follow this format.[25] Additional sections or subheadings include *Title*, *Abstract*, *Limitations*, *References*, and *Figures* (with legends). Editorials, commentaries, case reports, review articles, and other nontraditional research manuscripts are unlikely to share this format. Author names and degrees, affiliations, conflicts of interest, and funding support must be provided for all submissions and reviewed by editorial staff because reviewers are not given these. Each journal's format will dictate where, how, and to whom this information is provided. Authors and reviewers should be familiar with the CONSORT (Consolidated Standards of Reporting Trials) Statement for reporting randomized trials,[26] and with the EQUATOR (Enhancing the QUAlity and Transparency Of health Research) Network for reporting medical research.[27]

A reviewer should first consider the manuscript's *title*. Is it interesting? Clear? Concise? Relevant? Catchy or snazzy? Does it give away the conclusions of the research? Does it contain a mnemonic that might garner attention? If so, is the mnemonic appropriate? Is this a negative study with a negative title? Does the title draw the reader into the study itself? The manuscript's title may provide the first opportunity for a reviewer to share his or her opinion with the author (or editorial staff).

The *abstract* provides the overall information about the research and the setting in which it occurred. It should include brief background material, methods, findings, and conclusions. Each journal's abstract format may differ, including word count limitations and required components. Abstracts are important for readers (and journals) because they are often the only section of the article read. Furthermore, abstracts may be the only portion of an article indexed in electronic databases. Therefore, it is vital that authors accurately represent their findings in the abstract.

The *introduction* of an article presents the topic to readers. It includes background information, the context and reason for the study, the significance of the topic, and the incidence and prevalence of the issue being investigated. Occasionally, descriptions of the study design and findings may appear in this section, despite this not being the appropriate area of the manuscript. When this occurs, the reviewer should alert the authors. The research question under investigation and the purpose of the study should be clearly stated within this concise section.

Table 1. Checklist for reviews: areas for comment

1. Research question—importance, relevance, and utility
2. Originality
3. Strengths and weaknesses of methodology, experimental design, statistical approach, and interpretation of the results
4. Writing style and clarity
5. Presentation of figures and tables
6. Ethical concerns—animal, human, conflicts of interest

Adapted from Benos DJ, Kirk KL, Hall JE. How to review a paper. Adv Physiol Educ 2003 Dec;27(1–4):47–52.[10]

The *materials and methods* (or *methods*) section tends to be rather complex and detailed. However, this is expected for a scholarly manuscript resulting from rigorous research. This section describes all planned activities prior to data collection. Inclusion and exclusion criteria for study participants ensures the safety of group members, increases the homogeneity of the groups, and improves the likelihood for reproducibility and applicability of the study in another setting. These criteria are provided in painstaking detail. How randomization was performed; who enrolled patients; when (and how) they were enrolled; how data were collected; the data variables themselves (ie, continuous, ordinal, dichotomous); and which equipment, drugs, doses, administration techniques, and settings were used are key elements discussed within this section. The methods section should be written as the recipe for a study's design, so that others can reproduce the research in a different (or the same) setting. How the data were analyzed, by whom, and using which statistical tests of significance are crucial elements of this section as well. Many novice readers skim this section or skip it entirely. However, it is one of the most important sections of the manuscript. Therefore, it

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is the responsibility of reviewers to see if they can correctly reconstruct the study given the information provided in this section. If they cannot, they must request more detail from authors for this section. Because the study has already been conducted, the study design itself will not change on the basis of reviewers' comments. However, the manner in which the section is reported can be modified to provide readers with a greater understanding of the complexities of the authors' methodology. Furthermore, reviewer concerns about the materials and methods employed by the authors in the study may disclose several limitations that authors can report.

For manuscripts that review a clinical or health care topic, the methods employed by the authors to identify articles (including the time frame and databases searched), selection criteria used for those included, how data from those articles were abstracted and synthesized, and which articles were excluded in the research and why are essential elements in this section.

The *results* section includes the research findings. These can be presented as text, although tables, graphs, and illustrations help emphasize important findings. It is not necessary that all data be presented in figures. Whenever possible, images should not greatly interrupt the flow of text. Figures that are less essential to this section, or to understanding the main results from the study, may be added at the end of the manuscript as appendices or published on the journal's Web site if print space is an issue. Data from tests of statistical significance should be reported here as well. Authors should not *interpret* their results in this section; interpretation of results occurs in the discussion section.

The *discussion* section of an experimental study briefly summarizes the main research findings. The discussion can emphasize unique aspects of the study and the conclusions that can be drawn. This section should try to explain how and why these results were obtained, along with their significance. References to similar studies are included in this section, in which brief reports of those studies' findings are made, including comparisons with and contrasts to study design and results. Here, authors offer possible explanations for differences between their study and other studies. Implications and possible future research directions are appropriate to include in this section.[28]

A *limitations* section is not included in every article, because not every article has a need for this. For example, an editorial or review article would not require such a section. Not every journal or published article includes this section, unfortunately. In this section (or within the comments or discussion section), authors present to readers what they consider to have been limitations of their study design, such as problems with enrollment, outcomes, endpoints, or biases. Often, reviewers request that authors include limitations they had not considered but were identified during review of the manuscript. These limitations are not attributed to the reviewers in the final version of the article, and the anonymous reviewers' suggestion of additional limitations is not acknowledged in print. The limitations section should be thorough and insightful. As all studies have flaws, listing a number of limitations in no way decreases the impact of the research findings. In fact, many scholars believe that a well-prepared limitations section strengthens the authors' conclusions.

The author's *conclusions* are summary-type statements that pull together the research question, findings, and implications at the end of the manuscript. This is an opportunity for the authors to share with readers the significance of their research. Authors should be careful not to overstate their conclusions or make claims that are unsupported by their results. Statements that suggest new directions for research or potential implications of this research (especially related to health care costs or other financial issues, if not studied) should be clearly stated as hypothetical or suggestive, not as fact. This section is generally concise and uses direct language, without theory or grandiosity. Reviewers should determine to the best of their ability whether the authors' stated conclusions are supported by their data. These conclusions should neither overstep nor overreach the results presented in the research provided by the authors.

An *acknowledgment* section (if provided) should be reviewed to determine its appropriateness for publication. Not all journals include such a section.

The *references* section should follow the expected pattern of the journal in style, format, and sequence. Most journals prefer consecutive citations, although some prefer references provided alphabetically (and therefore not numbered sequentially). Whatever the instructions for references are for that journal, authors should follow them carefully, and reviewers should make note of this in their comments. References should be relatively current, important, and found in quality primary sources. Although personal communications or unpublished data as references may be relevant, these should be kept to a minimum (if used). If reviewers sense that references are from inappropriate sources, this may influence decisions related to

publication. Publications from an author or research group should be cited if the research is similar; however, if authors cite themselves to the exclusion of other articles or research, this should raise red flags for the reviewers. If possible, reviewers or someone from the editorial staff should randomly check citations for accuracy, because misrepresented information used once is often repeated in subsequent publications by different authors. This is especially true with background information found in the introduction section.

Many journals now include *appendices* to reduce the length of the article's body, improve the flow of information presented, and allow the reader to access information without needing to skip over it. These appendices commonly include additional information about methodology (eg, from a prior publication) or information related to the outcome of randomization. This is often referred to as *Table X*, where two groups are compared against each other to demonstrate that the randomization process of an experimental investigation was indeed random. Because these tables tend to demonstrate that the two groups were equivalent, that they were randomly assigned, and that comparisons between these groups reached statistical significance, simply stating this in the body of the manuscript but including the details in a traditional table format has become common. Reviewers should make the effort to scan appendices to confirm that this information belongs in an appendix and not in an article's body.

Tables and *figures* typically follow the last part of the submission, with clear legends. Authors can insert placeholder text (eg, *Table X* or *Figure B*) in the body of their text, because embedded tables or figures make it difficult for reviewers to follow the flow of the manuscript. Embedding figures may also be difficult for authors because of word-processing skills and software availability. Authors are generally given the instruction that each figure, table, and graph should be separate, clearly numbered, and clearly labeled so there is no confusion for the editorial team. These tables and images should be easy for the reviewers and editorial team to view and to include in the final layout and publication. Requisite permissions to use published material (including that from the Internet) should be obtained in advance by authors and attached to these figures. Reviewers or editorial staff should confirm that these permissions are appropriately constructed.

Review Process

After careful review of a manuscript's individual sections and overall merits, reviewers are expected to provide editors with recommendations regarding the manuscript's suitability for publication. Manuscripts can be accepted without revision (although rare, this does occur, especially for invited editorials or submissions), accepted with minor revisions, accepted with major revisions (often referred to as "conditionally accepted"), or rejected outright. A category of decision pending revisions is possible, although not all journals do this because many authors want to know what will likely occur once they take the time to make revisions. As the number of scientific manuscripts submitted grows, a streamlined peer-review process and a talented editorial staff assume additional influence on the journal's reputation and impact factor.[29]

Reviewers have a number of responsibilities to both authors (Table 2)[30] and editors (Table 3),[30] and, ultimately, the journal's

Table 2. Reviewers' responsibilities to authors

• Provide written, honest, and unbiased feedback in a timely manner
• Express a critical opinion about the manuscript, as experts in the field, in a collegial and constructive manner
• Comment on the style of writing, especially its clarity
• Rate the work's detail, methodology, relevance, accuracy, and originality
• Avoid comments or criticism of a personal nature
• Maintain professionalism and confidentiality, especially given the competitive nature of research, funding availability, and publication
• Refrain from directly contacting authors without permission from the editor, unless the journal stipulates otherwise

Adapted with permission from Jordan K, Pederick R. Guidelines for reviewers [cited 2009 Jul 18]. Available from: http://people.bath.ac.uk/liskmj/living-spring/journal/reviewgd.htm.[30]

Table 3. Reviewers' responsibilities to editors

• Respond to the editors promptly if unable or unavailable to review a manuscript
• Recommend names of other experts as potential reviewers if unavailable
• Determine the scientific merit of the submission, with recommendations for acceptance or rejection
• Identify possibilities to improve the manuscript to the authors
• Point out potential ethical concerns about research methodologies or similarities with other papers or ongoing research
• Acknowledge personal or author conflicts of interest and inform the editor of these

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Reviewing is a skill that takes time to develop; it develops in part from reading, writing, researching, and practice. Peer review is an integral part of the publication process.

readers (Table 4)[30] and the scientific community in general. Interesting research done by Baxt et al[31] sent a fictitious scientific manuscript with intentional errors to over 200 reviewers of a leading emergency medicine journal. Reviewer dispositions were categorized into acceptance, rejection, or revision. Planted errors considered by the researchers as "major" were missed by two thirds of reviewers. Their results and an interesting commentary about evaluating the peer-review process and peer reviewers received much attention from the academic community.[31–33]

Reviewers must be aware of their own biases. For example, a reviewer who does not favor research done on animals or studies with poor follow-up may recommend against publication of these manuscripts despite merits that were overlooked. Similarly, a reviewer with grammatical pet peeves (*data* used in the singular, the incorrect use of *that* versus *which*, the serial comma, active versus passive voice, *their* versus *he* or *she*) might not recommend an otherwise acceptable manuscript. Copy editors—on staff or freelancers with whom a journal contracts—can correct grammatical mistakes. A bias by reviewers against manuscripts with grammatical problems might unfairly favor manuscripts written by technical ghostwriters over manuscripts that are the product of more rigorous scholarship but are poorly written. Reviewers must not be distracted while reviewing a manuscript, as this is likely to interfere with review quality. Competing interests, especially in the area of related research activities, funding, or grants, may also affect reviewers overall impressions of the manuscript and the outcome of their review. It is essential that reviewers maintain professional integrity during scholarly review and determination of a manuscript's fate. Qualities of a good reviewer are provided (Table 5).

There are many benefits to serving as reviewers for the biomedical literature. Perhaps foremost is the opportunity for individual reviewers to contribute to the body of knowledge that makes up a medical specialty through the publication process. Once an article becomes part of the published literature, it is part of that specialty's foundation. At the professional level, the position of expert reviewer is one of distinction that helps build a résumé and can be immensely enjoyable. Most authors appreciate being given an opportunity to improve their manuscripts. This service provided to contributing authors, the specialty, and the journal is essential. Although authors do not know the identities of their manuscripts' reviewers, the satisfaction that reviewers gain from educating and mentoring peers (even those they do not know) is rewarding. Talented reviewers improve the overall quality of the journal. They can improve the clarity and utility of each manuscript, and they gain satisfaction seeing their comments integrated into a revised (or published) manuscript. Furthermore, conscientious reviewers can help a journal by bringing authors back for subsequent submissions. Finally, they will find that reviewing others' manuscripts improves their own research, study designs, and writing, although it is unlikely that reviewers approach this work with this purpose in mind.[11]

Table 4. Reviewers' responsibilities to the readers

• Ensure that published articles adhere to journal standards, as well as to standards of scientific practice
• Protect readers from incorrect or flawed research
• Identify missed references or erroneous citations (including misquoting or misinterpreting an author's findings)

Adapted with permission from Jordan K, Pederick R. Guidelines for reviewers [cited 2009 Jul 18]. Available from: http://people.bath.ac.uk/liskmj/living-spring/journal/reviewgd.htm.[30]

Table 5. Ten qualities of a good reviewer

1. Competence (and/or expertise) in the field
2. Consistency (within and between reviews)
3. Confidentiality
4. Responsibility in feedback (constructive, educational, unbiased)
5. Knowledge of the scientific process (research and writing)
6. Integrity
7. Impartiality
8. Timeliness (punctuality)
9. Detail orientation
10. Outstanding language skills

Adapted with permission from Jordan K, Pederick R. Guidelines for reviewers [cited 2009 Jul 18]. Available from: http://people.bath.ac.uk/liskmj/living-spring/journal/reviewgd.htm[30] and adapted with permission from Evans AT, McNutt RA, Fletcher SW, et al. The characteristics of peer reviewers who produce good quality reviews. J Gen Intern Med 1993 Aug;8(8):422–8.[34]

Summary

Writing and reviewing for the biomedical literature are both privileges and responsibilities. A careful review takes time and can

be challenging. Perhaps it is less stressful to offer feedback on and make decisions about someone else's work than receiving it on your own. Yet reviewers assume tremendous responsibility to the authors and the medical community, given the authority of their position. This creates stress and challenges for reviewers that most contributors do not recognize. Reviewing is a skill that takes time to develop; it develops in part from reading, writing, researching, and practice. Peer review is an integral part of the publication process. In addition to being expert in a field for which they review manuscripts, good reviewers possess traits that make them valuable to their journal, including fairness, courteousness, and punctuality. Good reviewers and reviews allow authors to remain positive about their manuscripts and their submission experience. Reviewers provide recommendations to editors about the merits of a manuscript and the appropriateness of the submission for the journal; it is the editors who make final decisions about publication. Editors should take an active role in reviewing their reviewers and provide feedback to them on the quality and timeliness of their reviews.[33,35,36] Reviewers and editors who treat their authors and their manuscripts well enhance the quality of their journal, its articles, and the medical community as a whole. ❖

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References

1. Singer AJ, Hollander JE. How to write a manuscript. J Emerg Med 2009 Jan;36(1):89–93.
2. Hall GM. How to write a paper. London: BMJ Publishing Group; 1994.
3. Hulley SB, Cummings SR, Browner WS, et al. Designing clinical research: An epidemiologic approach. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2006.
4. Browner WS. Publishing and presenting clinical research. 2nd ed. Baltimore, MD: Lippincott Williams & Wilkins; 2006.
5. Begg C, Cho M, Eastwood S, et al. Improving the quality of reporting of randomized controlled trials. The CONSORT statement. JAMA 1996 Aug 28;276(8):637–9.
6. Lang TA, Secic M. How to report statistics in medicine. 2nd ed. Philadelphia: BMJ Publishing Group; 2006.
7. Iverson C, Christiansen S, Flanagin A, et al. AMA manual of style: A guide for authors and editors. 10th ed. New York: Oxford University Press; 2007.
8. Taylor RB. Clinician's guide to medical writing. New York: Springer; 2005.
9. Huth EJ. Writing and publishing in medicine. 3rd ed. Baltimore, MD: Lippincott Williams & Wilkins; 1999.
10. Benos DJ, Kirk KL, Hall JE. How to review a paper. Adv Physiol Educ 2003 Dec;27(1–4):47–52.
11. Cummings P, Rivara FP. Reviewing manuscripts for Archives of Pediatrics & Adolescent Medicine. Arch Ped Adolesc Med 2002 Jan;156(1):11–3.
12. Provenzale JM, Stanley RJ. A systematic guide to reviewing a manuscript. AJR Am J Roentgenol 2005 Oct;185(4):848–54.
13. Polak JF. The role of the manuscript reviewer in the peer review process. AJR Am J Roentgenol 1995 Sep;165(3):685–8.
14. Shashok K. Content and communication: how can peer review provide helpful feedback about the writing? BMC Med Res Methodol 2008 Jan 31;8:3.
15. Goldbeck-Wood S. What makes a good reviewer of manuscripts? BMJ 1998 Jan 10;316(7125):86.
16. Bearinger LH. Beyond objective and balanced: Writing constructive manuscript reviews. Res Nurs Health 2006 Apr;29(2):71–3.
17. Laine C, Mulrow C. Peer review: Integral to science and indispensable to Annals. Ann Intern Med 2003 Dec 16;139(12):1038–40.
18. Schroter S, Black N, Evans N, Carpenter J, Godlee F, Smith R. Effects of training on quality of peer review: Randomised controlled trial. BMJ 2004 Mar 20;328(7441):673.
19. Black N, van Rooyen S, Godlee F, Smith R, Evans S. What makes a good reviewer and a good review for a general medical journal? JAMA 1998 Jul 15;280(3):231–3.
20. Cho MK, Justice AC, Winker MA, et al. Masking author identity in peer review: what factors influence masking success? PEER Investigators. JAMA 1998 Jul 15;280(3):243–5. Erratum in: JAMA 1998 Sep 16;280(11):968.
21. Godlee F, Gale CR, Martyn CN. Effect on the quality of peer review of blinding reviewers and asking them to sign their reports: a randomized controlled trial. JAMA 1998 Jul 15;280(3):237–40.
22. Nylenna M, Riis P, Karlsson Y. Multiple blinded reviews of the same two manuscripts: Effects of referee characteristics and publication language. JAMA 1994 Jul 13;272(2):149–51.
23. Pitkin RM, Burmeister LF. Identifying manuscript reviewers: Randomized comparison of asking first or just sending. JAMA 2002 Jun 5;287(21):2795–6.
24. Van Rooyen S, Godlee F, Evans S, Smith R, Black N. Effect of blinding and unmasking on the quality of peer review: A randomized trial. J Gen Intern Med 1999 Oct;14(10):622–4.
25. Uniform requirements for manuscripts submitted to biomedical journals: Writing and editing for biomedical publication [monograph on the Internet]. Philadephia, PA: International Committee of Medical Journal Editors; updated 2008 Oct [cited 2009 Jul 1]. Available from: www.icmje.org/manuscript_1prepare.html.
26. Altman DG, Schulz KF, Moher D; CONSORT GROUP (Consolidated Standards of Reporting Trials). The revised CONSORT statement for reporting randomized trials: explanation and elaboration. Ann Intern Med 2001 Apr 17;134(8):663–94.
27. equator-network.org [homepage on