

The Art of Peer Review

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The main purpose of a scientific journal is to share research findings, progress in the field, and general information with the public. This means that journals have a responsibility to vet manuscripts for their accuracy, thoroughness, and significance. Consequently, academic peer reviewers play a vital role in this process by evaluating the suitability of manuscripts for publication.

Being a peer reviewer is a shared responsibility in the academic community. However, there is often a lack of formal guidance or training on how to review a manuscript.^{1,2} Sometimes, reviewers are unsure how to evaluate a manuscript or write their feedback. This can lead to authors receiving unhelpful or biased feedback, and journal editors may struggle with deciding whether to publish a manuscript with inadequate or unreliable

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reviews. This means that a manuscript might be published despite significant shortcomings that undermine the manuscript's integrity. On the other hand, high quality papers may be unjustly rejected for insufficient reasons. Thus, it is important to give reviewers guidance on

committing to reviewing a manuscript, there are 3 criteria that you should meet (Figure).

First, it is critical to assess whether you have a conflict of interest, which can compromise the objectivity of your evaluation. The International Committee of Medical Journal Editors defines

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evaluating manuscripts for publication.

This editorial is a brief manual on peer-reviewing a manuscript for scientific journals. It consists of 5 sections: (1) making the decision to review a manuscript, (2) evaluating the manuscript, (3) composing the review report, (4) handling revisions, and (5) additional essential considerations. While we designed this guide explicitly for reviewing original research articles and brief reports for the *Wisconsin Medical Journal (WMJ)*, the principles can be broadly applied.

How to Decide if You Should Review a Manuscript

The initial stage of the peer review process may seem obvious, but it is still crucial: determining whether to review a manuscript. Before you

a conflict of interest as a situation where your professional judgment on a primary interest, like reviewing a manuscript, might be swayed by a secondary interest.³ This could be a financial interest, such as owning stock in a company whose product is being studied, or a non-financial one, like a close association with one of the authors. Remember, even the perception of a conflict is significant, as it can compromise the reviewer's impartiality.

Next, ensure that you possess the expertise to critique the manuscript. A peer reviewer should be able to understand, evaluate, and provide well-founded feedback on a manuscript. Someone not versed in the specific topic or the broader academic context is unlikely to perform effectively in this role. However, being an expert in every aspect of the research isn't

Table 1. Examples of Possible Major or Minor Comments for a Hypothetical Manuscript Under Review at the *Wisconsin Medical Journal*

Consider a hypothetical study that estimates the effect of a Medicaid-funded pregnancy care coordination program on the risk of having a low birth weight infant (<2500 grams). This is a retrospective cohort study with linked birth records and Medicaid insurance claims from Wisconsin. The authors hypothesized that the program would significantly reduce the risk of low birth weight. Correspondingly, results from a regression analysis indicate that program participation is associated with a reduced risk of low birth weight. In this scenario, assume that all comments accurately reflect the manuscript.

Comment	Major or Minor?	Rationale
“The authors do not describe the specific services in the pregnancy care coordination program, so it is uncertain how the program would affect the infant’s birth weight.”	Major (reconcilable)	The authors cannot sufficiently justify their study hypothesis without a description of program services. The authors can reasonably correct this weakness by describing the program’s services and how those services intervene in risk factors for low birth weight. This also may require reading and citing additional literature.
“The sample excludes infants who are born with very low birth weight (<1500 grams).”	Major (not reconcilable)	The estimates are prone to selection bias because the authors restricted their sample on the outcome (birth weight). ⁴ Thus, we cannot reasonably assume that the study’s results are valid.
“There was a recent published study of a pregnancy care coordination program in another state, and the results suggest that program participation reduced the risk of preterm birth (gestational age <37 weeks). This study is not cited in the manuscript.”	Minor	This is a potentially relevant study, and the authors can quickly read the study and decide whether to cite it in their manuscript.
“The sample only includes singleton-born infants, so it is uncertain if the results apply to deliveries that result in plural-born infants (eg, twins).”	Minor	The results in their current state are likely sound, as plural births account for a small percentage of deliveries. Nonetheless, the point is salient, and the authors can easily address this by re-running the regression analysis with plural births.
“The study does not consider infant mortality (death within the first year of life) as an outcome, which may be a more relevant metric for assessing maternal and infant health in a population.”	Not applicable	Whether infant mortality is a more relevant metric than low birth weight is subjective. Regardless, this does not undermine the validity, generalizability, or usefulness of the study. This comment should not be included in the review.

required. For instance, some reviewers bring deep knowledge of the subject matter, while others contribute as methodologists or statisticians.

Lastly, you should have the time and attention to devote to review a manuscript. Reviewing thoroughly and providing constructive feedback is a time-consuming task. The *WMJ* allows a generous 21-day period for completing a review. This ensures that reviewers can be meticulous without rushing, and authors receive timely feedback on their submissions.

Suppose that you are invited to review a manuscript and meet the criteria: no conflicts of interest, the right expertise, and sufficient time. In that case, you are well-positioned to be a peer reviewer, and we encourage you to accept the task. If not, it is best to decline the invitation. Remember that your suitability as a reviewer may differ from one case to another. If you decline, the editors will appreciate suggestions for other potential reviewers and their contact information.

Figure. Flow Diagram on Deciding Whether to Review a Manuscript for a Scientific Journal

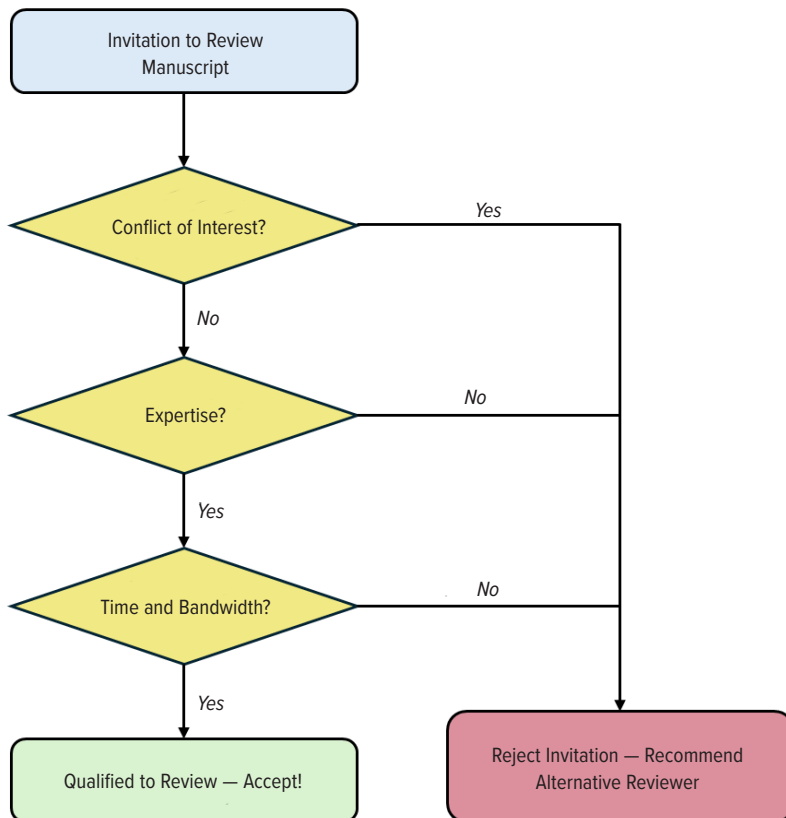


Table 2. Examples of Possible Reviewer Recommendations for a Hypothetical Manuscript Under Review at the *Wisconsin Medical Journal*

Reconsider a hypothetical study that estimates the effect of a Medicaid-funded pregnancy care coordination program on the risk of having a low birth weight infant (<2500 grams). This is a retrospective cohort study with linked birth records and Medicaid insurance claims from Wisconsin, and results from a regression analysis indicate that program participation is associated with a reduced risk of low birth weight. In this scenario, assume that the only problem with the manuscript is that the regression model may require additional control variables.

Recommendation	Actionable or Specific?	Rationale
“The authors should modify the regression model to improve the validity of the estimate.”	Neither actionable nor specific	This recommendation is not specific because it does not provide clear guidance on altering the regression model, nor does it explain why the model is invalid. Further, this recommendation is not actionable, as regressions can be modified in several ways (eg, regression type, control variables, modelling specification, sample stratification, etc).
“The authors should control for birth record variables that confound the causal pathway between pregnancy care coordination and the infant’s birth weight.”	Actionable but not specific	This recommendation is actionable because regression analysis permits controlling for variables and because the authors have birth record data. However, the recommendation is not specific because it does not suggest candidate variables for regression controls, nor does it state why authors should control for these variables.
“The authors should control for maternal polygenic risk scores of health risk behaviors, which are likely associated with the likelihood of participating in pregnancy care coordination programs and with the risk of delivering a low birth weight infant. This will reduce confounding bias in regression estimates.”	Specific but not actionable	This recommendation is specific because it clearly states that the authors should control for polygenic risk scores and that controlling for polygenic risk scores will reduce confounding bias in estimates. However, the recommendation is not actionable as birth records and Medicaid claims do not include genetic data.
“The authors should control for maternal age in their regressions, as maternal age is likely associated with pregnancy care coordination receipt and the risk of low birth weight delivery. Controlling for maternal age will yield more valid estimates by preventing bias from confounding.”	Actionable and specific	This recommendation is specific because it clearly states and justifies controlling for maternal age in the regression, and the recommendation is actionable because maternal age is available on birth records.

How to Evaluate a Manuscript

After agreeing to review a manuscript, you will receive the entire manuscript, including any additional materials. Reading and evaluating the manuscript is a demanding but crucial process. We offer guidelines to help you prepare for a detailed and practical review.

Begin by reading the manuscript multiple times, paying close attention to every section, from the title and abstract to the appendices. Academic journals like the *WMJ* often feature complex studies that require in-depth reading for complete comprehension. As you read, take notes on critical aspects of the paper: the research question’s clarity, the thoroughness and relevance of the literature review, the description of data acquisition and analytical methods, and the interpretation of results within the broader context of research, practice, and policy. Additionally, consider attributes that are missing from the paper (eg, an undetailed description of the methods that would preclude a replication of the study). Your insights into these omissions will contribute to a more constructive review.

Next, classify your notes as either “major” or “minor” comments. Major comments are essen-

tial queries or critiques that address the manuscript’s readiness for publication or point out fundamental flaws that might prevent publication as it currently stands. These could relate to unclear elements that could be clarified within a short timeframe or to deep-seated issues requiring substantial modification to the study. On the other hand, minor comments suggest improvements that, while helpful, are not critical to the manuscript’s readiness for publication and its contribution to the scientific literature. These might include expanding on a study procedure or adding a pertinent reference. Ensure your feedback aligns with the manuscript’s goals, avoiding suggestions that would alter the research question or fundamental methodology. Your comments should enhance the authors’ work rather than reflect a different vision for the study.

The distinction between “major” and “minor” comments and the significance of each relies on the expert opinion of the reviewers. These assessments determine how much a comment impacts the manuscript’s overall integrity and suitability for publication. For illustration, Table 1 lists examples of major and minor comments using a hypothetical study

investigating the effects of a pregnancy care coordination program on birth weight.

How to Write the Review

You can compose your review after carefully reading the manuscript and preparing your feedback. Start with a summary paragraph: first, describe the manuscript and its key findings or messages in 1 to 3 sentences. Then, in another 1 to 3 sentences, outline your general assessment and any major concerns, including a publication recommendation if the journal’s policy allows it—as the *WMJ* does.

Structure the main part of your review with 2 clearly defined sections: major comments and minor comments. Use headers for clarity and present each point separately, possibly as bullet points or individual paragraphs, to enhance readability. When referencing specific parts of the manuscript, include page and line numbers. A clear and concise rationale should accompany each comment.

Consider a hypothetical trial on the medication Drug X for reducing blood pressure among adults with chronic hypertension. Let us assume that the manuscript omits the inclusion and exclusion criteria for participants. This is a

significant oversight and should be highlighted as a major comment. A weak comment would simply identify the omission. A good comment would explain how this lack of detail hampers the study's external validity and replication, for example:

"Page 4, Lines 11-17: The authors did not list their inclusion and exclusion criteria. This makes it difficult to evaluate the generalizability of the findings, as we do not know the characteristics of the study sample, and the estimated effect of Drug X on blood pressure may not apply to other patient populations. Additionally, this omission hinders study replication, so other researchers cannot build upon these results."

If you suggest a revision, your recommendation should be actionable and specific. Reconsidering the hypothetical study on Drug X and blood pressure, an example of an actionable and specific recommendation follows:

"The authors should outline their inclusion and exclusion criteria sequentially, detailing the number of potential participants excluded at each step. Additionally, the authors should justify each inclusion or exclusion criterion. A flow diagram could effectively illustrate the selection process."

Table 2 provides example recommendations of varying quality alongside explanations of what makes them (or does not make them) specific or actionable. For confidential concerns such as ethical considerations or suggestions for accompanying commentary, use the confidential report to the editors, which remains unseen by the authors. This section allows you to communicate sensitive issues or ideas that are best handled between reviewers and editors.

How to Respond to Revisions

After you submit your review, you might be asked to evaluate a revised version of the manuscript. This will come with a response letter from the authors that addresses your feedback and outlines their changes. As you review the revised manuscript, ask the following questions:

1. Did the authors adequately address each of my comments through their revisions, or did

they provide reasonable explanations for any comments that did not elicit a revision?

2. Can I find the changes mentioned in the authors' letter in the revised manuscript?

The depth of your second review depends on the extent of the revisions. If the manuscript has been significantly altered, reviewing it as thoroughly as before is advisable, reassessing both major and minor points. For minor revisions, focus on the sections that have been updated. However, reevaluating the entire manuscript will best ensure that nothing is missed.

As you assess the revised manuscript, clearly state whether the authors have successfully addressed your concerns. If specific comments have not been sufficiently resolved, highlight this in your review, explaining its significance for your overall evaluation, especially if it influences a recommendation against publication.

Other Important Considerations

This editorial aims to be a helpful resource, but you may still have questions during the peer review process. Here are additional tips and considerations to keep in mind.

- Focus your review on the research's substance and methodology rather than the manuscript's grammar and formatting. While it is your role to assess the study's validity, not to proofread, do mention any grammatical or formatting issues that hinder your evaluation as minor points. However, if such errors are pervasive, making assessing the study's content difficult, you should report these to the editors confidentially.
- While a manuscript's literature review should be comprehensive, it does not need to be exhaustive. Authors should include enough references to provide context but need not cite every related source. Only recommend additional references if they add significant value. Refrain from suggesting your work unless it's directly relevant; insisting on citing it without necessity can be inappropriate and unethical.
- If you suspect plagiarism or other ethical concerns, promptly communicate these to the journal's managing editor and detail your concerns in your confidential report to the editors.
- Be selective with your comments and recommendations. Each should offer substan-

tial help or point out critical issues. Avoid overloading your review with minor criticisms—remember, the goal is to enhance the manuscript's informative value, not to nitpick for the sake of it. No manuscript is without flaws, but we can guide authors towards meaningful improvements.

Conclusion

Our aim with this editorial was to offer a concise and valuable manual for peer review in academic journals, such as the *WMJ*. While we could not cover every aspect of the process, we hope our instructions and advice are helpful for both new and experienced reviewers. Our guide is designed to enhance your experience with peer reviewing and the overall publication of scientific manuscripts.

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advancing the art & science of medicine in the midwest

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