How to write a peer review

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The peer review process is a quality control for scientific publication. Well done, it helps editors to improve their journals and protects readers from wasting time on ill-conceived, redundant, irrelevant or erroneous literature. Badly done it can act as an obstacle to innovation. This article tells you how to be a first rate peer reviewer.

WHAT IS PEER REVIEW?

Most scientific journals submit papers that they are considering for publication to the process of peer review. In practice, this means identifying one or two other workers in the same field and asking their opinion about the quality of the paper concerned. Ideally, this process will provide the editor with impartial but informed advice as to whether the paper is worth publishing as it stands, and if not, how the authors might improve it.

Provided the reviewer is familiar with the subject matter, prepared to spend time on the job and sufficiently open-minded to respond to new ideas, his or her report can provide a quality check that works to the advantage to editors, authors and readers alike. Peer review is something that experts in all fields, not just medicine, seem to accept they should do, usually in their own time and for no remuneration (Huston, 1994).

WHY ME?

The first time you are asked to do a peer review, you are likely to ask yourself 'Why me?' You may have been chosen because you have recently published research on a related topic yourself, and are now perceived as an expert in the field. Alternatively, you may have been selected as representative of the clinicians whose practice might be influenced by the research. Your name may have been suggested to the editor as a potential addition to the journal's list of regular peer reviewers and this simply seemed an opportunity to try you out. Research into peer reviewing has shown that the people who write the best peer reviews are from a top academic institution, aged under 40 years and known to the editor (Evans et al, 1993). Training in epidemiology or statistics also helps. If you do not have all, or indeed any, of these characteristics, it is worth considering why they might be important and what special qualities you could offer in their place.

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WHAT THE EDITOR WANTS

The editor is likely to be looking for a peer reviewer who has an inside knowledge of the field and can comment on:

- Whether the work adds anything new to the existing body of knowledge
- Whether the methods used were appropriate and properly explained
- Whether the results were of interest
- Whether the discussion dealt with the weaknesses and limitations of the study
- Whether the conclusions were justified by the findings.

They are not simply looking for advice as to whether to publish the paper, although they will value an opinion (Goldbeck-Wood, 1998).

Although errors or ambiguities should be pointed out, they don't want you to rewrite or copy edit the text. They appreciate constructive criticism that can be passed to the author, even if they decide not to publish. And, of course, they want you to provide the report within a stated time or say promptly if you cannot take it on.

WHAT THE AUTHOR WANTS

The author has a right to expect an informed, fair and confidential assessment of the submitted paper. An informed reviewer is not just an expert but one who has taken the trouble to read the paper thoroughly. It is infuriating, for example, to be criticized for 'omissions' which are actually there in the text or tables.

A fair reviewer will not make judgments based on the credentials of the 'stable' from which the research emanates, or the gender, age or ethnic origin of the researcher, but will judge the paper on its merits. A fair reviewer will also keep an open mind even when the approach or findings are contrary to their own views.

Confidentiality is a very real worry for the author, who is well aware that the peer reviewer may be a competitor in the same field. This is especially concerning when the paper is rejected, sent back for extensive revision or where the wait before publication is long. Most authors recognize that peer review has the potential to improve the quality of the paper (Sweitzer and Cullen, 1994), but even constructive criticism in the context of conditional acceptance is unwelcome if it means significant delay to publication.

WHAT THE READER WANTS

Readers like research articles to be reliable, readable and relevant to their practice (Justice et al, 1994). They need to be helped to see the article in the context of previous work in the field, to appreciate the limitations and weaknesses of the approach, and to

understand how the conclusions should affect their clinical practice or their own research. A good peer review will ensure that these points are addressed in the published paper. The reader would also like to be protected from ill-conceived, irrelevant, redundant or frankly erroneous papers. A study of readers of one medical journal indicated significantly increased satisfaction with articles after both peer review and editing (Jean-Pierre et al, 1996).

SHOULD I DO IT?

Most journals will give you a deadline of 2–6 weeks for your report, and will ask you to return the manuscript immediately if you do not think you will be able to do it in this time. Before deciding to accept the task, you should carefully consider whether you will have the time — about 3 hours is usual, although it varies with the length and complexity of the paper.

Next you need to consider whether the article is appropriate for you to review. It may be too far outside your area of expertise, or it may be too close to work you are currently engaged on, presenting you with a potential conflict of interest. It may have been written by a personal friend or enemy, either of which may make it difficult to offer an unbiased opinion. It may deal with an issue about which you feel so strongly that you would not be open-minded about any contrary point of view. A quick read through the article will alert you to likely problems along these lines and allow you to withdraw.

Any reasonable editor will respect you for this response, provided it is promptly done. Whether you accept or refuse, ethically you must be bound by the confidentiality of the peer review process. This means not discussing the paper even with your own team, not referring to the work even obliquely, and trying your best to wipe your mind clear of the work until or unless it is published.

CRITICAL APPRAISAL

You have read the article through quickly and decided that it would be appropriate to accept the challenge. The next step is to read it through again slowly, this time mentally asking yourself questions as you go through each section (*Table 1*).

What was the research intended to elucidate? Why did they choose this method? When did the study take place? Where was it done? Was the method chosen appropriate? Was that sample size large enough? Was the response rate high enough? Why might non-responders have differed? What were the outcome measures? Have the authors discussed the weaknesses and limitations? Note any points at which answers to these questions are not forthcoming from the text. Do the omissions matter to the reader's understanding of the research? Where a questionnaire has been used in the research, ask the editor for a copy before embarking on the peer review. Reading the actual wording of each question may reveal unintended ambiguities that explain otherwise surprising results.

Finally ask yourself, 'So what?' While this may seem a negative question, your attempt to answer it will help you to identify what is new or different or clinically relevant about the work. Sometimes the authors have become so immersed in presenting a mass of data that they themselves lose sight of its relevance. Judicious restructuring or clearing away irrelevant data may make the whole thing come alive and reveal the story a good paper should tell. Stop there and put the paper away until another day. Your mind will continue to work on it and when you return for the final reading before writing your report, you will be surprised at how much better you understand what the authors have done and are trying to say.

CHECK THE FACTS

Go through the paper again, making a note of any missing information or ambiguities you still find. Look for errors in tables, figures or references. It is common to find columns that don't add up, or that there are discrepancies between text and tables. Look up a sample of the references quoted. This may seem excessively time-consuming, but with Medline or the like it is not difficult to do. Careless errors or frank misrepresentation of citations should alert you to question the scientific data presented. At the same time, use key words to search for other papers on the subject. Peer review should help to expose errors, plagiarism or dual publication.

PREPARING THE REPORT

Many editors will tell you the structure they would like your report to follow. They may ask for comments on each element of the paper, such as abstract, introduction, method, results, analysis, discussion, conclusion or references. They may include

TABLE 1.
Peer review checklist

Title	Does this reflect the contents?
Abstract	Is this a fair summary, properly structured?
Introduction	Does this set the work in context?
Methodology	Is it appropriate? Is it adequately described?
Subjects and setting	Is there in-built bias? Is the sample large enough?
Statistical methodology	Is this adequately described, appropriate?
Results	Are they credible? Is the response rate adequate?
Tables and figures	Are they helpful, accurate, clear, properly labelled?
Discussion	Are weaknesses and limitations explored?
Conclusions	Are they justified?
References	Are they accurate? Are important references missing?
Originality	Does this paper add anything new? Am I being open to a new idea?
Relevance	Is it of interest to the journal's readership?

a rating scale for criteria such as originality, scientific validity or relevance to their readership.

Some will ask for an opinion on whether the paper should be published, and if so with what priority. You may be told what aspects of the paper they wish you to comment on — for example they may say that they have already sent the paper to their statistics expert, and it is the clinical relevance of the findings they would like your opinion about. Different kinds of papers need different approaches. A useful series of articles in the *Canadian Medical Association Journal* offers advice to both authors and peer reviewers about what makes a good case report (Huston, 1996a), survey (Huston, 1996b) or qualitative report (Rowan, 1997).

ADVICE TO THE AUTHOR

Most journals will ask for comments for the author on a separate sheet, often specifying that these should not include any comment about whether the paper should be published. These comments are often the most time-consuming part of the exercise. They should be constructive, courteous and realistic. Resist the temptation to direct the authors to your own seminal work on the subject, unaccountably missing from the references.

Judge the research for what it is, not what it might have been. Suggesting, for example, that a qualitative focus group study would have been better done as a large scale randomized controlled trial is unhelpful. The best peer review comments to authors point out ways in which the work already done could be presented more clearly, lead to more robust conclusions, or have more relevance to the reader.

MASKING AND BLINDING

Traditionally the peer reviewer has had the advantage of knowing the authors of the paper, while the authors have not known the identity of their peer reviewer. These traditions have recently become the subject of research and debate. Does keeping the identity of the peer reviewer secret from the author (masking) lead to better or worse outcomes than open reviewing? Would the reviewer feel motivated to be more thorough, or reluctant to be frank? The *British Medical Journal* carried out a randomized controlled trial of open peer review and concluded that it did not lead to higher quality opinions, but nor did it lead to poorer quality ones (van Rooyen et al, 1999). They have therefore now introduced open review, believing it to be fairer and more transparent (Smith, 1999).

Another hotly debated topic is the value of blinding the peer reviewer to the identity of the author. The argument is that a reviewer will be biased in favour of a paper from a well-respected source, and against an unknown one. One of the first randomized controlled trials on the subject suggested that journals using non-blinded peer review published a larger fraction of papers that should not have been published than did journals using blinded peer review (Laband, 1994). Two bigger trials failed, however, to find any benefit from blinding peer reviewers, and in practice it has proved very difficult to do it effectively (Justice et al, 1998; van Rooyen et al, 1998).

IS PEER REVIEW A WORTHWHILE EXERCISE?

The hallowed status of editorial peer review as the means of quality control in published papers has been vigorously questioned in the last few years (Bailar and Patterson, 1985; Horrobin, 1990; Rennie, 1998; Albert, 1999). Peer review has been criticized as slow, expensive, profligate of academic time, highly subjective, prone to bias, easily abused, poor at detecting gross defects and almost useless for detecting fraud.

In a study researchers took a paper about to be published in the *British Medical Journal*, inserted eight deliberate errors, and sent the paper to 420 potential reviewers: 221 responded. The median number of errors spotted was two, nobody spotted more than five, and 16% didn't spot any (Smith, 1997). At the same time, peer reviewers have themselves been known to behave unethically. Reviewer misconduct has included bias, plagiarism, conflict of interest and breach of confidentiality (Huston, 1994). Finally, peer reviewers with fixed ideas may block publication of papers that take a different approach or come up with contrary findings to their own.

All peer review can reasonably do is detect major defects of originality and scientific credibility, together with commenting on important omissions, the rigour of the arguments and defects in the writing style. Peer review does not and cannot ensure perfection; the final judge for the quality of any reported work must remain the test of time (Lock, 1994).

THE FUTURE OF PEER REVIEW

With the advent of the internet the possibilities have opened up for scientists and clinicians to 'publish' their findings, without having to convince gatekeepers on the way (Albert, 1997). This prospect may excite frustrated authors, but strikes dread into the hearts of clinicians already struggling to keep abreast of the explosion in medical knowledge. A system in which impartial experts prevent pointless, repetitive, or frankly incorrect research results from adding to the global information glut is clearly desirable.

One major problem with peer review appears to be lack of critical assessment skills. A formal curriculum in the fundamentals of peer reviewing, a credentialling process for peer reviewers, a set of broadly agreed criteria for peer review quality, tracking of performance to detect 'doves' and 'hawks' and the development of more effective mechanisms for applying those criteria all seem to be worth serious consideration (Davidoff, 1996).

The second problem appears to be lack of remunerated time for the peer reviewer to do the job properly. Journals pay their peer reviewers little or nothing for the job, relying on the good nature, interest, desire for influence, or 'noblesse oblige' in the academic world to motivate the reviewer to accept (Huston, 1994). Perhaps it would be an advantage for a journal to train and pay for a small team of experienced professionals. On the other

hand, the likely gain in rigour of such an approach might be counterbalanced by the loss of the interest and empathy the best peer reviewers bring to the task of evaluating each others results. For the moment the job is still there to be done, and the rewards are in the opportunity you will have to exercise your critical appraisal skills, in the insights you will gain about what makes a paper publishable, and in your consciousness of being useful to the scientific community of which you are a part. **HM**

Conflict of interest: Dr Paice is a peer reviewer, author and editor but does not benefit financially from any of these activities.

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KEY POINTS

- Respect the needs of editor, author and reader.
- Use a checklist to ensure you cover all aspects of the task.
- Help the author to make the most of what has been done.
- Don't break confidentiality.
- Say you will do it only if you can offer expertise, effort and impartiality.