

Guide for Peer Reviewers of Scientific Articles in the *Croatian Medical Journal**

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People to whom we send articles for review sometimes ask us why they should waste time on the free reviewing of other people's articles. A guide for peer review of a scientific article should begin with an answer to that question (Box 1)

Box 1: Why peer review?

- **Obligation** – peer review is a part of scientific publishing; whoever wants to publish, must be ready to peer review
- **Benefit** – increasing of knowledge and awareness, strengthening professional reputation
- **Satisfaction** – scientific debate, exchange of information, fulfilling the responsibility

Despite its shortcomings, peer review is still the best tool of scientific publishing. It brings benefits not only to the journal and its authors, but to the peer reviewers: they are privileged to have an insight into the latest research and still unpublished results in their scientific field. Reviewers also build up their ability to critically assess scientific papers, which may be useful in their own professional work and development. We wrote these brief guidelines to help the reviewers for the *Croatian Medical Journal* learn about the specificities of the journal and editor's expectations from their partnership with peer reviewers. The guidelines were created primarily for new reviewers, but they may be useful as a refresher text for experienced reviewers.

What is the Benefit of Peer Review?

A good review – one that gets to the essence of a reviewed article, keeping its clarity and simplicity at the same time – can considerably increase the scientific merit of the reviewed article (1). The reviewer acts as an educator: his or her suggestions and comments enrich authors' knowledge and ability to perform research and report about it.

It is true that the peer review process has many imperfections and shortcomings. It is subjective and difficult to control and standardize (2,3). Critics claim that the peer review process is slow, expensive, partial,

and subject to abuse (4). However, without peer review it would be almost impossible for editors to publish journals. Peer review is the pillar of scientific publishing, which in turn is a basis of accumulating human knowledge. It follows that anyone who wants to publish his or her own scientific reports must inevitably accept the obligation to be a peer reviewer.

Peer review also brings direct benefits to the reviewer. It is a chance for learning, a valuable source of up-to-date scientific information, and actually an exciting job. It increases the reviewer's knowledge, brings the pleasure and beauty of scientific debate, and creates a feeling of fulfilled responsibility. Reviewers are privileged to have an insight into the latest research and still unpublished results in their scientific field. Reviewers also build up their ability to critically assess scientific papers, which may be useful in their own professional work and development. Writing high quality reviews strengthens a reviewers' scientific reputation. Reviewing can also be a significant part of the *curriculum vitae*. There is an international initiative to provide peer reviewers with continuing medical education (CME) credits for their work (5).

What is Necessary for a Good Peer Review?

Responsibility. A prerequisite for a good reviewer is a strong sense of responsibility towards research and their colleagues. The reviewers assess the manuscript timely, fairly, and to the best of their abilities.

Conversance with the literature. The reviewers must be thoroughly conversant with the pertinent literature and be able to apply general scientific principles to the given problem. Good reviewers can place the article in the context of relevant previous research, recognize the limitations and weaknesses of the hypothesis, and understand the way in which the conclusions of the article

can relate to clinical practice (6). Reviewers should also be acquainted with the guidelines for authors of the journal for which they are refereeing (7).

Time. Depending on the complexity of the reviewed article and relevance to the reviewer's expertise, the time for a fair assessment of an article worth reviewing has been estimated to about three hours (8). Badly written articles increase the time needed for a review.

Knowing the journal. Different journals have different publishing priorities, review policies, and rejection rates. A good peer reviewer should know these aspects of the journal, so that the review process could identify the best articles for the journal. Publishing priorities of the *Croatian Medical Journal* can be found in the Guidelines for Authors (Table 1).

Table 1. Publishing priorities in the Croatian Medical Journal*

Topics of the manuscript	Acceptance priority
<i>Field of study:</i>	
basic sciences	high
clinical sciences	very high
public health	very high
health care organization	very high
medicine in developing and emerging countries	very high
war and post-war related medicine	very high
health and human rights	very high
medical education	very high
<i>Types of articles:</i>	
original research articles	absolute preference
reviews	solicited only
forum	discussion on an important topic
short communications	low
case reports†	low
correspondence	high
poetry and other artwork	very welcome

*Rejection rate of papers submitted to the Croatian Medical Journal is approximately 60%.†Unique case of hitherto unknown symptom or disease; new correlations of two or more diseases; new variant of known disease's course; disease course indicating new therapeutic or side effects.

How to Review a Manuscript

The first principle is to be respectful but resolute. This entails demanding explanations, arguments, and clarity. The seriousness of peer review should not be watered down, inconsistencies should not be concealed, and the editor must be given a clear recommendation (9).

The process of peer review has a common structure (Box 2): reading the abstract, reading the text of the article, final appraisal, and writing comments for authors and the editors. It is important to finish the review in the time limit set by the editor (10). If for some reason the reviewer cannot do so, he or she should immediately inform the editor and agree whether the editor will wait longer or send the manuscript to someone else, in which case the reviewer can recommend some less busy colleagues. It is also important to recognize possible conflicts of interest and, if necessary, decline reviewing the article, with an appropriate explanation to the editor (11).

Box 2: Process of peer review

- Reading the abstract
 - the message of the article
 - the type of study
 - broad questions
- First reading of the article – detecting shortcomings and limitations
 - specific questions
 - logic of “the story”
 - rules for presentation of research data (see Boxes 4 and 5)
- Second reading of the article – value assessment
 - intelligibility
 - scientific power
 - novelty
- Final appraisal
 - accept
 - minor revision
 - major revision
 - reject
- Writing a peer review
 - comments for the editor (up to 200 words)
 - comments for the authors (up to 1,000 words)

First Reading

In the first reading, the reviewer should try to understand the article and question all ambiguities. It is best to write down all the questions in the text of the manuscript, on its margins, or on the back of the paper. The first reading is like a triage (12), where the reviewer decides on the importance and relevance of the study (Box 3).

Box 3: Triaging manuscripts

- Treatment study
 - is it a randomized controlled trial?
 - if not, are there good reasons for not randomizing?
- Diagnosis study
 - is the test compared in a prospective and blind manner with a gold standard?
 - does the test population include patients with the condition, with related conditions that could be confused with the main condition, and people without the condition?
 - is there information on sensitivity, specificity, and other appropriate measures
- Prognosis study
 - is there a cohort of patients followed prospectively from when they were first identified with the disease?
 - are 80% of patients followed up?
- Qualitative study
 - were qualitative methods appropriate for the question?
 - were the methods and the analysis described in detail and justified?
- Questionnaire study
 - does it report what people say they do or what they really do?
 - are there other ways to answer the question?
 - is the response rate over 55%?
- Case report
 - not so common that everybody knows it?
 - not so rare?
 - written in an engaging and amusing way?
- Systematic review
 - the question asked is clear?
 - was search strategy clearly described?
 - were quality criteria set?
 - were studies appraised and discarded?

Reading the Abstract. In the abstract, authors disclose what they consider most

important in their report. Therefore, the reading of the abstract can help the reviewer to look for the crucial elements of the study design, methods, results, and conclusions.

At this point, it is good to note general, broad questions that arise from the abstract, such as “Is this really a double-blinded randomized study?”, “What is new here?”, “Is the sample big enough?” or “This is diagnostic research – is it reported according to STARD statement?”

Reading the body of the article. In the first reading, the reviewer has to focus on the science of the article. The reviewer has to be able to understand all scientific messages that the authors try to convey. Sometimes it is not easy to discern incoherent presentation from the author’s incoherent thinking. If there is anything that reviewer does not fully understand, he or she has to think about it, examine the literature or discuss the problem (not the article!) with a more adept colleague.

Specific questions can arise from any part of the article. Looking for the clear answers on those questions can help reviewer not to overlook some deficiency in the article (13).

– *Title*: does it accurately reflect the content, does it specify the type and the setting of the study?

– *Abstract*: is it structured, is it concise, does it specify outcome measures, are numerical data presented, does the conclusion relate directly to the results of the study?

– *Introduction*: does it justify performing the study, does it end with the hypothesis, and does the hypothesis arise logically from the theoretical framework?

– *Patients or Participants*: is the sample and its formation described in detail, are inclusion and exclusion criteria stated, is there a study flowchart?

– *Methods*: are they supported by references?

– *Statistical analysis*: is the test suitable, presentation appropriate, and interpretation correct?

– *Results*: are they clear and convincing? Each table and figure has to be self-sufficient and carry a single message.

– *Discussion*: does it begin with the most important finding, does it relate exclusively to the results of the study, are the limitations of the study clearly stated?

– *Conclusions*: are they based only on the presented results?

– *References*: are they accurate and up-to-date, are they written according to guidelines for authors, are there any obvious mistakes?

Article as a whole. During the first reading, the reviewer has to pay attention not only to the individual parts, but also to the article in its entirety.

– A properly written article begins with the introduction and continues with the description of materials and methods, presentation of the results, and finally with a discussion. Such a structure is known by the acronym IMRaD and is accepted as a standard in scientific journals (14).

– Some articles are poorly focused, ie “the story” about the idea, methods, and results does not flow well, and the parts of the article do not correspond to one another logically. There are many guidelines and instructions on writing scientific articles (15,16) and authors should do their best to write the article properly.

– Certain types of clinical studies have specific guidelines for data presentation (Box 4). Reporting on prospective randomized trials follows the CONSORT statement (17). There are similar guidelines for diagnostic trials (STARD) (18), meta-analyses of prospective randomized trials (QUOROM) (19), and meta-analyses of observational studies in epidemiology (MOOSE) (20). Furthermore, research results have to be presented with appropriate statistical indicators (Box 5).

Box 4: Obligatory guidelines for research data presentation**CONSORT** – Consolidated Standards of Reporting Trials (17)**STARD** – Standards for Reporting of Diagnostic Accuracy (18)**QUOROM** – The Quality of Reporting of Meta-analyses (19)**MOOSE** – Meta-analysis of Observational Studies in Epidemiology (20)**Box 5: Presenting the results with appropriate statistical indicators (24)****Treatment study**

- relative risk reduction – RRR
- absolute risk reduction – ARR
- number needed to treat – NNT
- control event rate – CER
- experimental event rate – EER

Diagnostic study

- sensitivity
- specificity
- likelihood ratio – LR
- accuracy
- positive predictive value – PPV
- negative predictive value – NPV

Etiology study

- cohort study - relative risk – RR
- case-control study - odds ratio – OR

Prognosis study

- confidence interval (95% CI)

Second Reading

The second reading should be done after a few hours or days, depending on the time available. It begins with checking the questions and remarks previously written on the manuscript. After that, the reviewer should assess the value of the article, keeping in mind several important points.

Firstly, if an expert reviewer does not understand something in the article, an average reader would probably be even more puzzled. Therefore, the reviewer should freely object to anything that disturbs him or her in reading and comprehending the article. In so doing it is not necessary to judge the

general style of the article, because the tastes in that regard can differ. Also, the reviewer is not required to rectify the errors in grammar, spelling, and punctuation – that is the job of a language editor. Still, an overall assessment of language quality can be useful to the editor.

Secondly, the reviewer should assess the scientific value of the article, especially the quality of reasoning, following the scientific principles and knowledge in the particular field of science.

Finally, an assessment is made about the importance of the science in article. The reviewer's judgment should not be biased with current popularity of some research areas, but depend upon the strength of the research methods, data, and conclusions. An important article is one that is scientifically sound and really brings new information into the body of human knowledge. It does not matter whether the study is applied or basic. Applied studies may be relevant for clinical practice, and basic studies may have a broader significance, but in both fields so much great work has been done that the field itself should not influence the judgment about the value of the report (9).

Final Appraisal and Recommendations to the Editor

The fame or reputation of the author should not be taken into account when judging the article. The reviewer who consciously or unconsciously eases the criteria in reviewing the articles of well-known scientists does a disservice both to the authors and the journal. On the other hand, peer review should not be abused as an opportunity for revenge. Any kind of personal remarks are utterly inappropriate and editors usually do not convey them to the authors (21).

Generally, the appraisal of the article can lead to different types of recommendations:

- If the article presents an interesting idea, but is not sufficiently scientifically sound, the reviewer should suggest the au-

thors how to improve it, and put forward the problem to the editor (9).

– If the article has good science in it, but presents only a minor novelty, the reviewer should ask the authors to explain what they consider new in their work.

– If the article is scientifically acceptable, but the text itself is poorly written, the reviewer can be tolerant, but only to a certain point: a carelessly written and messy article should be rejected.

Depending on the shortcomings detected during the first and second reading of the article, the reviewer will suggest the editor to accept or reject the article, or to send it back to the authors for revision.

Reasons for Recommending a Revision of the Article

In principle, if the reviewer sees the opportunity for authors to improve the scientific value and data presentation in their article, they can be given a chance to do so (Box 6).

Problems with science. The first group of problems stems from authors' illogical reasoning: contradictions, ill-founded conclusions, groundless generalizing or attributing causality, inappropriate extrapolations, circular reasoning, and studying irrelevant details. The reviewer may also notice inconsistencies in the classification and inaccuracy of measurements (Box 6).

Problems with presentation. There are many possible problems with presentation. These include redundancies, elaborating unimportant questions, and digressing into irrelevant issues. The reviewer has to point out the imprecise use of the words or phrases, ill-chosen words in translation to another language, use of jargon, and above all – non-standard abbreviations. One should not overlook the errors, such as incorrect sums and tables which do not correspond to the text.

Box 6: Reasons for revision of the article

Scientific problems

- contradictions
- ill-founded conclusions
- groundless generalizing or attributing causality
- inappropriate extrapolations
- circular reasoning
- studying irrelevant details
- inconsistencies in classification and measuring

Poor presentation of results

- redundancies
- elaborating unimportant questions
- imprecise use of words or phrases
- ill-chosen words in translation
- use of jargon and nonstandard abbreviations
- tables and figures not corresponding with text, incorrect sums

Reasons for Recommending Rejection

In spite of being aware that every article submitted for publishing is the result of more or less long and arduous labor of its authors, the reviewer should not hesitate to recommend rejection if the limitations of the article are insurmountable (Box 7).

Fundamentally flawed study. The reviewer can conclude that the study does not bring anything new or that it engages in completely unimportant subject matter, and therefore does not deserve to be published in a scientific journal. The fundamental structure of the study can be flawed, for example when the study does not really test the hypothesis. Unacceptable ethical doubts regarding the study can also be a reason for recommending rejection. The reviewer has to bear in mind that the approval of an institutional ethical committee is not always a guarantee that the study is ethically acceptable. It is the reviewer's duty to independently assess the ethical integrity of the study (9). The reviewer should also help in disclosure of plagiarisms and duplicate publications.

Box 7: Reasons for rejecting the article**Flawed study**

- does not bring anything new
- unimportant subject matter
- fundamentally flawed structure
- major ethical doubts

Unacceptable shortcomings

- no hypothesis
- no control
- weak evidences
- inappropriate statistical analysis

Unacceptable shortcomings of the study. The article should be rejected if the authors did not use basic scientific principles (e.g. setting up the hypothesis, forming the sample and control group), if they did not objectively consider the reliability of methods used in the study, if they did not notice significant bias factors, or if they did not employ appropriate statistical methods. Improper statistical analysis is not necessarily a reason for recommending rejection, because the authors can correct it. However, appropriate analysis often shows that there are no substantial differences needed to prove the hypothesis, which makes the article unacceptable for publishing.

Writing a Peer Review Report

A peer review report consists of two main parts – one for the editor, and the other for the authors. The reviewers commonly receive a printed review form in which they can grade each aspect of the submitted article (22). This review form should be carefully filled out. Additionally, the reviewer is usually asked to write comments for the editor and, separately, for the authors. No part of the report should be written by hand, because important remarks could be overlooked or disregarded due to indistinct handwriting.

Comments for the Editor

The part intended for the editor should be brief, approximately 200 words. It is good, but not necessary, to begin with a brief summary of the main topic, approach, results, and conclusions of the article. In that way, the editor can find out what the reviewer recognized as the essential message.

After that, the main objections and open questions should be stated, beginning with the most important ones. Sometimes it is useful to divide the remarks into general and specific. The reviewer should explain why he or she considers certain objections and questions important, and suggest the way the authors could work them out. At this point one could also express any doubt as to whether authors would be able to satisfactorily resolve the problems. Finally, this is the place for possible praise or recommendation, for example: “This is an original idea, so in spite of the shortcomings of the article, it deserves to be revised instead of rejected” (9).

Comments for the Authors

If the editor decides that the article should be revised before publishing (which is usually the case), he or she will send the reviews to the authors. Although the identity of the reviewer usually remains unknown to the authors, the review should be written as though it would be signed – politely, constructively, and collegially. Some journals have an open peer review, where both reviewers and authors are known to each other (23). The *Croatian Medical Journal* does not have such a system, but leaves an option for the reviewer to sign his or her comments for the author.

The part intended for authors can be as long as 1,000 words or more, but length itself does not always guarantee quality. A few clear, well thought out, and focused questions can be more than enough to help authors to

improve the article. A review has to be written in such a way that all comments can be understandable to authors, and if possible, accompanied by examples. The reviewer should avoid any kind of censure, but also any kind of praise. The purpose of review is to call attention to possible shortcomings of the article and help the authors to correct them, not to feed the authors' ego.

The first paragraph can be identical to the brief summary from the comments to the editor. The authors might find it useful to see what the reviewer understood as the main message of their article. If the reviewer could not evaluate certain aspects of the article, he or she should openly admit it. For example, an immunologist can evaluate the analysis of cytokines and growth factors in an article on immunological disturbances in schizophrenia, but will not go into reliability of division of patients according to subtypes of schizophrenia. By going beyond his or her own area of expertise, a reviewer not only does a disservice to the authors of the reviewed article, but also compromises his or her own reputation and credibility.

The comments for authors should be divided and numbered so that the authors can clearly answer each one of them.

Major comments. The reviewer should first state the comments which were described to editor as the most important. Every comment or question should be well-explained and well-founded. Instead of general remarks like "sampling was bad", it is necessary to clarify why certain aspects of the article are problematic. It is crucial to write precisely and to make clear if the comment is the result of personal reasoning or it is based on available scientific evidences.

If the article is scientifically strong, but poorly written, the reviewer will help authors the most by explaining what he or she did or did not understand, or by indicating where he or she "got lost" while reading (9).

Minor comments. The reviewer finally mentions minor faults like unnecessary repetitions, incorrect symbols, or abbreviations. They should be ordered in the same way they appear in the text, and identified by page, paragraph, and line.

In Conclusion

Reviewing scientific articles is an essential part of a scientist's job, equal with reading literature or conducting research. It is a very important and responsible work. There are certain rules which a peer reviewer should follow, at least in general. Although relatively unrecognized, the benefits of peer review are significant and valuable.

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