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## **Producing a scientific journal in a small scientific community: an author-helpful policy**

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### **Introduction**

Most scientific information is published in a small number of prestigious journals that address mainstream science [4]. At the same time, developing countries encompass almost a quarter of the world's scientists but only less than 6% of research spending [4]. Journals from this "scientific periphery" [10] are poorly visible in the scientific community: the *Science Citation Index (SCI)*, one of the most prestigious bibliographic databases, included less than 2% of journals in developing countries in 1995 [4].

We have previously described the vicious cycle of inadequacy for small journals from small scientific communities [4]: due to the small number and poor quality of manuscripts submitted, inadequate review process, and imperfect English, these journals cannot reach sufficient high visibility to attract better-quality reports and a broader readership, to become indexed, and thus to eventually escape from the shadow of anonymity [10]. We have also described our experience at the *Croatian Medical Journal (CMJ)* with breaking out of this vicious cycle [8,11,15,17]. During our work with Croatian authors during the war years from 1991 to 1995 [9,12,14], we developed an author-helpful editorial policy—a procedure with which most of the articles received were pre-reviewed intramurally and improved before being sent out for extramural review [11,14,17]. This scheme of work evolved natural-

ly from our everyday practice, because our authors were mostly inexperienced scientists and writers, unaware of the importance of publishing and lacking the knowledge and technology for research planning. Thus, we had to embark on teaching not only scientific writing but also research planning, as well as data analysis and interpretation [13]. By taking on the role of educators, teaching both authors and undergraduate and postgraduate students how to write a scientific paper, we have helped them to produce and publish articles not only in the *CMJ* but also in many other international journals [8,14]. Such a policy has resulted in an enormous burden to the journal's personnel, but also in a significant formal success—the inclusion of the *CMJ* in the most selective international indexing databases (MEDLINE in 1998, and *Current Contents/Clinical Medicine* and *Web of Science* in 1999), and even in an international award for design from the Association of Learned and Professional Society Publishers in 2002. The journal's impact factor grew steadily from 0.2 in 1998, to 0.43 in 2000, to 0.71 in 2002, hopefully reflecting the increased interest of readers worldwide in articles published in the *CMJ*. If, despite the controversies surrounding the true meaning and importance of impact factor [3], we consider the inclusion of the *CMJ* into the prestigious bibliographic databases and the steady growth of its impact factor to be signs of success, then our editorial policy and work may hold a clue for breaking out of the confines of inadequacy. Therefore, the approach we have adopted at the *CMJ* deser-

ves to be described in detail, as our experience may be helpful to those involved in producing science journals published in small scientific communities, or any small scientific journal.

Each of the six editors in the editorial office communicates with the author, who is the focus of all editorial actions (Fig. 1). The editing process itself can be divided into four main stages.

### Cooperation with the author

Our key problem is the shortage of quality articles, i.e., articles that: (i) describe properly designed and conducted studies, (ii) clearly present and adequately interpret the data, (iii) conform with the technical requirements of the journal's format and style guidelines, and (iv) are written in good English—the latter being the least of the problems. During processing a manuscript to the point of publication, we deal with each of these aspects in a different way, depending on the stage of the editing process.

Almost two-thirds of submitted manuscripts are rejected [6,16], either immediately by the Editor-in-Chief or after peer-review. The most common reasons for rejection are unoriginality and major flaws in methodology and presentation. A significant portion of manuscripts accepted for publication still requires greater or lesser amount of work from both editors and authors, whose close cooperation is of paramount importance in producing a well-written journal article.

### First stage. Pre-review and peer review

**Pre-review.** One of the two Coeditors-in-Chief (M. Marusic) reads the manuscript and independently decides whether the manuscript will be rejected, sent to extramural reviewers and one of the four Statistical Editors [7], or returned to the author for improvements before peer-review (Fig. 1). Approximately a quarter of submitted manuscripts are rejected at this point, mainly because the data are too weak, incorrect, or insufficient, and the manuscript cannot be improved without additional research. Our policy is to always write a detailed rejection letter, explaining the weaknesses of the study and advising the authors on how to improve their future studies. Another quarter of received manuscripts are sent immediately for extramural review, whereas the remaining half is returned to the authors, with extensive instructions on how to improve the report to the level of quality needed for the extramural review.

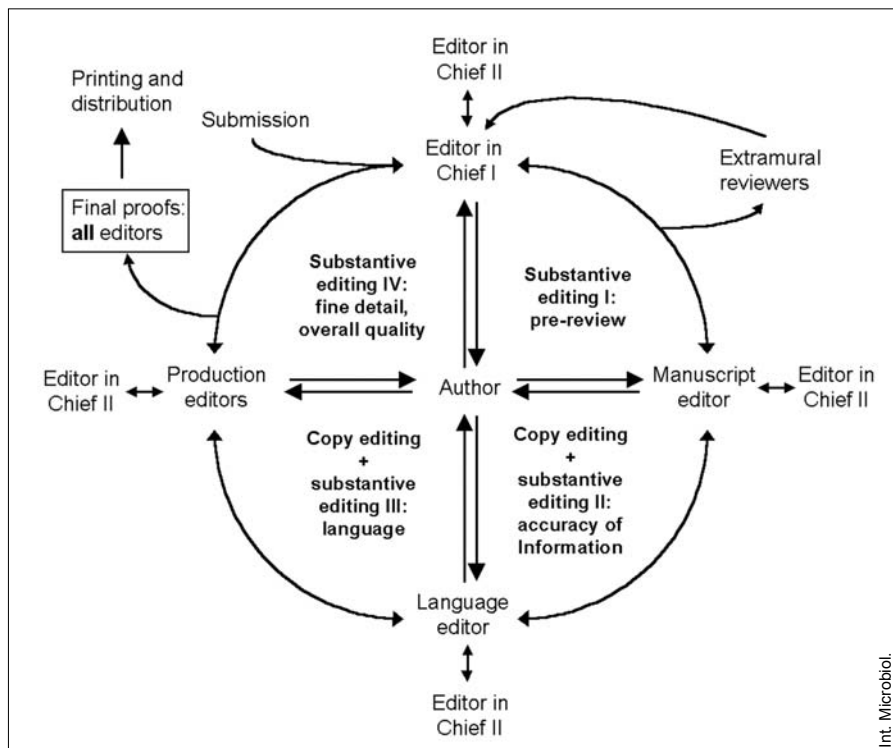


Fig. 1. Processing of manuscripts in the Editorial Office of the *Croatian Medical Journal*.

After the manuscript has been corrected according to the Editor's requirements and resubmitted for publication, the Editor reads it again and consults the other Coeditor-in-Chief (A. Marusic). They decide together whether to reject the work, return it to the author for further corrections, or send it out for extramural review (Fig. 1). If the manuscript is not rejected, the editor makes additional corrections and suggestions for further improvements. Sometimes, the manuscript is returned to the author for further improvements several times before it reaches the acceptable level of presentation quality. The author can even be asked to meet the editors in person, if possible, in order to receive an extensive explanation as to how to improve the report. When the pre-review stage is over, the author is asked to submit four paper copies of the manuscript, which are then sent out for official extramural review.

In this phase of work, the Editors are focused on the inner logic of the study and its presentation: clearly stated aim and hypothesis, properly designed study, adequate presentation of relevant data, and appropriately discussed results. Language also undergoes substantial editing [17]. The final goal is to extract the essence of the research done and ensure that the message clearly follows from the data obtained from the research.

**Peer review.** Each manuscript that reaches this phase is reviewed by three extramural reviewers (Fig. 1). If statistical analysis of the data is included, the paper is also sent to one of the *CMJ*'s four statistical editors. The Coeditor-in-Chief (M. Marusic) ensures that authors adequately address all reviewers' requests and also decides on the acceptance or rejection of the manuscript, depending on the reviewers' evaluation; when necessary, he consults the other Coeditor-in-Chief. Of all manuscripts sent for extramural reviews, approximately 25% are rejected [6]. Manuscripts that need major revision are read again by the reviewers who have asked to see the reviewed manuscript again after revision, and get accepted only if the revised version is approved. A small number of papers require only minor revisions or none at all [16].

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## Second stage. Technical revisions and formatting

After passing the first stage, the manuscript is read by the Coeditor-in-chief (A. Marusic). She can still reject it if it does not fit the profile of the journal after all, or has significant flaws that have escaped the reviewers' attention (Fig. 1). The accepted manuscript is then referred to the Manuscript Editor, who reorganizes and formats the text and tables for further processing, checks the key words against the Medical

Subject Headings (MeSH of the MEDLINE), and checks all references, mostly by searching biomedical (e.g. MEDLINE) and other databases. As only 17% of the citations are completely technically correct in manuscripts accepted for publication by the *CMJ* (unpublished finding), the communication with the author mostly concerns revision of incomplete or otherwise inadequate references, ensuring that all bibliographic entries listed in the paper conform with propositions as stated in the Uniform Requirements for Manuscripts Submitted to Biomedical Journals [5]. The Manuscript Editor confers on controversial references (unsound, untraceable, inappropriate, or out-of-date) with Coeditors-in-Chief before the final decision on the acceptance or rejection of the reference is made. The Manuscript Editor then passes the manuscript to the Language Editor.

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## Third stage. Language, clarity, and fluency

The Language Editor reads the manuscript as a "naïve" reviewer, paying attention to the inner logic and consistency of the paper, IMRaD structure [5,19], organization of tables and figures, abbreviations, names of the chemicals and instruments and their manufacturers, measurement units, order of the references, language, and English spelling, as described in detail in the journal's guidelines for authors. This stage of manuscript processing, which comes after pre-review, extramural review, and statistical review, is a sort of safety net intended to catch finer omissions, incongruities, linguistic clumsiness, and other details (Fig. 1). The Language Editor also communicates with the author. If needed, she returns the manuscript to the author by e-mail, requiring further clarification of unclear or ambiguous parts of the manuscripts or asking the author to provide data that need to be included in the text. She corrects grammar where needed, checks spelling, and ensures terminological consistency. The Language Editor works closely with Coeditor-in-Chief (A. Marusic), who reads the manuscript once again before it is referred to the Production Editor. She also confers with the Production Editor for the technical acceptability of figures and tables. At the end of this stage, the paper is considered ready for publication and is referred to the Production Editor.

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## Fourth stage. Layout and precision

We have two Production Editors, each with quite different tasks (Fig. 1). One of them is responsible for desktop publishing and is in charge of the format, make-up, and style of

the journal. He organizes each manuscript technically and visually, assesses critically every aspect of the printed version of the paper and the journal as a whole, and ensures that tables and figures are as simple, uniform, and clear as possible and have the most appropriate place within the text. He instructs authors on the format and resolution of the figures submitted for publication and e-mails them a PDF format of the manuscript for proofreading. Production Editors also prepare the XML files of bibliographic data for the *PubMed* database and supervises the printing process.

It is not a rare case that authors submit figures that are simply too confusing, cumbersome, incomplete, or impossible to edit. Many are still unfamiliar with software for drawing, or cannot afford a professional to draw the figures for them. In such cases, the Production Editor draws the figures anew. One of the Production Editors (D. Hren) also acts as a statistical advisor and oversees the updating of the journal's website.

Production Editors closely cooperate with the Coeditors-in-Chief, Manuscript Editor, and Language Editor, who all proofread the printouts before they are sent to authors for final checkup and approval. Despite all this checking, we sometimes find a typing error or some other imperfection in the paper edition of the journal [8].

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## Staff and human resources management

The Coeditors-in-Chief, both of whom are physicians with years-long scientific experience, have completely different functions in the journal. One of them (M. Marusic) is a professor of physiology and an experienced researcher, and the other (A. Marusic) is a professor of anatomy, with a good command of English and feeling for logic and clarity within a scientific text. Their editorial posts in the journal are voluntary and they receive no pay or fees for their work. M. Marusic is the moving force of the *CMJ*; he creates the overall politics of the journal, guards it from all kinds of unprofessional pressures, and manages the editorial staff. He assesses the general context of every article and assembles each issue of the journal. A. Marusic does fine tuning at every level of the journal production (Fig. 1). She reads each article at least three times.

The Manuscript Editor is also a physician, proficient in English and medical informatics. In addition to helping the Coeditors-in-Chief with correspondence and other routine work associated with running the journal, her main task is to assure the technical quality and consistency of manuscripts. The Language Editor is also a physician, currently studying

for her degree in English and linguistics. The most important part of her work is to improve the language and logic of the manuscript. She polishes the paper and ensures that the story flows smoothly and logically.

Of the two Production Editors, one is a sociologist and the other a psychologist, both experts in computer work. The Manuscript Editor and one Production Editor (D. Hren) are also research fellows at the journal and their most important task is research related to journals and teaching scientific methodology to medical students. All members of the editorial office are actively involved in teaching scientific methodology and writing at the graduate and postgraduate level, as well as during continuing education courses [13].

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## Discussion

There are many scientific journals that, like the *CMJ*, are published in developing, non-English speaking countries from the "scientific periphery" [4]. Most such journals strive to join the family of internationally recognized, indexed journals, but with rather modest success. This is because the articles they receive are not scientifically, logically, technically, and linguistically satisfactory enough to allow the production of a journal that would meet all required international standards [10]. We have broken this vicious cycle by actively approaching potential authors via our author-helpful policy, and by investing an enormous amount of time and effort. Large, prestigious science journals have a completely opposite problem: to select the best out of the thousands of well-written papers they receive each year, because authors usually send their best work to top journals. Still, even these journals need trained experts to work on accepted papers if they are to meet the highest quality standards. In contrast, small journals receive much poorer products and lack the knowledge and/or the resources to improve them to an acceptable level. This gap between big and small journals continues to exist, despite the desire of the international scientific community to be informed of research done in developing countries, and the striving of small journals from developing countries to become visible and recognized [2].

We have managed to lessen the gap between big and small journals by hard work and constant learning. Quality manuscripts, good English, and timely production are our holy triad. Each manuscript is read eight times on average before it goes to print; each step in the journal's production is given maximum attention; an author's work is checked and rechecked at every level; and every detail is considered crucial. Demanding as it may seem, this is the only way by which we can reach acceptable level of international visibility.

Contrary to expectations, the key problem is not the poor English of our authors, although most of them come from non-English speaking countries. Poorly designed or unoriginal research and lack of knowledge of techniques of scientific planning and reasoning are the main reasons why manuscripts are rejected. Science teaching in medical schools does not exist [1], either in developed or developing countries. Once they graduate, physicians are overwhelmed by the routine of their work, and, when faced with the challenge of writing their observations in the form of an original scientific article, they discover that they do not know how to do it. They cannot adequately plan research, collect data, perform data analysis, and compose a clear, logical, and convincing story. English is the least of the problems: professional translators can easily translate the article if it is written in a translatable form. However, translators can deal only with the linguistic aspect, scientific content is not their competence. We believe that, in countries less fortunate, it is journal editors who must take on the role of educators in order to change the scientific level in their environment and to make their journals internationally significant [15].

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