



A contribution to the authorship debate: Can we trust definitions and declarations?

by Ana and Matko Marušić



The trade of authorship is a violent, and indestructible obsession.

George Sand (French writer, 1804-1876)

In biomedicine, authorship may not be a violent obsession but it continues to attract heated debates. The 30-year history of the definition of authorship in the Uniform Requirements for Manuscripts submitted to Biomedical Journals (URM) of the International Committee of Medical Journal Editors (ICMJE) demonstrates how the definition of authorship in biomedicine has evolved over time and how it has solved some problems but created others.

The history of authorship definitions in biomedicine

It is difficult to follow the history of authorship definitions before the electronic age: the ICMJE website only archives the full text of URM revisions from 2004 (<http://www.icmje.org/archive.html>) and provides a list of selected publications from 1979 (http://www.icmje.org/selected_citations.pdf), when the URM was first published by the International Steering Committee (ICMJE came into existence in 1982) [1]. An overview of the changes in the definition of authorship is presented in Table 1, and is based on the search for URM revisions published in individual member journals. The first two URMs, from 1972 and 1982, did not define authorship at all. The only mention made of the roles of different individuals in the publication was the following instruction relating to the Acknowledgment section of a submitted manuscript: “Acknowledge only persons who have made substantive contributions to the study” [1,2].

The first definition of authorship was put forward in the 1988 revision [3], with 3 main sets of criteria which are still in use today: substantial contribution to a) the research leading to the manuscript, b) preparation of the manuscript and c) final approval of the manuscript to be published. Authors were required to take public responsibility for the whole content of the manuscript, and at least one of them had to be responsible for “any part of an article critical to its main conclusions”. There were no changes relating to authorship in the 1991 URM revision [4], but the 1994 URM revision [5] introduced the recommendation that the order of authors in the byline should be the joint responsibility of the authors and could be explained in writing in the manuscript. The 1995 revision [6] took out

these instructions on the order of authors and expanded those on corporate (collective) authorship, requiring that all members of the group named as authors, regardless of their position in the byline or a footnote, should fully meet the authorship criteria. The 1997 revision of the URM [7] brought back the instructions on the order of authors and replaced the option for editors to require justification for the assignment of authorship with the possibility that they could request and publish information on the contribution of individual authors.

An important change to the definition of authorship occurred in 2000. There is no print version of this revision and the electronic version is not available any more. The only document referring to this change is an editorial by John Hoey from the *Canadian Association Medical Journal* [8]. The first important change was that more contributions were considered eligible to meet the first criterion for authorship, as the requirement for authors to have been involved in “conception and design, or analysis and interpretation of data” was replaced by “substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data”. Thus, data acquisition became a legitimate authorship contribution. The second change was in the requirement for public responsibility of individual authors, which was reduced from the whole content to “appropriate portions of the content”. It was, however, expected that “one or more authors should take responsibility for the integrity of the work as a whole, from inception to published article”. These definitions have remained mostly unchanged until today (Table 1).

Contributors vs. authors

The changes to the URM in 1997, which introduced the option for editors to ask for and publish information on the contributions of individual authors, were prompted by the call for responsible authorship by Drummond Rennie and his colleagues [9]. They proposed “dropping the outmoded notion of author in favor of the more useful and realistic one of contributor”. The notion of contributorship was accepted by the ICMJE journals, as reflected in the yearly URM revisions since 2004, which are available in full text from the ICMJE web-site (<http://www.icmje.org/archive.html>). The former section on authorship is now called “Authorship and Contributorship” and strongly encourages editors to “develop and implement a contributorship policy, as well as a policy on identifying who is responsible for

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the integrity of the work as a whole". However, the notion of contributors instead of authors never prevailed. Today's journals still publish the author byline under the title on the front page, and the contributions of the authors are published in small print at the end of the article.

To accommodate the contributorship policy, journals developed various different formats through which contributions relevant for authorship could be declared, and this introduced the problem of the validity of such a declaration. When we started collecting information on authors' contributions in our journal, the *Croatian Medical Journal*, we were surprised to discover that many authors did not satisfy the criteria for authorship [10]. We thought that one of the reasons for a high number of undeserving

authors might have been the way we asked for information on their contributions, as research from psychology shows that self-reported surveys (such as contribution declaration forms) have significant limitations. To test this possibility, we performed a number of studies related to the reliability and other psychometric characteristics of contribution disclosure forms.

We first tested the association between authorship eligibility and the format of contribution declaration forms used by 3 major general medical journals. We showed that the journal with the lowest proportion of authors who did not meet the ICMJE criteria had an instructive declaration format, telling the respondent how many contributions are needed to satisfy the ICMJE authorship criteria. In >

Table 1 History of the definition of authorship in the Uniform Requirements for Manuscripts submitted to biomedical journals (URM) by the International Committee of Medical Journal Editors

URM	
1988, 1991	<p>All persons designated as authors should qualify for authorship. Each author should have participated sufficiently in the work to take public responsibility for the content.</p> <p>Authorship credit should be based only on substantial contributions to (a) conception and design, or analysis and interpretation of data; and to (b) drafting the article or revising it critically for important intellectual content; and on (c) final approval of the version to be published. Conditions (a), (b), and (c) must all be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. General supervision of the research group is also not sufficient for authorship. Any part of an article critical to its main conclusions must be the responsibility of at least one author.</p> <p>A paper with corporate (collective) authorship must specify the key persons responsible for the article; others contributing to the work should be recognised separately (see "Acknowledgments").</p> <p>Editors may require authors to justify the assignment of authorship.</p>
1994	<p><i>The following statement was added:</i></p> <p>The order of authorship should be a joint decision of the coauthors. All authors should meet the previously mentioned basic criteria. Because the order of authorship is assigned in different ways its meaning cannot be inferred accurately unless it is stated by the authors. Authors may wish to add an explanation of the order of authorship in a footnote. In deciding on order authors should be aware that many journals limit the number of authors listed in the table of contents and that the National Library of Medicine lists only the first 10 authors in MEDLINE.</p>
1995	<p>All persons designated as authors should qualify for authorship. The order of authorship should be a joint decision of the coauthors. Each author should have participated sufficiently in the work to take public responsibility for the content.</p> <p>Authorship credit should be based only on substantial contributions to (a) either conception and design or else analysis and interpretation of data and to (b) drafting the article or revising it critically for important intellectual content and on (c) final approval of the version to be published. All three conditions must be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. General supervision of the research group is also not sufficient for authorship. Any part of an article critical to its main conclusions must be the responsibility of at least one author.</p> <p>Editors may require authors to justify the assignment of authorship.</p> <p>Increasingly, multicentre trials are attributed to a corporate author. All members of the group who are named as authors, either in the authorship position below the title or in a footnote, should fully meet the criteria for authorship as defined in the "Uniform requirements." Group members who do not meet these criteria should be listed, with their permission, under Acknowledgements or in an appendix (see Acknowledgements).</p>
1997	<p>All persons designated as authors should qualify for authorship. Each author should have participated sufficiently in the work to take public responsibility for the content.</p> <p>Authorship credit should be based only on substantial contributions to (a) conception and design, or analysis and interpretation of data; and to (b) drafting the article or revising it critically for important intellectual content; and on (c) final approval of the version to be published. Conditions (a), (b), and (c) must all be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. General supervision of the research group is not sufficient for authorship. Any part of an article critical to its main conclusions must be the responsibility of at least one author.</p> <p>Editors may ask authors to describe what each contributed; this information may be published.</p> <p>Increasingly, multicenter trials are attributed to a corporate author. All members of the group who are named as authors, either in the authorship position below the title or in a footnote, should fully meet the above criteria for authorship. Group members who do not meet these criteria should be listed, with their permission, in the Acknowledgments or in an appendix (see Acknowledgments).</p> <p>The order of authorship should be a joint decision of the coauthors. Because the order is assigned in different ways, its meaning cannot be inferred accurately unless it is stated by the authors. Authors may wish to explain the order of authorship in a footnote. In deciding on the order, authors should be aware that many journals limit the number of authors listed in the table of contents and that the National Library of Medicine lists in MEDLINE only the first 24 plus the last author when there are more than 25 authors.</p>

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2004 – 2006	<p>Authorship credit should be based on 1) substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data; 2) drafting the article or revising it critically for important intellectual content; and 3) final approval of the version to be published. Authors should meet conditions 1, 2, and 3.</p> <p>When a large, multi-center group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript. These individuals should fully meet the criteria for authorship defined above and editors will ask these individuals to complete journal-specific author and conflict of interest disclosure forms. When submitting a group author manuscript, the corresponding author should clearly indicate the preferred citation and should clearly identify all individual authors as well as the group name. Journals will generally list other members of the group in the acknowledgements. The National Library of Medicine indexes the group name and the names of individuals the group has identified as being directly responsible for the manuscript.</p> <p>Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.</p> <p>All persons designated as authors should qualify for authorship, and all those who qualify should be listed.</p> <p>Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content.</p> <p>Some journals now also request that one or more authors, referred to as “guarantors,” be identified as the persons who take responsibility for the integrity of the work as a whole, from inception to published article, and publish that information.</p> <p>Increasingly, authorship of multi-center trials is attributed to a group. All members of the group who are named as authors should fully meet the above criteria for authorship.</p> <p>The order of authorship on the byline should be a joint decision of the co-authors. Authors should be prepared to explain the order in which authors are listed.</p>
2007	<p><i>The section on the order of authorship changes to:</i></p> <p>The group should jointly make decisions about contributors/authors before submitting the manuscript for publication. The corresponding author/guarantor should be prepared to explain the presence and order of these individuals. It is not the role of editors to make authorship/contributorship decisions or to arbitrate conflicts related to authorship.</p>
2008 – 2009	<p><i>The section on large, multicentre groups changes to:</i></p> <p>When a large, multicenter group has conducted the work, the group should identify the individuals who accept direct responsibility for the manuscript. These individuals should fully meet the criteria for authorship/contributorship defined above and editors will ask these individuals to complete journal-specific author and conflict-of-interest disclosure forms. When submitting a manuscript authored by a group, the corresponding author should clearly indicate the preferred citation and identify all individual authors as well as the group name. Journals generally list other members of the group in the Acknowledgments. The NLM indexes the group name and the names of individuals the group has identified as being directly responsible for the manuscript; it also lists the names of collaborators if they are listed in Acknowledgments.</p>

> contrast, a higher proportion of authors not meeting the ICMJE criteria was found in the journals that had either an open-ended answering format or a list of contribution categories to choose from [11]. We then demonstrated a causal relationship between the structure of the contribution disclosure form and the likelihood that authors met ICMJE criteria for authorship in a randomized study in our own journal [12], confirming that the cognitive task of mapping the answer to the response format influenced the answers on the forms and, consequently, the attribution of authorship. The instructional format of the contribution declaration was again associated with the lowest proportion of authors not meeting the ICMJE criteria, because such a format leads the respondent to give socially (editorially) desirable answers, as has been shown in psychology research [13].

In the next study, we assessed the reliability of contribution declaration forms, defined as the extent to which a test is dependable, stable and consistent when administered to the same people on different occasions. When the same corresponding authors were asked about their contributions to the same manuscript at two different time points, more than two-thirds differed in at least one contribution choice between the two disclosure statements [14], demonstrating poor reliability of the contribution declaration forms as an accurate way of assessing authorship of a manuscript.

In another randomized study, we tested whether offering a range of response alternatives for declaring contributions would influence the respondent’s answer by providing a reference range to assess the behaviour to be reported [15]. When authors could choose the extent of their contribution on a scale from 0 (none) to 4 (full), they reported more contributions eligible to meet ICMJE authorship criteria than those who were offered only a binary (yes-no) format for declaring a contribution. This study also showed that the authors perceived all ICMJE-eligible contributions as at least ordinal variables, except for the “Final approval of the article”, which was perceived as a dichotomous variable.

Our research demonstrated that contribution declaration policy and authorship criteria themselves have been introduced into the scientific publication process without adequate evidence for all aspects of their validity. Also, a number of reports show that researchers in biomedicine differ from journal editors in their views on what constitutes authorship [16-18]. Obviously, there is much confusion and misunderstanding in the arena of biomedical authorship, and perhaps journal editors should not have taken on the responsibilities of the research community to define when one deserves to be considered an author of the published research. This may have been the reason for the introduction of a disclaimer into the 2007 URM revision (http://www.icmje.org/2007_urm.pdf): “It is not the role of editors to make authorship/contributorship decisions or to arbitrate conflicts related to authorship”.

Conclusions

The history of authorship definition and research into current authorship practices in biomedicine demonstrates that there is still much confusion and misunderstanding about authorship among stakeholders in the research enterprise. The existing contribution disclosure and authorship forms do not seem to be the best format for making judgments on authorship, and more research is needed on the cognitive aspects of their construction and evaluation. Until there is enough evidence to propose reliable guidelines for authorship, perhaps it would be best to ask each manuscript author a single open-ended question: “Why do you think you deserve to be the author of this manuscript?”

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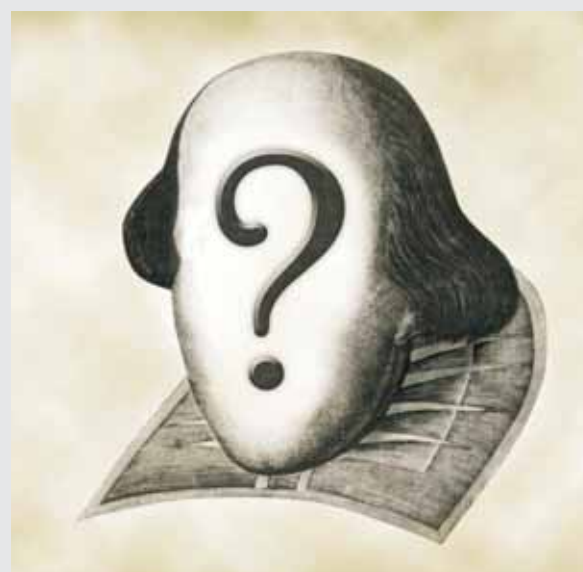
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Reasons to doubt Shakespeare's authorship

DoubtAboutWill.org¹, a site dedicated to legitimising the Shakespeare authorship issue, makes fascinating reading. Shakespeare is the only presumed writer of his time for whom there is no contemporary evidence of a writing career. Although the reigns of Queen Elizabeth and King James I were well-documented times there is no evidence for Shakespeare having written his works from the time he lived. The main reason to believe he was the author dates from 7 years after he died and primarily rests on testimony in the First Folio collection of the plays published in 1623. The site details grounds for rejecting each piece of prima facie evidence for Shakespeare's authorship including the different spellings of his name, doubts surrounding the testimony in the First Folio, which reads like a sales pitch, and that even the monument effigy of Shakespeare has been 'repaired', i.e. altered to depict a writer, since it was erected in the early 1600s.

There are also numerous incongruities between Shakespeare's life and his reputation as a famous writer. For instance, he left no handwritten documents behind—unusual for a writer—and there is no trace of how he acquired the requisite knowledge to write works demonstrating a wide knowledge of law, philosophy, classical literature, history astronomy etc.—books were expensive and difficult to obtain except at universities and private libraries.

Having read the account you may well be tempted to add your signature to the declaration of reasonable doubt.

¹ <http://doubtaboutwill.org/declaration>