

# Authorship Criteria and Disclosure of Contributions

## Comparison of 3 General Medical Journals With Different Author Contribution Forms

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**A**LTHOUGH AUTHORSHIP OF biomedical publications establishes credit and responsibility for reported research to readers, authors, and editors alike, it is burdened by misunderstandings and misuses.<sup>1-3</sup> In response to the 1997 proposal to acknowledge research contributions in journal articles<sup>1</sup> as a way to limit irresponsible authorship, contribution disclosure has been introduced in some general medical journals. The most recent revision from the Uniform Requirements for Manuscripts Submitted to Biomedical Journals of the International Committee of Medical Journal Editors (ICMJE) encourages editors to develop and implement contributorship policies.<sup>4</sup> The ICMJE defines authorship as (1) substantial contribution to the 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. Studies across a variety of journals show that 20% to 50% of authors do not satisfy all 3 ICMJE criteria and may be honorary authors.<sup>2,5-8</sup>

To assess whether 6 years of contribution disclosure practice has had an

**Context** A number of general medical journals and the International Committee of Medical Journal Editors (ICMJE) request authors to disclose their contributions. Little is known about the effect of journal policies on authors' disclosure of their contributions.

**Objective** To determine the number of named authors who do not meet ICMJE criteria for authorship, according to their published contributions, in 3 medical journals with different contribution disclosure practices.

**Design** Observational study of authors' contributions in research articles published in 2002 in *Annals of Internal Medicine* (n=72), *BMJ* (n=107), and *JAMA* (n=81). *BMJ* asks authors to describe research contributions in their own words; *Annals* asks authors to choose from a list of coded contributions; and *JAMA* uses a structured checklist with instructions on contributions that qualify for ICMJE authorship criteria. Honorary authorship was defined as the lack of contribution from the first ICMJE criterion (study conception and design, or acquisition of data, or analysis and interpretation of data) and/or second (drafting the article or critical revision for important intellectual content) ICMJE criterion.

**Results** According to authors' published contributions, the number of honorary authors was highest in *Annals* (121/562 authors, 21.5%), followed by *BMJ* (46/482, 9.5%), and *JAMA* (3/641, 0.5%) ( $\chi^2=146.67$ ,  $P<.001$ ). The number of articles with honorary authors was 60% in *Annals*, 21% in *BMJ*, and 4% in *JAMA*. Honorary authors had fewer published contributions than authors who met ICMJE criteria and were positioned more toward the end of the byline. Honorary authors either lacked contributions for both ICMJE criteria (10% in *Annals* and 22% in *BMJ*) or contributions to the second ICMJE criterion (75% in *Annals*, 67% in *BMJ*, and 2 out of 3 in *JAMA*).

**Conclusions** General medical journals differed in prevalence of honorary authors according to published research contributions of named authors. Different authorship/contributorship policies and procedures should be explored as a possible explanation for the differences in contributions disclosed by authors among these journals.

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effect on the number of authors whose published contributions do not meet ICMJE criteria for authorship, we analyzed published statements of authors' contributions in 3 major general medical journals. We studied journals with 3 different contribution disclosure practices: *BMJ*, which asks authors to describe research contributions in their own words<sup>9</sup>; *Annals of Internal Medicine*, which asks authors to choose from a list of con-

tributions and associated letter codes and mark these codes on an author's form<sup>10</sup>; and *JAMA*, which requires authors to complete a structured checklist that itemizes how many contributions qualify for ICMJE authorship criteria.<sup>11</sup>

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## METHODS

We analyzed research articles published in 2002: "Articles" in *Annals* (n=72), "Papers" in *BMJ* (n=107), and "Original Contributions" (n=81) in *JAMA*. As *Annals* is published every other week, only the first and third monthly issues of *JAMA* and *BMJ* were analyzed. Paper editions were analyzed, except when the author contribution information was available only on the Web (all *Annals* articles since April 16, 2002, and 67 [61%] *BMJ* articles). Articles without disclosed author contributions (6 "Drug Points" in *BMJ* and 3 case reports in *JAMA*) were excluded. Stated author's contributions were categorized and entered into a database jointly by 2 authors (T.B. and A.A.); the database was independently checked against the articles by a third author (A.M.).

Contributions were coded into 11 categories: (1) conception and design of the study, (2) analysis and interpretation of data, (3) collection or assembly of data, (4) statistical expertise, and (5) provision of study material or patients (categories 1-5 are eligible for authorship according to the first ICMJE criterion); (6) drafting of the article or part of the article and (7) critical revision of the article for important intellectual content (categories 6 and 7 are eligible for the second ICMJE criterion); (8) obtaining funding; (9) administrative, technical, or logistic support; (10) guarantor of the study; and (11) study supervision or coordination. As the information on the third ICMJE criterion (approval of the version of the manuscript to be published) was rarely stated, we assumed that all authors fulfilled this criterion.<sup>5</sup> *Honorary author* was thus defined as a person named in the article as an author whose published contributions did not meet both the first and second ICMJE criteria for authorship.

Based on the assumption that the number of articles with honorary authors would decrease by half from 19% reported in 1996,<sup>2</sup> we estimated a sample size of 80 articles in each group with  $\beta = .20$  and 2-tailed  $\alpha = .05$ . Differences in proportions were tested with  $\chi^2$  tests.

The Kruskal-Wallis test and a subsequent Wilcoxon test were used to compare number of contributions, number of authors, and their byline position. Bonferroni correction was used for multiple comparisons. All statistical tests and 95% confidence intervals were calculated using Medcalc statistical software (Medcalc, Mariakerke, Belgium).

## RESULTS

As shown in the TABLE, *JAMA* had the fewest (0.5%) honorary authors (ie, authors whose published contributions did not meet minimum criteria for authorship), compared with 9.5% in *BMJ* and 21.5% in *Annals* ( $\chi^2_2=146.67$ ,  $P<.001$ ), as well as the fewest articles with honorary authorship ( $\chi^2_2=64.54$ ,  $P<.001$ ). An honorary author was never the first author in the byline. In *BMJ* and *Annals*, 11 and 5 articles, respectively, had honorary authors as the last person in the

byline. Compared with authors whose published contribution met authorship criteria, honorary authors were placed more toward the end of the byline (*Annals*,  $z$  score=5.494,  $P<.001$ ; *BMJ*,  $z$  score=4.398,  $P<.001$ ), and articles with honorary authors had longer bylines (*Annals*,  $z$  score=-3.932,  $P<.001$ ; *BMJ*,  $z$  score=2.798,  $P=.005$ ). *BMJ* articles, either with or without honorary authors, had significantly fewer authors than *Annals* or *JAMA* ( $z$  score=6.217 vs *Annals*,  $P<.001$ ;  $z$  score=6.743 vs *JAMA*,  $P<.001$ ). The number of honorary authors per article did not differ among the journals (mode=1 for all), but the number of contributions per honorary author was significantly fewer than that for authors whose published contributions met authorship criteria (*Annals*,  $z$  score=-13.627,  $P<.001$ ; *BMJ*,  $z$  score=-9.090,  $P<.001$ ). Most honorary authors did not have stated contri-

**Table.** Characteristics of Authors and Their Contributions in 3 Medical Journals

Parameter	Journal		
	<i>JAMA</i>	<i>BMJ</i>	<i>Annals of Internal Medicine</i>
No. of articles	81	107	72
Published randomized controlled trials, No. (%)	24 (30)	20 (19)	20 (28)
Authorship			
No. of authors	641	482	562
Authors from country of journal publication, No. (%)*	469 (73)	303 (63)	361 (64)
Authors per article, median No. (95% CI)	7 (6-8)	4 (4-5)	7 (6-9)
Honorary authors, No. (%)	3 (0.5)	46 (9.5)	121 (21.5)
Articles with honorary authors, No. (%)	3 (4)	22 (21)	43 (60)
Byline authors in articles with honorary authors, median No. (95% CI)	7/9/21†	6 (4-7)	9 (7-10)
Byline authors in articles without honorary authors, median No. (95% CI)	7 (6-8)	4 (3-4)	5 (4-6)
Placement of honorary author in the byline, median No. (95% CI)	4/4/5†	4 (3-5)	6 (5-7)
Contributions			
No. of contributions	2257	1590	3131
Contributions per honorary authors, median No. (95% CI)	1/3/4†	1 (1-2)	2 (2-2)
Contributions per author satisfying ICMJE criteria, median No. (95% CI)*	5 (4-5)	3 (3-3)	4 (4-5)
Honorary authors lacking contributions to ICMJE criteria, No. (%)‡			
First criterion	1	5 (11)	18 (15)
Second criterion	2	31 (67)	91 (75)
Both criteria	0	10 (22)	12 (10)

Abbreviations: CI, confidence interval; ICMJE, International Committee of Medical Journal Editors.

\*Authors from the United States for *JAMA* and *Annals* and authors from the United Kingdom for *BMJ*.

†There were only 3 honorary authors in *JAMA*, so statistical analysis was not possible. The numbers presented are individual values for the 3 authors.

‡First criterion: conception and design of the study, or acquisition of data, or analysis and interpretation of data; second criterion, drafting the article or revising it critically for important intellectual content.

butions to meet the second ICMJE criterion (ie, drafting or critically revising the manuscript) (Table).

We separately analyzed articles with a group as the author in the byline. *BMJ* had 2 such articles: 1 had 14 honorary authors out of 20 listed, all lacking contributions from the second ICMJE criterion. In *JAMA*, 2 out of 5 articles with group authorship were authored by the same study group members and had 8 honorary authors each, all lacking contributions from the second ICMJE criterion.

## COMMENT

Although limited by its cross-sectional design and selection of journals, our study showed significant differences in the number of authors whose published contributions did not meet authorship criteria in research articles published in 3 general medical journals. In comparison with data from studies conducted before journals instituted author contribution disclosure policies,<sup>2,12,13</sup> the proportion of authors whose published contributions did not meet authorship criteria, ie, honorary authors, in this study did not change in *Annals* but decreased in *BMJ*, from 29% reported in 1998 to 10%, and decreased in *JAMA*, from 18% in 1996 to 0.5%.

The current differences among 3 journals in the number of authors whose published contributions did not meet ICMJE authorship criteria could be explained by many factors, including journal size, type of research published, and origin of authors, as well as different authorship/contribution policies, procedures, and forms. The Author's Form in *Annals* asks individual authors to choose from 10 research contribution codes associated with letters *a* through *j* and then mark these letter codes in a space provided under author information; ICMJE criteria are stated in an Information for Authors guide but not directly in the Author's Form, which is located on a separate Web page. *BMJ's* Guidelines for Authors (Authorship and Contributorship section) cite ICMJE criteria and

repeat the ICMJE statement that "participation solely in the acquisition of funding or the collection of data does not justify authorship." In addition, the *BMJ* guideline explains the concept of contributorship and asks authors to describe research contributions in their own words. *JAMA's* form for "Authorship Responsibility, Financial Disclosure, Copyright Transfer, and Acknowledgment" lists the ICMJE authorship criteria and includes a structured checklist of specific contributions with the number of contributions qualifying for each authorship criterion.

*Annals* and *JAMA* had similar median numbers of authors per article ( $n=7$ ), but almost double that in *BMJ*. This suggests that the size of the byline is not associated with the type of contribution disclosure but perhaps with other characteristics of the journals, such as types of research studies reported or geographic origin of authors. In our study, 30% and 28% of research articles published by *JAMA* and *Annals*, respectively, were randomized controlled trials, compared with 19% in *BMJ*. There were also differences in geographic origin of authors: 64% and 73% of authors in *Annals* and *JAMA*, respectively, were from the United States and 63% of authors in *BMJ* were from the United Kingdom. A common finding for all journals was that most honorary authors did not meet the second ICMJE criterion on contribution to manuscript writing or critical revision.

In conclusion, after several years of contribution disclosure practices in 3 general medical journals, the number of authors with published contributions that did not meet authorship criteria differs among these journals. Future research should address how these differences may be related to different authorship/contribution policies and procedures as well as different forms used to collect this information.

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**Acquisition of data:** Bates, Anić.

**Analysis and interpretation of data:** Bates, Anić, A. Marušić.

**Drafting of the manuscript:** Bates, Anić, A. Marušić.

**Critical revision of the manuscript for important intellectual content:** M. Marušić.

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