Misrepresentation by Ophthalmology Residency Applicants

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**Objectives:** To determine the percentage of publication misrepresentation among applicants to an ophthalmology residency, to compare that percentage with published percentages from other specialties, and to compare the number of US-trained applicants vs non–US-trained applicants found to misrepresent published articles.

**Methods:** Published articles in peer-reviewed journals listed on residency applications to the Jones Eye Institute from October 10, 2000, to December 1, 2004, were searched, excluding applications that were unavailable or were from current residents and faculty. The type of misrepresentation of published articles and the country of medical school training were recorded. Compared were US-trained applicants vs non–US-trained applicants to determine which group was more likely to list published articles and which group was more likely to have a misrepresented published article.

**Results:** Eight hundred twenty-one of 852 applications (96.4%) were reviewed. Five hundred fifty applicants (67.0%) were from US medical schools, and 271 applicants (33.0%) were from non-US medical schools. Two hundred one applicants (24.5%) listed peer-reviewed published articles. Misrepresentation of published articles was found in 15 applicants (5 US trained and 10 non-US trained). The mean percentage of applicants with misrepresentation per applicant pool was 1.9%, while the mean percentage per applicants listing published articles was 8.1%. The most common misrepresentation found was self-promotion on the author list (50.0%), followed by omission of other authors (25.0%), nonexistent articles (12.5%), and nonauthorship (12.5%). Foreign medical graduates were more likely to list published articles ($P = .008$) and to have a misrepresented published article ($P = .01$).

**Conclusions:** Ophthalmology has one of the lowest reported percentages of applicant publication misrepresentation in the literature. Foreign medical graduates were more likely to list published articles and to misrepresent published articles. Self-promotion on the author list was the most common type of misrepresentation found. Residency program directors should request copies of published articles from interviewing applicants.

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IN 1995, SEKAS AND HUTSON reported that 30.2% of physicians listing published articles on their applications to a gastrointestinal fellowship had some form of misrepresentation of their publications. Since then, 17 other studies of applicants to residency and fellowship programs in other medical specialties have found misrepresentation in 1.8% to 100.0% of applicants listing publications and in 0.8% to 16.1% of the total number of applicants. The wide range of percentages was addressed in a study of applicants to internal medicine residency by Hebert et al, who concluded that previous studies had overestimated the scope of the problem by an inadequate publication strategy. Speculative causes of applicant misrepresentation have included the desire to appear more competitive, the low likelihood of detection, the justification that everyone likely enhances his or her curriculum vitae, the competitiveness of the field, psychiatric problems, and mistakes owing to carelessness or misunderstandings. Six studies compared rates of publication misrepresentation among foreign medical graduates (FMGs) vs US medical graduates. Three of 6 found statistically higher rates of misrepresentation among FMGs, while the other 3 did not. Among the FMGs, Caplan et al cited concern about the competitive disadvantage of FMGs and about the opportunity of training and practicing in the United States as a possible reason for these findings.
A review of the current literature found no previous study of misrepresentation by residency applicants to ophthalmology.\(^{19}\) Therefore, the objectives of this study were to determine the percentage of publication misrepresentation among applicants to an ophthalmology residency, to compare that percentage with published percentages from other specialties, and to compare the number of US-trained applicants vs non–US-trained applicants found to misrepresent published articles.

### METHODS

After obtaining approval from the institutional review board at the University of Arkansas for Medical Sciences, applications were examined from the San Francisco Match Centralized Application Service for ophthalmology residency positions received by the Jones Eye Institute at the University of Arkansas for Medical Sciences from October 10, 2000, to December 1, 2004. Applications that were unavailable for review and applications from current residents and faculty were excluded from this study. Each application was reviewed to determine if published peer-reviewed articles were listed and to determine the applicant’s country of medical school training. Abstracts, book chapters, and articles listed as submitted, in press, or accepted for publication were excluded. Articles published in journals that were inaccessible for verification were also excluded.

Listed articles were searched based on the extensive strategy used by Hebert et al\(^{11}\) to study applicants to internal medicine residency. The following sources were searched until the article was located: PubMed, Web of Science, Journal Citation Reports, Google Scholar, Article First, Academic Search Elite, CINAHL, PsycINFO, Education Resource Information Center, SciFinder Scholar, and a manual review of the journal cited. Searches used all available information (ie, author names, article title, and journal citation information) in combinations and separately. Other issues of the cited journal were searched to account for possible typographic errors in the reference. It was concluded that the article did not exist in the literature if it was not located after using these aforementioned sources.

The type of misrepresentation was recorded when found. Misrepresentation was defined in a manner similar to that by Caplan et al\(^{20}\) and includes the following: (1) reporting authorship of an article when not listed as an author, (2) listing an article that does not exist in the literature, (3) self-promoting the applicant’s name on the author list, (4) omitting other authors from the author list, and (5) reporting the article to be published in a more prestigious journal.

### RESULTS

During the study, it was discovered that some applicants reported abstracts as published articles. Although many applicants specified the difference, some made no distinction, allowing the appearance of more published articles. It was unclear if this should be considered misrepresentation. In their study of emergency residency applicants, Roellig and Katz\(^{17}\) considered this fraudulent. However, 17 other studies\(^{1,2,4-18}\) of residency or fellowship applicant misrepresentation did not. An ethics committee consisting of 12 academic ophthalmologists at the Jones Eye Institute was assembled to address this question. Although not unanimous, the majority opinion was that the wording on the San Francisco Match Centralized Application Service form asked for publications and did not specify that abstracts should be distinguished from articles. Because both can be considered publications, applicants with unspecified abstracts should not be considered to have misrepresented their published articles. Based on the recommendation of the ethics committee, this was excluded from the study definition of misrepresentation.

Last, the numbers of US medical graduates and FMGs were compared to determine if one group was more likely to list published articles and to determine if one group was more likely to have a misrepresented article. Comparisons were made using 2-tailed Fisher exact test. \(P < .05\) was considered statistically significant.

Eight hundred fifty-two candidates applied for 3 ophthalmology residency positions at the University of Arkansas for Medical Sciences from October 10, 2000, to December 1, 2004. Nine applicants were current residents or faculty and were excluded from review. In addition, 22 applicants were excluded from application year 2000. In that year, the applications received by residency program directors were in transition from paper to compact disk data. Although 124 applicants were listed on the compact disk, data were missing from 22 who had applied in paper format only. These applications were not retained by the department.

Eight hundred twenty-one applications (96.4%) were reviewed (Table 1). Among those, 550 applicants (67.0%) were from US medical schools, and 271 applicants (33.0%) were from non-US medical schools. Two hundred one applicants (24.5%) listed published articles in peer-reviewed journals. Of those reporting published articles, 119 applicants (39.2%) were US trained,

### Table 1. Number of Applications Reviewed and Number of Applicants Listing Published Articles

<table>
<thead>
<tr>
<th>Application Year</th>
<th>Applications Reviewed, No.</th>
<th>US-Trained Applicants</th>
<th>Non–US-Trained Applicants</th>
<th>Applicants Listing Articles</th>
<th>US-Trained Applicants Listing Articles (^a)</th>
<th>Non–US-Trained Applicants Listing Articles (^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>102</td>
<td>72 (70.6)</td>
<td>30 (29.4)</td>
<td>20 (19.6)</td>
<td>14 (19.4)</td>
<td>6 (20.0)</td>
</tr>
<tr>
<td>2001</td>
<td>158</td>
<td>112 (70.9)</td>
<td>46 (29.1)</td>
<td>38 (24.1)</td>
<td>22 (19.6)</td>
<td>16 (34.8)</td>
</tr>
<tr>
<td>2002</td>
<td>184</td>
<td>127 (69.0)</td>
<td>57 (31.0)</td>
<td>43 (23.4)</td>
<td>28 (22.0)</td>
<td>15 (26.3)</td>
</tr>
<tr>
<td>2003</td>
<td>179</td>
<td>116 (64.8)</td>
<td>63 (35.2)</td>
<td>46 (25.7)</td>
<td>25 (21.6)</td>
<td>21 (33.3)</td>
</tr>
<tr>
<td>2004</td>
<td>198</td>
<td>123 (62.1)</td>
<td>75 (37.9)</td>
<td>54 (27.3)</td>
<td>30 (24.4)</td>
<td>24 (32.0)</td>
</tr>
<tr>
<td>Total</td>
<td>821</td>
<td>550 (67.0)</td>
<td>271 (33.0)</td>
<td>201 (24.5)</td>
<td>119 (21.6)</td>
<td>82 (30.3)</td>
</tr>
</tbody>
</table>

\(^a\) Percentage of US-trained applicants.  
\(^b\) Percentage of non–US-trained applicants.
and 82 applicants (40.8%) were not. A comparison of US medical graduates vs FMGs reporting publications found that FMGs were more likely to list published articles on their application (P = .008). For 22 applicants, at least 1 article was excluded from review because of an inaccessible journal.

Over 5 years of study, misrepresentation of published articles was found in a mean of 3 applicants (range, 1-6) per year (Table 2). The mean percentage of applicants with misrepresentation per applicant pool was 1.9% (range, 0.6%-3.0%). The mean percentage per applicants listing published articles was 8.1% (range, 2.2%-15.0%).

Fifteen applicants over the 5-year period misrepresented published articles. Five were trained in the United States, and 10 were trained outside of the United States (Table 3). A comparison of the 2 groups found that FMGs were more likely to misrepresent published articles (P = .01). The most common misrepresentation found was self-promotion on the author list (50.0%), followed by omission of other authors (25.0%), nonexistent articles (12.5%), and nonauthorship (12.5%). No examples of listing the article as published in a more prestigious journal were found.

**COMMENT**

To date, this study is the first to examine publication misrepresentation among applicants to ophthalmology residency. Based on the number of applications reviewed, it is the largest study of residency or fellowship applicant misrepresentation in the current literature. It is also the first study to examine residency or fellowship applicants across 5 application years. Although no level of publication misrepresentation is desirable, 1.9% per applicant pool and 8.1% per applicants listing published articles are the lowest reported among all previous studies except for internal medicine and dermatology.1-18 The present study expands on the question in the literature of whether FMG applicants are more likely to have a misrepresented published article than their US counterparts by finding a significant difference between the 2 groups.

It is difficult to know with certainty if the misrepresentations found in this study were examples of carelessness, innocent misunderstandings, or a willful intent to bolster the applicant’s competitiveness through deception. Two applicants listed published articles for which they were discovered not to be authors. One applicant claimed to be the first author, while the other applicant claimed to be the third among 4 authors. It is possible that these applicants may have participated in the projects at some level, creating an assumption of authorship. They may have originally been listed as an author but were removed in a resubmission to another journal, as one applicant listed an incorrect journal and month of publication. However, the other applicant correctly referenced the article and claimed first authorship. It is difficult to imagine that a first author could have unknowingly been eliminated and then looked up the citation to record it on the residency application without noticing the absence of his or her name. It is also concerning that neither nonauthor applicant was mentioned in the acknowledgment section of the published articles.
Two applicants listed published articles that could not be located by extensive searching. On their applications, each article was reported to be in a major journal indexed by the National Library of Medicine (Bethesda, Maryland). Because the authors and their article titles could not be located in these or any other accessible peer-reviewed publications, it is difficult to explain these misrepresentations as a misunderstanding or a typographic error.

Four applicants omitted author names from their listed publications, giving the appearance that fewer individuals were responsible for the work. One applicant listed 12 published articles and eliminated author names in 5 of them. Although these examples could be rationalized as carelessness, the applicants should have been aware of the correct number of authors when recording the reference information.

Half of the misrepresentations found were self-promotions on the author list. Similar to author name omissions, these errors could be owing to carelessness. If so, among 201 applicants who listed publications, it would be expected to find a roughly equal number of author list promotions and demotions. However, every case was a promotion of the applicant. Similarly, Caplan et al\textsuperscript{10} reported 7 instances of author self-promotion among 641 applicants to psychiatry residency. They found no case of author self-demotion. Furthermore, in all 8 cases of authorship promotion in the present study, the applicant self-promoted to first or second author, with second author being chosen slightly more often. If these acts were unintentional, it would be expected to find examples of self-promotion to third or fourth author, as many articles had multiple authors. However, no examples of lower promotion were found. Six of 8 applicants listed a single article with self-promotion, 1 applicant incorrectly claimed first authorship on 2 articles, and 1 applicant erroneously reported second authorship on 2 articles, suggesting a coincidence or a possible preference in the degree of self-promotion.

Medical licensure in the United States requires the completion of a US residency. Foreign medical graduates applying to US residencies may face a competitive disadvantage. The higher likelihood of FMGs to list publications than US-trained applicants reflects the need to strengthen their application. As already discussed, the greater pressure placed on FMGs to bolster their application to obtain a US residency may explain why significantly more FMG applicants misrepresented published articles.

There are limitations to this study. First, as a medium-sized residency program located in the South, candidates preferring to apply to programs of different size or location may not have applied to this institution. Therefore, these results may not generalize to all ophthalmology program applicant pools. Second, although this study found a lower percentage of applicant publication misrepresentation than almost all other similar investigations, comparisons must consider differences in the methodology. For example, I used a more extensive search strategy than many previous studies.\textsuperscript{1,3,5,9,11,13} Also, 12 studies of 18 included articles in press but not published after a defined time frame,\textsuperscript{1,2,5,7,9,12-15,17,18} and 5 studies considered articles in unlocated journals as examples of misrepresentation.\textsuperscript{1,5,6,9,11} I chose not to include these, as there are valid reasons why articles may be withdrawn before publication, and an unlocated journal may be inaccessible and not necessarily indicate fabrication. Therefore, the extent of the search protocol and the exclusion of articles in press or in unverifiable journals could explain why my study found a lower percentage of misrepresentation compared with others.

We should not be surprised to learn that willful misrepresentation occurs at some level, as the risks of detection are low and the rewards of a residency position are high. Residency program directors cannot be expected to verify all information presented by every applicant to their program. However, they should be aware that misrepresentation was found for every application year in this study and was as high as 11.1% to 15.0% among applicants listing publications in 2 of 5 study years. Small changes could help minimize these occurrences. Many have recommended that applicants invited to interviews should be asked to forward copies of their published articles for verification and interview facilitation. In addition, the San Francisco Centralized Application Service should consider rewording the residency application to require the differentiation of abstracts, articles in press, and published articles. Residency program directors who choose not to ask applicants to forward published articles should consider verifying publications listed by interviewing applicants, keeping in mind that author self-promotion and author omission are the most common forms of article misrepresentation. Differences in study methods aside, it is comforting to know that misrepresentation among applicants to our field falls at the lowest end of the reported spectrum. The results of this study suggest that ophthalmology continues to attract high-quality and ethical applicants.

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