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Publication misrepresentation among otolaryngology residency applicants

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ABSTRACT

OBJECTIVE: To assess the extent of research publication misrepresentation among otolaryngology residency applicants and to determine applicant attributes associated with misrepresentation.
STUDY DESIGN: Prospective study.
SETTING: A single otolaryngology residency program.
SUBJECTS AND METHODS: Electronic Residency Application Service (ERAS) applications to the incoming 2010 class of an otolaryngology residency program were reviewed for peer-reviewed journal publications reported as "provisionally accepted," "accepted," or "in print." Publications were verified by searching PubMed, Google Scholar, and electronic journals. Applicants with remaining unverified publications were e-mailed before announcing interviews. Erroneously reported or unverifiable publications were considered misrepresented.
RESULTS: There were 432 publications reported by 173 of 325 applicants (53.2%). Twenty-two publications (5.1%) were misrepresented by 17 applicants (9.8%). Contacting applicants verified 26 publications and identified 10 errors. Seven publications were inappropriately reported as provisionally accepted, three articles were not peer-reviewed, and applicants were erroneously listed as first author on two publications. Ten publications remained unverifiable. Multivariate logistic regression models showed that being an international medical graduate ($P = 0.002$) and male gender ($P = 0.040$) were predictors of misrepresentation after adjusting for potential confounders. Among international medical graduates alone, no attributes were associated with misrepresentation. All U.S. applicants with misrepresented publications were male ($P = 0.033$) and were from a medical school not ranked in the top 50 by *U.S. News & World Report* for research ($P = 0.002$) or primary care ($P = 0.018$).
CONCLUSION: Misrepresentation of research experience exists among otolaryngology residency applicants. ERAS should develop standardized definitions for publication statuses to help reduce inadvertent misrepresentation.

The medical residency application process in the United States is increasingly competitive. From 2006 to 2010, the increase in the number of residency applicants has greatly outpaced the increase in the number of positions, and the successful match rate for all applicants has continued to decline. In 2010, there were over 5000 (20%) more National Resident Matching Program (NRMP) participants than there were total residency spots available.[1]

Residency applicants may feel compelled to overstate their accomplishments due to the competitiveness of securing a position. Researchers in a number of specialties, including emergency medicine, general surgery, internal medicine, neurosurgery, ophthalmology, orthopedic surgery, pediatrics, psychiatry, radiation oncology, and radiology, have documented that six to 41 percent of total publications on residency and fellowship applications are inaccurate or misrepresented.[2-16] On the other hand, one study determined that 99 percent of research publications to two internal medicine residency programs were verifiable.[17]

Misrepresentation of research publications has not been assessed in otolaryngology residency applicants. Like many of the other specialties previously studied, otolaryngology is highly competitive. In 2010, there were 115 (41%) more otolaryngology residency applicants than residency positions available. Sixty-five (20%) applicants who ranked only otolaryngology residency programs did not match.[1] All but one of the previous studies examining applicant misrepresentation were retrospective, and the single prospective study did not assess the effectiveness of contacting applicants to verify publications.[9] We sought to explore misrepresentation among otolaryngology residency applicants prospectively by asking applicants for verification when our search methods could not verify a publication. As an incentive to respond, applicants were contacted for verification before any residency interviews were offered. This approach attempts to minimize error and may yield a more accurate view of misrepresentation. In this regard, we prospectively reviewed the Electronic Residency Application Service (ERAS) applications to the University of Pittsburgh Otolaryngology Residency Program for the incoming 2010 class to assess the extent of misrepresented research publications, determine attributes associated with misrepresentation, and ascertain the time necessary for this review.

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Methods

This study was determined to be quality assurance by the institutional review board of the University of Pittsburgh and was exempt from review. Residency applications to the University of Pittsburgh Otolaryngology Residency Program were submitted through ERAS. Applications for the year 2010 were prospectively reviewed for journal articles in the "Peer Reviewed Journal Articles/Abstracts" and "Peer Reviewed Journal Articles/Abstracts (Other Than Published)" sections of the ERAS application that were reported as provisionally accepted, accepted, or in print. Articles that were listed as submitted, as well as all abstracts, posters, presentations, and chapters, were excluded. Data extracted from each application included age, gender, United States Medical Licensing Examination (USMLE) Step 1 score, interval between undergraduate graduation and start of medical school, interval between medical school graduation and planned start of residency, type of medical school, additional graduate degree(s), *U.S. News & World Report* ranking of medical school, language of publication, and number of publications per applicant.

Publications were verified between September and November 2009 in up to three rounds of searching (Fig 1). Articles successfully verified in any round were not searched for in subsequent rounds. In round 1, PubMed and Google Scholar were searched by a physician or medical student. In round 2, PubMed, Google Scholar, and the online journal of the citation were searched by a professional otolaryngology librarian. In round 3, *Ulrich's International Periodicals Directory* was consulted, and national and/or foreign libraries were contacted by a professional librarian for unverifiable in-print articles. Simultaneously, applicants were e-mailed by the residency program director before any residency interviews were offered. The original acceptance notification from the journal was requested as verification.

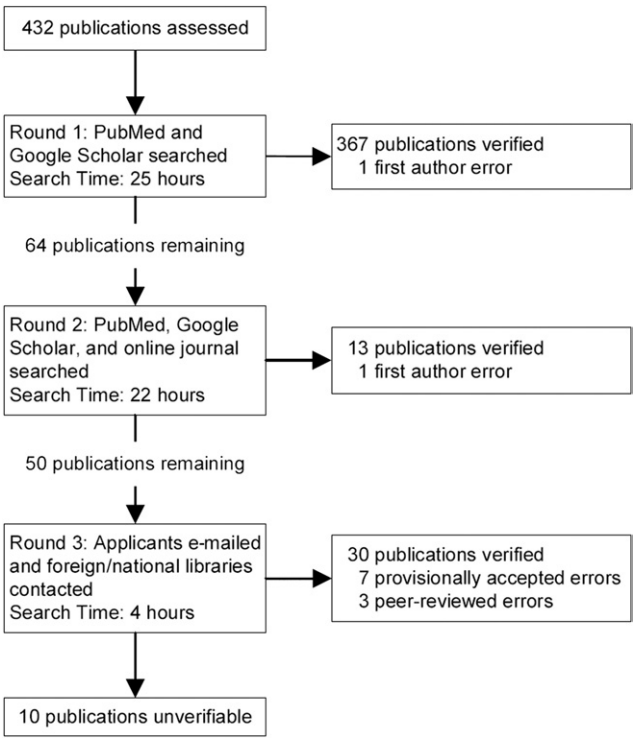

Figure 1 Search used to verify research publications of applicants to a U.S. otolaryngology residency program, 2010.

Misrepresented publications were defined as those publications that were either unverifiable or erroneously reported. Types of errors included inappropriately reporting an article as provisionally accepted when it was submitted or rejected, incorrectly listing oneself as first author on the ERAS application, and improperly listing that the article appeared in a peer-reviewed periodical. The definition used for "provisionally accepted" was a commitment by the journal to publish the article.

Data were entered into an Excel spreadsheet (Microsoft Corporation, Redmond, WA). Statistical analysis was performed using Stata SE 10.1 software (StataCorp LP, College Station, TX). Univariate analysis was performed using the t test and χ^2 test, and multivariate analysis was conducted using logistic regression models. All tests were performed using a two-sided alpha level of 0.05 for statistical significance.

Results

Three hundred twenty-five applications were received for residency positions starting July 2010 in the University of Pittsburgh Otolaryngology Residency Program prior to October 15, 2009. Fifty-three percent (173 of 325) of applicants reported 432 peer-reviewed publications that were reported in ERAS as "provisionally accepted," "accepted," or "in print." There were 406 articles published in English, five in Chinese, three in Farsi, and one in French. The language of 17 articles could not be determined. Searching the literature via online means and contacting other libraries could not account for 46 publications (10.7%), 41 of which were listed as provisionally accepted or accepted. Thirty-four of 37 applicants (91.9%) responded to our e-mail query. Contacting applicants verified 26 articles and identified 10 errors. Ten publications remained unverifiable. The total search time was 51 hours (Fig 1).

Seventeen applicants (9.8% of applicants reporting a publication, 5.2% of all applicants) misrepresented 22 publications (5.1%) (Table 1). Univariate analysis showed that gender, interval between undergraduate graduation and start of medical school, possession of doctorate or nondoctorate graduate degree(s), and number of publications per applicant were not associated with misrepresentation. However, being an international medical graduate (IMG) ($P < 0.0001$), older age ($P < 0.001$), having a lower USMLE Step 1 score ($P = 0.017$), and increasing duration between medical school graduation and planned start of residency ($P < 0.0001$) were independently associated with misrepresentation (Table 2). These four factors are correlated to each other and are potential confounders: On average,