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Outcomes of reapplication to otolaryngology residency: A prospective cohort study

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Abstract

Although the field of otolaryngology has experienced a decline in the number of applicants to our residency programs, otolaryngology remains a highly competitive field with an extremely strong applicant pool. Many highly qualified candidates cannot obtain a position in our field each year, and many of these candidates choose to reapply the next year. Data are lacking regarding reapplicants' success rate and the best gap year employment and training options for these reapplicants. Reapplicants were studied prospectively via a two-stage survey during the 2014-2015 and 2015-2016 application cycles. Success rates for the overall group were compared to those from published data, and success rates between subgroups were also compared. First-time reapplicants in the study performed extremely well. Their match rate (19/22) was not significantly different from that of traditional otolaryngology applicants (551/619, $p = 0.73$*) and was significantly higher than that of nontraditional applicants not in our cohort (23/62,* $p < 0.001$*). No significant difference was found between applicants by employment/training activities, with both researchers (11/12) and surgical interns (8/10,* $p = 0.57$*) performing well. Predictors of reapplicant success could not be assessed because only 3 reapplicants in the cohort were unsuccessful. First-time otolaryngology reapplicants remain a highly competitive group of applicants to our field, regardless of employment/training activities undertaken after graduating medical school.*

Introduction

By any measure, the field of otolaryngology–head and neck surgery is one of the most competitive specialties in the United States. For example, in 2016, the average United States Medical Licensing Exam (USMLE) Step 1 score for matched applicants to otolaryngology programs was 248, higher than every field except dermatology (249) and integrated plastic surgery (250).[1] In years past, high levels of competition have led to many highly qualified applicants going "unmatched" but still desiring to pursue a career in the specialty.

The first difficult decision these applicants face is whether it is worthwhile to reapply to the specialty. Unfortunately, data are lacking regarding their odds of a successful match as a "reapplicant." In addition to their yearly report of applicant totals and match rates, the National Resident Matching Program (NRMP) publishes additional competitiveness data for matched and unmatched applicants in most specialties, including USMLE scores, Alpha Omega Alpha Honor Medical Society (AOA) standing, number of publications, and other measures, in their "Charting Outcomes in the Match" publication every 2 to 3 years.

Before 2016, the data were reported for both United States allopathic senior medical students (traditional applicants) and the heterogeneous group "independent applicants," which includes reapplicants, foreign medical graduates, osteopathic medical students, those applying to specialties for a second residency, and others. For 2016, even the independent applicant data were not available. The otolaryngology match rate for reapplicant U.S. allopathic graduates is unknown and/or unreported but may be higher or lower than for the entire independent group.

During the "gap year" between application cycles, motivated reapplicants will have several months to improve their applications, and they are offered several options that may help them to do so. They may enter a training program in a closely related field (usually general surgery), or they may engage in clinical or basic science research within a research-oriented otolaryngology department. Each option has advantages, making it attractive for different reasons.

A research fellowship allows candidates to improve their research credentials and obtain letters of reference from well-published faculty members, while a year of residency training in a related field will allow the candidate to exhibit clinical decision-making skills similar

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to what is demanded of an otolaryngology resident. Research fellowships may or may not offer the candidate a competitive salary. A surgery resident may have the option to continue in general surgical training at a postgraduate year-2 (PGY-2) level if the reapplication to otolaryngology is unsuccessful. The challenge of deciding whether and how to reapply is often compounded by the mere hours to make this profoundly impactful decision during the NRMP's Supplemental Offer and Acceptance Program (SOAP) (previously known as "the scramble").

There are few data regarding which option, if any, offers the best chance for reapplicants to obtain a position in an otolaryngology residency, and no prospective data on the topic exist. Therefore, we undertook this prospective study to help answer this question and to obtain prospective data on the match rate for otolaryngology reapplicants.

Participants and methods

This prospective cohort study was conducted with IRB approval from August 2015 through April 2017, with data collection performed by survey in two stages.

The first stage of the survey obtained demographic data and information regarding the reapplicants' competitiveness within the applicant pool, including under-represented minority status, USMLE score, AOA status, number of publications authored, and the number of interviews obtained during the previous year's application cycle, as well as whether they were conducting a clinical internship or research during their gap year (hereafter referred to as *interns* or *researchers*).

Reapplicants also provided an institutional email address that allowed the study team to verify their association with a teaching hospital. This email address was used in late March 2017 to provide subjects with a linked second-stage survey that asked them whether their reapplication was successful and whether they matched to the institution at which they were performing their gap year activity.

Subjects were recruited initially from two sources. Applicants to our institution's residency program for the 2014-2015 cycle were reviewed on the NRMP database to determine whether they were successful in obtaining an otolaryngology position. Those who were unsuccessful were sent an email invitation to join the survey study.

The second source of subjects was a popular online message board frequented by otolaryngology applicants to discuss the application process (**www.otomatch.com**). With permission from the website administrator, a message was posted describing the study and inviting reapplicants to participate. For the second year of the study, we used the message board only and reserved the email for additional recruitment, but it was not needed. The study enrollment period each year lasted 1 month, beginning in the early fall before the start of the residency interview season for most programs.

U.S. allopathic graduates who had applied unsuccessfully once to otolaryngology residencies were included in the study. Exclusion criteria included osteopathic graduates, international graduates, military applicants, applicants for whom otolaryngology was not their first choice specialty, and those planning to couples match.

Data obtained from the study were held in strict confidence from faculty, who could use it to identify applicants in the active applicant pool. The data were collected by the corresponding author, a resident, who did not participate in applicant interviews or the ranking of applicants. Although baseline demographic data including sex and under-represented minority status were obtained, these data were intentionally limited to reassure applicants that anonymity would be preserved.

Instead of asking for an exact USMLE score, applicants were asked to specify into which five-point range their USMLE scores fell to further de-identify the data. To incentivize participation, a $200 gift certificate to a popular online store (**Amazon.com**) was awarded to the winner of a random drawing at the end of each year of the study. The winner was notified via email.

After the second year of the study, a *post hoc* analysis was made to compare reapplicants in our study with the match rate of all traditional and independent applicants during the years of the study. When the match rate for our cohort was compared to nontraditional applicants, we subtracted our cohort from the nontraditional totals to avoid duplication of these applicants into both pools.

Comparisons between groups were made with the Student *t* test for continuous variables, the chi-square test for dichotomous variables, and the Mann-Whitney *U* test for the ordinal variable of USMLE score ranges. These computations were performed using free-to-use online software from **graphpad.com** and **socscistatistics.com.**

Results

Twenty-three reapplicants satisfying all inclusion criteria agreed to be surveyed over both years of the study. A response rate was not calculable from data published by the NRMP. However, 100% of applicants who completed our first survey also completed the second survey.

No statistically significant difference was found between interns and researchers regarding under-represented minority status, USMLE scores, or number of interviews in the prior application cycle. A trend toward higher numbers of research projects for researchers was observed, although no comparison demonstrated statistical significance. (table, figure)

The number of researchers and interns in our cohort was nearly evenly split, with 12 researchers and 11 interns participating. Nineteen applicants successfully obtained an otolaryngology residency position: 11 of 12 (91.7%) researchers and 8 of 11 (72.7%) interns. All successful

Table. Baseline characteristics of interns and researchers*

	I	R	*p* Value†
Total no.	11	12	
No. males	6	8	0.68
Under-represented minorities	3	1	0.32
AOA members	5	6	1.00
First-author papers accepted	0.55	1.42	0.12
Non–first-author papers accepted	0.73	3.67	0.09
First-author presentations	1.27	2.42	0.19
Previous applications	67.91	64.25	0.58
Previous interviews	9.73	10.33	0.84

**Numbers are expressed as totals or means.*
†p *Value of chi-square or Student* t *test, where appropriate.*
Key: I = interns; R = residents; AOA = Alpha Omega Alpha Honor Society.

reapplicants obtained their positions in the main residency match; none obtained positions outside the match or for PGY-2 positions. One of the interns who did not match into otolaryngology changed course and decided to apply to a different specialty, bringing the match rate to 8 of 10 (80%) for interns and 19 of 22 (86.4%) overall.

The difference in match rate between researchers and interns was not statistically significant ($p = 0.57$). With only three reapplicants failing to match, we did not perform analyses of predictors of match success.

Both unmatched interns were able to continue in their training at a PGY-2 level; the unmatched researcher began at a PGY-1 level. Three of 11 (27.3%) matched researchers successfully matched to the program where they were completing their research gap year activities and 8 did not. Two of 8 (25.0%) matched interns matched to the institution where they had been working the past year and 6 did not. Researchers and interns matched with near equal rates to their gap year institution ($p = 1.00$).

In the 2015-16 application cycle, 272 of 314 (86.6%) traditional applicants successfully matched into otolaryngology. In the 2016-2017 cycle, 279 of 305 (91.5%) traditional applicants successfully matched, yielding a total of 551 of 619 (89.0%). There was no significant difference between this match rate and that of our reapplicant cohort ($p = 0.73$).

In the 2015-16 application cycle, 56 nontraditional applicants applied to otolaryngology in the main residency match, and 30 of them matched. In the 2016-17 cycle, 28 nontraditional applicants applied to otolaryngology in the main residency match, and 12 matched, yielding a 2-year nontraditional match rate of 42 of 84 (50.0%). Subtracting our surveyed applicant pool (19/22) from this group results in a match rate of 37.1% (23/62). The difference between the two match rates was significant ($p < 0.001$).

Unfortunately, since the NRMP does not publish the number of U.S. allopathic graduates that apply to each specialty each year, determining the overall response rate to our survey invitation is not possible. However, the number of U.S. allopathic graduates that are successful is published yearly. Our study featured 19 of the 29 U.S. allopathic graduates that successfully matched during the 2 years of the study.[2]

Discussion

This study is the first prospective study of otolaryngology reapplicants that examines two difficult questions they face: (1) What are the odds of matching as a reapplicant, and (2) is an reapplicant in better position to match after completing a year of research versus a year of surgical training.

Our study indicates that highly motivated reapplicants likely have an excellent chance to obtain a residency position in our specialty, regardless of whether they pursued research or internships. The match rate for reapplicants in our cohort was even slightly higher than the match rate for traditional applicants during the years we conducted our study.

Before this study, the only available data reported the success rate of nontraditional applicants, which is a heterogeneous group that also includes international medical graduates and osteopathic medical students.

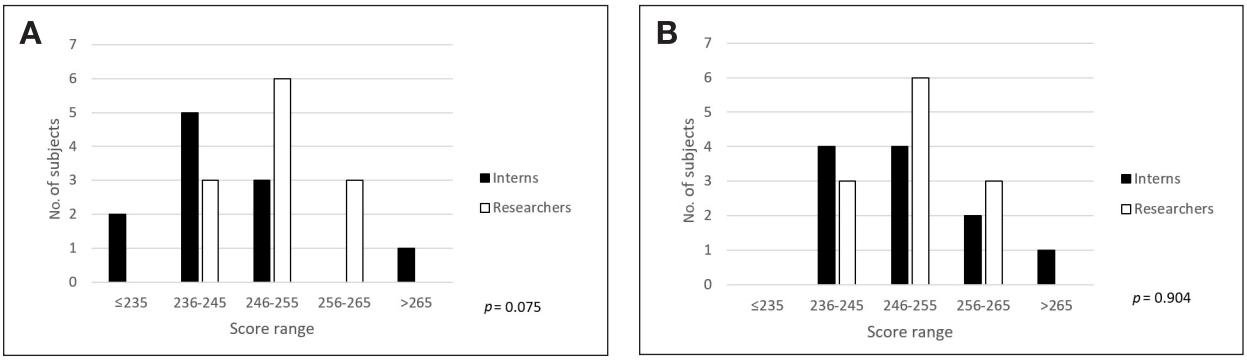

Figure. ***A****: Analysis of United States Medical Licensing Exam (USMLE) Step 1 scores for interns and researchers indicated no difference in scores between the two groups.* ***B****: Analysis of USMLE Step 2 clinical knowledge scores for interns and researchers indicated no difference in scores between the two groups.* (p = p *value of Mann-Whitney* U *test comparison between groups.)*

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Our data show that first-time allopathic reapplicants who responded to the survey had a significantly better match rate than the pool of other nontraditional applicants. Although the comparison likely still included several first-time allopathic reapplicants that did not participate in our study, the difference in success between all first-time allopathic reapplicants and all remaining nontraditional applicants may be even higher than suggested by this study.

A 2013 study surveyed orthopedics residency program directors and chairpersons regarding reapplicants, and the results indicate that university-affiliated programs favored research years for reapplicants, whereas community-based programs did not.[3] However, no data on the actual performance of reapplicants were compiled.

A 2011 cross-sectional study of dermatology reapplicants demonstrated several factors that were associated with improved match outcomes.[4] Unsurprisingly, these included higher USMLE scores (including Steps 1, 2, and 3), AOA standing, more listed honors, a letter of recommendation from an attending dermatologist, and more research experience. General medicine internships were better for gap year activities than other internships. Overall reapplicant success was low (20.8%).

A retrospective study from 2016 evaluated the success rate of orthopedics reapplicants over the previous 20 years by tracking NRMP data and data from LinkedIn and professional websites for all applicants to the authors' institution.[5] Most (>90%) reapplicants pursued an internship, and there was no significant difference in reapplicant success based on gap year activities. Overall success was 40 to 50%.

Given these published statistics, we were surprised to find that our data showed such success for our reapplicant cohort. Respondents to our study might have self-selected as highly motivated candidates who felt so confident in their chances that they did not feel intimidated by sharing their data with an academic institution, which could have artificially inflated our apparent success rate via survey sampling bias. Of the 2 years, our survey reached 22 of 84 nontraditional applicants (26.2%); however, it is not possible to determine the survey response rate among first-time allopathic applicants based on available data.

This low-powered study showed no significant difference between the success rate of researchers and interns. Researchers had an increased number of research activities as of early autumn, when study enrollment occurred, but this trend was not significant. Ascertaining whether this activity reflected old research activities undertaken before the failed match cycle or if the researchers were able to publish additional projects within the 6- or 7-month time frame between their failed match and study enrollment is not possible.

Application dynamics continue to shift year to year. The 2016-17 application cycle was one of the kindest in many years to otolaryngology applicants. The number of applicants was the lowest in years; the match rate for traditional applicants was 92.1% and the overall match rate was 87.9%.[2] In 2013, the match rate for traditional applicants was just 71.3% and the overall match rate was 65.6%,[6] both all-time lows.

The recent, higher match rate for traditional applicants probably results in fewer and lower-quality reapplicants the next year. However, the average USMLE Step 1 score for otolaryngology applicants has risen each year, and this trend suggests that the quality of reapplicants should continually improve as the overall applicant pool becomes stronger by this measure.

Given both these trends, it is reasonable to consider that the applicant pool is shrinking because the "bottom" of the applicant pool has been eliminated from the specialty, as was suggested in a pair of publications in 2017.[7,8] The data we present should prove encouraging to those candidates who may be considered less competitive: Even if an applicant fails to match on the first attempt, reapplication remains viable for motivated applicants who are dedicated to the field of otolaryngology.

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