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COVID-19 and the Otolaryngology Residency Match: Rising Incidence of Home Matches

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Objectives/Hypothesis: To quantify the effect of the coronavirus disease 2019 (COVID-19) pandemic upon the 2020 to 2021 residency match for Otolaryngology-Head and Neck Surgery (OHNS).

Study Design: Retrospective cohort design.

Methods: Residency match outcomes for all applicants to our institution during 2020 to 2021 were collected from the National Residency Matching Program including medical school of origin and matched program. Matches were categorized as to home-program, within-region, or out-of-region and sorted by US geographic region. Matches from the 2020 to 2021 cycle were compared to those from 2019 to 2020, as well as averages and trends from match cycles 2016 to 2020. Statistical analysis included descriptive statistics and chi-square testing.

Results: During 2020 to 2021, there were 436 applicants to our single OHNS program. From 2019–2020 to 2020–2021, the match rate decreased significantly for groups studied, including: All applicants (72.0% [268/372] to 64.7% [282/436]; $P = .025$); all US MD Senior applicants (76.5% [254/332] to 68.9% [262/380]; $P = .024$); and US MD Seniors specifically without a home program (77.5% [31/40] to 56.4% [22/39]; $P = .046$). The match rate for US MD Seniors with a home program did not change significantly (76.4% [223/292] to 70.4% [240/341]; $P = .09$). From 2019–2020 to 2020–2021, the proportion of US MD seniors who matched to home-program increased significantly (22.0% [49/223] to 30.0% [72/240]; $P = .05$).

Conclusion: The COVID-19 pandemic saw high volumes of OHNS applicants with an overall decreased rate of matching compared to previous years. These changes particularly affected applicants without home programs. Home-program matching increased significantly, likely as a consequence of the limitations placed on in-person away experiences including interviews.

Key Words: Residency, matching, Otolaryngology-Head and Neck Surgery, National Residency Matching Program, coronavirus disease 2019.

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INTRODUCTION

The annual residency match into Otolaryngology–Head and Neck Surgery (OHNS) has become increasingly competitive in recent years. The metrics most often used to assess applicant competitiveness, primarily United States Medical Licensing Examination Step 1 scores and number of research publications, have continually increased over recent years.¹ In 2021, of the 378 US MD Senior applicants who ranked otolaryngology as their only specialty choice, 28% (106/378) went unmatched.² This striking proportion of unmatched applicants exceeded that of other competitive residencies such as orthopedic surgery (21.7%), plastic surgery (20.1%), and neurological surgery (19.8%).² These figures represent a continuation of a trend present in OHNS since 2017. The number of training positions has remained relatively stable in the

specialty, with a net zero new positions added from 2020 to 2021. However, with each passing cycle since 2016 to 2017, there has been an increase in the number of applicants into the specialty. This inevitably results in a greater number of unmatched applicants each year.^{2–7}

The process of applying, interviewing, and matching have all been challenged by the COVID-19 pandemic. During the 2020 to 2021 application cycle, extensive policy changes were implemented in the interest of public health and to mitigate risk of spreading infection. These changes included, but were not limited to, suspension of away rotations, limitations upon travel between programs, suspension of in-person conferences and meetings, and implementation of virtual alternatives in lieu of in-person rotations and interviews.^{8,9} We present 2020 to 2021 match cycle data from applicants to our institution and offer a comparison to previously published data from 2015 to 2020 in order to quantify the changes in the residency match outcomes during the COVID-19 pandemic.

MATERIALS AND METHODS

Deidentified applicant data were available for the 2020 to 2021 Electronic Residency Application Service (ERAS) cycle from our Accreditation Council for Graduate Medical Education-accredited OHNS residency program. Applicant data collected were limited to year of application and Association of American Medical Colleges identification number (AAMC ID). Personal information including name, gender, race, awards, scores, away

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TABLE I.
Comparison of Application Volume to Our Institution.

	2019–2020 N	2020–2021 N	P
Applying to our institution			
All applicants	372	436	
US MD seniors (% all applicants)	332 (90.6)	380 (87.1)	.36
US MD seniors, with home program (% US MD applicants)	292 (88.0)	341 (89.7)	.45
US MD seniors, no home program (% US MD applicants)	40 (12.0)	39 (10.2)	.45
US MD senior applicants, by region	N (%)	N (%)	
West	45 (13.6)	49 (12.9)	.80
South	128 (38.6)	136 (35.8)	.45
Northeast	83 (25.0)	110 (28.9)	.28
Midwest	76 (22.9)	85 (22.4)	.87

Significance = $P < .05$.

rotations, letters of recommendation, or other identifying information was not collected for privacy purposes. Senior-level students from medical schools based in the United States (US MD Seniors) were selected for further analysis for their relative homogeneity and applicability of their trends. Applicants from Puerto Rico were counted as part of the International student group. Applicants from medical schools which did not have an affiliated OHNS residency were selected for further analysis. Methods were largely identical to those outlined previously in Bernstein et al.¹⁰

States were sorted into US Census-designated geographic regions: West, South, Northeast, and Midwest.¹¹ Matches were categorized as “home-program” (those who matched at the institution affiliated with their medical school of graduation), “home-region” (those who matched to nonhome programs within the same geographic region as their medical school), and “out-of-region.” Proportions of total matches were calculated and compared. The match characteristics of US MD Senior applicants who lacked home programs were also recorded. These applicants were excluded from calculations on proportional matching to home programs. To assess for any significant changes in matching, the results from the 2020 to 2021 application cycle were compared to the results from the previous years of matching 2015 to 2020. Statistical analysis was completed with SPSS and included pairwise analysis by Fisher exact tests and chi-square tests with level of significance set to $P < .05$.¹² This study was reviewed and provided exemption from informed consent by our university’s Institutional Review Board.

RESULTS

During the 2020 to 2021 application cycle, 436 individuals applied to our single institution OHNS residency program, of which 87.1% (380/436) were US MD Seniors. This comprised 67.3% (380/565) of all US MD Senior applicants to OHNS residencies, according to ERAS data.¹³ Of US MD senior applicants to our institution, 10.2% (39/380) attended medical schools without an affiliated OHNS residency. This was a slight decrease from 2019 to 2020, where 12.0% (40/332) lacked a home program. Regionally, the South contributed the largest proportion of US MD Senior applicants (35.8%, 136/380). The West contributed the smallest proportion of applicants

(12.9%, 49/380). There were no significant differences in proportion of applicants by region between 2019 to 2020 and 2020 to 2021 (Table I).

For all applicants during the 2020 to 2021 cycle, the rate of matching into OHNS residency programs (“match rate”) was 64.7% (282/436). This was a significant decrease from 2019 to 2020 (72.0%, 268/372; $\chi^2 = 5.01$, $P = .025$) and lower than the previous 5 years of matching for applicants to our institution (range \pm SD = 75.4–96.4% \pm 10.6%). For US MD Seniors alone, the overall match rate was 68.9% (262/380), which was significantly less than the 2019 to 2020 cycle (76.5%, 254/332; $\chi^2 = 5.07$, $P = .024$). Stratifying by presence of home program showed that the match rate for US MD Seniors with a home program did not decrease significantly from 2019–2020 to 2020–2021 (76.4% [223/292] to 70.4% [240/341]; $P = .09$). However, for US MD Senior applicants without home OHNS programs, the match rate significantly decreased from 2019–2020 to 2020–2021 (77.5% [31/40] to 56.4% [22/39]; $\chi^2 = 3.98$, $P = .046$). Of the US MD Senior applicants to OHNS, 12.9% (49/380) matched into General Surgery or preliminary surgical residency programs during 2020 to 2021. The rate of home-program matching for US MD Seniors rose from 22.0% (49/223) in 2019 to 2020 to 30.0% (72/240) in 2020 to 2021, which was a statistically significant increase ($P = .0495$). There were no significant differences in rates of within-region and out-of-region matching during the 2020 to 2021 match cycle compared to the previous year’s match (Table II).

Regional matching analysis did not reveal significant differences in matching across 2019–2020 to 2020–2021. The match rate for applicants without a home program, by region, was greatest for applicants from the West (100%, 4 of 4) and least for the Midwest (41.7%, 5 of 12) (Table III). Trendline analysis for US MD Senior applicants and matches from 2016 to 2021 revealed a positive trend of increasing annual volume of applicants (Slope = 36.971; $R^2 = 0.8077$) along with a down-trending annual match rate across the study period (slope = -5.18% ; $R^2 = 0.6564$) (Fig. 1).

TABLE II.
Comparison of Matching Outcomes for Applicants to Our Single Institution, 2019–2021.

	2019–2020 N Matched/Applied (%)	2020–2021 N Matched/Applied (%)	<i>P</i>
All applicants	268/372 (72.0)	282/436 (64.7)	.025*
All US MD seniors	254/332 (76.5)	262/380 (68.9)	.024*
US MD with home program	223/292 (76.4)	240/341 (70.4)	.090
US MD without home program	31/40 (77.5)	22/39 (56.4)	.046*
US MD seniors, matching to:	% Matched US MD seniors	% Matched US MD seniors	<i>P</i>
General surgery/surgical preliminary	N/A	49 (12.9)	
To home program	49/223 (22.0)	72/240 (30.0)	.0495*
Within region, not home	94/254 (37.0)	83/262 (31.7)	.20
Out of region	111/254 (43.7)	107/262 (40.8)	.51

*Significance = $P < .05$.
N/A = Data unavailable.

TABLE III.
Regional Application and Matching, US MD Seniors.

	2019–2020 N Matched/Applied (%)	2020–2021 N Matched/Applied (%)	<i>P</i>
West	36/45 (80.0)	37/49 (75.5)	.602
South	96/128 (75.0)	89/136 (65.4)	.090
Northeast	65/83 (78.3)	80/110 (72.7)	.374
Midwest	57/76 (75.0)	56/85 (65.9)	.207
US MD seniors, no home program			
West	2/3 (66.7)	4/4 (100.0)	.429
South	14/16 (87.5)	8/15 (53.3)	.054
Northeast	7/11 (63.6)	5/8 (62.5)	1.000
Midwest	8/10 (80.0)	5/12 (41.7)	.099

Significance = $P < .05$.

DISCUSSION

We were able to assess the 2021 matching outcomes for 67.3% (380/565) of all US MD Senior OHNS applicants according to ERAS,¹³ constituting a representative sample useful for further analysis of matching trends. It was observed that the rate of matching into OHNS decreased significantly from 2020 to 2021 for all applicants, for US MD Seniors, and specifically for US MD Senior applicants without home OHNS programs. These significant changes in match rates for 2021 are likely due to the COVID pandemic policy changes of limiting travel and in-person experiences.

The overall lower rate of matching into OHNS during 2020 to 2021 appears to be driven primarily by a greater number of applicants interested in the specialty. While applicant numbers rise, the number of available OHNS training positions has remained constant, at 350, from 2019–2020 to 2020–2021.² The upshot of this finding is that there is a greater interest in pursuing a career in OHNS than ever before. Efforts to expose medical students to OHNS practices through educational outreach appear to be largely successful. The downside of this greater interest is that in 2021, OHNS had the

largest proportion of unmatched applicants who ranked any single specialty as their only choice.² Along with the increasing number of competitive applicants, the number of peer-reviewed journal articles written by unmatched applicants increased significantly from 2020 to 2021. Meanwhile, scores and publications among matched applicants remained the same.¹⁴ As the field becomes more competitive, programs will need to innovate to identify the most qualified candidates.

Applicants without home programs were found to be significantly impacted in terms of successful matching rates during the 2020 to 2021 cycle. A survey study by Wang et al. identified significant differences in the rates of matching between applicants with and without home programs.¹⁵ From our study, it appears that the applicants without home programs were particularly vulnerable to changes in the status quo of the match and at a proportionally greater magnitude than their counterparts with home programs. In response to COVID-19, certain travel exceptions were made to allow these applicants to participate in away rotations, yet policy encouraged visitation of only the nearest programs, rather than typical cross-country travel.⁸ Compared to 2019 to 2020, we

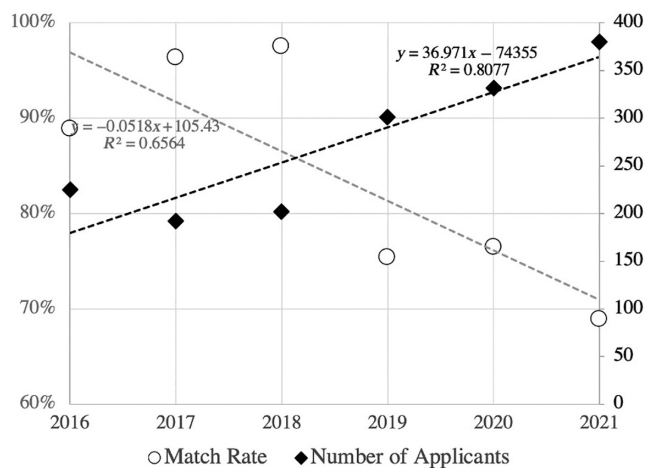


Figure 1. Trendline analysis of US MD senior applicants (2016–2021). Rising applicant numbers into Otolaryngology-Head and Neck Surgery (OHNS) mirror reduced rates of matching. ○ = match rate; ◆ = number of applicants.

found that a significantly greater proportion of applicants matched to their home programs, seizing upon an opportunity unavailable to applicants without home programs.

The volume of home-program matches into OHNS increased significantly between the 2019 to 2020 and 2020 to 2021 match cycles (22.0%–30.0%; $P = .0495$). During this timeframe, in-person activities were replaced by online alternatives with the exception of medical students rotating at their home programs.^{8,9,16} This allowed for nearly exclusive in-person exposure between home applicants and their respective home programs. It is reasonable to assume that this exclusivity influenced program selection of applicants as well as applicant formation of rank-order lists. Different trends of matching during COVID-19 were identified by Lenze et al.¹⁴; however, our focus specifically upon home matching, coupled with the large sample size, supports the significant findings we identified.

Looking toward the future, it is encouraging to see recent updates from the AAMC signifying the end to away rotation restrictions.¹⁷ Any policy regarding student travel should aim toward two goals: first, to improve the equality of opportunity between applicants with and without home programs and second, to provide programs with ample opportunity to assess how the student fits in with their residents. It is important to note that differences of experience between these groups extend beyond the fourth-year curriculum. Many students who develop an early interest in the specialty will take advantage of shadowing opportunities during the preclinical years of medical school. Students with home programs can often easily obtain access to clinical and operative settings to establish rapport with their faculty mentors. For those students without home Otolaryngology residencies, this may be more difficult, and we strongly suggest seeking these sorts of shadowing opportunities as early as possible. To support these students without home programs, the large conferences and meetings of our specialty could consider formalizing efforts to connect interested students

with volunteering surgeons for early exposure and mentorship.

Regarding the applicants who did not match into OHNS, 12.9% secured General Surgery or preliminary surgical positions. Presumably, some portion of these applicants plan to reapply into OHNS, while others may gravitate to other specialties or remain on the General Surgery track. In years to come, US MD nonseniors may comprise a substantial portion of applicants, bringing further competition into the match.

The limitations of this study include the finite sample size. Data are comprised of applicants to a single institution and may not entirely reflect national trends of matching. Individual information including merits, signals, or number of interviews was not collected for study. This may introduce confounding variables into the data, as there may be undetected differences between groups with and without home-programs or between matched and unmatched candidates. Lastly, demographic information was not collected, which may be of use in understanding the individual characteristics of successful matches. Future research could be directed toward understanding demographic differences between matched and unmatched applicants with and without home programs, as well as study the effect of “signals” upon outcomes for all students.

CONCLUSION

A study of the OHNS residency match in the setting of COVID-19 is presented by contrasting the 2020 to 2021 match cycle with the five previous years of matching. A higher volume of applicants during 2020 to 2021 resulted in overall reduced rates of matching compared to the previous year. There were significantly more home-program matches during 2020 to 2021, which may have been secondary to the COVID-19 pandemic travel restrictions. Applicants without home OHNS residency programs were found to have significantly lower matching rates, presumably as a result of policies limiting in-person rotation experiences.

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