Match 2017: Blindsided or Fumbled?

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Abstract
The field of otolaryngology has historically enjoyed extreme interest among residency applicants. However, in the past few years, the number of applicants has precipitously dropped, so that there is no longer a significant excess of applications. It remains important for academic programs to promote student interest in otolaryngology, to break down barriers that may dissuade excellent candidates, and to widen the welcome.

Keywords
residency, otolaryngology, match, SOAP, statistics, ERAS, NRMP, control chart, scramble, unfilled

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Let me set the scene by painting the historical mystique of the otolaryngology match process. Traditionally, the specialty has enjoyed an era of desirability and competitiveness, with match rate nadir for ranked US seniors at 81% in 2013. Applicants were counseled that high US Medical Licensing Examination (USMLE) board scores, multiple publications, and outstanding preclinical and clerkship scores were paramount. Because of the historic desirability of otolaryngology residency positions, applicants had felt the need to widely apply to programs to ensure successfully matching. This resulted in a phenomenon analogous to a cold war nuclear arms race: escalating number of applications per applicant. In 2015, applicants submitted a mean all-time high of 64.5 applications per applicant, equivalent of applying to 60% of otolaryngology programs.

Otolaryngology departments—while thrilled with the number of excellent applicants—felt the increasing work hours required for application review. Handling the deluge of applications necessitated more faculty time commitment and/or reduction of time spent scrutinizing each application. Meanwhile, contemporary medical and economic practice patterns continued to place increasing demands on academic physicians. Consequently, multiple commentaries popped in the literature calling for a reevaluation of the application process, with the aim of reducing costs and increasing fidelity of residency selection.

But, somewhere along this journey, the number of candidates interested in otolaryngology rapidly fell. Figure 1 is a superimposed color area/line chart that demonstrates the number of total Electronic Residency Application Service (ERAS) applications (yellow), total US and Canadian ERAS applicants (white line within the yellow area), total number of applicants who ranked otolaryngology programs (darker blue), total number of US seniors who ranked otolaryngology programs (lighter blue), number of otolaryngology match positions offered (red line), and number of filled positions through the initial match, not including supplemental offer and application process (purple) plotted per year. Since 2014, there has been a precipitous fall in otolaryngology ERAS applications, repercussions of which percolate through subsequent stages of the residency placement process: interview offers, ranking, and final match.

In 2017, the number of ranked US seniors (303) fell below the actual number of available positions (305). That year, 14 spots went unfilled after the initial match, an unprecedented number in recent otolaryngology history. Examining 2017 otolaryngology ERAS and National Resident Matching Program (NRMP) data in relationship to other surgically oriented specialties, the percentile “excess” number of ERAS applications (Figure 2) and percentile “excess” number of ranked applicants (Figure 3) were extremely tight. The number of ranked applicants exceeded the number of offered otolaryngology positions by only 8%. In other words, a very narrow pool of candidates was being considered by programs, leaving little wiggle room for error in the match.

The significance in the drop of applications can be analyzed using a control chart. Control charts are frequently used in quality control analysis to evaluate whether a process (such as manufacturing) is stably meeting quality metrics. Analyzing patterns of process variation is done to

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differentiate concerning variation (special cause variation) from nonconcerning variation (common cause variation). This allows one to head off problems before they occur or make changes to correct the deficient issue. Outcomes are plotted over time in reference to the estimated standard deviation ($\sigma$) from the mean value. Various rules (eg, Western Electric rules, Nelson rules) define circumstances that constitute when data are “out of control.” Using control charts to analyze ERAS data, the drop in applications seen in 2017 and 2018 exceeded defined control limits, whether examining either US/Canadian ERAS applicants (satisfies Nelson rule 5: 2 of 3 successive points falling farther than $2\sigma$ from the mean) or total ERAS applicants (satisfies Nelson rule 1: 1 point more than $3\sigma$ from the mean) (Figure 4 and Figure 5).

Have applicants been scared off from pursuing an otolaryngology residency? Matching into otolaryngology has been viewed as impossible or near impossible. A polished
application seemingly requires impeccable board scores, a plethora of authored publications, and a flawless transcript. To get ahead of their peers, some prospective students are even extending their medical school training to add a year of research or an additional degree to their qualifications. With such difficult “requirements,” medical school advisors may be steering prospective residents away from otolaryngology in fear of jeopardizing their graduating student match rates.

Yet, much research has been done within our specialty literature, showing that metrics such as board scores, Alpha Omega Alpha Honor Medical Society membership, and research poorly correlate to future resident performance. This leaves training programs scratching their heads to figure out what measuring sticks to apply when deciphering applications. In an attempt to humanize the selection process, our specialty has asked applicants to supply additional information, whether through the use of supplemental information on the personal statement or use of a talent

Figure 3. 2017 Percentile “excess” number of ranked applicants compared to positions offered. For example, otolaryngology exhibits 8% more ranked applicants than available positions in 2017.

Figure 4. Control chart analysis of US and Canadian applicants to otolaryngology. Data for 2018 match represent applications submitted as of October 15, 2017. Remainder of data is from February 15 of each match year. ERAS, Electronic Residency Application Service.

Figure 5. Control chart analysis of total Electronic Residency Application Service (ERAS) applicants to otolaryngology. Data for 2018 match represent applications submitted as of October 15, 2017. Remainder of data is from February 15 of each match year.
identification survey. Have these additional requirements inadvertently created the perception of being less inviting of candidates to our field?

Moving forward, our academic departments should consider the following:

- Beware of imparting a sense of elitism or exclusivity.
- Challenge traditional selection criteria and other barriers that may prevent excellent candidates who come from various pathways from entering into otolaryngology.
- Cultivate early otolaryngology experiences among students during medical school to increase the pipeline.
- Undertake a conscious effort to widen our welcome.

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