

UC Davis

Dermatology Online Journal

Title

Does it match? Analyzing self-reported online dermatology match data to Charting Outcomes in the Match

Permalink

<https://escholarship.org/uc/item/4604h1w4>

Journal

Dermatology Online Journal, 26(4)

Authors

Ramachandran, Vignesh
Nguyen, Hai-Yen
Dao Jr, Harry

Publication Date

2020

DOI

10.5070/D3264048340

Copyright Information

Copyright 2020 by the author(s). This work is made available under the terms of a Creative Commons Attribution-NonCommercial-NoDerivatives License, available at <https://creativecommons.org/licenses/by-nc-nd/4.0/>

Peer reviewed

Does it match? Analyzing self-reported online dermatology match data to Charting Outcomes in the Match

Vignesh Ramachandran¹ MD, Hai-Yen Nguyen¹ BSA, Harry Dao Jr² MD

Affiliations: ¹Baylor College of Medicine, Houston, Texas, USA, ²Department of Dermatology, Loma Linda University Health, Loma Linda, California, USA

Corresponding Author: Vignesh Ramachandran, Baylor College of Medicine, 1 Baylor Plaza, DeBakey Building, M-210, MS: BCM368, Houston, TX 77030-3411, vig.ramachandran@gmail.com

Abstract

Dermatology is arguably the most competitive residency (81.6% match rate for United States allopathic seniors) with significantly more applicants than available positions. To objectify this process, the National Residency Match Program (NRMP) has produced bi-annual Charting Outcomes in Match (COM) datasets, which aggregate data from the prior two application cycles and tabulate statistics to aid applicants. In parallel, online forums provide medical trainees with vast amounts of information, including residency application insights. Reddit medical school subforum compiles annual spreadsheets of anonymous, individualized applicant data to aid future applicants. We compared this data to NRMP data to show that although the data means are similar (e.g. Step 1), the Reddit dermatology spreadsheet collects more data and the individualized nature aids applicants in a personalized way unlike the mean aggregate data in NRMP. Under univariate analysis, Alpha Omega Alpha status, overall publications, and dermatology-specific publications are associated with interview invitation rates. Although limitations of the study include small data size and reporting bias, this is the first of its kind to our knowledge to compare these two often-used tools to aid dermatology applicants. Future endeavors should expand anonymous data reporting and use the data to carry out more extensive studies to investigate factors influencing the application process.

Keywords: dermatology, match, Charting Outcomes, National Residency Matching Program, Reddit, spreadsheet, medical education

Introduction

Dermatology is one of the most competitive residencies with an 81.6% match rate for United States allopathic seniors and significantly more applicants than available positions [1]. Matched dermatology applicants have the highest percentage of students within the Alpha Omega Alpha honor medical society of all specialties. Additionally, dermatology boasts the highest United States Medical Licensing Exam Step (USMLE) 1 and 2 scores for matched applicants [1]. These factors make applying to this specialty competitive and stressful. Historically, students have sought guidance from mentors and peers. To objectify this process, the National Residency Match Program (NRMP) has produced bi-annual Charting Outcomes in Match (COM) datasets, which aggregate data from the prior two application cycles and tabulate statistics to aid applicants [2].

In parallel, online forums provide medical trainees with vast amounts of information, including residency application insights. One of the most prodigious forums is Reddit, which boasts tens of thousands of topic threads and hundreds of thousands of posts within its medical school subreddit making information and conversation readily available [3]. In fact, annually, Reddit's medical school subreddit community generates specialty-specific spreadsheets in its medical school subreddit during the application season allowing applicants to self-report their application data [4]. Dermatology applicants frequent these spreadsheets before and during the application season.

At present, students applying for a dermatology residency have access to both tools, each of which has its advantages and disadvantages. Lacking is a comparison of the two datasets for dermatology residencies as has been performed in other specialties' research [5, 6]. Although the Reddit medical school community continues to grow as an important resource for residency applicants with over 203,000 members of its medical school subreddit the validity of its annual dermatology spreadsheet data and its concordance with NRMP data has not been verified [3]. Herein, the authors aim to a) summarize Reddit community self-reported dermatology applicant data, b) compare this data to NRMP's COM data, and c) assess the utility of Reddit community self-reported dermatology data in the residency application process.

Methods

Data collection

Residency application data was extracted from a publicly available dataset on Reddit entitled "Dermatology Application Info" (an aggregate sheet of self-reported data from the prior application cycles) and compared to data reported in NRMP's 2018 Charting Outcomes in the Match [7]. Institutional Review Board review was waived since the spreadsheets are publicly available. The Reddit dataset comprised included 2016-2017 and 2017-2018 application cycle data, which correlates with the time frame of reported data in the 2018 NRMP Charting Outcomes in the Match.

Data analysis

Statistical measurement and analysis were performed in Microsoft Excel (Microsoft, Redmond, WA) and R Studio (R Studio, Boston, MA). Normality tests were undertaken via the Shapiro-Wilk test. Mann-Whitney U test was used to assess associations for analyses with nominal input variables. Univariate linear regression was performed with continuous input variables. One-sample t-test and one-sample binomial test were performed to compare the Reddit dataset to NRMP Charting Outcomes in the Match values. In the Reddit dataset, cases with missing variables or those reported as not applicable were

excluded from comparative analysis of that variable to the NRMP data. A P-value of <0.05 was deemed statistically significant. NRMP matched (N=340) and unmatched (N=72) means were aggregated and computed via weighted average; in this manner, means were recalculated allowing for comparison with the Reddit dataset, which may include matched and unmatched applicants' data.

Results

Reddit Data Descriptive Analysis

The Reddit dataset consisted of 98 applicants' data ([Table 1](#)). Mean Step 1 and Step 2 scores were 249.34 (± 10.63) and 257.12 (± 10.75), respectively. Overall, 48 (50.53%) noted induction into Alpha Omega Alpha, the prestigious medical school academic honor society. The mean number of overall publications (abstracts, posters, and publications) was 11.73 (± 8.05) whereas the mean number of dermatology-specific publications was 4.64 (± 4.27). Medical students applying to dermatology residency often complete away rotations, which are clinical rotations performed in a specific specialty at another institution for any number of reasons. The mean number of away rotations in dermatology conducted in the Reddit cohort was 2.82 (± 1.18). Overall, 12 (12.63%) applicants had completed a PhD whereas 20 (21.05%) completed a research year. The overall interview rate (defined as interviews received as a percentage of total applications submitted) for applicants was 14.21% ($\pm 0.11\%$). These values and their respective ranges are depicted in [Table 1](#). The Shapiro-Wilk test determined that all the analyzed variables were non-normal at the $P < 0.05$ level of significance.

Comparison to NRMP

Charting Outcomes in the Match applicant characteristics of the combined matched and unmatched groups (N=412) are also reported ([Table 1](#)). Standard deviations are unavailable since NRMP's COM only displays a mean and not individual data points. Mean NRMP Step 1 score (247.60) was not significantly different than the mean Reddit community self-reported Step 1 score (249.34), ($P=0.055$) but did approach significance. On the

other hand, the mean NRMP Step 2 score (254.77) was significantly lower than the Reddit cohort (257.12), ($P < 0.05$). In the NRMP cohort, 44.40% were designated AOA applicants, which was not significantly different than the Reddit cohort (50.53%), ($P = 0.256$). The percentage of PhD applicants to dermatology in the NRMP cohort (5.85%) was significantly lower than that of the Reddit cohort (12.63%), ($P < 0.05$). The final variable that could be compared to the NRMP dataset was overall publications. The mean overall publications of the NRMP cohort were 13.63, which was significantly higher than the Reddit cohort's mean (11.73), ($P < 0.05$). Other variables were unable to be compared owing to NRMP lacking data on these attributes ([Table 1](#)).

Factors influencing Interview Invitation Rate

Interview invitation rate was defined as the number of interviews received as a percentage of total applications submitted. Univariate analysis of the Reddit variables ([Table 1](#)) revealed that only AOA status, overall publications, and dermatology-specific publications were associated with interview invitation rate (all $P < 0.05$). Step 1 score alone ($P = 0.365$), Step 2 score alone ($P = 0.660$), PhD completion ($P = 0.175$), research year completion ($P = 0.109$), and number of sub-internships in dermatology ($P = 0.286$) were not associated with interview invitation rate.

A multivariate analysis was also conducted with all variables. However, the model poorly accounted for the variance in the data ($R^2 = 0.41$) and was subsequently not presented.

Discussion

Applying to dermatology residency is competitive and students often turn to various resources for information regarding their competitiveness. To this end, NRMP's COM delivers applicants an extensive national dataset. It provides valuable information regarding mean scores, research experiences, AOA status, and a few other variables of interest. However, its most striking deficiency is a lack of individual data points to personalize interpretation. The Reddit community's self-reported dataset allows applicants

to gauge their candidacy for programs and compare their profiles to those of similar students, allowing for personalized insights. As the costs of applying to dermatology residency increase with increasing number of applications per applicant submitted, such information is extremely valuable [8]. Although the NRMP has released additional application tools such as the At-A-Glance Program Director Survey and the Interactive COM, these resources again provide aggregated data with modest response rate, limiting utility for individual applicants [9, 10].

Additionally, part of the appeal of online forums is the notion of longitudinal application cycle information. Since dermatology is competitive, medical students may select the field as their choice of residency to apply early in medical school. As such, Reddit's "DermApp" subreddit, along with other online forums for medical students such as Student Doctor Network (which also has a Dermatology community subforum and where users often share the link to the Reddit spreadsheet), can be used to enhance competitiveness by offering information before (e.g. acquiring research), during, and after the application process (e.g. assistance with rank order lists), [11, 12]. Many discussion threads are generated regarding these topics, and more [11, 12]. However, it is important to bear in mind that students utilizing online forums such as Reddit or Student Doctor Network for information on dermatology residencies may encounter posts and topics inducing unnecessary stress and anxiety vis-à-vis subjective opinions of forum members. Applicants would be prudent to be aware of this double-edged sword when considering forums. Notably, the spreadsheet can be accessed and used independent of the forum, foregoing commentary from members. Overall, the Reddit medical school subreddit self-reported data for dermatology appears to be a very useful and compelling tool for students applying to dermatology residency.

In comparing Reddit to NRMP data our analysis shows that the Reddit cohort tends to have higher mean scores, percentage of AOA members, and PhD students. However, only Step 2 scores and PhD status were significantly different between the two datasets whereas overall publications were

significantly lower in the Reddit cohort. Furthermore, the wide range of scores and similar means even in significantly different categories (such as Step 2) reinforce the utility of the Reddit dataset. The spreadsheet can be reasonably used by a wide range of applicants even if the data is slightly tilted towards more competitive applicants. This skew is small, especially when compared to analysis of Reddit to NRMP in other specialties for which the differences in Step 1, Step 2, AOA status, and PhD are all significantly different for all variables [5, 6].

Univariate analysis revealed that AOA status, overall publications, and dermatology-specific publications were associated with interview rate in the Reddit cohort. This may be attributed to the notion that the Reddit cohort have baseline high scores. Means of 249 on Step 1 and 257 on Step 2 are at the ~85th percentile of test takers [13]. It may be that after this point, an increase in scores does not contribute as much to interview invitation rate as do other aspects of the application that may allow candidates to stand out. These other factors may include AOA status, a significant distinction that may allow for differentiation of applicants from the same institution, and research publications, which may reflect students' ability to balance clinical rotations and studying with their commitment to intellectual curiosity in academia. Interestingly, PhD completion or research year completion were not associated with increased interview invitation rate. This may reflect greater value in research productivity itself than completion of dedicated research time. Furthermore, overall research, not just dermatology-specific research, is associated with increased interview invitation rate, which further contributes to this notion. It is notable that dermatology sub-internships completed are not associated with increased interview invitation rate. Sub-internships are costly (students must pay to apply in addition to costs of housing, transport, airfare, food, and more) and require time investment. For many students, applying and completing away rotations is arguably more stressful than the formal residency application process itself. The prevailing notion is for students to complete as many away rotations as feasible in terms of cost and scheduling flexibility. However, our

results suggest reevaluation of this concept and further investigation into the role away rotations should play in the dermatology application process.

This study is not without limitations. There is potential reporting bias in the Reddit dataset, which has been suggested in evaluations of Reddit data by other specialties [5, 6]. This is likely to influence our results to the same extent. However, it is notable that the comparison of Reddit to NRMP data in our study shows they are more similar than described for prior studies of other specialties. Despite this bias, the range of data is extensive allowing a broad spectrum of applicants to identify similar students and gain advice and insight into the application process. Another important limitation of the Reddit dataset was that of cases with missing data. We excluded these cases in analysis of said variables. Our yield was still high with at least 92 out of 98 Reddit applicants' data used for each variable's analysis. Nevertheless, it is a fraction of the over 600 annual U.S. applicants to dermatology. Another proposed limitation of online forums is the validity of available data. Unfortunately, owing to the anonymous nature of the forum it is difficult to authenticate its reliability.

Nevertheless, such a study has never been performed before for dermatology to our knowledge. It also expands upon the growing desire and need for students to have access to individualized data to navigate the complex residency process. Compared to the sheer number of participants in the NRMP dataset, Reddit data is limited. This restricted our ability to perform multivariate analysis, which we believe is important and would be a well-intentioned goal for future studies with larger dataset of self-reported, individualized data. Additionally, we were unable to assess the association between interview invitation rate and matching to dermatology owing to lack of self-reported applicant data on whether they matched or not. This would also be an interesting and important goal of future studies. Furthermore, although this study assessed quantifiable factors associated with interview invitation rate, it cannot account for subjective factors in the application process such as strength of letters of

recommendation, interview performance, strength of personal statements and supplemental applications, and faculty advocating for students.

Personalizing the residency application process would be an admirable goal. Although the NRMP data is of utility as a baseline tool to assess competitiveness, it lacks much of the data that makes the Reddit spreadsheet popular among applicants of dermatology residencies. Some institutions have worked towards personalizing the application process. The Texas STAR (Seeking Transparency in Application to Residency) database is a multi-institutional effort to generate a tool allowing applicants to filter anonymous applicant data across all specialties [14]. Tabulated in Texas STAR are fields such as Step 1 score, Step 2 score, AOA membership, number of clerkships Honored, and research publications. Like the Reddit spreadsheet, this tool shows where applicants received interviews and where they matched. Further collaborations, more extensive datasets to increase utility, and increased awareness of such tools would benefit applicants as such data is collected within institutions in a more formal manner

and less apt to the influence of fictional posts or reporting bias.

Conclusion

The dermatology residency application process is extremely competitive. Applicants may use mean data provided by NRMP's COM, which serves an important role in informing applicants. However, datasets like the Reddit annual spreadsheet provide individualized (and more) data serving a separate and equally important role for applicants. These data are largely comparable to NRMP but are individual data points allowing for personalized insights. Univariate analysis showed an association between AOA status, overall publications, and dermatology-specific publications with interview invitation rate. In the end, in this era of personalized medicine, the residency application process for dermatology ought to be personalized.

Potential conflicts of interest

The authors declare no conflicts of interests.

References

1. National Resident Matching Program. Characteristics of applicants who matched to their preferred specialty in the 2018 Main Residency Match. 2018. <https://www.nrmp.org/wp-content/uploads/2018/06/Charting-Outcomes-in-the-Match-2018-Seniors.pdf>. Accessed on February 2, 2019.
2. Main Residency Match Data and Reports. 2019. <http://www.nrmp.org/main-residency-match-data/>. Accessed on February 2, 2019.
3. A Reddit for Medical School Students. 2020. <https://www.reddit.com/r/medschool/new>. Accessed on March 15, 2020.
4. 2018-2019 Dermatology Spreadsheet: Applicant Data. 2019. https://docs.google.com/spreadsheets/d/16WYBDd4BhLhgR5F5BWWMLRAKtg_Na3d9DHyoKtUg0rA/edit#gid=297752836. Accessed on June 24, 2019.
5. Sura K, Wilson LD, Grills IS. Comparison of Self-Reported Data on Student Doctor Network to Objective Data of the National Resident Matching Program. *J Am Coll Radiol*. 2017 Dec;14:1594-1597. [PMID: 29097048].
6. Yi PH, Novin S, Vander Plas TL, et al. How Does the Current Generation of Medical Students View the Radiology Match?: An Analysis of the AuntMinnie and Student Doctor Network Online Forums. *Acad Radiol*. 2018;25:699-707. [PMID: 29751856].
7. Dermatology application info. 2019. <https://docs.google.com/spreadsheets/d/1hgUH-3baFx35doDTxnUZajAYDqkWDa5XHYUudZK0vUA/edit#gid=0>. Accessed on February 8, 2019.
8. Mansouri B, Walker GD, Mitchell J, Henderson RA. The cost of applying to dermatology residency: 2014 data estimates. *J Am Acad Dermatol*. 2016;74:754-6. [PMID: 26979356].
9. National Resident Matching Program's At-A-Glance Program Director Survey. 2019. <http://www.nrmp.org/at-a-glance-program-director-survey/>. Accessed on March 1, 2019.
10. National Resident Matching Program's Interactive Charting Outcomes in the Match. 2019. <http://www.nrmp.org/interactive-charting-outcomes-in-the-match/>. Accessed on March 1, 2019.
11. Dermatology Residency Applications. 2020. <https://www.reddit.com/r/DermApp/>. Accessed on April 1, 2020.
12. Dermatology Discussion Forum. 2020. <https://forums.studentdoctor.net/forums/dermatology.56/>. Accessed on April 1, 2020.
13. USMLE Score Interpretation Guidelines. 2020. https://www.usmle.org/pdfs/transcripts/USMLE_Step_Examiniati_on_Score_Interpretation_Guidelines.pdf. Accessed on April 1, 2019.
14. University of Texas Southwestern Texas STAR (Seeking Transparency in Application to Residency). 2020. <https://www.utsouthwestern.edu/education/medical-school/about-the-school/student-affairs/texas-star.html>. Accessed on April 1, 2020.

Table 1. Comparison of self-reported applicant data with Charting Outcomes in the Match data.

	Reddit (n=98)	NRMP (n=412)	P-value
Step 1 Score*			
Median	250	-	0.055
Mean (SD)	249.34 (10.63)	247.60	
Range	65	>60	
Step 2 Score*			<0.05
Median	258	-	
Mean (SD)	257.12 (10.75)	254.77	
Range	59	>40	
AOA Status**			0.256
Yes	48 (50.53%)	44.40%	
No	44 (46.32%)	55.60%	
N/A	3 (3.15%)	-	
PhD			<0.05
Yes	12 (12.63%)	5.85%	
No	83 (87.37%)	94.15%	
Research Year			-
Yes	20 (21.05%)	-	
No	75 (78.95%)	-	
Sub-Internships			-
Median	3	-	
Mean (SD)	2.82 (1.18)	-	
Range	6	-	
Overall Publications			<0.05
Median	10	-	
Mean (SD)	11.73 (8.05)	13.63	
Range	49	-	
Dermatology-Specific Publications			-
Median	4	-	
Mean (SD)	4.64 (4.27)	-	
Range	20	-	
Interview Invite Rate			-
Median	10.9%	-	
Mean (SD)	14.40% (0.11)	-	
Range	57.9%	-	

* Step 1 and 2 score P values reflect one sample t-test using National Residency Match Program (NRMP) means as a reference.

** Alpha Omega Alpha (AOA) status P value reflects one sample binomial test using NRMP probability as a reference.