Characteristics of Matched vs Nonmatched Dermatology Applicants

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PRACTICE **POINTS**

- Dermatology residency continues to be one of the most competitive specialties, with a match rate of 84.7% in 2019.
- A high US Medical Licensing Examination (USMLE) Step 1 score and having a home dermatology program and a greater number of interviews may lead to higher likeliness of matching in dermatology.
- Most applicants (82.4%) applied to programs their partner had interviews at, suggesting this may be a helpful strategy.

Dermatology residency continues to be one of the most competitive specialties, with a match rate of 84.7% in 2019. We surveyed 475 dermatology applicants who applied to the Mayo Clinic in Scottsdale, Arizona, during the 2018-2019 application cycle and 629 dermatology applicants who applied to the Mayo Clinic in Scottsdale; Rochester, Minnesota; and Jacksonville, Florida, during the 2019-2020 application cycle. The initial survey obtained application and demographic information. The follow-up survey obtained match data. The initial 2019 and 2020 surveys were completed by 149 and 142 dermatology applicants, respectively, and 112 and 124 applicants completed the respective follow-up surveys. Our survey finds that factors associated with matching included a higher US Medical Licensing Examination (USMLE) Step 1 score, having a home dermatology program, and a higher number of interviews offered and attended. Some demographics had varying USMLE Step 1 scores but similar match rates.

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Dermatology residency continues to be one of the most competitive specialties, with a match rate of 84.7% for US allopathic seniors in the 2019-2020 academic year.[1] In the 2019-2020 cycle, dermatology applicants were tied with plastic surgery for the highest median US Medical Licensing Examination (USMLE) Step 1 score compared with other specialties, which suggests that the top medical students are applying, yet only approximately 5 of 6 students are matching.

Factors that have been cited with successful dermatology matching include USMLE Step 1 and Step 2 Clinical Knowledge (CK) scores,[2] research accomplishments,[3] letters of recommendation,[4] medical school performance, personal statement, grades in required clerkships, and volunteer/extracurricular experiences, among others.[5]

The National Resident Matching Program (NRMP) publishes data each year regarding different academic factors—USMLE scores; number of abstracts, presentations, and papers; work, volunteer, and research experiences—and compares the mean between matched and nonmatched applicants.[1] However, the USMLE does

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not report any demographic information of the applicants and the implication it has for matching. Additionally, the number of couples participating in the couples match continues to increase each year. In the 2019-2020 cycle, 1224 couples participated in the couples match.[1] However, NRMP reports only limited data regarding the couples match, and it is not specialty specific.

We aimed to determine the characteristics of matched vs nonmatched dermatology applicants. Secondarily, we aimed to determine any differences among demographics regarding matching rates, academic performance, and research publications. We also aimed to characterize the strategy and outcomes of applicants that couples matched.

Materials and Methods

The Mayo Clinic institutional review board deemed this study exempt. All applicants who applied to Mayo Clinic dermatology residency in Scottsdale, Arizona, during the 2018-2019 cycle were emailed an initial survey (N=475) before Match Day that obtained demographic information, geographic information, gap-year information, USMLE Step 1 score, publications, medical school grades, number of away rotations, and number of interviews. A follow-up survey gathering match data and couples matching data was sent to the applicants who completed the first survey on Match Day. The survey was repeated for the 2019-2020 cycle. In the second survey, Step 2 CK data were obtained. The survey was sent to 629 applicants who applied to Mayo Clinic dermatology residencies in Arizona, Minnesota, and Florida to include a broader group of applicants. For publications, applicants were asked to count only published or accepted manuscripts, not abstracts, posters, conference presentations, or submitted manuscripts. Applicants who did not respond to the second survey (match data) were not included in that part of the analysis. One survey was excluded because of implausible answers (eg, scores outside of range for USMLE Step scores).

Statistical Analysis—For statistical analyses, the applicants from both applications cycles were combined. Descriptive statistics were reported in the form of mean, median, or counts (percentages), as applicable. Means were compared using 2-sided *t* tests. Group comparisons were examined using χ^2 tests for categorical variables. Statistical analyses were performed using the BlueSky Statistics version 6.30. $P<.05$ was considered significant.

Results

In 2019, a total of 149 applicants completed the initial survey (31.4% response rate), and 112 completed the follow-up survey (75.2% response rate). In 2020, a total of 142 applicants completed the initial survey (22.6% response rate), and 124 completed the follow-up survey (87.3% response rate). Combining the 2 years, after removing 1 survey with implausible answers, there were 290 respondents from the initial survey and 235 from the follow-up survey. The median (SD) age for the total applicants over both years was 27 (3.0) years, and 180 applicants were female (61.9%).

USMLE Scores—The median USMLE Step 1 score was 250, and scores ranged from 196 to 271. The median USMLE Step 2 CK score was 257, and scores ranged from 213 to 281. Higher USMLE Step 1 and Step 2 CK scores and more interviews were associated with higher match rates (Table 1). In addition, students with a dermatology program at their medical school were more likely to match than those without a home dermatology program.

Gender Differences—There were 180 females and 110 males who completed the surveys. Males and females had similar match rates (85.2% vs 89.0%; $P=.39$)(Table 2).

Family Life—In comparing marital status, applicants who were divorced had a higher median age (38.5 years) compared with applicants who were single, married, or in a domestic partnership (all 27 years; $P<.01$). Differences are outlined in Table 3.

On average, applicants with children (n=27 [15 male, 12 female]; $P=.13$) were 3 years older than those without (30.5 vs 27; $P<.01$) and were more likely to be married (88.9% vs 21.5%; $P<.01$). Applicants with children had a mean USMLE Step 1 score of 241 compared to 251 for those without children ($P=.02$) and a mean USMLE Step 2 CK score of 246 compared to 258 for those without children ($P<.01$). Applicants with children had similar debt, number of publications, number of honored rotations, and match rates compared to applicants without children (Figure).

Couples Match—Seventeen individuals in our survey participated in the couples match (7.8%), and all 17 (100%) matched into dermatology. The mean age was 26.7 years, 12 applicants were female, 2 applicants were married, and 1 applicant had children. The mean number of interviews offered was 13.6, and the mean number of interviews attended was 11.3. This was higher than participants who were not couples matching (13.6 vs 9.8 [$P=.02$] and 11.3 vs 8.9 [$P=.04$], respectively). Applicants and their partners applied to programs and received interviews in a mean of 10 cities. Sixteen applicants reported that they contacted programs where their partner had interview offers. All participants' rank lists included programs located in different cities than their partners' ranked programs, and all but 1 participant ranked programs located in a different state than their partners' ranked programs. Fifteen participants had options in their rank list for the applicant not to match, even if the partner would match. Similarly, 12 had the option for the applicant to match, even if the partner would not match. Fourteen (82.4%) matched at the same institution as their significant other. Three (17.6%) applicants matched to a program in a different state than the partner's matched program. Two (11.8%) participants felt their relationship with their partner suffered because of the match, and 1 (5.9%) applicant was undetermined.

TABLE 1. Characteristics of Matched vs Nonmatched Applicants[a]

	Did you match into dermatology?		
Characteristics	**Yes (n=207)**	**No (n=28)**	***P* value**
Median age, y (IQR)	27 (26-29)	27 (26-31)	.37
Gender, n (%)			.55
Male	75 (36.2)	13 (46.4)	
Female	131 (63.3)	15 (53.6)	
Race, n (%)			.02
White (n=161)	141 (77.8)	20 (71.4)	
Asian (n=51)	48 (23.2)	3 (10.7)	
Black (n=10)	7 (3.4)	3 (10.7)	
Native Hawaiian/ Pacific Islander (n=1)	1 (0.05)	0 (0)	
Native American/Native Alaskan (n=1)	0 (0)	1 (0.05)	
Ethnicity, n (%)			.05
Non-Hispanic/non-Latino (n=205)	184 (90.0)	21 (10.2)	
Hispanic/Latino (n=20)	15 (75.0)	5 (25.0)	
Current marital status, n (%)			<.01
Single (never married)	144 (70.2)	19 (67.9)	
Married	59 (28.8)	6 (21.4)	
In a domestic partnership	2 (1.0)	1 (3.6)	
Divorced	0 (0)	2 (7.1)	
Do you have children? n (%)			.74
Yes	18 (8.7)	3 (10.7)	
No	187 (90.3)	25 (89.3)	
USMLE Step 1 score			<.01
Median (IQR)	251 (243-257)	242 (216.75-252.25)	
Mean (SD)	248.7 (12.31)	235.8 (2)	
USMLE Step 2 CK score			<.01
Median (IQR)	259 (243-257)	246 (238-257)	
Mean (SD)	256.8 (12.68)	244.6 (16.35)	
Publications, median (IQR)	5 (3-9)	4 (1-7)	.12
First author publications, median (IQR)	3 (1-5)	1.5 (0.25-4)	.07
No. of honored rotations, median (IQR)	5 (4-7)	4.5 (2.25-6)	.07

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TABLE 1. (continued)

Characteristics	Did you match into dermatology? Yes (n=207)	No (n=28)	*P* value
Gap year, n (%)			
Yes	65 (31.4)	9 (32.1)	.98
No	142 (68.6)	19 (67.9)	
Home dermatology program, n (%)			.04
Yes	166 (80.2)	18 (64.3)	
No	39 (18.8)	10 (35.7)	
No. of away dermatology rotations, median (IQR)	3 (2-3)	2 (0-3)	.29
No. of dermatology programs applied to, median (IQR)	90 (73-110)	75 (24-110)	.16
No. of dermatology interviews offered, median (IQR)	10 (7-13)	3 (1-5)	<.01
No. of dermatology interviews attended, median (IQR)	9 (7-12)	3 (2.75-6)	<.01

Abbreviations: CK, Clinical Knowledge; USMLE, US Medical Licensing Examination.

[a]Not every participant answered each question.

One applicant described their relationship suffering from "unnecessary tension and anxiety" and noted "difficult conversations" about potentially matching into dermatology in a different location from their partner that could have been "devastating and not something [he or she] should have to choose."

Comment

Factors for Matching in Dermatology—In our survey, we found the statistically significant factors of matching into dermatology included high USMLE Step 1 and Step 2 CK scores ($P<.01$), having a home dermatology program ($P=.04$), and attending a higher number of dermatology interviews ($P<.01$). These data are similar to NRMP results[1]; however, the higher likelihood of matching if the medical school has a home dermatology program has not been reported. This finding could be due to multiple factors such as students have less access to academic dermatologists for research projects, letters of recommendations, mentorship, and clinical rotations.

Gender and having children were factors that had no correlation with the match rate. There was a statistical difference of matching based on marital status ($P<.01$), but this is likely due to the low number of applicants in the divorced category. There were differences among demographics with USMLE Step 1 and Step 2 CK scores, which is a known factor in matching.[1,2] Applicants with children had lower USMLE Step 1 and Step 2 CK scores compared to applicants without children. Females also had lower median USMLE Step 1 scores compared to males. This finding may serve as a reminder to programs when comparing USMLE Step examination scores that demographic factors may play a role. The race and ethnicity of applicants likely play a role. It has been reported that underrepresented minorities had lower match rates than White and Asian applicants in dermatology.[6] There have been several published articles discussing the lack of diversity in dermatology, with a call to action.[7-9]

Factors for Couples Matching—The number of applicants participating in the couples match continues to increase yearly. The NMRP does publish data regarding "successful" couples matching but does not specify how many couples match together. There also is little published regarding advice for participation in the couples match. Although we had a limited number of couples that participated in the match, it is interesting to note they had similar strategies, including contacting programs at institutions that had offered interviews to their partners. This strategy may be effective, as dermatology programs offer interviews relatively late compared with other specialties.[5] Additionally, this strategy may increase the number of interviews offered and received, as evidenced by the higher number of interviews offered compared with those who were not couples matching. Additionally, this survey highlights the sacrifice often needed by couples in the couples match as revealed by the inclusion of rank-list options in which the couples reside long distance or in which 1 partner does not match. This information may

TABLE 2. Characteristics of Male vs Female Applicants

Characteristics	Gender		*P* value
	Male (n=110)	Female (n=180)	
Median age, y (IQR)	27 (26-29)	27 (26-29)	.37
Current marital status, n (%)			<.01
Single (never married)	144 (70.2)	19 (67.9)	
Married	59 (28.8)	6 (21.4)	
In a domestic partnership	2 (1.0)	1 (3.6)	
Divorced	0 (0)	2 (7.1)	
Do you have children? n (%)			.74
Yes	18 (8.8)	3 (10.7)	
No	187 (91.2)	25 (89.3)	
USMLE Step 1 score			.02
Median (IQR)	253 (247-260)	247 (237-255)	
Mean (SD)	251 (12.44)	244 (15.19)	
USMLE Step 2 CK score			.26
Median (IQR)	259 (246-266)	255 (248-263)	
Mean (SD)	255.58 (15.4)	254.49 (12.53)	
Publications, median (IQR)	5 (2-10)	5 (3-9)	.40
First author publications, median (IQR)	3 (1-6)	3 (1-5)	.52
No. of honored rotations, median (IQR)	5 (3-7)	5 (3-7)	.64
Gap year, n (%)			
Yes	56 (50.9)	34 (18.9)	.90
No	54 (40.1)	146 (81.1)	
No. of away dermatology rotations, median (IQR)	3 (1-4)	3 (2-3)	.26
No. of dermatology programs applied to, median (IQR)	87 (61-110)	90 (80-110)	.17
No. of dermatology interviews offered, median (IQR)	10 (6-15)	8 (6-12)	.08
No. of dermatology interviews attended, median (IQR)	9 (6-13)	8 (6-11)	.07
Match into dermatology, n (%)	88 (85.2)	146 (89.0)	.39

Abbreviations: CK, Clinical Knowledge; USMLE, US Medical Licensing Examination.

TABLE 3. Characteristics of Applicants Based on Current Marital Status[a]

Characteristics	Current marital status				*P* value
	Single (never married) (n=200)	Married (n=80)	In a domestic partnership (n=5)	Divorced (n=2)	
Median age, y (IQR)	27 (26-28)	27 (26-30)	27 (26-29)	38.5 (34-42)	<.01
Gender, n (%)					.26
Male	68 (34.0)	37 (46.3)	1 (20.0)	1 (50.0)	
Female	132 (66.0)	43 (53.8)	4 (80.0)	1 (50.0)	
Race, n (%)					.73
White (n=193)	136 (70.5)	53 (27.5)	3 (1.6)	1 (0.5)	
Asian (n=64)	44 (68.8)	17 (26.6)	2 (3.1)	1 (1.6)	
Black (n=14)	8 (57.1)	6 (42.9)	0 (0)	0 (0)	
Native Hawaiian/Pacific Islander (n=2)	0 (0)	2 (100)	0 (0)	0 (0)	
Native American/Native Alaskan (n=1)	1 (100)	0 (0)	0 (0)	0 (0)	
Ethnicity, n (%)					.86
Non-Hispanic/non-Latino (n=247)	170 (68.8)	70 (28.3)	5 (2.0)	2 (0.8)	
Hispanic/Latino (n=23)	17 (73.9)	6 (26.1)	0 (0)	0 (0)	
Do you have children? n (%)					<.01
Yes	0 (0)	20 (25.0)	1 (20.0)	1 (50.0)	
No	198 (99)	60 (75.0)	4 (80.0)	1 (50.0)	
USMLE Step 1 score, median (IQR)	250 (242-257)	250 (237-257)	246 (242-255)	212 (208-216)	.16
USMLE Step 2 score, median (IQR)	258 (249-263)	255 (245-262)	261 (260-262)	223 (224-235)	.11
Publications, median (IQR)	5 (3-9)	5 (2-7)	3 (2-9)	0.5 (0.25-0.75)	.11
First author publications, median (IQR)	3 (1-6)	3 (1-5)	3 (1-5)	0 (0-0)	.34
No. of honored rotations, median (IQR)	5 (3-7)	6 (3-7)	6 (4-7)	8 (8-8)	.46
Gap year, n (%)					.63
Yes	56 (28.0)	28 (35.0)	2 (40.0)	1 (50.0)	
No	141 (73.5)	52 (65.0)	3 (60.0)	1 (50.0)	
No. of away dermatology rotations, median (IQR)	3 (2-3)	3 (2-3)	2 (2-3)	3 (2-5)	.64
No. of dermatology programs applied to, median (IQR)	89 (75-114)	93 (75-130)	51 (36-65)	19 (17-20)	.04

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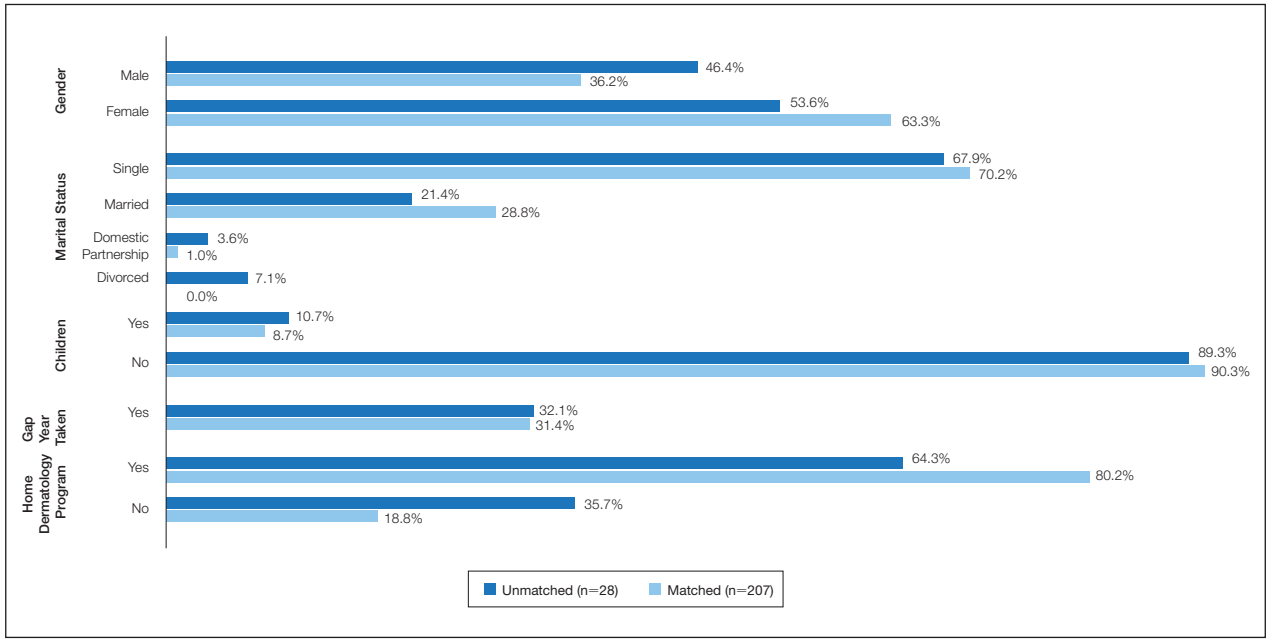
TABLE 3. (continued)

Characteristics	Current marital status: Single (never married) (n=200)	Married (n=80)	In a domestic partnership (n=5)	Divorced (n=2)	*P* value
No. of dermatology interviews offered, median (IQR)	9 (6-13)	8 (5-14)	5 (5-5)	0 (0)	.08
No. of dermatology interviews attended, median (IQR)	9 (6-12)	8 (6-12)	6 (5-8)	0 (0)	.37
Match into dermatology, n (%)					<.01
Yes	144 (88.3)	59 (90.8)	2 (66.7)	0 (0)	
No	19 (11.7)	6 (9.2)	1 (33.3)	2 (100)	

Abbreviation: USMLE, US Medical Licensing Examination.

[a]Not every participant answered each question.



Comparison of gender, marital status, children, gap year, and home dermatology program differences in matched vs unmatched applicants.

be helpful to applicants who are planning a strategy for the couples match in dermatology. Although this study does not encompass all dermatology applicants in the 2019-2020 cycle, we do believe it may be representative. The USMLE Step 1 scores in this study were similar to the published NRMP data.[1,10] According to NRMP data from the 2019-2020 cycle, the mean USMLE Step 1 score was 248 for matched applicants and 239 for unmatched.[1] The NRMP reported the mean USMLE Step 2 CK score for matched was 256 and 248 for unmatched, which also is similar to our data. The NRMP reported the mean number of programs ranked was 9.9 for matched and 4.5 for unmatched applicants.[1] Again, our data were similar for number of dermatology interviews attended.

Limitations—There are limitations to this study. The main limitation is that the survey is from a single institution and had a limited number of respondents. Given the nature of the study, the accuracy of the data

is dependent on the applicants' honesty in self-reporting academic performance and other variables. There also may be a selection bias given the low response rate. The subanalyses—children and couples matching—were underpowered with the limited number of participants. Further studies that include multiple residency programs and multiple years could be helpful to provide more power and less risk of bias. We did not gather information such as the Medical Student Performance Evaluation letter, letters of recommendation, or personal statements, which do play an important role in the assessment of an applicant. However, because the applicants completed these surveys, and given these are largely blinded to applicants, we did not feel the applicants could accurately respond to those aspects of the application.

Conclusion

Our survey finds that factors associated with matching included a higher USMLE Step 1 score, having a home dermatology program, and a higher number of interviews offered and attended. Some demographics had varying USMLE Step 1 scores but similar match rates.

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