

Supplemental ERAS® 2022-2023 Application Cycle: Evaluation of Geographic Preferences

Introduction

This data report summarizes the AAMC's second year of piloting geographic and setting preference questions in the Electronic Residency Application Service® (ERAS®) application, introducing a structured process for applicants to express their preferences to complete residency training in particular areas of the country and in an urban or rural setting. Geographic and setting preference questions were introduced to improve accuracy and fairness in the selection process.

While program directors and applicants report that geographic location is one of the most important factors in residency program selection,^{1,2} the existing MyERAS® application process does not have a standardized way for applicants to share their geographic preferences with programs. Instead, program directors often infer applicants' geographic preferences based on an applicant's permanent address and the location of their MD- or DO-granting school (hereafter referred to as "medical school") or based on personal correspondence with the applicant or their advisors. This practice is problematic, as some applicants may have preferences for locations that differ from their prior experiences, while others may not have a geographic preference. Current practices are also problematic from an equity perspective, as some applicants may not have access to advisors who can advocate on their behalf.

During the ERAS® 2022-2023 application cycle, applicants applying in 14 specialties³ had the opportunity to share their geographic and setting preferences by responding to two questions:

- **Geographic division preferences:** Applicants were asked to indicate their geographic preferences by selecting up to three of nine U.S. census divisions or selecting *I do not have a division preference* (Figure 1). The question was optional, so applicants could skip the question. Applicants also were asked to write up to three short essays (300-character limit) describing each of their three division preferences or one short essay describing their lack of division preference (300-character limit).
- **Setting preference:** Applicants were asked to indicate their setting preference using a 5-point rating scale (Strong Preference for Rural, Slight Preference for Rural, No Preference, Slight Preference for Urban, Strong Preference for Urban) by selecting a degree of preference for a rural or urban setting. Applicants could indicate no preference or skip the question. Applicants were asked to write a short essay (300-character limit) describing their setting preference or their lack of setting preference.

Specialty-specific data and key results for each evaluation question are summarized in the tables below. Those results, along with data from applicant, advisor, and program director surveys and focus groups, will be used to refine the geographic and setting preference questions.

This document summarizes answers to the following questions, based on results from the first stage of evaluation of geographic and setting preferences:

1. How were applicants' geographic preferences distributed across the response options (i.e., one or more division preference, no preference, and skipped)?
2. Were geographic divisions over- or under-preferred relative to the number of programs in each division (i.e., divisional program density)?

3. How many applicants indicated a geographic preference to the division that includes their (a) permanent address and (b) medical school location?
4. How many applicants wrote division preference essays to support their geographic preferences? How long were the essays?
5. What is the relationship between indicating a geographic preference and where applicants actually applied?
6. Which divisions were frequently co-selected?
7. What are the response frequencies and proportions for the rural/urban preference question?
8. How many applicants wrote the rural/urban preference essay to support their setting preference? How long was the essay?

A future report will summarize any emerging themes in the geographic and setting preference essays, as well as the relationship between geographic preference and the probability of being invited to interview in participating specialties.



Figure 1. U.S. census region map used to define states within each division.

Data and key results from each evaluation question are summarized in the tables below. Results, along with data from applicant, advisor, and program director surveys, will be used to determine what, if any, content should be refined or removed from future iterations of the geographic preference section. (Percentage values in tables may not total 100% due to rounding and cells with fewer than five observations.)

Methods

Sample

As of Oct. 3, 2022, most applicants to participating specialties indicated geographic division preferences; however, applicant participation varied by specialty and ranged from 71% to 97% for division preferences and 73% to 97% for setting preferences (Table 1). The demographic composition of the specialty-specific samples was comparable to their respective 2022-2023 ERAS populations (Tables 2-3), except for the Psychiatry specialty, where there was a smaller proportion of international medical graduates (IMGs) compared with the overall ERAS 2022-2023 application population (32% versus 36%).

Table 1. Percentage and Number of Applicants Who Completed the Geographic and Setting Preference Questions, by Specialty, 2022-2023

Specialty ¹	Applicants Who Completed the Geographic Preference Question		Applicants Who Completed the Setting Preference Question		Number of Applicants as of Oct. 3, 2022
	Percentage	Number	Percentage	Number	
Adult Neurology	92%	1,837	90%	1,813	2,005
Anesthesiology	95%	3,260	95%	3,229	3,415
Dermatology	96%	960	95%	951	1,001
Diagnostic Radiology	96%	2,195	95%	2,172	2,291
Interventional Radiology	95%	381	94%	377	401
General Surgery	92%	4,460	91%	4,424	4,866
Internal Medicine - Categorical	91%	15,895	90%	15,754	17,538
Internal Medicine/ Psychiatry	92%	236	91%	233	257
Neurological Surgery	92%	401	91%	394	435
Orthopedic Surgery	97%	1,553	97%	1,549	1,603
Pediatrics	92%	4,241	91%	4,186	4,589

(continued)

Table 1. Percentage and Number of Applicants Who Completed the Geographic and Setting Preference Questions, by Specialty, 2022-2023 (continued)

Specialty ¹	Applicants Who Completed the Geographic Preference Question		Applicants Who Completed the Setting Preference Question		Number of Applicants as of Oct. 3, 2022
	Percentage	Number	Percentage	Number	
Physical Medicine and Rehabilitation	95%	957	94%	945	1,006
Psychiatry	92%	3,361	91%	3,329	3,665
Public Health and General Preventive Medicine	71%	91	73%	93	128

1. Applicants could apply to more than one specialty and were included in each specialty they applied to. Data for Emergency Medicine and Obstetrics and Gynecology were not included because they did not participate in geographic or setting preferences for the 2022-2023 application cycle.

Table 2. Percentage and Number of Applicants Who Completed the Geographic Preference Question, by Race/Ethnicity and Specialty, 2022-2023¹

Specialty ²	White Only	Asian	Black or African American	American Indian or Alaska Native	Native Hawaiian or Other Pacific Islander	Multiple Race/Ethnicity	Hispanic, Latino, or of Spanish Origin	Other Race/Ethnicity	Unknown Race/Ethnicity
Adult Neurology	32% (580)	43% (787)	7% (129)	0.3% (6)	-- ³	8% (150)	9% (162)	8% (155)	2% (44)
Anesthesiology	44% (1,434)	29% (950)	9% (293)	0.7% (23)	0.2% (7)	10% (337)	11% (370)	6% (209)	2% (70)
Dermatology	41% (395)	28% (265)	12% (111)	0.9% (9)	0.5% (5)	11% (109)	10% (98)	9% (84)	3% (29)
Diagnostic Radiology	43% (944)	33% (729)	6% (138)	0.5% (10)	0.5% (10)	10% (212)	9% (193)	7% (157)	3% (59)
Interventional Radiology	45% (171)	30% (114)	7% (25)	--	--	8% (31)	8% (29)	9% (33)	3% (11)
General Surgery	45% (1,985)	26% (1,145)	9% (388)	0.9% (42)	0.3% (15)	11% (505)	13% (587)	8% (335)	2% (105)
Internal Medicine - Categorical	27% (4,229)	46% (7,263)	10% (1,580)	0.4% (56)	0.2% (25)	7% (1,137)	10% (1,537)	7% (1,154)	2% (359)
Internal Medicine/Psychiatry	36% (86)	29% (68)	13% (30)	--	--	6% (15)	10% (23)	8% (18)	4% (10)
Neurological Surgery	39% (155)	27% (107)	11% (43)	--	--	11% (46)	13% (53)	8% (32)	4% (15)
Orthopedic Surgery	59% (911)	19% (296)	8% (126)	1% (16)	0.4% (6)	9% (143)	9% (136)	5% (81)	2% (27)
Pediatrics	41% (1,734)	32% (1,371)	9% (398)	0.6% (26)	0.14% (6)	9% (373)	12% (494)	5% (229)	2% (77)
Physical Medicine and Rehabilitation	42% (402)	32% (304)	9% (83)	0.6% (6)	--	10% (100)	11% (107)	6% (59)	2% (20)
Psychiatry	34% (1,146)	36% (1,210)	12% (410)	0.9% (30)	0.27% (9)	10% (326)	11% (372)	6% (215)	2% (78)
Public Health and General Preventive Medicine	24% (22)	46% (42)	15% (14)	--	--	8% (7)	8% (7)	7% (6)	--

1. Applicants could select more than one race/ethnicity, so the total can be greater than 100%. "White Only" refers to applicants who selected only White as their race/ethnicity. "Multiple Race/Ethnicity" refers to applicants who selected more than one race/ethnicity.

2. Applicants could apply to more than one specialty and were included in each specialty they applied to.

3. Dashes indicate cells with fewer than five observations.

Table 3. Percentage and Number of Applicants Who Completed the Geographic Question, by Gender, Applicant Type, and Specialty, 2022-2023

Specialty ¹	Gender				Applicant Type		
	Men	Women	Declined to Indicate	Another Gender Identity	MD	DO	IMG
Adult Neurology	54% (988)	46% (847)	-- ²	--	36% (662)	14% (250)	50% (925)
Anesthesiology	65% (2,129)	35% (1,125)	--	--	62% (2,022)	21% (671)	17% (567)
Dermatology	33% (317)	67% (643)	--	--	77% (735)	13% (129)	10% (96)
Diagnostic Radiology	74% (1,619)	26% (575)	--	--	64% (1407)	17% (363)	19% (425)
Interventional Radiology	80% (303)	20% (78)	--	--	59% (225)	18% (69)	23% (87)
General Surgery	56% (2,486)	44% (1,963)	--	0.3% (11)	54% (2,413)	16% (721)	30% (1,326)
Internal Medicine - Categorical	54% (8,546)	46% (7,337)	--	0.1% (8)	29% (4,573)	15% (2,333)	57% (8,989)
Internal Medicine/Psychiatry	50% (118)	49% (115)	--	--	37% (88)	11% (26)	52% (122)
Neurological Surgery	71% (283)	29% (118)	--	--	78% (312)	4% (17)	18% (72)
Orthopedic Surgery	78% (1,210)	22% (343)	--	--	75% (1,169)	18% (287)	6% (97)
Pediatrics	28% (1,202)	71% (3,030)	--	0.2% (9)	46% (1,948)	18% (762)	36% (1,531)
Physical Medicine and Rehabilitation	66% (635)	33% (319)	--	--	45% (428)	38% (359)	18% (170)
Psychiatry	48% (1,605)	51% (1,729)	--	0.7% (23)	49% (1,647)	19% (636)	32% (1,078)
Public Health and General Preventive Medicine	55% (50)	45% (41)	--	--	23% (21)	9% (8)	68% (62)

1. Applicants could apply to more than one specialty and were included in each specialty they applied to.
2. Dashes indicate cells with fewer than five observations.

Analysis

Data were analyzed separately for each specialty because applicant pools and application processes differ by specialty. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to investigate how applicants responded to questions in the geographic preferences section.

Results

How were applicants' geographic preferences distributed across the response options (i.e., one or more division preferences, no preference, and skipped)?

- Applicants' responses to the geographic preference question varied by specialty. Most eligible applicants reported at least one division preference in all specialties (52%-82%) except Neurological Surgery (35%). However, one-third or more of applicants reported no geographic preference in four of the more competitive specialties and two of the specialties with a larger proportion of IMG applicants (Table 4).

Table 4. Percentage and Number of Applicants Reporting at Least One Geographic Preference, No Geographic Preference, and Missing, by Specialty, 2022-2023

Specialty	Reported at Least One Division Preference	No Geographic Preference	Missing	Total Unique Applicants
Adult Neurology	66% (1,226)	33% (611)	1% (22)	1,859
Anesthesiology	81% (2,659)	18% (601)	1% (20)	3,280
Dermatology	58% (565)	41% (395)	1% (6)	966
Diagnostic Radiology	82% (1,810)	17% (385)	1% (11)	2,206
Interventional Radiology	79% (302)	21% (79)	-- ¹	383
General Surgery	66% (3,016)	32% (1,444)	2% (76)	4,536
Internal Medicine - Categorical	66% (10,639)	33% (5256)	1% (161)	16,056
Internal Medicine/Psychiatry	70% (166)	30% (70)	0% (0)	236
Neurological Surgery	35% (142)	63% (259)	2% (7)	408
Orthopedic Surgery	52% (814)	47% (739)	1% (17)	1,570
Pediatrics	73% (3,128)	26% (1,113)	1% (32)	4,273

(continued)

Table 4. Percentage and Number of Applicants Reporting at Least One Geographic Preference, No Geographic Preference, and Missing, by Specialty, 2022-2023 (continued)

Specialty	Reported at Least One Division Preference	No Geographic Preference	Missing	Total Unique Applicants
Physical Medicine and Rehabilitation	75% (727)	24% (230)	1% (7)	964
Psychiatry	77% (2603)	22% (758)	1% (28)	3,389
Public Health and General Preventive Medicine	54% (52)	40% (39)	6% (6)	97

1. Dashes indicate cells with fewer than five observations.

Were geographic divisions over- or under-preferred relative to the number of programs in each division (i.e., divisional program density)?

- Overall, the percentage of preferences indicated was proportional to program density in each division (i.e., divisions with a higher proportion of programs also received a larger proportion of geographic preferences; Appendix A). While there were some small differences in proportion of division preferences received compared with program density, the level of over- or under-preferencing did not reach a small effect for any division in most specialties. Some exceptions are:
 - East North Central was under-preferred relative to program density for General Surgery and Orthopedic Surgery.
 - Middle Atlantic was under-preferred relative to program density in Physical Medicine and Rehabilitation.

How many applicants indicated a geographic preference to the division that includes their (a) permanent address and (b) medical school location?

- Of those applicants who indicated at least one division preference, most indicated a division preference that aligned with their permanent address (86%-95%) or medical school division (52%-89%).

Table 5. Percentage and Number of MD and DO Applicants Who Indicated a Preference for Their Home or Medical School Division, by Specialty, 2022-2023¹

Specialty	Permanent Address		Medical School	
	Division Preference Reported	Number of Applicants	Division Preference Reported	Number of Applicants
Adult Neurology	87% (671)	769	81% (625)	771
Anesthesiology	90% (2,054)	2,290	85% (1,951)	2,294
Dermatology	94% (475)	505	87% (439)	507
Diagnostic Radiology	90% (1,378)	1,531	85% (1,307)	1,539
Interventional Radiology	89% (216)	244	81% (197)	244
General Surgery	90% (2,042)	2,280	83% (1,905)	2,290
Internal Medicine - Categorical	91% (5,417)	5,946	85% (5,062)	5,970
Internal Medicine/Psychiatry	87% (81)	93	76% (71)	93
Neurological Surgery	86% (97)	113	81% (92)	113
Orthopedic Surgery	95% (724)	759	89% (680)	763
Pediatrics	91% (2,086)	2,292	85% (1,949)	2,298
Physical Medicine and Rehabilitation	92% (572)	622	84% (523)	623
Psychiatry	90% (1,785)	1,986	83% (1,662)	1,992
Public Health and General Preventive Medicine	93% (25)	27	52% (14)	27

1. IMG applicants and Canadian applicants were excluded from these analyses because most of their permanent addresses were international and therefore did not correspond with a U.S. census division.

What percentage of applicants wrote geographic preference essays? How long were the essays?

- Approximately 96% of geographic preferences were paired with a short essay describing their geographic preference. On average, these essays were 238 characters (SD = 67.2) out of 300 characters available.
- Of those applicants reporting no geographic preference, 90% wrote a short essay describing their lack of preference. On average, these essays were 215 characters (SD = 75.5) out of 300 characters available.

How many applicants wrote the setting preference essays? How long were the essays?

- Of those applicants who reported a setting preference, approximately 85% provided a short essay describing their preference for settings. On average, setting preference essays used 228 characters (SD = 71.5) out of 300 characters available.

- Of those applicants who reported no setting preference, about 80% wrote a short essay describing why they did not have a setting preference. On average, no-preference essays used 209 characters (SD = 77.3) out of 300 characters available.

Among applicants with division preferences, what proportion of their applications were sent to programs in the divisions they preferred?

- Applicants across specialties sent most of their applications to programs in preferred divisions (54-73%; Table 6).

Table 6. Mean, Minimum, and Maximum Percentage of Applications Sent to Programs Within Preferred Geographic Divisions, by Specialty, 2022-2023¹

Specialty	Mean	Minimum	Maximum
Adult Neurology	64%	11%	100%
Anesthesiology	59%	16%	100%
Dermatology	54%	18%	100%
Diagnostic Radiology	62%	17%	100%
Interventional Radiology	65%	5%	100%
General Surgery	70%	0% ²	100%
Internal Medicine - Categorical	73%	0%	100%
Internal Medicine/Psychiatry	55%	0%	100%
Neurological Surgery	50%	24%	100%
Orthopedic Surgery	62%	18%	100%
Pediatrics	72%	0%	100%
Physical Medicine and Rehabilitation	60%	18%	100%
Psychiatry	70%	0%	100%
Public Health and General Preventive Medicine	61%	0%	100%

1. Results are presented for applicants who sent three division preferences. Data from applicants who sent one division preference (n = 2,822) and two division preferences only (n = 3,530) were excluded from this analysis. A total of 57 applicants across specialties indicated a preference for a division but did not apply to any programs in those divisions.

Among applicants with no geographic preference, did they apply to programs in many different geographic divisions or were their applications isolated to a few geographic divisions?

- Across specialties, 64%-97% of applicants who indicated no preference for geographic divisions sent applications to eight or nine of the possible areas (refer to Appendix B), suggesting they genuinely may not have had a geographic preference.

To what extent did division preferences co-occur?

- Table 7 shows that most divisions co-occurred in fewer than 50% of preference combinations. In general, geographic preferences more commonly co-occurred with adjacent divisions. This co-occurrence was stronger for eastern divisions.

Table 7. Percentage of Co-occurring Geographic Preferences, 2022-2023^{1,2}

Division	Number Applicants	1	2	3	4	5	6	7	8	9
1. East North Central	9,567		9%	55%*	11%	18%	19%	50%*	15%	14%
2. East South Central	2,745	32%†		15%	7%	4%	4%	77%‡	8%	41%†
3. Middle Atlantic	12,904	41%†	3%		5%	42%	23%	60%†	3%	12%
4. Mountain West	3,575	30%†	5%	17%		10%	55%*	33%†	13%	24%
5. New England	7,002	25%†	2%	77%‡	5%		25%†	51%*	2%	5%
6. Pacific West	6,492	28%†	2%	46%†	30%†	27%†		35%†	4%	16%
7. South Atlantic	13,149	36%†	16%	58%*	9%	27%†	17%		5%	22%
8. West North Central	2,135	66%*	10%	19%	23%	7%	13%	29%†		19%
9. West South Central	4,947	28%†	23%	31%†	18%	7%	21%	58%*	8%	

1. Results are presented for applicants who sent two or three division preferences. Data from applicants who sent one division preference (n = 2,822) were excluded from this analysis. Percentages are based on the total number of applicants within a division. Percentages across rows sum to over 100% because each division could be selected along with up to two other divisions.

2. Light green and † = 25%-49%. Light blue and * = 50%-74%. Dark blue and ‡ = 75% or higher.

What are the response frequencies and proportions for the rural/urban preference question?

Most applicants reported no preference for rural or urban setting (46%-81% of applicants). Between 5% and 32% had a slight or strong preference for urban settings and <1%-4% had a slight or strong preference for rural settings. Findings were generally consistent across specialties (Table 8).

Table 8. Percentage and Number of Applicants' Rural and Urban Setting Preferences, by Specialty, 2022-2023

Specialty	Strong Preference for Rural	Slight Preference for Rural	No Preference	Slight Preference for Urban	Strong Preference for Urban	Total Applicants
Overall	0.7% (232)	2% (695)	56% (17,994)	26% (8,497)	18% (5,853)	33,161
Adult Neurology	0.5% (9)	1% (24)	58% (1,046)	24% (439)	16% (295)	1,813
Anesthesiology	0.2% (5)	2% (49)	46% (1,472)	32% (1,038)	21% (665)	3,229
Dermatology	-- ¹	1% (12)	66% (631)	21% (199)	11% (107)	951
Diagnostic Radiology	--	1% (20)	54% (1,177)	28% (604)	17% (370)	2,172
Interventional Radiology	--	--	50% (187)	30% (112)	20% (74)	377
General Surgery	0.6% (27)	3% (132)	51% (2,238)	28% (1,244)	18% (783)	4,424
Internal Medicine - Categorical	1% (157)	2% (366)	60% (9,523)	21% (3,383)	15% (2,325)	15,754
Internal Medicine/ Psychiatry	--	4% (10)	57% (133)	22% (52)	15% (34)	233
Neurological Surgery	--	--	62% (246)	24% (94)	13% (52)	394
Orthopedic Surgery	0.5% (8)	2% (33)	66% (1,024)	22% (347)	9% (137)	1,549
Pediatrics	0.7% (30)	2% (102)	50% (2,093)	27% (1,118)	20% (843)	4,186
Physical Medicine and Rehabilitation	0.5% (5)	0.5% (5)	54% (512)	31% (296)	13% (127)	945
Psychiatry	1% (44)	3% (103)	52% (1,730)	24% (791)	20% (661)	3,329
Public Health and General Preventive Medicine	--	--	81% (75)	12% (11)	5% (5)	93

1. Dashes indicate cells with fewer than five observations.

Conclusions and Next Steps

These analyses show that geographic preference questions may add value to the residency selection process, although the usefulness of certain questions may vary across residency programs due to differential use of the no preference response option. Except for Neurological Surgery, more than half of applicants across specialties (52%-82%) indicated preference for at least one geographic division, and of those applicants, 5%-48% did not indicate a preference for a geographic area that was the same as their permanent address or medical school. Most applicants (46%-81%) indicated no preference for geographic setting (i.e., rural or urban). The small percentage of applicants who indicated a slight or strong preference for rural settings (<5% across specialties) suggests this question may be more useful to programs in rural settings or those that include rural-specific training sites. Over 80% of applicants were willing to provide more information about their geographic division and setting preferences by including essays. Finally, most geographic divisions were selected in fewer than 50% of combinations with one another, although the New England, Middle Atlantic, and South Atlantic divisions co-occurred more often compared with other divisional combinations. These findings suggest that applicants do not always prefer adjacent regions, are creating unique combinations of regions that meet their preferences, and/or are distributing geographic preferences widely.

More research is needed to evaluate the fairness and value added by geographic preference questions. Future research will include:

- Thematic analysis of essay responses (winter 2023).
- Exploring the relationship among geographic preferences, the no preference selection, and interviews using the “selected to interview” status (spring 2023).

Notes

1. National Resident Matching Program, Data Release and Research Committee. *Results of the 2019 NRMP Applicant Survey by Preferred Specialty and Applicant Type*. Washington, DC: National Resident Matching Program, 2019.
2. National Resident Matching Program, Data Release and Research Committee. *Results of the 2022 NRMP Program Director Survey*. Washington, DC: National Resident Matching Program, 2022.
3. The specialties Obstetrics and Gynecology and Emergency Medicine did not participate in the geographic preferences section during the 2023 ERAS cycle.

Appendix A

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Adult Neurology (155)			
East North Central	14% (556)	18% (28)	0.10
East South Central	3% (113)	5% (7)	*
Middle Atlantic	18% (717)	19% (29)	0.01
Mountain West	5% (199)	6% (10)	*
New England	9% (350)	7% (11)	*
Pacific West	8% (316)	10% (16)	*
South Atlantic	16% (643)	17% (26)	0.01
West North Central	3% (118)	7% (11)	*
West South Central	7% (277)	11% (17)	*
No Preference	16% (611)		
Total Number of Preferences	3,900		
Total Number of Unique Applicants	1,837		
Total Number of Missing Applicants	22		

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Anesthesiology (154)			
East North Central	14% (1,127)	18% (27)	0.09
East South Central	4% (358)	5% (7)	*
Middle Atlantic	17% (1,375)	21% (32)	0.09
Mountain West	5% (406)	3% (5)	*
New England	11% (890)	9% (14)	*
Pacific West	10% (797)	12% (18)	*
South Atlantic	20% (1,574)	17% (26)	-0.07
West North Central	3% (262)	6% (10)	*
West South Central	7% (588)	10% (15)	*
No Preference	8% (601)		
Total Number of Preferences	7,978		
Total Number of Unique Applicants	3,260		
Total Number of Missing Applicants	20		
Dermatology (123)			
East North Central	13% (264)	15% (18)	*
East South Central	3% (60)	4% (5)	*
Middle Atlantic	15% (301)	17% (21)	0.05
Mountain West	4% (82)	5% (6)	*
New England	8% (156)	7% (9)	*
Pacific West	9% (182)	11% (13)	*
South Atlantic	18% (362)	23% (28)	0.12
West North Central	4% (81)	7% (9)	*
West South Central	6% (115)	11% (14)	*
No Preference	20% (395)		
Total Number of Preferences	1,998		
Total Number of Unique Applicants	960		
Total Number of Missing Applicants	6		

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Diagnostic Radiology (186)			
East North Central	14% (768)	18% (33)	0.10
East South Central	4% (232)	5% (10)	*
Middle Atlantic	17% (930)	22% (41)	0.13
Mountain West	6% (300)	4% (7)	*
New England	11% (585)	11% (20)	0.00
Pacific West	10% (546)	11% (20)	0.02
South Atlantic	20% (1089)	15% (27)	-0.14
West North Central	3% (187)	6% (11)	*
West South Central	8% (428)	9% (17)	*
No Preference	7% (385)		
Total Number of Preferences	5,450	--	
Total Number of Unique Applicants	2,195	--	
Total Number of Missing Applicants	11	--	
Interventional Radiology (86)			
East North Central	15% (140)	17% (15)	*
East South Central	3% (27)	3% (3)	*
Middle Atlantic	16% (154)	20% (17)	*
Mountain West	5% (50)	3% (3)	*
New England	12% (117)	10% (9)	*
Pacific West	11% (105)	9% (8)	*
South Atlantic	20% (186)	20% (17)	*
West North Central	2% (23)	8% (7)	*
West South Central	7% (62)	8% (7)	*
No Preference	8% (79)		
Total Number of Preferences	943	--	
Total Number of Unique Applicants	381	--	
Total Number of Missing Applicants	--	--	

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
General Surgery (283)			
East North Central	12% (1,177)	20% (57)	0.22
East South Central	4% (394)	5% (14)	*
Middle Atlantic	17% (1,598)	20% (58)	0.10
Mountain West	5% (522)	5% (13)	*
New England	9% (909)	5% (15)	*
Pacific West	9% (904)	11% (30)	0.04
South Atlantic	19% (1,798)	20% (56)	0.03
West North Central	3% (258)	6% (16)	*
West South Central	7% (636)	8% (24)	0.07
No Preference	15% (1,444)	--	
Total Number of Preferences	9,640	--	
Total Number of Unique Applicants	4,460	--	
Total Number of Missing Applicants	76	--	
Internal Medicine - Categorical (513)			
East North Central	14% (4673)	18% (94)	0.11
East South Central	3% (1054)	5% (26)	0.10
Middle Atlantic	19% (6386)	21% (106)	0.03
Mountain West	4% (1258)	5% (24)	0.04
New England	9% (2971)	6% (29)	-0.13
Pacific West	8% (2649)	11% (54)	0.09
South Atlantic	18% (5787)	20% (103)	0.07
West North Central	2% (798)	4% (23)	0.11
West South Central	7% (2185)	11% (54)	0.14
No Preference	16% (5256)	--	
Total Number of Preferences	33,017	--	
Total Number of Unique Applicants	15,895	--	
Total Number of Missing Applicants	161	--	

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Internal Medicine/Psychiatry (13)			
East North Central	13% (67)	15% (2)	*
East South Central	6% (30)	8% (1)	*
Middle Atlantic	14% (73)	N/A	
Mountain West	4% (21)	N/A	
New England	10% (51)	N/A	
Pacific West	7% (37)	8% (1)	*
South Atlantic	20% (106)	38% (5)	*
West North Central	4% (21)	15% (2)	*
West South Central	9% (45)	15% (2)	*
No Preference	13% (70)	--	
Total Number of Preferences	521	--	
Total Number of Unique Applicants	236	--	
Total Number of Missing Applicants	--	--	
Neurological Surgery (110)			
East North Central	6% (42)	16% (18)	*
East South Central	3% (17)	5% (6)	*
Middle Atlantic	12% (80)	17% (19)	*
Mountain West	4% (24)	5% (6)	*
New England	8% (53)	9% (10)	*
Pacific West	9% (60)	11% (12)	*
South Atlantic	13% (84)	17% (19)	*
West North Central	1% (6)	6% (7)	*
West South Central	5% (31)	12% (13)	*
No Preference	39% (259)	--	
Total Number of Preferences	656	--	
Total Number of Unique Applicants	401	--	
Total Number of Missing Applicants	7	--	

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Orthopedic Surgery (182)			
East North Central	12% (350)	22% (40)	0.28
East South Central	4% (133)	5% (10)	*
Middle Atlantic	14% (412)	21% (38)	0.19
Mountain West	6% (168)	4% (8)	*
New England	7% (209)	5% (9)	*
Pacific West	8% (235)	9% (17)	*
South Atlantic	16% (469)	17% (31)	0.04
West North Central	3% (102)	7% (12)	*
West South Central	6% (183)	9% (17)	*
No Preference	25% (739)	--	
Total Number of Preferences	3,000	--	
Total Number of Unique Applicants	1,553	--	
Total Number of Missing Applicants	17	--	
Pediatrics (200)			
East North Central	14% (1,262)	17% (34)	0.09
East South Central	4% (400)	5% (9)	*
Middle Atlantic	17% (1,590)	23% (46)	0.14
Mountain West	5% (489)	4% (7)	*
New England	9% (785)	5% (10)	*
Pacific West	9% (823)	10% (19)	*
South Atlantic	19% (1,758)	22% (44)	0.07
West North Central	3% (316)	6% (11)	*
West South Central	7% (687)	10% (20)	0.09
No Preference	12% (1,113)	--	
Total Number of Preferences	9,223	--	
Total Number of Unique Applicants	4,241	--	
Total Number of Missing Applicants	32	--	

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Physical Medicine and Rehabilitation (94)			
East North Central	15% (322)	21% (20)	0.17
East South Central	4% (93)	4% (4)	*
Middle Atlantic	18% (397)	27% (26)	0.22
Mountain West	6% (134)	5% (5)	*
New England	6% (125)	3% (3)	*
Pacific West	9% (200)	7% (7)	*
South Atlantic	20% (445)	17% (16)	-0.09
West North Central	3% (68)	6% (6)	*
West South Central	9% (188)	8% (8)	*
No Preference	10% (23)	--	
Total Number of Preferences	2,202	--	
Total Number of Unique Applicants	957	--	
Total Number of Missing Applicants	7	--	
Psychiatry (256)			
East North Central	12% (888)	15% (38)	0.10
East South Central	3% (248)	4% (11)	*
Middle Atlantic	19% (1445)	22% (57)	0.08
Mountain West	6% (466)	4% (11)	*
New England	11% (816)	7% (18)	*
Pacific West	12% (898)	11% (29)	-0.01
South Atlantic	18% (1356)	21% (54)	0.09
West North Central	3% (242)	6% (16)	*
West South Central	7% (534)	9% (22)	0.06
No Preference	10% (758)	--	
Total Number of Preferences	7,651	--	
Total Number of Unique Applicants	3,361	--	
Total Number of Missing Applicants	28	--	

(continued)

Comparison of the Proportion of Total Number of Geographic Preferences and Program Density, by U.S. Census Division and Specialty, 2022-2023¹ (continued)

Specialty (number of participating programs)	Geographic Preferences Indicated % (n)	Divisional Program Density % (n)	Cohen h^2
Public Health and General Preventative Medicine (26)			
East North Central	8% (13)	15% (4)	*
East South Central	4% (7)	12% (3)	*
Middle Atlantic	11% (18)	19% (5)	*
Mountain West	10% (16)	8% (2)	*
New England	5% (8)	4% (1)	*
Pacific West	13% (22)	12% (3)	*
South Atlantic	16% (26)	15% (4)	*
West North Central	--	4% (1)	*
West South Central	8% (13)	12% (3)	*
No Preference	23% (39)	--	
Total Number of Preferences	166	--	
Total Number of Unique Applicants	91	--	
Total Number of Missing Applicants	6	--	

1. Program density was calculated by dividing the number of participating programs in a particular division by the total number of participating programs. Dashes indicate cells with fewer than five observations.

2. Asterisks indicate cells where Cohen h was not computed due to fewer than 20 observations per group.

Appendix B

Applicants Who Reported No Geographic Preference and Sent Applications to Different Numbers of Geographic Divisions, by Specialty, 2022-2023

Number of Different U.S. Census Divisions Applicants Applied To	Percentage and Number of Applicants ¹
Adult Neurology	
1	--
2	--
3	--
4	--
5	1% (8)
6	3% (15)
7	7% (44)
8	19% (115)
9	69% (421)
Anesthesiology	
1	--
2	--
3	--
4	--
5	0.2% (9)
6	5% (28)
7	8% (50)
8	15% (88)
9	70% (421)

(continued)

Applicants Who Reported No Geographic Preference and Sent Applications to Different Numbers of Geographic Divisions, by Specialty, 2022-2023 (continued)

Number of Different U.S. Census Divisions Applicants Applied To	Percentage and Number of Applicants¹
Dermatology	
1	--
2	--
3	--
4	--
5	1% (5)
6	2% (6)
7	4% (17)
8	7% (26)
9	85% (337)
Diagnostic Radiology	
1	--
2	--
3	--
4	--
5	--
6	4% (14)
7	6% (22)
8	10% (39)
9	79% (304)
Interventional Radiology	
1	--
2	--
3	--
4	--
5	--
6	--
7	--
8	9% (7)
9	86% (68)

(continued)

Applicants Who Reported No Geographic Preference and Sent Applications to Different Numbers of Geographic Divisions, by Specialty, 2022-2023 (continued)

Number of Different U.S. Census Divisions Applicants Applied To	Percentage and Number of Applicants¹
General Surgery	
1	.4% (5)
2	.6% (9)
3	.6% (9)
4	1% (21)
5	2% (22)
6	3% (46)
7	8% (111)
8	15% (212)
9	70% (1,009)
Internal Medicine - Categorical	
1	.7% (37)
2	.8% (41)
3	2% (82)
4	2% (113)
5	3% (174)
6	5% (255)
7	9% (459)
8	17% (879)
9	61% (3,216)
Internal Medicine/Psychiatry	
1	--
2	--
3	--
4	--
5	--
6	--
7	7% (5)
8	16% (11)
9	70% (49)

(continued)

Applicants Who Reported No Geographic Preference and Sent Applications to Different Numbers of Geographic Divisions, by Specialty, 2022-2023 (continued)

Number of Different U.S. Census Divisions Applicants Applied To	Percentage and Number of Applicants¹
Neurological Surgery	
1	--
2	--
3	--
4	--
5	--
6	--
7	2% (5)
8	5% (13)
9	92% (238)
Orthopedic Surgery	
1	--
2	--
3	--
4	--
5	1% (11)
6	2% (16)
7	8% (56)
8	15% (113)
9	72% (535)
Pediatrics	
1	--
2	2% (17)
3	1% (10)
4	2% (21)
5	3% (35)
6	7% (80)
7	10% (116)
8	19% (206)
9	56% (627)

(continued)

Applicants Who Reported No Geographic Preference and Sent Applications to Different Numbers of Geographic Divisions, by Specialty, 2022-2023 (continued)

Number of Different U.S. Census Divisions Applicants Applied To	Percentage and Number of Applicants¹
Physical Medicine and Rehabilitation	
1	--
2	--
3	--
4	--
5	2% (5)
6	3% (8)
7	6% (13)
8	10% (22)
9	77% (178)
Psychiatry	
1	--
2	--
3	--
4	--
5	--
6	4% (14)
7	6% (22)
8	10% (39)
9	79% (304)
Public Health and General Preventative Medicine	
1	--
2	--
3	--
4	--
5	--
6	--
7	18% (7)
8	18% (7)
9	46% (18)

1. Dashes indicate cells with fewer than five applicants.