doi:10.36849/JDD.9505

 ORIGINAL ARTICLE

Patient Interest in Dermatologists in the United States: A 20-Year Google Trends and Workforce Analysis

Yagiz Matthew Akiska BSE,[a,b] Savanna I.Vidal BS,[a] Mana Nasseri BS,[a] Nikita Menta BA,[a] Cleo Whiting MD,[a] Sara Abdel Azim MD,[c] Adam Friedman MD[a]

[a]Department of Dermatology, George Washington University School of Medicine and Health Sciences, Washington, DC
[b]Milken Institute School of Public Health, George Washington University, Washington, DC
[c]School of Medicine, Georgetown University, Washington, DC

ABSTRACT

Background: Dermatologists remain unevenly distributed throughout the United States (US), leading to disparities in access to dermatologic care.

Objective: To evaluate geographic variation in patient interest in dermatology services and compare it to dermatologist supply to identify areas of potential unmet need.

Methods: An ecological, cross-sectional study was conducted using Google Trends data from 2004 to 2023 to assess relative search volume (RSV) for "dermatologist" across US states. RSV was normalized and combined with dermatologist density data from the AAMC to generate a Relative Demand Index (RDI) for each state. Spearman's rank correlation assessed associations between RDI, dermatologist supply, urbanization, and population size.

Results: States with high RDI, such as Alabama and Mississippi, had high patient interest but low dermatologist density, suggesting workforce shortages. Conversely, states like Massachusetts and the District of Columbia had low RDI and high provider density. RDI showed a strong inverse correlation with dermatologist density (rs = -0.76, $P<0.0001$).

Limitations: This study relied on a keyword, Google-only search data, and assumed internet access. County-level nuances were not captured.

Conclusion: Significant geographic disparities in dermatologist availability and demand exist, highlighting the need for targeted workforce distribution strategies to ensure equitable access to dermatologic care.

J Drugs Dermatol. 2026;25(4):357-362. doi:10.36849/JDD.9505

INTRODUCTION

In recent years, there has been a notable increase in attention to and financial support for dermatology.[1,2] Skin conditions now rank as the fourth leading contributor to nonfatal disease burden globally, as measured by disability-adjusted life years.[3] Dermatologists play a key role in identifying skin conditions that serve as early indicators of serious health conditions, and are crucial in enhancing the quality of life for patients by addressing the multisystem impacts of various dermatological conditions.[3,4]

Among 84.5 million Americans, a quarter of whom were affected by skin disease, the burden of dermatological conditions on the United States (US) healthcare system incurred $75 billion in 2013, encompassing medical, preventative, prescription, and non-prescription costs.[5] According to the Association of American Medical Colleges (AAMC), the number of US dermatologists has shown a gradual increase over the past decade, reaching 12,516 in 2019, reflecting an average annual growth of 1.6% since 2010.[2] Yet, the gap between urban and rural areas has widened, with an overall density slightly below the suggested 4.0 per 100,000 population to meet demand adequately.2[6,7] Despite these projections, dermatologists continue to be unevenly distributed across the US.[6,7] Findings reported by the US Department of Health and Human Services in 2016 indicated that dermatology is anticipated to be among the medical specialties facing the most significant national deficits by 2025, underscoring the high demand for dermatological care.[8]

When exploring unmet patient needs, quantifying patient demand is essential for identifying actionable healthcare gaps. GoogleTrends is a platform that compiles and quantifies Google search data, providing population-level insight into search volumes by time and geography.[9] Google Trends has been employed as a proxy to assess patient interest in healthcare services across several medical subspecialties, including orthopedic surgery, ophthalmology, and radiology.[10–15] In the US, 58% of patients self-refer to physicians, often utilizing online resources to do so.[13] Dermatology has been reported to be the most frequently searched medical specialty in the United States, and Google Trends is a powerful tool for estimating patient interest.[13]

To our knowledge, no prior study has analyzed dermatologist supply and patient demand at the state level using Google Trends. This study aims to analyze and compare the density of dermatologists

MATERIALS AND METHODS

Google Trends search data were analyzed to gauge patient interest in dermatology services across the US. The monthly search volumes for the term "dermatologist" in each state from January 1, 2004, to December 31, 2023, were divided by the total monthly Google searches within that state and averaged. This method yielded a relative value, indicating the search volume for key terms as a percentage of the state's total search volume. The resulting values were normalized on a scale of 0 to 100 to create a Relative Search Volume (RSV) index, to allow for comparisons of searches across states.[16] A higher RSV value suggests greater interest in dermatology, with 100 assigned to the state displaying the highest interest and 0 to the state with the lowest interest.

The number of practicing dermatologists in each state was determined using data from the AAMC's 2023 State Physician Workforce Data Report, which provides information on active physicians per specialty per state.[17] This count was then divided by the 2023 United States Census Bureau state population estimates to calculate the density of dermatologists per 100,000 individuals.

To assess the relative demand for dermatologists across states, a Relative Demand Index (RDI) was utilized, taking into account both supply (physician density per 100,000 people) and demand (RSV) within each state. A demand index (DI) for dermatologists was calculated per state by dividing the RSV by the concentration of dermatologists per 100,000 people. This demand index was normalized on a scale from 0 to 100 by individually dividing each state's DI by the largest DI and multiplied by 100 to create the RDI (Figure 1).[15,18] The RDI can also serve as an indicator of the abundance or shortage of dermatologists in a given state, with a higher RDI suggesting a relative shortage and a lower RDI indicating a relative abundance of dermatologists. This methodology has been employed in similar analyses of RDI in other medical specialties.[11,15,18–20]

The urbanization percentage for each state was determined using data from the United States Census Bureau, which categorizes the total population into urban and rural areas.[21]This involved dividing the population residing in urban areas by the total state population.

FIGURE 1. Calculation formula for state-by-state Relative Demand Index.

$$\text{Relative Demand Index} = \text{normalized}\left[\frac{\text{Relative Search Volume}}{\frac{(\text{No. of Dermatologist in each State} * 100{,}000)}{\text{State Population}}}\right]$$

All correlation relationships were analyzed via Spearman's rank correlation coefficient. Statistical significance was defined as a *P*-value <0.05.

This study adheres to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

RESULTS

State-by-State Characteristics

Table 1 presents the characteristics of each state, including population size, Google relative search volume, the number of dermatologists, physician density, and urbanization percentage. These variables offer insights into the demand for dermatologists across different regions.

In 2023, 13,133 dermatologists in total were actively practicing in the United States. The overall mean concentration of dermatologists was 3.68±1.52 per 10,000 people, ranging from 10.3 in Washington, DC, to 2.0 in Nevada and Nebraska. By individual states, the highest concentrations of dermatologists per 10,000 people were in Washington, DC (10.3), Rhode Island (7.2), and Massachusetts (7.1), and the lowest concentrations were found in Oklahoma (2.1), Nevada (2.0), and Nebraska (2.0). The mean percentage of the state population living in urban areas was 72.98% and ranged from 100% in the District of Columbia to 35.1% in Vermont.

The mean relative search volume was 59.33±14.95, with New Jersey (100), Alabama (86), and New York (84) having the highest, and Maine (34), North Dakota (29), and Vermont (28) having the lowest relative search volumes. The states with the highest RDI were Alabama (100), Mississippi (98), and Delaware (92), while the states with the lowest RDI were Vermont (25), Massachusetts (21), and the District of Columbia (21) (Figure 2).

FIGURE 2. Map of the United States depicting Relative Demand Index (RDI) by state. Red indicates states with the highest RDI (relative shortage of dermatologists), and green indicates the lowest RDI (relative abundance).

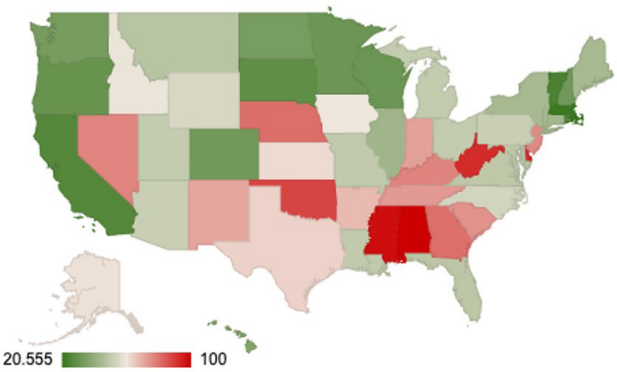


TABLE 2.

Correlations Between Different State-by-State Characteristics		
Correlation between Dermatologist Concentration with:	r_s	*P (2-tailed)*
Relative search volume	0.11	0.43
Urban population (%)	0.51	0.00014
Correlation between Relative Demand Index with:		
Relative Search Volume	0.495	0.0002
State Population	0.034	0.78
Physician Density	-0.76	<0.0001
Urban Population (%)	-0.27	0.05

To compare RDI and population size between states, we categorized them as follows:

- RDI: High (>75th percentile), Moderate (25th–75th percentile), or Low (<25th percentile).
- Population Size: High (>75th percentile), Moderate (25th–75th percentile), or Low (<25th percentile).

Analyzing RDI alongside the state populations revealed diverse patterns, categorized into six categories shared by at least three states, encompassing a total of 50 states and the District of Columbia.

Correlations Between State Characteristics

This study explored correlations between dermatologist concentration and various factors (Table 2). A weak non-significant postive correlation (r_s=0.11, *P*=0.43) was found between dermatologist concentration and relative search volume, while a strong positive correlation was observed with urban population percentage (r_s=0.51, *P*<0.001).

Regarding RDI, a moderate positive correlation (r_s=0.495, *P*=0.0002) with relative search volume suggests increased demand for dermatologists. Conversely, a strong negative correlation was found with physician density (r_s=-0.76, *P*<0.0001), indicating lower demand in areas with higher physician density. Additionally, a moderate negative correlation (r_s=-0.27, *P*=0.05) with urban population percentage suggests lower demand in more urbanized areas.

DISCUSSION

This study examines dermatologist supply and demand in the US, using patient interest as a proxy for need within the context of physician availability. Findings reveal disparities in dermatologist concentration and demand indices across different regions, uniquely considering population size and urbanization.

The relationships between RDI and dermatologist density illustrate the nuanced interplay between dermatologist demand and state populations. States with the highest RDIs, such as Alabama and Mississippi, demonstrate significant demand but low dermatologist density (<2.6 per 100,000). These states are also less urbanized, indicating limited healthcare infrastructure in rural areas. Conversely, Delaware, despite high urbanization (82.6%), also has a high RDI due to relatively low dermatologist density, highlighting that care gaps exist when the workforce is insufficient.[21] In contrast, states with low RDIs, such as Massachusetts and D.C., benefit from high dermatologist density (>4.0 per 100,000) and urbanization, increasing potential care access. Vermont, with low urbanization (35.1%), also has a low RDI, likely due to lower overall demand and moderate workforce availability (4.6 dermatologists per 100,000).[21] Unsurprisingly, there was a strong negative correlation between dermatologist density and RDI (r_s = -0.76, *P*<0.0001), and higher urbanization was linked to lower RDI, while rural states showed a higher RDI. However, the notable deviations from this generalization provide additional context when discussing dermatologist workforce needs.

Previous analyses showed that 40% of American Academy of Dermatology (AAD) dermatologist members practice in the 100 densest 3-digit postal section codes, with 81% in the Northeastern US and 97% residing in the Boston metropolitan area or in Manhattan.[7,23] The differential distribution is also present in dermatologic subspecialties, with workforce analyses showing that 96% of board-certified pediatric dermatologists and 98% of inpatient dermatologists practice in urban/metropolitan areas.[24,25] While this present analysis focused on trends at the state level, the data from this study further demonstrate the geographic maldistribution of dermatologists.

The trends observed in this study align with dermatologists' perceptions of physician availability. A 2017 AAD Practice Profile Survey revealed that dermatologists in rural communities are most likely to report a need for more dermatologists (48%), whereas urban (39%) and suburban dermatologists (32%) are consistently more likely to report an abundance.[26] These findings support the RDI variations identified in this study, and the persistence of these trends suggests that redistribution efforts, such as incentives for dermatologists to practice in underserved areas or expanded use of teledermatology, are necessary to address differential access.

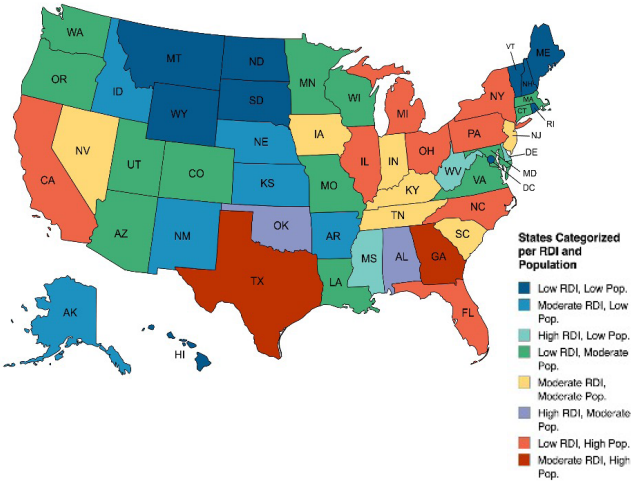
Regional patterns across the US unveil further workforce imbalances (Figure 3). Rocky Mountain states like Montana, Wyoming, North Dakota, and South Dakota exhibit both low populations and RDIs, whereas neighboring states like Idaho and Nebraska, despite low populations, exhibit relatively higher RDIs (Table 1). The higher RDI in these states may be attributed to a combination of factors, including fewer dermatologists, greater RSVs, and the higher availability of dermatologists in neighboring states, fueling inquiries. Similar trends are seen in the low-population Northeastern states – Vermont, New Hampshire, and Maine. In the Northeast, high-population states

TABLE 1.

State-by-state Characteristics Population, Search Volume, Dermatologists, and Urbanization, Listed by Decreasing Normalized RDI

State	State Population	Google Relative Search Volume	No. Dermatologists	Physician Density	Demand Index	Relative Demand Index Normalized	Urban Population (%)
Alabama	5,108,468	86	133	2.6	33.0	100	57.7
Alaska	733,406	44	16	2.2	20.2	61	64.9
Arizona	7,431,344	59	255	3.4	17.2	52	89.3
Arkansas	3,067,732	57	78	2.5	22.4	68	55.5
California	38,965,193	43	1886	4.8	8.9	27	94.2
Colorado	5,877,610	46	247	4.2	10.9	33	86
Connecticut	3,617,176	79	197	5.4	14.5	44	86.3
Delaware	1,031,890	74	25	2.4	30.5	92	82.6
District of Columbia	678,972	70	70	10.3	6.8	21	100
Florida	22,610,726	75	1040	4.6	16.3	49	91.5
Georgia	11,029,227	71	294	2.7	26.6	81	74.1
Hawaii	1,435,138	54	64	4.5	12.1	37	86.1
Idaho	1,964,726	49	49	2.5	19.6	59	69.2
Illinois	12,549,689	57	501	4.0	14.3	43	86.9
Indiana	6,862,199	57	164	2.4	23.9	72	71.2
Iowa	3,207,004	49	79	2.5	19.9	60	63.2
Kansas	2,940,546	54	77	2.6	20.6	62	72.3
Kentucky	4,526,154	67	119	2.6	25.5	77	58.7
Louisiana	4,573,749	74	204	4.5	16.6	50	71.5
Maine	1,395,722	35	33	2.4	14.8	45	38.6
Maryland	6,180,253	81	305	4.9	16.4	50	85.6
Massachusetts	7,001,399	50	494	7.1	7.1	21	91.3
Michigan	10,037,261	62	370	3.7	16.8	51	73.5
Minnesota	5,737,915	43	233	4.1	10.6	32	71.9
Mississippi	2,939,690	80	73	2.5	32.2	98	46.3
Missouri	6,196,156	59	220	3.6	16.6	50	69.5
Montana	1,132,812	48	34	3.0	16.0	48	53.4
Nebraska	1,978,379	54	40	2.0	26.7	81	73
Nevada	3,194,176	51	64	2.0	25.5	77	94.1
New Hampshire	1,402,054	45	58	4.1	10.9	33	58.3
New Jersey	9,290,841	100	370	4.0	25.1	76	93.8
New Mexico	2,114,371	58	52	2.5	23.6	71	74.5
New York	19,571,216	84	1116	5.7	14.7	45	87.4
North Carolina	10,835,491	68	410	3.8	18.0	54	66.7
North Dakota	783,926	29	20	2.6	11.4	34	61
Ohio	11,785,935	60	420	3.6	16.8	51	76.3
Oklahoma	4,053,824	61	85	2.1	29.1	88	64.6
Oregon	4,233,358	39	160	3.8	10.3	31	80.5
Pennsylvania	12,961,683	73	550	4.2	17.2	52	76.5
Rhode Island	1,095,962	62	79	7.2	8.6	26	91.1
South Carolina	5,373,555	73	159	3.0	24.7	75	67.9
South Dakota	919,318	39	37	4.0	9.7	29	57.2
Tennessee	7,126,489	69	203	2.8	24.2	73	66.2
Texas	30,503,301	67	970	3.2	21.1	64	83.7
Utah	3,417,734	64	130	3.8	16.8	51	89.8
Vermont	647,464	38	30	4.6	8.2	25	35.1
Virginia	8,715,698	63	334	3.8	16.4	50	75.6
Washington	7,812,880	43	298	3.8	11.3	34	83.4
West Virginia	1,770,071	69	40	2.3	30.5	92	44.6
Wisconsin	5,910,955	41	231	3.9	10.5	32	67.1
Wyoming	584,057	53	17	2.9	18.2	55	62

FIGURE 3. State-by-state comparison of relative demand index (RDI) and population (pop.) size in categories of low (<25 %ile), moderate (25–75 %ile), and high (>75 %ile) numbers, respectively. Each state is categorized by low, moderate, or high population size and RDI. The comparison reveals patterns of dermatologist demand relative to population density, helping to identify underserved regions.



like Illinois, Michigan, Ohio, Pennsylvania, and New York showed low RDIs, likely due to their high population, relative physician density, and higher urbanization. Overall, while the calculated RDIs may suggest relatively less demand or a dermatologist abundance in both geographic clusters, it is evident that a maldistribution of dermatologists exists between them.

Limited access to dermatologic care has tangible consequences across several skin diseases, especially amongst rural and other underserved communities, potentially leading to life-threatening consequences for patients.[7,27,28] Higher dermatologist density is associated with lower melanoma mortality rates, while rural areas have higher incidences of late-stage melanoma diagnoses.[29,30] In parallel, greater survival rates for Merkel cell carcinoma have been observed in urban communities.[31] Geographic disparities also impact psoriasis treatment, with increased biologic prescriptions in urban areas.[32] Distinct geographic discrepancies in emergency room visits and prescription medication use in patients with atopic dermatitis were highlighted in one study, noting significant care disparities in the Midwest US.[33] These care access trends, and their consequences, are especially concerning as the prevalence of skin diseases continues to rise.[34]

In high-RDI states with low dermatologist density, primary care physicians (PCPs) often assume dermatologic care responsibilities. One study of 12,000 patients found that skin diseases comprise 12.4% of cases seen by family physicians, and another study showed that only 40% of dermatologic concerns were evaluated by specialists in underserved areas.[35,36] As a result, non-specialists and PCPs must instead fill that care gap, with one-third of primary care visits addressing a dermatologic concern.[36-38] Although PCPs play a valuable role in addressing basic dermatologic conditions, patients typically report higher confidence in dermatologists managing their care. Additionally, dermatologists' training better equips them to provide more accurate diagnoses and comprehensive treatment.[37]

Despite a 1.6% annual increase in dermatology residency positions since 2010, workforce distribution remains limited by training site availability and graduate preferences.[39-41] In the Northwest/Midwest cluster, only Nebraska has a residency program, while the Northeast cluster boasts seven to twelve programs per state. This discrepancy highlights the intricate relationship between state population size, RDI, and the availability of dermatology training programs.[41] As dermatologists have been shown to prefer practicing near their training sites, as evidenced by a physician retention rate of 57.1% in the state in which residency was done, the scarcity of dermatologists in low-population states, especially rural regions, is directly linked to the paucity of academic institutions in these regions.[41]

When considering barriers to rural recruitment, urban settings have been shown to align better with the professional and personal preferences of younger dermatologists.[6] Dermatologists also prefer to enter practice in private groups or academic centers and to have opportunities to perform procedural and cosmetic dermatology, all of which are concentrated in urban areas.[2,6,28] These insights may serve as a launching point for longitudinal analyses of specific areas of need and places in which investment in the workforce may be most promising. Strategies to augment the availability of dermatologists in rural areas include promoting recruitment of trainees of rural origin, incorporating rural residency tracks in the residency curriculum, and establishing robust financial incentive programs to draw dermatologists to underserved areas. Of important note, telehealth holds the promise of improving dermatologic access in rural and remote areas. However, the availability of infrastructure needed for telehealth and familiarity with its use pose challenges.[41-48]

Limitations of our study include restricted keyword selection, which may have overlooked relevant terms, the inclusion of only patient-initiated searches, the reliance on internet search data, introducing a potential bias toward individuals with internet access, and the exclusion of other search engines. Lastly, while our state-level estimates fill a knowledge gap, they do not capture nuances at the sub-state, county, or city level due to the lack of a reliable number of dermatologists per state to perform these calculations.

CONCLUSION

In conclusion, our study provides objective data emphasizing that areas with the greatest demand and the greatest need for dermatologic care are subject to the lowest access. This first-of-its-kind analysis of patient-directed demand and dermatologist resource distribution across states emphasizes the need for tailored strategies to address workforce imbalances. Integrating real-time demand data, like that presented in this study, with workforce planning helps to ensure equitable access to dermatological services. Future research should delve into the factors influencing searches for dermatologist supply and demand and incorporate these data to identify areas of workforce.

DISCLOSURES

The authors have no conflicts of interest to disclose.

REFERENCES

1. Porter ML, Kimball AB. Predictions, surprises, and the future of the dermatology workforce. *JAMA Dermatol.* 2018;154(11):1253. doi:10.1001/jamadermatol.2018.2925
2. Gronbeck C, Kodumudi V, Brodell RT, et al. Dermatology workforce in the United States – Part I: overview, trans-formations, and implications. *J Am Acad Dermatol.* 2023;89(1):1-14. doi:10.1016/j.jaad.2022.06.1191
3. Prasad S, Bassett IV, Freeman EE. Dermatology on the global stage: the role of dermatologists in international health advocacy and COVID-19 research. *Int J Womens Dermatol.* 2021;7(5):653-659. doi:10.1016/j.ijwd.2021.10.003
4. Kowalewska B, Jankowiak B, Krajewska-Kułak E, et al. Quality of life in skin diseases as perceived by patients and nurses. *Adv Dermatol Allergol.* 2020;37(6):956-961. doi:10.5114/ada.2019.86182
5. Lim HW, Collins SAB, Resneck JS, et al. The burden of skin disease in the United States. *J Am Acad Dermatol.* 2017;76(5):958-972.e2. doi:10.1016/j.jaad.2016.12.043
6. Feng H, Berk-Krauss J, Feng PW, Stein JA. Comparison of dermatologist density between urban and rural counties in the United States. *JAMA Dermatol.* 2018;154(11):1265. doi:10.1001/jamadermatol.2018.3022
7. Glazer AM, Farberg AS, Winkelmann RR, Rigel DS. Analysis of trends in geographic distribution and density of US dermatologists. *JAMA Dermatol.* 2017;153(4):322. doi:10.1001/jamadermatol.2016.5411
8. Bureau of Health Workforce. *National and Regional Projections of Supply and Demand for Internal Medicine Sub-specialty Practitioners: 2013-2025.* US Dept of Health and Human Services; 2016.
9. Ransohoff JD, Sarin KY. Referred by Google: mining Google Trends data to identify patterns in and correlates to searches for dermatological concerns and providers. *Br J Dermatol.* 2018;178(3):794-795. doi:10.1111/bjd.15491
10. Blau JA, Levites HA, Phillips BT, Hollenbeck ST. Patient demand for plastic surgeons for every US state based on Google searches. *JPRAS Open.* 2020;25:88-92. doi:10.1016/j.jpra.2020.06.001
11. Choo ZY, Choo ZN, de Luzuriaga AR. Google Trends analysis of teledermatology interest in the United States during the COVID-19 pandemic. *JAAD Int.* 2023;12:171-173. doi:10.1016/j.jdin.2023.04.006
12. Searle TN, Al-Niaimi F, Ali FR. Dermatological insights from Google Trends: what does the public think is important during COVID-19 lockdown? *Clin Exp Dermatol.* 2020;45(7):898-900. doi:10.1111/ced.14319
13. Sivesind TE, Szeto MD, Kim W, Dellavalle RP. Google Trends in dermatology: scoping review of the literature. *JMIR Dermatol.* 2021;4(1):e27712. doi:10.2196/27712
14. Montgomery SNB, Elbuluk N. Evaluating population interest in vitiligo through an analysis of Google Trends and social media. *J Drugs Dermatol.* 2020;19(6):661-665.
15. Doepker CP, Pakhchanian H, Raiker R, et al. Google Trends data of radiologists who accept Medicare: a potential tool for predicting state demand. *Curr Probl Diagn Radiol.* 2022;51(1):46-50. doi:10.1067/j.cpradiol.2021.03.004
16. Google Trends: understanding the data. Google News Initiative. Accessed February 25, 2024. https://newsinitiative.withgoogle.com/resources/trainings/google-trends-understanding-the-data/
17. 2023 US physician workforce data dashboard. AAMC. Accessed February 25, 2024. https://www.aamc.org/data-reports/data/2023-us-physician-workforce-data-dashboard
18. Akosman S, Tran E, Rosenberg S, et al. Patient demand for ophthalmologists in the United States: a Google Trends analysis. *Ophthalmic Epidemiol.* Published online October 26, 2023. doi:10.1080/09286586.2023.2273508
19. Davison-Kerwood M, Jiang S, Gonzalez M. Orthopaedic surgical demand index: a measure of need in the United States. *J Am Acad Orthop Surg Glob Res Rev.* 2022;6(11):e22.00131. doi:10.5435/JAAOSGlobal-D-22-00131
20. Wynne M, Pakhchanian H, Raiker R, et al. Patient demand for urologists in the United States: a Google Trends analysis. *Urol Pract.* 2023;10(2):155-160. doi:10.1097/UPJ.0000000000000385
21. State population totals and components of change: 2020-2023. US Census Bureau. Accessed February 25, 2024. https://www.census.gov/data/tables/time-series/demo/popest/2020s-state-total.html
22. ACGME data resource book. ACGME. Accessed February 25, 2024. https://www.acgme.org/about/publications-and-resources/graduate-medical-education-data-resource-book/
23. Yoo JY, Rigel DS. Trends in dermatology: geographic density of US dermatologists. *Arch Dermatol.* 2010;146(7):779. doi:10.1001/archdermatol.2010.127
24. Sinha S, Lin G, Zubkov M, et al. Geographic distribution and characteristics of the pediatric dermatology workforce in the United States. *Pediatr Dermatol.* 2021;38(6):1523-1528. doi:10.1111/pde.14824
25. Hydol-Smith JA, Gallardo MA, Korman A, et al. The United States dermatology inpatient workforce between 2013 and 2019: a Medicare analysis reveals contraction of the workforce and vast access deserts—a cross-sectional analysis. *Arch Dermatol Res.* 2024;316(4):103. doi:10.1007/s00403-024-02845-0
26. Ehrlich A, Kostecki J, Olkaba H. Trends in dermatology practices and the implications for the workforce. *J Am Acad Dermatol.* 2017;77(4):746-752. doi:10.1016/j.jaad.2017.06.030
27. Kodumudi V, Gronbeck C, Brodell RT, et al. Dermatology workforce in the United States – Part II: patient outcomes, challenges, and potential solutions. *J Am Acad Dermatol.* 2023;89(1):17-26. doi:10.1016/j.jaad.2022.06.1192
28. Buster KJ, Stevens EI, Elmets CA. Dermatologic health disparities. *Dermatol Clin.* 2012;30(1):53-59. doi:10.1016/j.det.2011.08.002
29. Aneja S, Aneja S, Bordeaux JS. Association of increased dermatologist density with lower melanoma mortality. *Arch Dermatol.* 2012;148(2):174-178. doi:10.1001/archdermatol.2011.345
30. Cortez JL, Vasquez J, Wei ML. The impact of demographics, socioeconomics, and health care access on melanoma outcomes. *J Am Acad Dermatol.* 2021;84(6):1677-1683. doi:10.1016/j.jaad.2020.07.125
31. Nelson R. High rate of subsequent cancers in MCC. *MDedge Dermatology.* September 13, 2023. Accessed March 29, 2024. https://www.mdedge.com/dermatology/article/265304/nonmelanoma-skin-cancer/high-rate-subsequent-cancers-mcc
32. Drozdowski R, Jain N, Gronbeck C, Feng H. Disparities in care for psoriasis. *Dermatol Clin.* 2024;42(3):507-512. doi:10.1016/j.det.2024.02.009
33. Wu KK, Nguyen KB, Sandhu JK, Armstrong AW. Does location matter? Geographic variations in healthcare resource use for atopic dermatitis in the United States. *J Dermatolog Treat.* 2021;32(3):314-320. doi:10.1080/09546634.2019.1656796
34. Laughter MR, Maymone MBC, Karimkhani C, et al. The burden of skin and subcutaneous diseases in the United States from 1990 to 2017. *JAMA Dermatol.* 2020;156(8):874-881. doi:10.1001/jamadermatol.2020.1573
35. Verhoeven EWM, Kraaimaat FW, van Weel C, et al. Skin diseases in family medicine: prevalence and health care use. *Ann Fam Med.* 2008;6(4):349-354. doi:10.1370/afm.861
36. Bae GH, Hartman RI, Joyce C, Mostaghimi A. Comparing dermatology referral patterns and diagnostic accuracy be-tween nonphysician providers, physician trainees, and attending physicians. *J Am Acad Dermatol.* 2016;75(1):226-227. doi:10.1016/j.jaad.2016.02.1213
37. Federman DG, Reid MC, Feldman SR, et al. The primary care provider and the care of skin disease: the patient's per-spective. *Arch Dermatol.* 2001;137(1):25-29. doi:10.1001/archderm.137.1.25
38. Feldman SR, Fleischer AB, Williford PM, et al. Increasing utilization of dermatologists by managed care: an analysis of the National Ambulatory Medical Care Survey, 1990–1994. *J Am Acad Dermatol.* 1997;37(5):784-788. doi:10.1016/S0190-9622(97)70118-X
39. Chen AJ, Schwartz J, Kimball AB. There's no place like home: an analysis of migration patterns of dermatology resi-dents prior to, during, and after their training. *Dermatol Online J.* 2016;22(6):13030/qt3sf6z3pn.
40. Fulk T, Wessman LL, Gupta R, et al. Geographic practice preferences of graduating medical students pursuing careers in dermatology. *J Am Acad Dermatol.* 2022;87(5):1193-1196. doi:10.1016/j.jaad.2022.02.061
41. Physician retention in state of residency training, by state. AAMC. Accessed April 21, 2024. https://www.aamc.org/data-reports/students-residents/data/report-residents/2023/table-c6-physician-retention-state-residency-training-state
42. Carol R. As rural America seeks dermatologists, increasing rural residency tracks may steer them there. *Dermatology World.* May 1, 2023. Accessed March 29, 2024. https://www.aad.org/dw/monthly/2023/may/feature-help-needed
43. Desrosiers AS, Petruzzelli CJ, Bobo JF, et al. Clinical interventions aimed at expanding access to dermatologic care. *Dermatol Online J.* 2021;27(3):13030/qt9w82x2z1.
44. Morrissette S, Pearlman RL, Kovar M, et al. Attitudes and perceived barriers toward store-and-forward teledermatology among primary care providers of the rural Mississippi. *Arch Dermatol Res.* 2022;314(1):37-40. doi:10.1007/s00403-021-02208-z
45. Pearlman RL, Le PB, Brodell RT, Nahar VK. Evaluation of patient attitudes towards the technical experience of synchronous teledermatology in the era of COVID-19. *Arch Dermatol Res.* 2021;313(9):769-772. doi:10.1007/s00403-020-02170-2
46. Bui IT, Youssef RM, Gracey LE. An investigation of teledermatology trends in the state of Texas: a multicenter, retrospective cohort review of an eConsult service line. *Telemed J E-Health.* Published online February 14, 2024. doi:10.1089/tmj.2023.0629
47. Ahmad M, Marson JW, Litchman GH, et al. Telemedicine versus teledermatology usage and perception among US-based physicians: a survey study. *J Drugs Dermatol.* 2023;22(11):e4-e8. doi:10.36849/JDD.7386
48. Patel AD, Rundle CW, Kheterpal M. Trends in teledermatology utilization in the United States. *Iproceedings.* 2021;7(1):e35439. doi:10.2196/35439

AUTHOR CORRESPONDENCE

Adam J. Friedman MD FAAD

E-mail:..... ajfriedman@mfa.gwu.edu