ORIGINAL INVESTIGATION

Oculofacial plastic surgeon distribution by county in the United States, 2021

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ABSTRACT

Purpose: To characterize the number of oculofacial plastic surgeons (OPS) per county in the United States (U.S.).

Methods: The 2021 public databases of the American Society of Ophthalmic Plastic and Reconstructive Surgery and the American Academy of Ophthalmology were used to identify all OPS in the U.S. Surgeon practice location was used to determine per capita physician density by county.

Results: A total of 1184 OPS in the U.S. were identified. Three hundred forty-eight counties were served by at least one OPS whereas 2795 counties (89%), and two states, North Dakota and Wyoming, had no OPS. The average ratio of OPS to 100,000 population was 0.3572 (1 per 279,955). Of the counties with at least one OPS, the average was 0.5860 surgeons per 100,000 population (1 per 170,648), ranging from 0.0705 (1 per 1,418,440) to 11.26 (1 per 8,881) per 100,000. The counties with the greatest OPS density were Pitkin County, CO (1 per 8,881), San Juan County, WA (1 per 17,580), and Montour County, PA (1 per 18,231). Counties with the lowest density of those with at least one OPS were Bronx County, NY (1 per 1,418,238), San Bernardino County, CA (1 per 1,090,037), and Gwinnett County, GA (1 per 936,329). The counties with the most OPS were Los Angeles County, CA (46), New York County, NY (38), and Cook County, IL (25).

Conclusions: Geographic disparities in OPS distribution exist in the U.S. Future investigations of OPS supply according to population and other characteristics for demand may be useful.

INTRODUCTION

Within the next decade, the United States is facing a shortage of physicians.1 This shortage is multifactorial, due in part to an aging and growing United States population, an aging healthcare workforce, increasing physician burnout, and a relatively stagnant healthcare workforce supply.1–3 Although non-surgical specialty supply is projected to increase over the next several years, the number of surgical specialists is predicted to remain largely unchanged, which may exacerbate predicted physician shortages.1

The national density of ophthalmologists has declined since 19954 and rural areas have disproportionately fewer ophthalmologists and access to appropriate care which may present future challenges.4 Oculofacial plastic surgeons (OPS) represent a small portion of the total ophthalmologists. As such, shortages of OPS in certain areas may mirror or be more pronounced. To our knowledge, there are no current studies assessing the per capita or regional distribution of OPS across the United States.

The purpose of this report is to characterize the supply and distribution of OPS within the United States at the county, state, and national levels. Therefore, we tested the hypothesis that there exists an unequal per capita density of OPS across counties within the United States.

MATERIALS AND METHODS

OPS were individually identified from public “Find a Surgeon” and “Find an Ophthalmologist” databases found on the websites of the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS) and the American Academy of Ophthalmology (AAO). Cities and zip codes were used to locate the primary practice location of each physician. A list of counties was compiled with the corresponding total number of individual OPS practicing within that county. Data from the United States Census Bureau website was used to find the total county and county equivalent populations.5 For simplicity, county equivalents were treated/counted as counties. Surgeon per capita density was calculated using the total number of OPS within a county and county populations. OPS density was defined as the total number of OPS per 100,000 population. Maptive® (Maptive © 2020, CA, United States) a mapping software tool, was used to create a map depicting county level OPS density in the United States (Figure 1).

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5 Supplemental data for this article can be accessed on the publisher’s website.
Results

In the United States, a total of 1,184 OPS were identified, and a total of 3,143 counties and county equivalents according to the United States Census Bureau. There were 348 individual counties served by at least one OPS (Supplementary Tables S1 and S2). Eighty-nine percent of counties (2,795) had no OPS including two states, North Dakota and Wyoming, having no OPS representation.

The regional distribution and density of OPS in the United States is illustrated in Figure 1, using individual primary practice location of each surgeon at the county level.

The average national density of OPS was 0.000003572 OPS per United States population, or 0.3572 OPS per 100,000 population (1 per 279,955). Of the counties with at least one OPS, the average density was 0.5860 surgeons per 100,000 population (1 per 170,648), ranging from 0.0705 to (1 per 1,418,440) to 11.26 (1 per 8,881). For each county served by at least one OPS, total OPS and OPS density were recorded and presented as Supplementary Tables S1 and S2.

Discussion

The American Association of Medical Colleges projects physician shortages in the United States. Whether current efforts to increase supply will keep up with the current demand remains uncertain. Physician distribution in the United States is disproportionate. Currently, to the authors’ knowledge, there are no prior published reports of the distribution of OPS in the United States.

The data herein demonstrates a wide range of per capita OPS in the United States. The range was 0 to 11.26 OPS per 100,000 population with 2,795 counties having no OPS with a primary practice location in that region. Importantly, many of these counties are very sparsely populated. Nevertheless, these findings corroborate studies that demonstrate the current variation in geographic distribution of physicians in the United States. Further research is necessary to characterize the actual subspecialty needs in these areas. Many areas that appear to be devoid of an OPS provider may actually have coverage through satellite practices. Moreover, non-OPS trained surgeons may provide these services in these specific areas.
Of the counties with at least one OPS, there exists a broad range of representation and as high as 1 OPS per 8,881 population. These counties with the lowest density were highly populated regions with just one or two OPS. The five counties with at least one OPS with the lowest density were Bronx County, NY (0.07051 per 100,000), San Bernardino County, CA (0.09174 per 100,000), Gwinnett County, GA (0.1068 per 100,000), Denton County, TX (0.1127 per 100,000), and Wayne County, MI (0.1143 per 100,000). On the other hand, the counties with the highest density were those with a relatively small population and just one or two OPS. The five counties with the greatest density were Pitkin County, CO (11.25 per 100,000), San Juan County, WA (5.688 per 100,000), Montour County, PA (5.485 per 100,000), Labette County, KS (5.097 per 100,000), and Albemarle County, VA (4.573 per 100,000). With a total population of 17,767 and two OPS, Pitkin County, CO, whose largest city is Aspen, had the greatest density of 11.26 OPS per 100,000 population. Similarly, other high-density OPS counties tended to be those with a relatively small total population. Among the top 20 most dense counties, New York County (or Manhattan borough), with a density of 2.333 OPS to 100,000 population, was the only county with a population exceeding 160,000.

The range of total OPS within a county was from 0 to 46 OPS. The counties with the most OPS were Los Angeles County, CA (46; 0.4582 OPS per 100,000), New York County, NY (38; 2.333 OPS per 100,000), Cook County, IL (25; 0.4854 OPS per 100,000), Harris County, TX (23; 0.4880 OPS per 100,000), and King County, WA (22; 0.9766 OPS per 100,000), each with an OPS density above the national average of 0.3572 OPS per 100,000 population. Although these data suggest some heavily populated counties are adequately supplied with OPS when compared to the national average, many heavily populated counties exist with a very low OPS density.

The county level OPS density in the United States with clustering regions of OPS corresponding with major metropolitan cities, such as Los Angeles, San Francisco, Seattle, Philadelphia, Miami, Chicago, New York City, and Boston is depicted in Figure 1. However, counties in these areas have relatively low OPS density. There is an apparent relative lack of OPS in the rural areas of the Western and Mid-Western regions. Specifically, Wyoming and North Dakota have no OPS within the entire state. Another state in this region, South Dakota, has just one OPS, peripherally located on the states border. Other states have relatively large areas without an OPS, including Montana, Nebraska, Texas, northern Minnesota, southern Utah, and Northern Arizona. This corroborates other studies mapping specialty care in the United States, with the exception of Wyoming, that is more adequately served by other surgeons and subspecialists, with the reasons for this discrepancy being uncertain. 8,10,11

Our findings herein suggest there may be areas in the United States without adequate supply of OPS. Whether these areas are underserved depend on additional variables beyond surgeons’ primary practice designation such as population, demographics, and willingness to travel for specialist care. For instance Siddappa et al., found that 91.7% of counties with the highest density of oncologists were designated as medically underserved areas or health professional shortage areas. 12 Nevertheless, our findings are consistent with other reports that have demonstrated that specialist density is disproportionate, and lower in rural areas of the United States. 13–17

Specialty care across the United States may vary according to specialty, highlighting the need for more granular research describing needs and supply of oculo-facial plastic surgery specialty services. Work by Penne and Lemke suggests that manpower requirements for oculoplastic surgery demand depend on many factors, including patient demographics and an expanding field, which changes over time making characterization of these needs a real challenge. 18 Our findings from this study describing the current county level distribution of OPS in the U.S may achieve an important first step.

The current study has several limitations. First, the quantification of individual OPS was created using ASOPRS and AAO public databases which may not accurately reflect the actual number of OPS in the United States due to ongoing retirement and new graduates. Additionally, our methods do not account for part-time or limited OPS practices. The authors also acknowledge that there may be OPS who are not listed on either the ASOPRS nor AAO databases. Second, these data are based on primary practice location and do not account for physicians with practice locations other than or in addition to that listed. Finally, our study measure of demand uses per capita population data. A more sophisticated measure of demand may highlight additional regional disparities in demographics and both patients and pathology.

Conclusions

There exist disparities in OPS supply within the United States. Thousands of counties within the United States are without an OPS who designates his/her primary practice location there. OPS in the United States are largely clustered in large metropolitan areas. The rural northern Mid-West, and non-coastal West may be two of the most underserved areas. Future research of the OPS workforce supply and demand in the United States is warranted.
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