Access to podiatric healthcare in Los Angeles county and health disparities

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This study examined the geographic distribution of podiatric medical services in Los Angeles County, with consideration of the health inequalities occurring throughout the county. Podiatry was the chosen field of interest because it is a medical specialty in high demand within medically underserved communities. Regions lacking providers were isolated, and the demographic data of these areas were explored in detail to examine a relationship between access to healthcare and health disparities. The demographic data used included public data maps portraying race, income, education, economic hardship, age, air quality, life expectancy, population density, and access to retail food stores.

Keywords: access to healthcare, private practice, Los Angeles, health disparities, Los Angeles podiatry, podiatry

Health disparities among racial and ethnic groups have become an increasing focus of public health efforts. These disparities have been found to be exacerbated by geographic factors. While large-scale considerations are valuable, evaluation of the dynamics of individual cities can be helpful as well. Further, there has been limited formal analysis of podiatric healthcare needs and access.

Los Angeles is the second largest city in the United States, with one of the most diverse populations in the country. Nearly half of the population is Hispanic (44.6%), and approximately one-third is white (31.1%). Roughly 2 million people in the city are above the age of 60 [1-2].

In considering access to podiatric care, the prevalence of diabetes among racial and ethnic minorities is relevant. For example, according to the CDC diabetes prevalence was highest among males, those aged ≥ 65 years, non-Hispanic Blacks and those of mixed race, Hispanics, persons with less than high school education, those considered poor, and those with a disability [3].

The purpose of the present study is to evaluate the geographic distribution of podiatric medical services in Los Angeles County, with consideration of racial, ethnic, and socioeconomic factors. The goal is to help motivate or direct outreach efforts, and to raise awareness of disparities within the county. It is hypothesized that there is a deficit in podiatric healthcare in neighborhoods characterized by socioeconomic disparities and racial/ethnic diversity.

Methods

The geographic locations of podiatric practitioners in Los Angeles County were identified using the internet-based websites Google Maps and Yelp. This method matches the manner in which potential patients may search for local podiatric practitioners. Following identification of podiatric practitioners, information was confirmed with individual practice websites or other healthcare listings. Additional sites were included if discovered during the process of confirming practice locations.
Population data including the distribution of age, racial/ethnic and socioeconomic groups were obtained from public information available on various government or non-government sponsored organizations. Specifically, the sites used were the following: OurCountyLA.org, the U.S. Census Bureau, the Los Angeles Department of Public Health, the Los Angeles County Department of Public Health, the LA Times, The University of Virginia, EmpowerLA.org, the California Department of Aging, and OurCountyLA.org.

Following identification of areas deficient in podiatric medical care, further comparative analysis was performed. This analysis included consideration of average income, racial/ethnic distribution, education level, and age distribution.

Areas of the county which are largely unoccupied for geological reasons, such as mountainous terrain, were excluded from analysis.

**Results**

A total of 360 podiatrists and 346 individual practices were identified with Google Maps (Figure 1). These results were confirmed using either Yelp or separate practice websites. The population estimate of LA County in 2019 was 10,039,107 [4]. This yields a ratio of 27,886 persons for each podiatrist in LA County.

Note first that while the county has 4,084 square miles of total land, less than half of that is livable due to the mountainous terrain [1]. Only 1,741 square miles of the land is reported as “flat land,” or livable land available for development [1]. With a population of over 10 million people, the average population density is 8,327 people per square mile [5]. This would yield an ideal distribution of about 1 podiatrist for every 4 square miles of land. However, the actual distribution varies by locality.

**South Los Angeles**

South Los Angeles (South LA, formerly known as South Central Los Angeles) is home to some of the most underserved people of the entire city, encompassing a region which is 16 miles long and 7 to 10 miles wide [6]. It stretches from just south of downtown Los Angeles, with Gardena and Willowbrook in its center. The population is 486,087 as of 2019, and the area is 61% Hispanic and 28.7% Black [6-7].

The areas encircled in red highlight over 100 total square miles of urban, high-density Los Angeles real estate without a single podiatrist (Figure 2, 2.1). Based on the population of this area, 17 podiatrists would have been expected. While provider availability was not evaluated in detail, of the practices adjacent to the highlighted areas some offered podiatric care on a limited or part-time basis.
South LA is characterized by low-income residents, with medium-to-high population density (Figures 3 and 4). It is also the highest minority-occupied area (Figures 5 and 6), and is characterized by decreased life expectancy (Figure 7). The area is also characterized by poor air quality (Figure 8), and residents suffer from moderate-to-high economic hardship (Figure 9). Educational level is also heavily impacted, as a High School Diploma is the most common highest level of education across the region (Figure 10).

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Population</th>
<th>Year of Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Los Angeles</td>
<td>277,682</td>
<td>2017</td>
</tr>
<tr>
<td>Carson</td>
<td>91,394</td>
<td>2018</td>
</tr>
<tr>
<td>West Carson</td>
<td>21,699</td>
<td>2010</td>
</tr>
<tr>
<td>Gardena</td>
<td>59,329</td>
<td>2019</td>
</tr>
<tr>
<td>Willowbrook</td>
<td>35,983</td>
<td>2010</td>
</tr>
</tbody>
</table>

Figure 2.1 Population Estimate Breakdown of Figure 2 Red Circles by city [8].
Figure 6 Percentage of neighborhoods with the highest Black populations. Courtesy of The LA Times 2010.

Figure 7 Life expectancy by neighborhood. Courtesy of the Public Health and Wellbeing Briefing of 2018 (ourcountyla.org).

Figure 8 Pollution and air quality distribution. Courtesy of the Public Health and Wellbeing Briefing of 2018 (ourcountyla.org).

Figure 9 Map of economic hardship index. Courtesy of Los Angeles County Department of Public Health 2016.
Figure 10 Percentage of adults with a High School Diploma being their highest level of education. Courtesy of The LA Times 2010.

Antelope Valley

The northeastern corner of Los Angeles County is also characterized by reduced access to podiatric care. With a population estimate of 339,815, the area is approximately 25 miles wide (Figure 11, 11.1) [8]. There are 10 podiatrists currently serving it, all located at the western edge of the area. This yields a ratio of one podiatrist for every 33,981 people, notably higher than the LA County average of 25,098:1 [8].

Figure 11.1 Population Estimate Breakdown of Figure 11 Red Zone by City [8].

This region has a high concentration of Blacks (Figure 6) who have a “medium” median household income (Figure 3), yet they rank among the 3rd to 4th quartile for suffering the greatest economic hardship (Figure 9). The highest average level of education in this area is a High School Diploma. This is also a region where there is the greatest proportion and area of people over the age of 65 (Figure 12 and 13), yet they have the lowest life expectancy at 79 years old (Figure 7). This area has the fewest public transportation services available to residents and is classified as a Food Desert, having limited retail food options (Figure 8).

Figure 12 Median age map. Dark orange (High) indicates high median age, yellow (low) indicates low median age. Courtesy of The LA Times 2010.
Valley is particularly impacted in this regard.

Figure 13 Growth trends of California residents over 60 from 1970 to 2060. Courtesy of the California Department of Aging.

Discussion

A total of 360 podiatrists could be confirmed within the confines of Los Angeles County. Understanding the geographic distribution of podiatrists within Los Angeles County reveals the undercurrents of the demographics of the county itself. The dynamics of South Los Angeles and Antelope Valley are especially important in characterizing the county. Interestingly, the LA Times reported that the northeast corner of LA County, specifically Palmdale and Lancaster, is where many Black residents from South LA fled to after the L.A. riots of 1992 [9]. This movement is relevant in considering the demographic transition of South Los Angeles from predominantly Black to predominantly Hispanic.

A notable differentiating factor is the population density. Northeast LA County has the lowest population density of the county, ranging from 10 to about 1,200 people per square mile [8]. This is an important consideration when allocating resources and attempting to maximize the benefits of healthcare investments.

Despite the difference in population density, both South Los Angeles and Antelope Valley have been characterized as food deserts (Figure 14). Antelope Valley is particularly impacted in this regard.

Financial status is a relevant factor, as lower income status is associated with poor health outcomes [10]. Financial issues contribute to an absence of healthcare insurance, difficulty obtaining time away from work, long physically demanding work hours, less exercise and improper nutrition [10].

Financial issues also contribute to difficulty pursuing higher education and career opportunities [10]. For example, the highest level of education on average in both South Los Angeles and Antelope Valley is a high school diploma (Figure 10). This in turn can lead to greater risks of counterproductive lifestyle choices, poor coping mechanisms and crime [10].

These factors may be further compounded by the presence of an aging population. Projections for the next 40 years suggest that more providers will be required to keep up with this growth (Figure 13) [11].

Average life expectancy is also helpful in objectively understanding the impact of health disparities (Figure 7). The local population of South Los Angeles and Antelope Valley are among the lowest in anticipated life expectancy in the county (75.8-80.6 years) [12].
Environmental factors are also a consideration. South Los Angeles in particular is harshly affected by poor air quality and pollution (Figure 8).

Limitations of this study include the nuances of individual practices. Actual podiatrist hours may be different than those represented online, podiatrists may cater to certain local geographic areas, and patient volume and scheduling varies by provider. Access to care may be an impact, as even patients geographically near to potential providers may be limited by a lack of transportation options. Furthermore, in compiling provider information, information was less easily accessible for providers working for larger hospital systems. Providers without an online presence were also difficult to identify. It is likely that the number of podiatric physicians within Los Angeles County is in actuality considerably larger than 360. Overall, the findings described in this study may be more representative of private practices in the county.

Conclusions

Overall, podiatric physicians within Los Angeles County appear geographically situated in areas less affected by socioeconomic factors. Specifically, there was a relative dearth of podiatric physicians in South Los Angeles and Antelope Valley. This trend in geographic distribution may have a healthcare impact on local populations. Related factors are an important consideration in understanding the diversity of Los Angeles County.

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References

