Assessing Geographic Access of Indian Health Service Facilities for Native American populations in New Mexico, US.

Report

March 2024

Jenna LoBasso

[1] No information on the health locations services was found.

Introduction

Access to healthcare services significantly influences health outcomes, particularly among marginalized populations like Native Americans. The Indian Health Service (IHS) is pivotal in providing healthcare to Native American communities across the United States. However, disparities in healthcare access persist due to variations in the distribution of IHS facilities and low government funding. This project examines the geographic accessibility of IHS facilities for Native American populations in New Mexico using Origin-Destination (OD) Cost Matrix analyses.

Methods

The American Indian population data at the census tract level for New Mexico was obtained using the tidycensus package in R. Additionally, the IHS facilities data was sourced from ihs.gov and imported into R as an Excel file. This dataset included information on the geographic distribution of healthcare facilities as well as the facility types. Subsequently, the file was converted into a spatial data frame using the st_as_sf function. Following this, the dataset was filtered to include only the state of New Mexico. Furthermore, population centroids were created for the census tracts using the sf package in R.

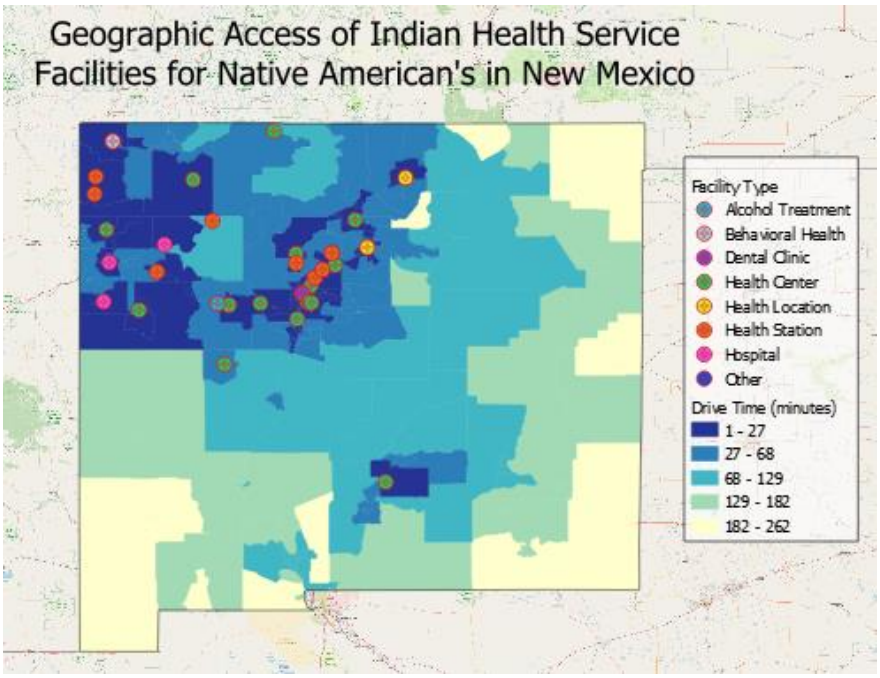
In ArcGIS Pro, an OD Matrix was created incorporating the locations of IHS facilities and the population centroids. This matrix facilitated the calculation of travel times between population centroids and IHS facilities, providing the geographic information necessary for further analysis.

Upon creating the OD Matrix, it was imported into R to conduct accessibility modeling. The matrix table was joined between the Native American populations and the IHS facilities and filtered to include only the nearest facility. Subsequently, this data was utilized to create a geographical map in QGIS.

A graph was generated to visualize the percentage of the native population traveling specific distances. After filtering out unnecessary columns, a distance quantile column was added (0, 1/6, 2/6, 3/6, 4/6, 5/6, 1). The table was then grouped by population and quantile range, with the population per quantile summed up. A total population column was subsequently added by adding up all of the quantile populations. These values were then used to calculate the percent population per distance quantile. A bar graph illustrating distance in kilometers vs. percent population was generated based on these calculations. Similarly, a drive time vs. percent population table was created following the same methodology.

Results

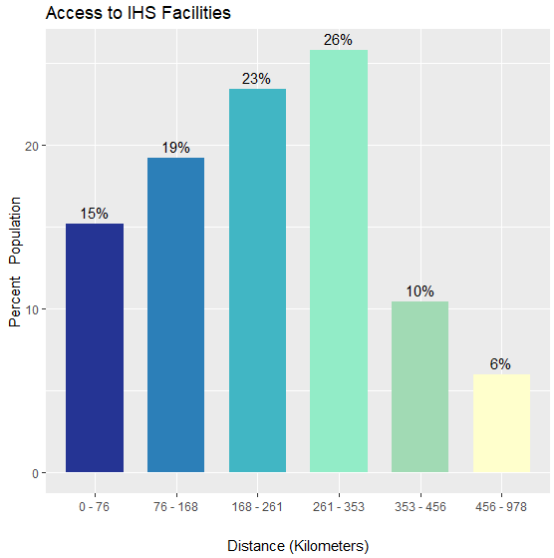
[1] No information on the health locations services was found.



The geographic map reveals distinct patterns in accessibility across New Mexico. Areas surrounding the IHS facilities, particularly clustered in the northwest of the state, exhibit the shortest drive times. Conversely, drive times increase as one disperses further from each facility. A predominant color on the map is aqua-blue, indicating drive times between 68 and 129 minutes. Regions in the east and south of the state where IHS facilities are sparse, are green and yellow, indicating drive times ranging from 129 to 262 minutes. Notably, the northwest cluster predominantly features drive times of 1 to 68 minutes.

Also notable from the map, are the different facility types. Out of the 41 IHS facilities in New Mexico, health centers comprise the majority, with 21 facilities. Additionally, there are 9 health stations, 4 hospitals, 2 dental clinics, 2 health locations, and 1 of each alcohol and substance abuse treatment, behavioral health, and other categories.

[1] No information on the health locations services was found.



	Access Measure	Percent of Native Population
Distance (km)	1.34 - 52.59	14.81%
Drive Time (minutes)	0.53 - 75.73	15.16%
Distance	52.59 - 104.93	18.41%
Drive Time	75.73 - 167.67	19.22%
Distance	104.93 - 164.26	25.23%
Drive Time	167.67 - 260.65	23.42%
Distance	164.26 - 212.78	22.23%
Drive Time	260.65 - 353.15	25.77%
Distance	212.78 - 274.59	12.15%
Drive Time	353.15 - 455.70	10.44%
Distance	274.59 - 580.56	7.17%
Drive Time	455.70 - 977.63	5.99%

The bar graph reveals that approximately 15% of the native population resides within 0 and 76 kilometers (km) from an IHS facility. Around 19% live 76 to 168 km away, 23% live 168 to 261 km away, 26% live 261 to 353 km, 10% live 353 to 456 km, and 6% of the native population live 456 to 978 km away from an IHS facility.

Similarly, from further analysis, it was found that around 15% of the population lives within 1 and 53 minutes from an IHS facility. Around 18% live 53 to 105 minutes away, 25% live 105 to 164 minutes, 22% live 164 to 213 minutes, 12% live 213 to 275 minutes, and 14% of the native population live 275 to 581 minutes away from an IHS facility. Something interesting to note from the table is the percentage difference between the median drive times and distances. Around 26% of the population live 105 to 164 km from the nearest facility but seem to take around 260 to 353 minutes to get there, rather than the expected 168 to 260 minutes. As might be expected, both sets of data follow a bell-like curve, both exhibiting a negative skew.

Discussion

The results of this project provide valuable insights into the accessibility of IHS facilities for Native American populations in New Mexico, revealing significant disparities in healthcare access across the state.

The drive time map highlights distinct accessibility patterns, revealing areas with varying levels of healthcare access. The cluster of IHS facilities in the northwest corresponds to shorter drive times, indicating better geographic accessibility in these regions. Conversely, the sparsity of facilities in the east and south leads to longer drive time, signifying poorer access. The prevalence of the aqua-blue color on the map suggests that many Native American communities have to travel over an hour to reach the nearest facility. Additionally, there is a decent area of New Mexico with travel times between 2 and 5 hours.

[1] No information on the health locations services was found.

The bar graph depicting the population distribution in relation to distance from IHS facilities provides further context on healthcare access. The percentage of the population residing within close proximity to an IHS facility reflects relatively good accessibility; however, the majority of the population (49%) resides between 158 to 363 km from the nearest IHS facility. To add some perspective, on average, rural Americans live under 17 km from their nearest hospital (Lam et al.). With this added information, the healthcare discrimination Native Americans face is evident. Additionally, the drive time quartile does not always parallel the corresponding distance quartile as discussed previously. This incongruence underscores the multifaceted nature of healthcare accessibility, influenced by factors beyond physical distance, including road infrastructure, transportation options, service availability, and socioeconomic factors.

The spatial distribution of IHS facilities significantly influences healthcare accessibility; however, it is essential to recognize that not all facilities offer the same level of care. Hospitals operated by IHS vary in size and services offered. Some provide surgical services and specialty care and nearly all have emergency departments. Health centers provide outpatient services, primary, and preventative care. These facilities may also offer health education, laboratory, pharmacy, and radiology services. Health stations provide similar care to health centers, although are significantly smaller and typically operate for fewer than 40 hours per week. This is extremely significant information when assessing healthcare accessibility (Congressional Research Service). [1]

Due to limited geographic access and services provided, many native individuals must seek care outside of the IHS facilities. This leads to financial strain, as funding for healthcare services for native populations outside of the IHS network is limited (Smith). This highlights the challenges faced by the Native populations in accessing comprehensive healthcare services and underscores the urgent need for increased funding and resources to improve healthcare equity for these communities. By addressing these disparities and expanding access to specialized care, policymakers and healthcare providers can work towards ensuring that all indigenous population in America have access to quality and affordable healthcare services.

Conclusion

This project sheds light on the complex landscape of healthcare accessibility for Native American populations in New Mexico. The analysis reveals significant disparities in healthcare access across the state, influenced by factors such as geographic distribution of Indian Health Service (IHS) facilities, travel times, and the types of services offered. Addressing these disparities requires concerted efforts from policymakers to increase funding and expand access to specialized care. By prioritizing healthcare equity and addressing the challenges faced by Native communities, policymakers can work towards ensuring that all individuals have access to quality and affordable healthcare services, regardless of geographic location or socio-economic status.

[1] No information on the health locations services was found.

Works Cited

Congressional Research Service. *The Indian Health Service (IHS): An Overview*. 12 Jan. 2016.

Lam, Onyi, et al. "How Far Americans Live from the Closest Hospital Differs by Community Type." *Pew Research Center,* 12 Dec. 2018, www.pewresearch.org/short-reads/2018/12/12/how-far-americans-live-from-the-closest-hospital-differs-by-community-type/#:~:text=Rural%20Americans%20live%20an%20average.

Smith, Mary . "Native Americans: A Crisis in Health Equity." *Www.americanbar.org,* www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/the-state-of-healthcare-in-the-united-states/native-american-crisis-in-health-equity/#:~:text=American%20Indians%20and%20Alaska%20Natives%20born%20today%20have%20a%20life.

US Department of Health and Human Services. "Locations | Indian Health Service (IHS)." *Locations,* 2017, www.ihs.gov/locations/.

Walker K, Herman M (2024). *tidycensus: Load US Census Boundary and Attribute Data as 'tidyverse' and 'sf'-Ready Data Frames*. R package version 1.6.3, https://walker-data.com/tidycensus/.

[1] No information on the health locations services was found.