

## Findings

My findings are based on four visualizations created from the supplied data: a choropleth map of the entire country that focuses on the number of dermatologist beneficiaries per FIPS code, and three pie charts that represent a count of the providers for each provider type in the Volusia, Flagler, Seminole, Brevard, St. Johns, Marion, and Putnam County region, for all providers, only men, and only women.

## Choropleth Map

My initial line of thinking for focusing on dermatological visits by location was that certain regions, particularly warm and coastal regions such as the prompted east-central Florida region, are hot spots for skin disease and therefore dermatologist visits. The choropleth map does hint at this being the case, with nearly the entirety of Florida and the southwestern US at the upper end of the scale. However, it should be noted that because this data was not adjusted for population, there is a strong bias towards populated areas maxing out. When compared against a population map, regions such as New York, Chicago, and Denver stand out as regions that don't necessarily match the profile for cities with high occurrence of skin disease but still come out with well over the 75,000 upper limit of the scale.

One particular region that caught my attention early in this project was Little Rock; whether I chose beneficiaries or services to count, Little Rock came out on top for no immediately obvious reason. Because the map is grouped by counties, Little Rock is no longer the top of the chart, accounting for only 103,000 compared to regions it previously outscored like the West Palm Beach region with 365,000. The West Palm Beach region also includes Boca Raton, and between these two cities the approximate population is just over 200,000; this puts it on nearly even footing with Little Rock whose population was reported at 202,000 people in the 2021 census according to the US Census Bureau, which further emphasizes the prevalence of dermatological concerns in the state of Florida.

When I first generated this map, I noticed the general absence of any data at all in many regions. Nearly the entire state of Nevada was solid white (representing a lack of data), and there are plenty of other stretches throughout where nothing seems to be going on. Upon reflecting on the data (during which I had a moment of panic when I noticed my own hometown was missing from the map, searched the original data hosted on the CMS website and found that physicians from Booneville, Mississippi were in fact listed, and then remembering that I had specifically focused on Dermatology and that yes, many small towns including mine do not have dermatologists on hand and the locals have to go to a nearby city for treatment just like I did and as a result concluded nothing was actually wrong here), I recognize that is merely a reflection of rural America rather than of healthcare data itself.

If revisited, this project would benefit from controlling for population like initially intended and may better be able to prove or disprove that dermatologists are more essential where there's more exposure to sunlight (it would be particularly interesting consider QuoteWizard did a study on CDC and NCI data that *did* account for population, at which point they found out that these Florida-like regions account for the most *deadly* skin cancer occurrences but have lower case rates than states like Utah and Minnesota, neither of which have a single county that topped my scale).

## Pie Charts

My pie charts were targeted directly at the FHCP region, counting practices by provider type for male, female, and all distinct NPIs. Some of the most common provider types include: nurse practitioner, family practice, internal medicine, physician assistant, physical therapist in private practice, chiropractic, certified registered nurse anesthetist (CRNA), and emergency medicine. After the previous dataset, dermatology was a point of interest coming to this batch of data; with 106 records counted, it's certainly prevalent but far from the most common specialist in the region.

Most of the documented provider types are typical and it's not surprising that they are numerous in this or any region. The most notable standout here is chiropractic by far, which has 295 records and ranks 6<sup>th</sup> among provider types. There are a few explanations I can think of: because this is Medicare data, it stands to reason that the data skews towards services required by those who are elderly and/or disabled; motor impairments are a particularly common disability; and chiropractic services can be an appealing alternative before committing to surgical procedures. It would be interesting to see how prevalent this provider type becomes using data that is not Medicare focused.

Turning my attention towards female only provider types, there were some unsurprising trends: Female nurse practitioners account for 917 records, the overwhelming majority of the 1040 records in the wider data and by far the most common provider type here; physician assistants collect 339 records, a distant second; some more "general knowledge" specialties are far more common than niche specialists with family practice at 263, internal medicine at 166, and physical therapist in private practice with 165.

These wide-open specialties are not exclusive to women, however; family practice accounts for the most records in the data for men only, with 430. Several of the same mainstays in the wider data are consistent with these findings once the nurse practitioners are factored out, but cardiology and orthopedic surgery appear far more common when investigating just men. Recall that several less common provider types were merged into Other; while cardiology is the 8<sup>th</sup> most common category for men with 128 records, cardiology among women is rare enough that with 14 records it was nearly banished to this consolidated Other category. This underscores a frightening trend in which women's cardiac health symptoms are not well-known.

One particular difference I expected to see between genders would be the prevalence of urology among male doctors and gynecology among female doctors; unsurprisingly, among the women, obstetrics & gynecology accounts for 64 records and urology is so rare it was relegated to the Other category. What I *did* find surprising is that among men, urology accounts for 67 records but is only marginally more common than obstetrics & gynecology at 61. Evaluating why this might be, perhaps gynecology stands out as a particularly fulfilling role; cancers that predominately affect women tend to be more treatable than cancers that affect men, they assist in delivering babies when many people consider having children the greatest moment of their lives, and women tend to be more proactive than men about going to the doctor and by filtering out individuals who are slow to seek treatment means it's more feasible for a serious diagnosis to happen early and the amount of difficult conversations is limited.

These findings feel much more complete than the findings in the previous visualization, but because this is a nonspecific set of data it feels more like preliminary investigation to find more specialized data points to target for further analysis.