

Final Project Report

Brett Peters - GTIM 524

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Question

"What percentage of the Dallas-Fort Worth population has a self-care disability and how has this changed over time?"

Continuing my focus on the Dallas-Fort Worth area, I looked into disability data for DFW residents. Specifically, I wanted to see how many people are struggling to take care of themselves and may need living assistance currently or in the future. I took a look at the latest data from 2022 as well as data over time (2012 was the earliest year I could obtain) to see if I can uncover any trends.

Audience

My audience for this project are current caretakers, those in the caretaking industry, charities and policymakers that would be concerned with how many resources might be needed in DFW and how those could be best distributed to those in need.

Importance

The question is important because it might bring attention to areas of growing need where the current or future resources for care could be lacking. Care for those with disabilities can already be expensive and hard to find, so finding an answer to this question can be a step towards addressing these issues.

Dataset

The dataset was obtained from the American Community Survey 5-year data (2012-2022). I'm specifically using the variable *B18106* related to self-care disability. The data comes directly from the ACS separated into age groups categories, so I did some aggregating to get a single total population number for each mapping unit. Also to account for the variations in tract/county size and total population differences, I normalized the data as a percentage of the total population for a given area. Since there has been widespread growth in the DFW area, any increase in raw counts would likely be attributed to overall population growth, which is not what we want to show.

Tools Used

The primary tool I used for this project was R using the RStudio IDE. I obtained the dataset using the TidyCensus package for RStudio. Further data cleaning and aggregation was done in R as well. I created the map shapefiles for all years (2012-2022) in RStudio and exported them to ArcGIS Pro for further processing. The Leaflet map was also created using the leaflet package in RStudio, exported as an HTML widget, and deployed as a web page using GitHub. I also used RStudio and ggplot2 to create the lollipop bar chart of counties. The final version of this chart was done in Affinity Designer 2 to combine the chart with a blank county reference map that I also exported from R.

ArcGIS Pro was used to put together the final maps used in the time-series animation maps. I used an ArcPy Python script to automate the Getis-Ord G_i^* hot-spot calculations for each individual year's shapefile, but the process could have been completed manually in ArcGIS Pro pretty easily.

Finally, the entire project was put together into an Esri StoryMap to make everything available online.

Results

Whether looking at the data through time or only using the latest data from 2022, the picture of self-care disabilities in DFW is pretty similar. What I see consistently in the data is a localized hot spot in South Dallas. Several counties on the south side of Downtown south of the Trinity River have a persistently higher percentage of the population with self-care difficulties. This is clear on the interactive map, where a cluster of yellow/bright green tracts can be seen in this area, with a range from about 8-12% of the population in these tracts having self-care difficulties.

This pattern continues when looking at the hot-spot analysis animation for years 2012 - 2022 of the data. While some of the counties vary year-to-year, there is still a clear hot-spot trend in the South Dallas area. All years show multiple tracts in this area as hot spots, including several with 99% confidence levels. Other areas around DFW occasionally show some hot-spot clustering, but these counties come and go depending on the year.

These results raise further questions related to disability data, which will be discussed in the next section. However, this analysis did reveal a pocket of Dallas-Fort Worth that

has a greater need for self-care assistance. The limited scope of these results mean I don't have any particular solutions or recommendations, but they do provide a jumping off point for further analysis focused on South Dallas.

Missing Data

These results bring up a few additional questions. I've listed three below, but there are many more:

1. Does the pattern in South Dallas hold for the other types of disabilities?
2. How well are the needs of the disabled populations being met?
3. How do the results in the DFW area compare to other metro areas?

Ideally, this project would have included data that could help answer these questions and more.

Additional data from the ACS survey for all types of disabilities would allow a similar analysis to be done for each type, as well as an overall disability result.

Data related to caretaker availability and costs related to healthcare could help answer the question of how well we are meeting the needs of our disabled residents.