A Geospatial Analysis of Choosing California Counties for Developing Urgent Care Facilities Based on the Diabetic Medicare Enrollees Receiving HbA1c Test

Udayan Sawant

December 10, 2019

Introduction

Urgent Care Facilities care is defined as the delivery of ambulatory medical outside of a hospital emergency department on a walk-in basis without a scheduled appointment. The Urgent Care dataset consist of any location that can provide emergency medical care and must provide emergency medical treatment beyond what can normally be provided by an EMS unit; must ne able to perform surgery or must be able to provide recuperative care beyond what is normally provided by a doctor's office. Diabetic Monitoring is the percentage of diabetic fee-for-service Medicare patients ages 65-75 whose blood sugar control was monitored in the past year using a test of their glycated hemoglobin (HbA1c) levels. The study will investigate California State Counties having 535 Urgent Care Facilities across the state. Counties with high number of patients with Diabetic Medicare enrollees receiving HbA1c test and low number of Urgent Care Facilities. Conversely, those counties having high number of Urgent Care Facilities and low number of patients with Diabetic Medicare enrollees receiving HbA1c test. Both alternatives were explored in the study.

Research Questions

For better understanding, the counties that the Urgent Care Facilities situated in demographic data on density (a count) and patients receiving Diabetic Medicare Enrollees were analyzed. The research questions were as follows:

- *Which counties have high number of Urgent Care Facilities AND a low number of patients with Diabetic Medicare Enrollees receiving HbA1c Test?*
- *Which counties have low number of Urgent Care Facilities AND a high number of patients with Diabetic Medicare Enrollees receiving HbA1c Test?*

Methodology

The development environment for this study was ESRI ArcGIS Arcmap. This study used data from Social Explorer's US Health Data from 2010, specifically, diabetes. Data about Urgent Care Facilities was collected from the Homeland Infrastructure Foundation Level Data (HIFLD) website in the Public Health category. Data for California was used.

Base Maps & Context Layers

To get a base map of counties, the study used United States Census Bureau TIGER/Line Shapefiles (2010).

Foe map context, towns, roads and rails were added, also form the National Map:

- Counties & Subdivisions, 2010
- Rails, 2010
- Roads, 2010

Figure1 is a color-coded map showing the percent of Diabetic Medicare Enrollees receiving HbA1c test in California

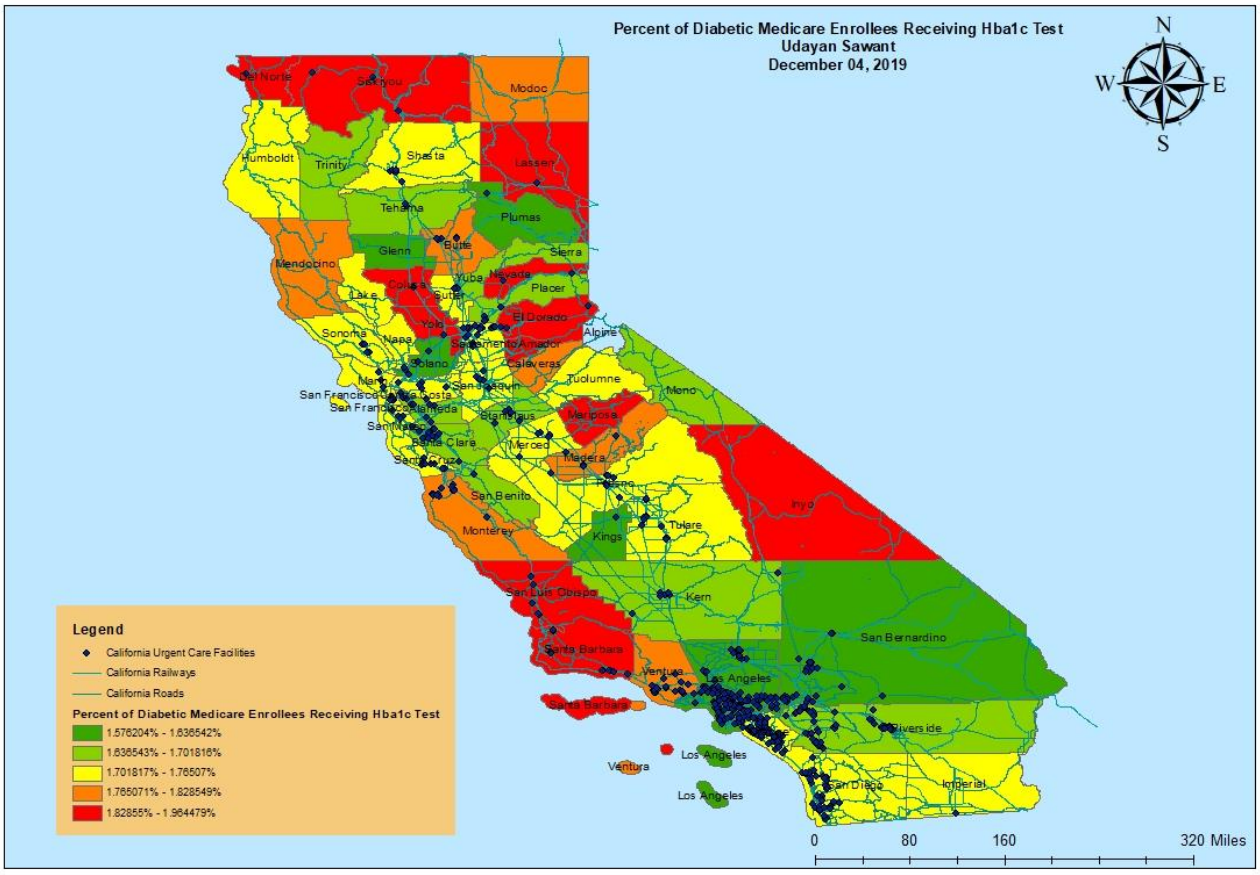

Figure 1: Percent of Diabetic Medicare Enrollees Receiving HbA1c test in California

Figure 2 is color coded map showing the distribution of Urgent Care Facilities throughout the counties in California

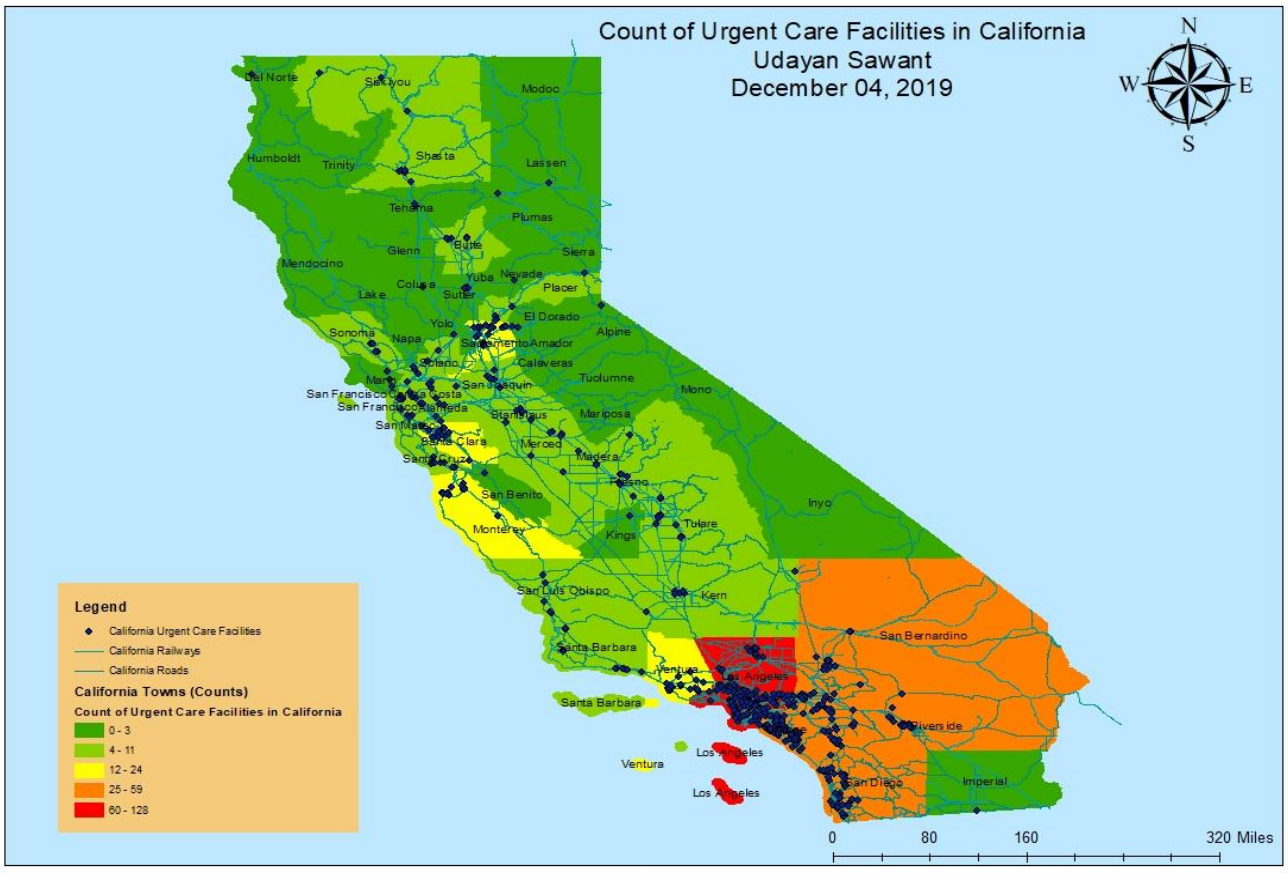

Figure 2: Urgent Care Facilities Count by County

Data Analysis

In order to identify with a high or low number of Urgent Care Facilities and high or low Diabetic Medicare Enrollees, a compound selection by attribute was done.

Figure 3 & 4 shows the Analysis for Research Question 1

Counties with Chlamydia Cases < 1000 AND Diabetic Medicare Enrollees > 10

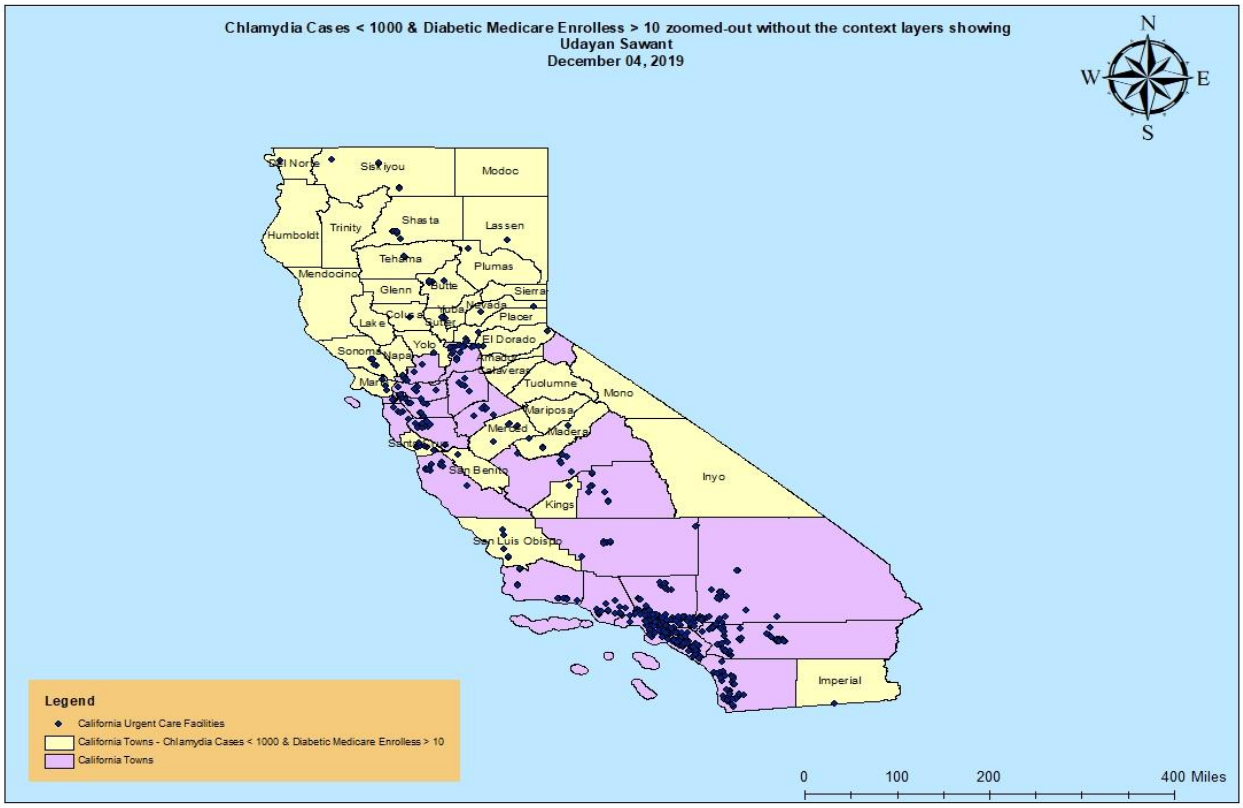

Figure 3: Counties with high Chlamydia Cases and low Diabetic Medicare Enrollees

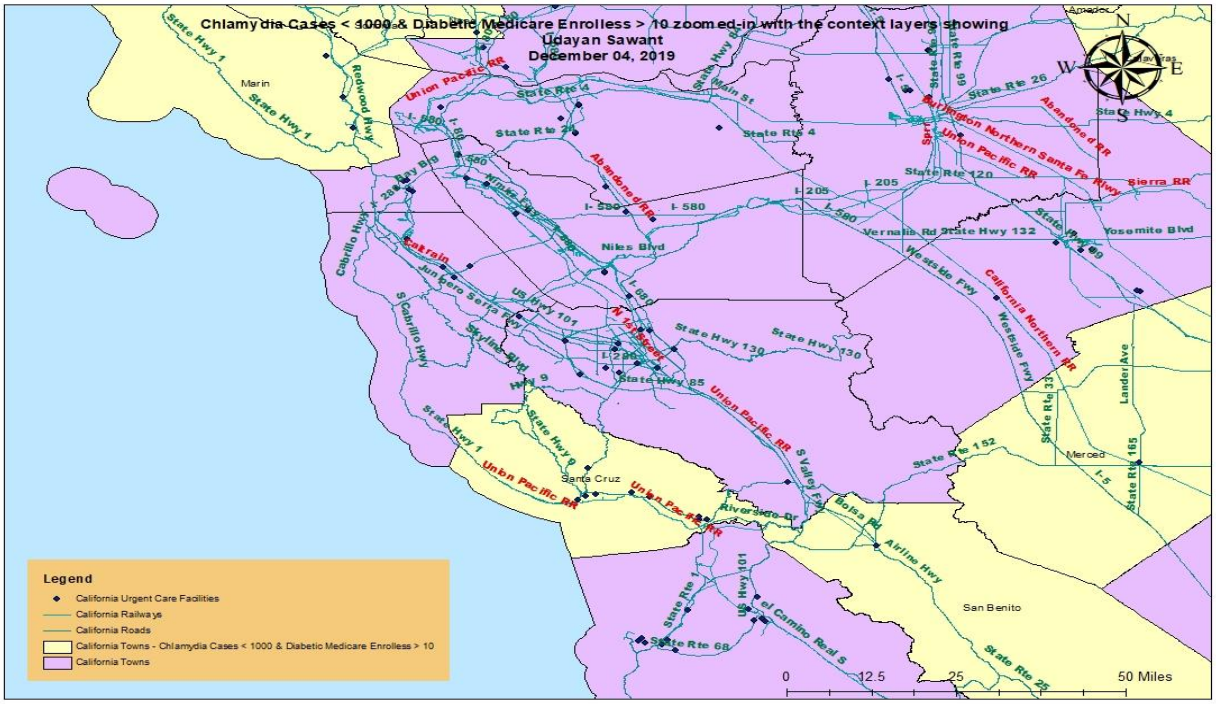

Figure 4: Counties with high Chlamydia Cases and low Diabetic Medicare Enrollees (Zoomed)

Figure 5 & 6 shows the Analysis of Research Question 2

Counties with Urgent Care Facilities < 5 AND Diabetic Medicare Enrollees > 200

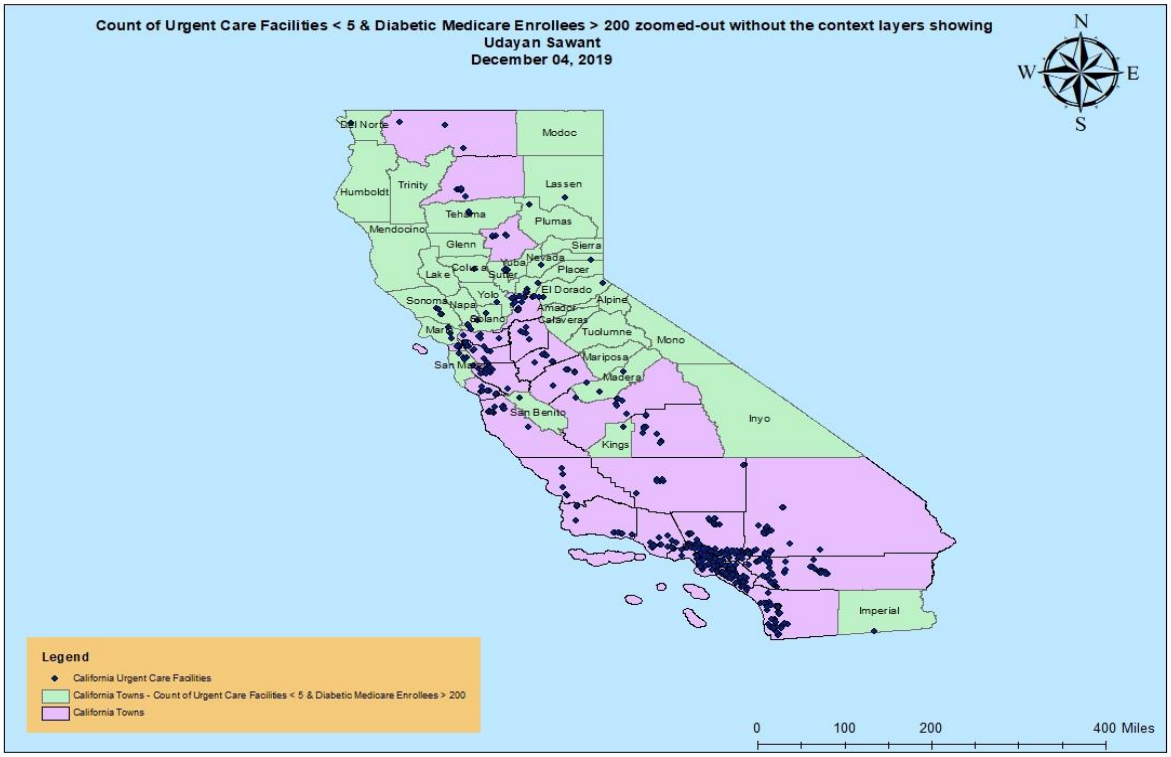

Figure 5: Counties with low Urgent Care Facilities & high Diabetic Medicare Enrolleess

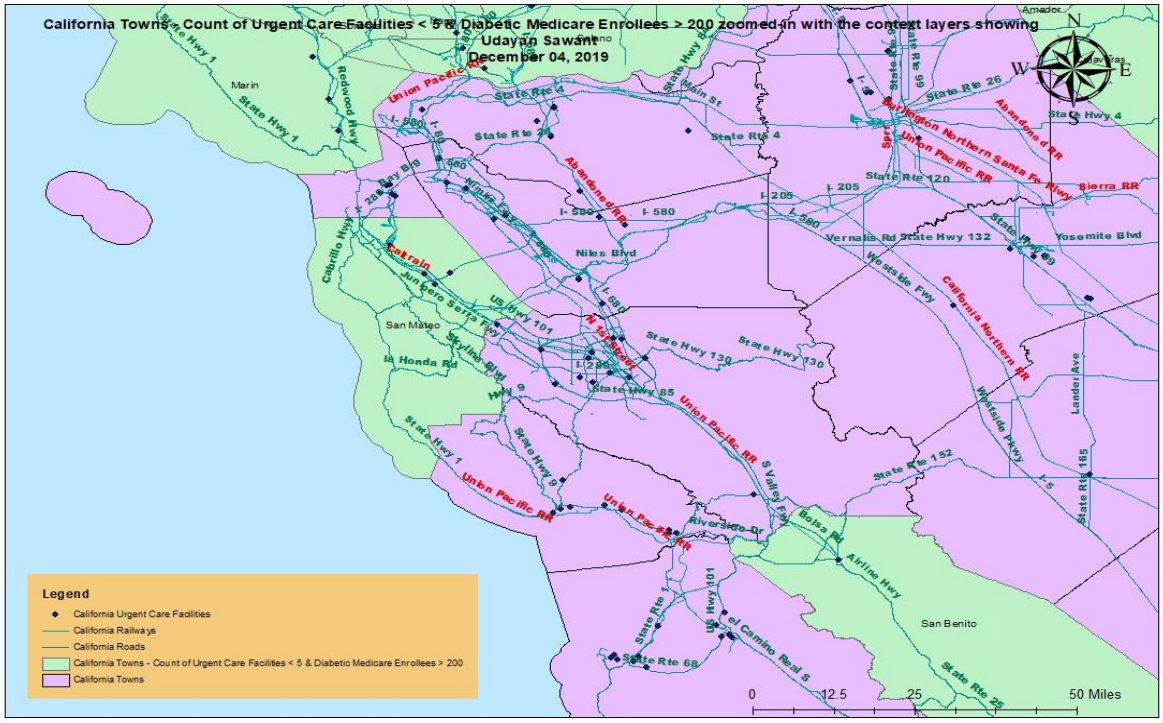

Figure 6: Counties with low Urgent Care Facilities & high Diabetic Medicare Enrollees (Zoomed)

Figure 7 shows the results of both research questions side by side

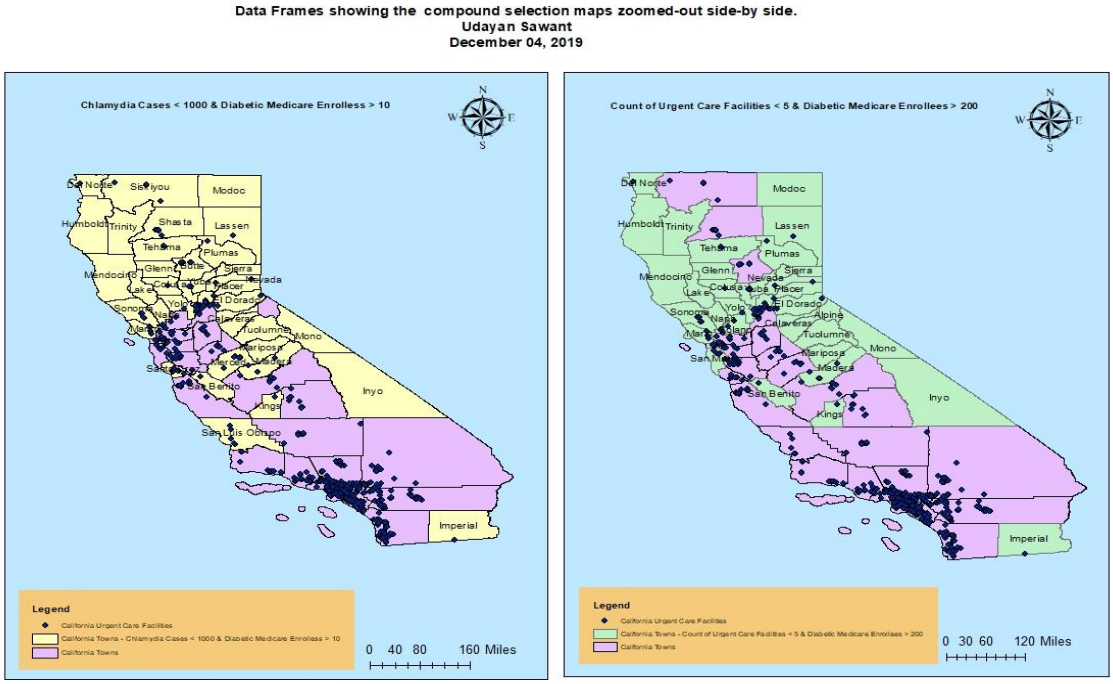

Figure 7: Both Research Questions showing High & Low Diabetic Medicare Enrollees, Chlamydia Cases and the Count of Urgent Care Facilities

Conclusion & Discussion

Looking at the distribution of Urgent Care Facilities, we can see that is highest in Los Angeles. Looking at distribution of Diabetic Medicare Enrollees, we can see that is highest in Saki you, Modoc, Del Norte, Nevada, Gienn, Colusa, Mono, San Luis Obispo, Santa Barbara and Inyo.

The analysis which identifies counties with high Chlamydia Cases and low Diabetic Medicare Enrollees are more in the northern states of California. This may be due to low number of Urgent Care Facilities in the northern states of California.

Also, the analysis identifies the counties with low Urgent Care Facilities & high Diabetic Medicare Enrollees are more towards the eastern and western counties in California. The result may be due to lack of Urgent Care Facilities in those counties.

References

- ESRI, ArcMap 10.7.1, ESRI, Inc., URL: http//www.esri.com
- California Counties, US Census Bureau Tigerline, URL: https://www.census.gov/geo/maps-data/data/tiger-line.html
- Health Data: URL: https://www.socialexplorer.com/
- US Roads: https://nationalmap.gov/small_scale/atlasftp.html?openChapters=chpref#chpref
- US Rails https://www.census.gov/cgi-bin/geo/shapefiles/index.php?year=2010&layergroup=Rails
- Urgent Care Facilities: https://hifld-geoplatform.opendata.arcgis.com/datasets/urgent-care-facilities?geometry=118.810%2C-9.367%2C17.208%2C74.330