Ensign Services Challenge – Data Analyst (Pavan Naik)

PBJ Data Analysis

Low staffing is a root cause of many injuries in nursing homes.

Assumptions
Full workday for a staff member is 8 hours for 5 days a week.

Tools – Excel, Python, Tableau

Workflow –

Dataset:

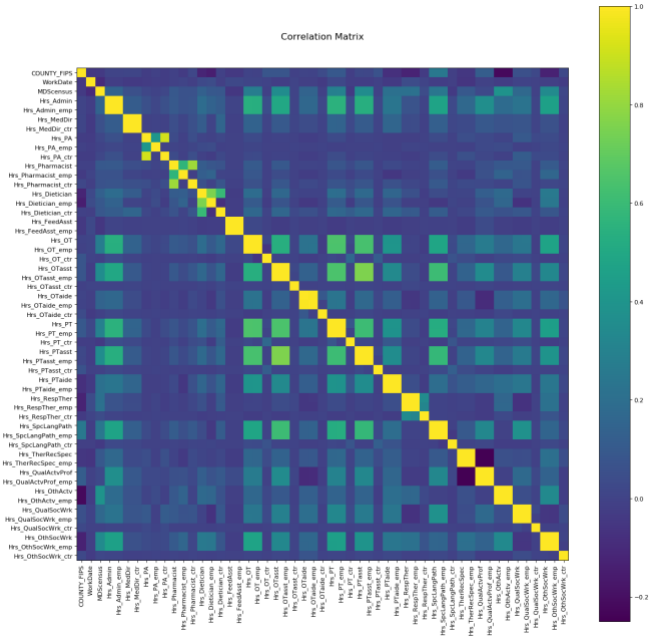
- cms.gov Quarter data for Nursing staff and Non-Nursing staff (Q1,Q2,Q3,Q4 PBJ data for 2020)
- Kaiser Health News Data (https://khn.org/wpcontent/uploads/sites/2/2018/07/kaiser_health_news_snf_staffing _q11.zip)
- Provider data from Ensign Services

Data Table: Merged the dataset using pandas in python for Q1 through Q4 for both PBJ Nursing staff and Non-Nursing Staff and performed **inner join** to match the provider list generating two individual datasets.

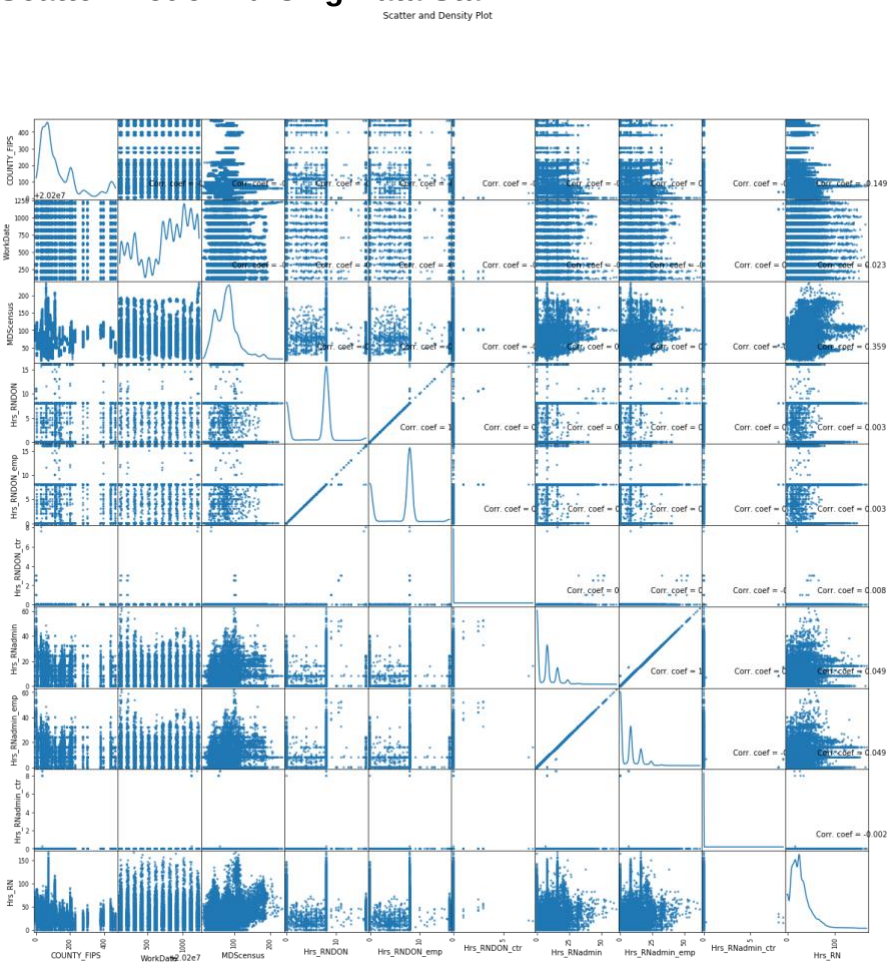
Visualizations

- **Exploratory Data Analysis**

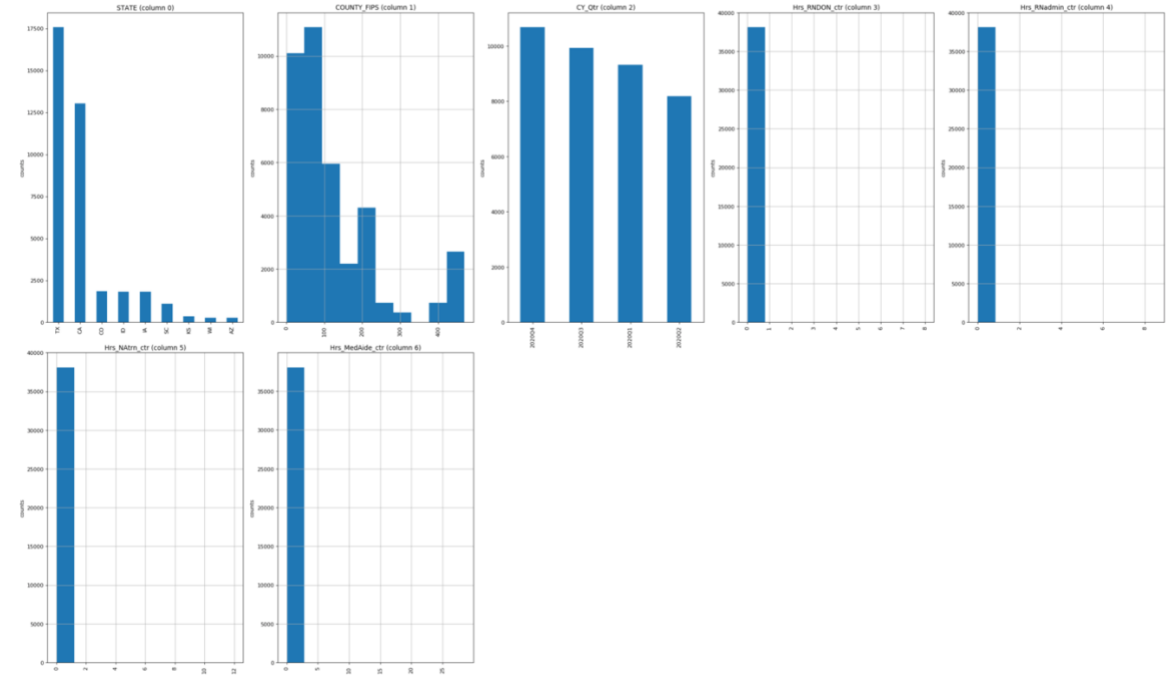
Correlation Matrix of Nursing Staff features

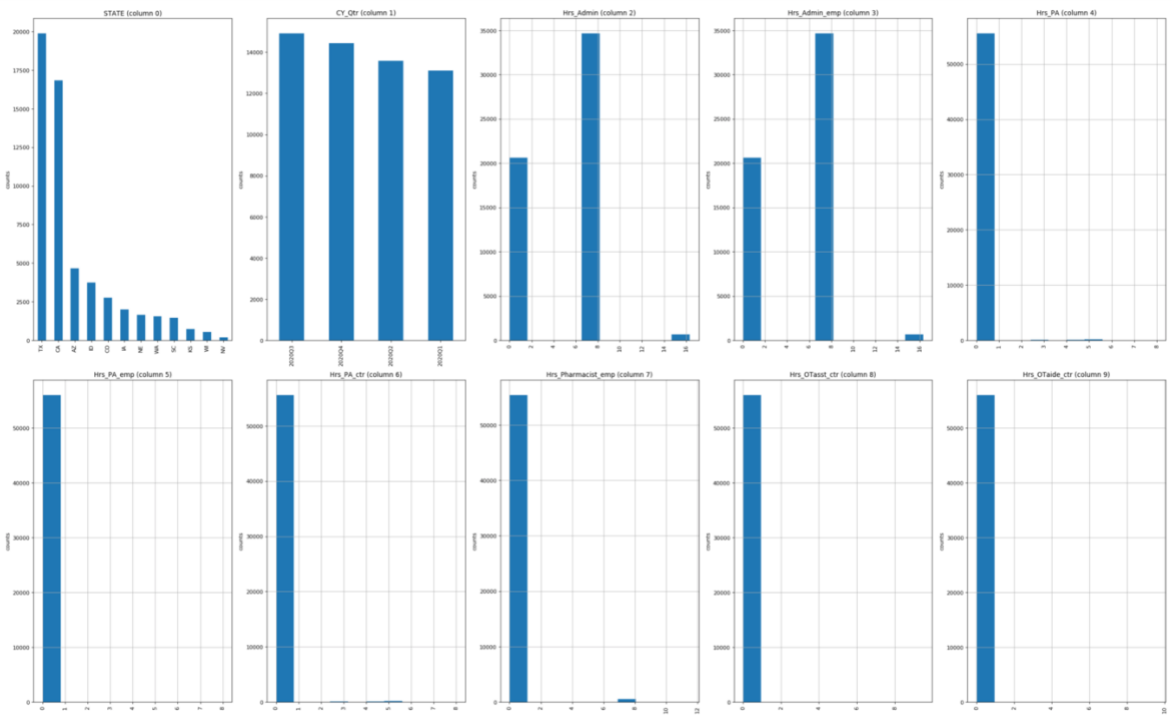


Scatter Plot of Nursing Data Staff

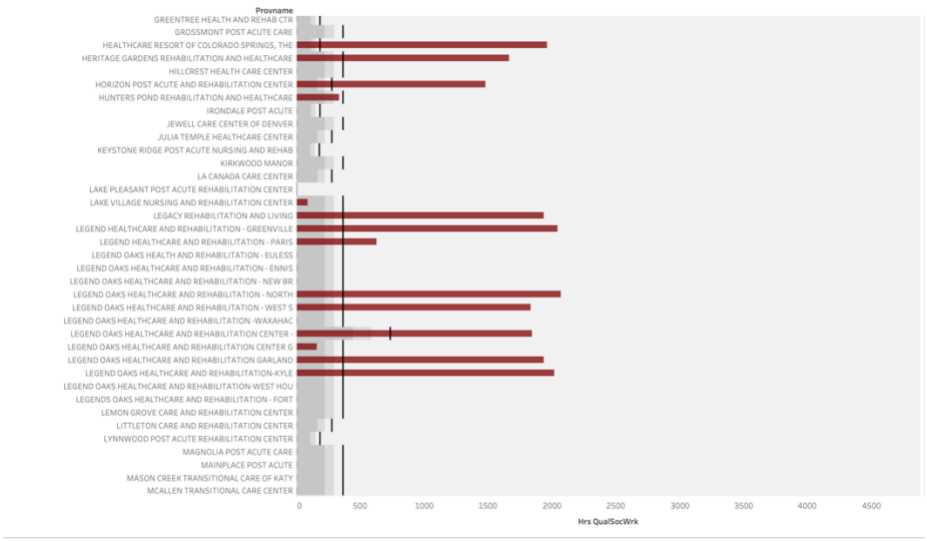


Column plot of Nursing Data features



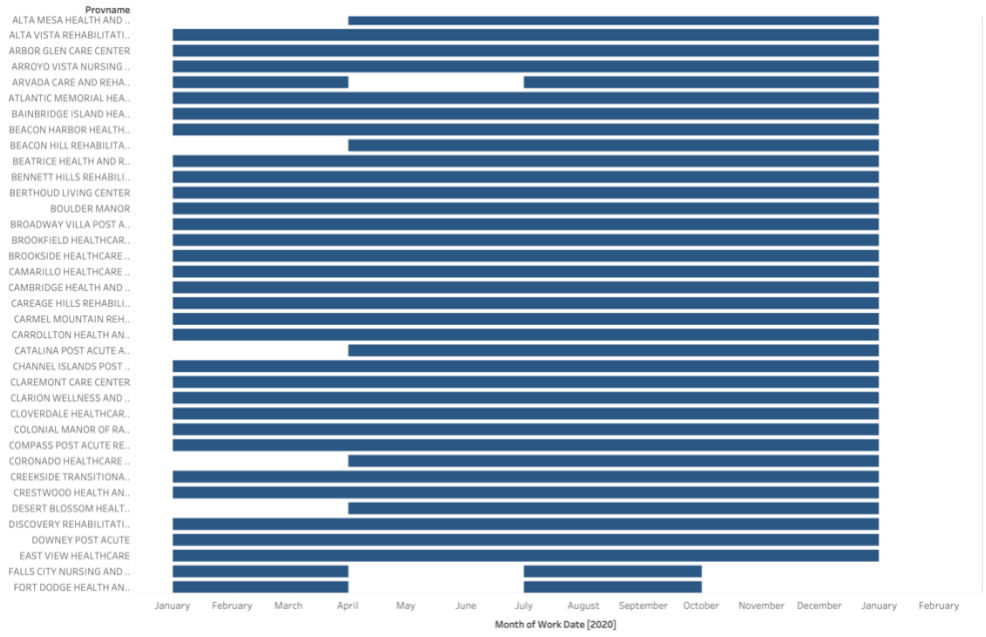


Provider wrt Clocked time of Quality Social Workers



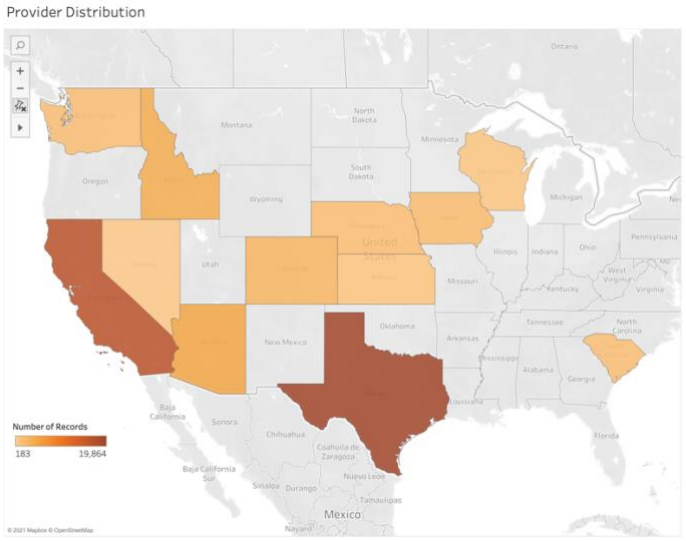
It can be seen that on an average Social Workers across the providers clocked in an average of 400 hours throughout the year 2020. Whereas the around 10% of the providers had social workers clock in around 2000 hours. This is a result of a greater number of social workers working at the provider facility.

Provider vs Month of Work Date.



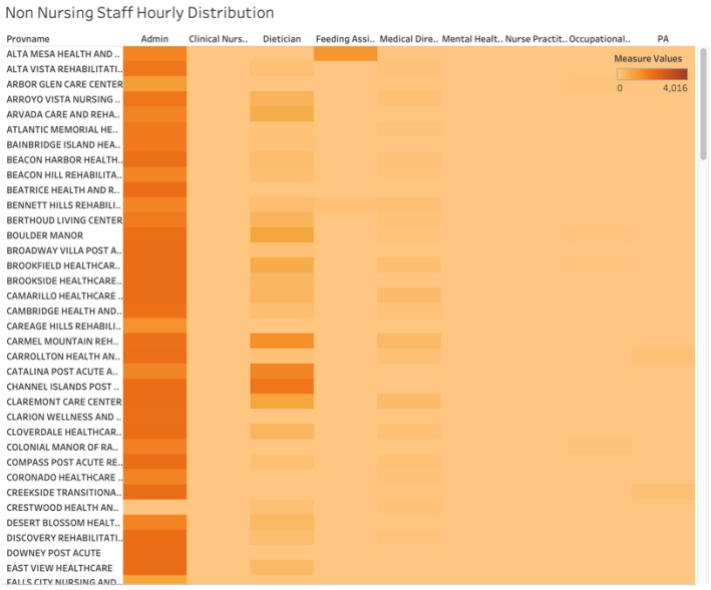
It can be inferred that many providers did not have non-Nursing staff during the months **January through April.**

Staff member distribution across the states



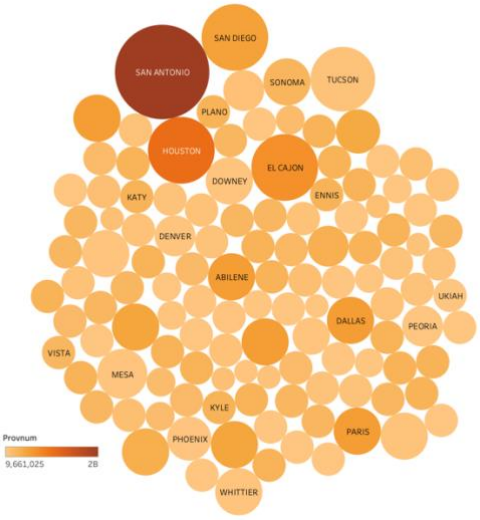
California and Texas have the highest number of staff members across the United States. The productivity can be captured across each provider by their geographical location (city, county, zip code) and similarly evaluated for Nursing Staff.

Non-Nursing Staff Distribution



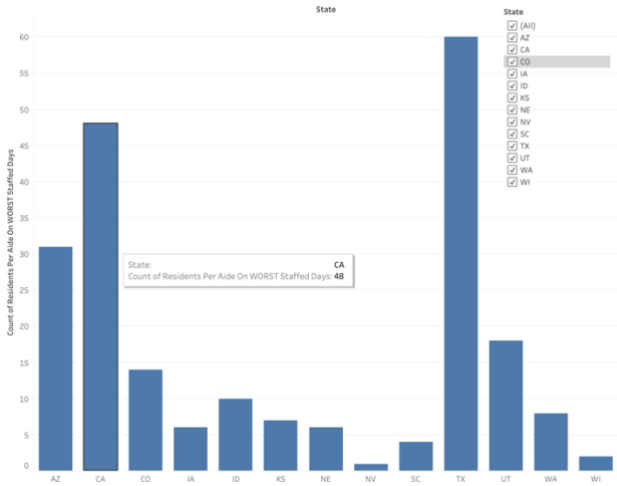
It can be inferred from the above visualization that the Number of Administrative staff are more compared to any other designation across all the providers.

Non – Nursing Staff Distribution across cities

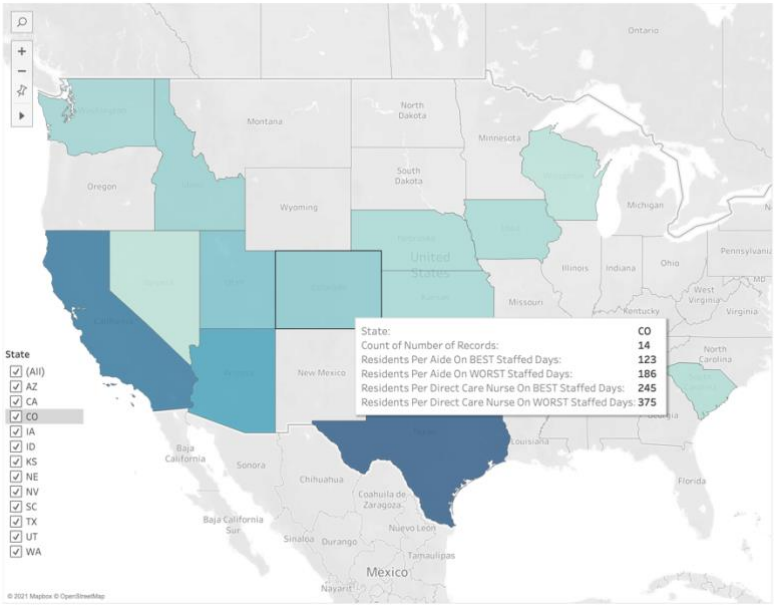


San Antonio, Houston across all the cities have the highest number of staff members. The demand for Non-Nursing staff here is more.

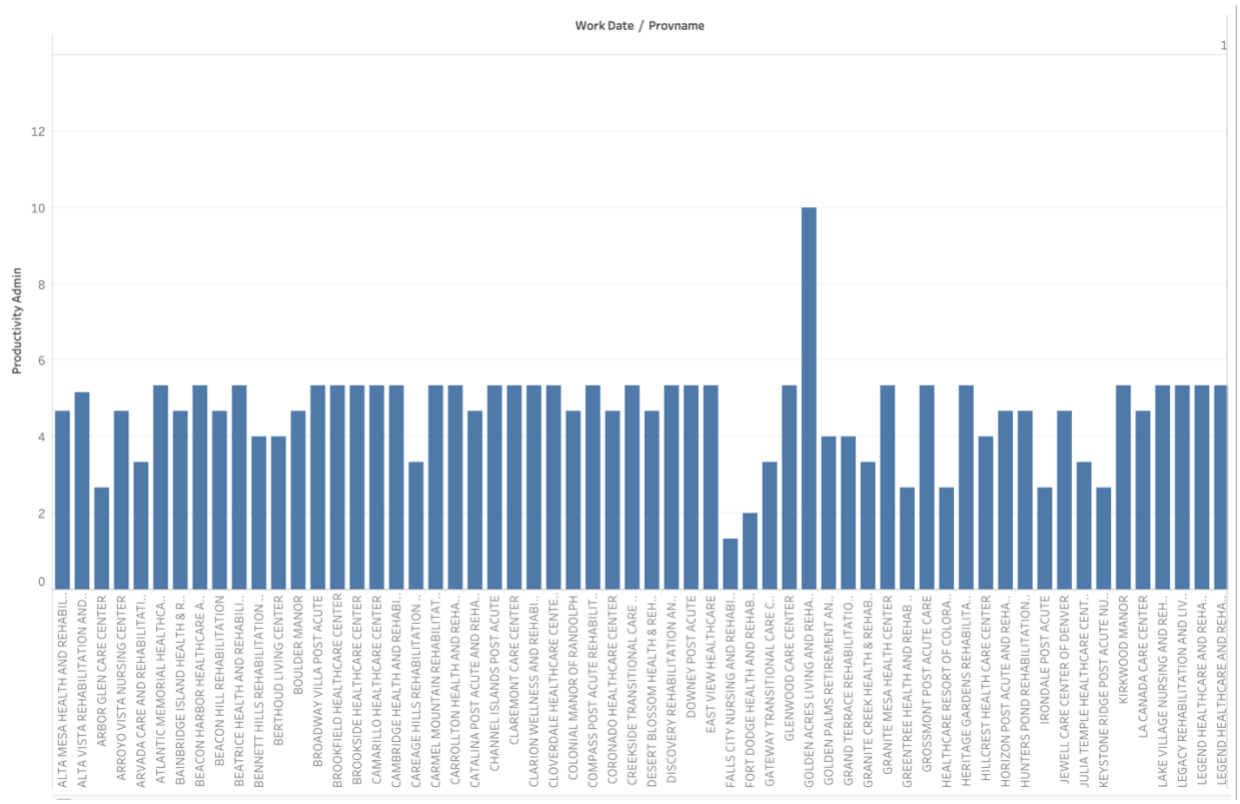
Residents per Aide vs State on Worst Staffed Days



The number of residents that each nurse has to aide on the worst staff day in California is 48 and even more in Texas. This shows that there is an increase need for help, or the providers are under-staffed.



The resident per aide on a best staff day is significantly less amongst all the providers as compared to that on a worst staff day and on average there is a scarcity of at least 50% staff members. Thus, yielding lesser number of nursing staff who can cater services.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BEACON HARBOR HEALTHCARE A..
BEACON HILL REHABILITATION
BEATRICE HEALTH AND REHABILI..
BENNETT HILLS REHABILITATION..
BERTHOUD LIVING CENTER
BOULDER MANOR
BROADWAY VILLA POST ACUTE
BROOKFIELD HEALTHCARE CENTER
BROOKSIDE HEALTHCARE CENTER
CAMARILLO HEALTHCARE CENTER
CAMBRIDGE HEALTH AND REHABI..
CAREAGE HILLS REHABILITATION ..
CARMEL MOUNTAIN REHABILITAT..
CARROLLTON HEALTH AND REHA..
CATALINA POST ACUTE AND REHA..
CHANNEL ISLANDS POST ACUTE
CLAREMONT CARE CENTER
CLARION WELLNESS AND REHABI..
CLOVERDALE HEALTHCARE CENTE..
COLONIAL MANOR OF RANDOLPH
COMPASS POST ACUTE REHABILIT..
CORONADO HEALTHCARE CENTER
CREEKSIDE TRANSITIONAL CARE..
DESERT BLOSSOM HEALTH & REH..
DISCOVERY REHABILITATION AN..
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GRANITE MESA HEALTH CENTER
GREENTREE HEALTH AND REHAB ..
GROSSMONT POST ACUTE CARE
HEALTHCARE RESORT OF COLORA..
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JEWELL CARE CENTER OF DENVER
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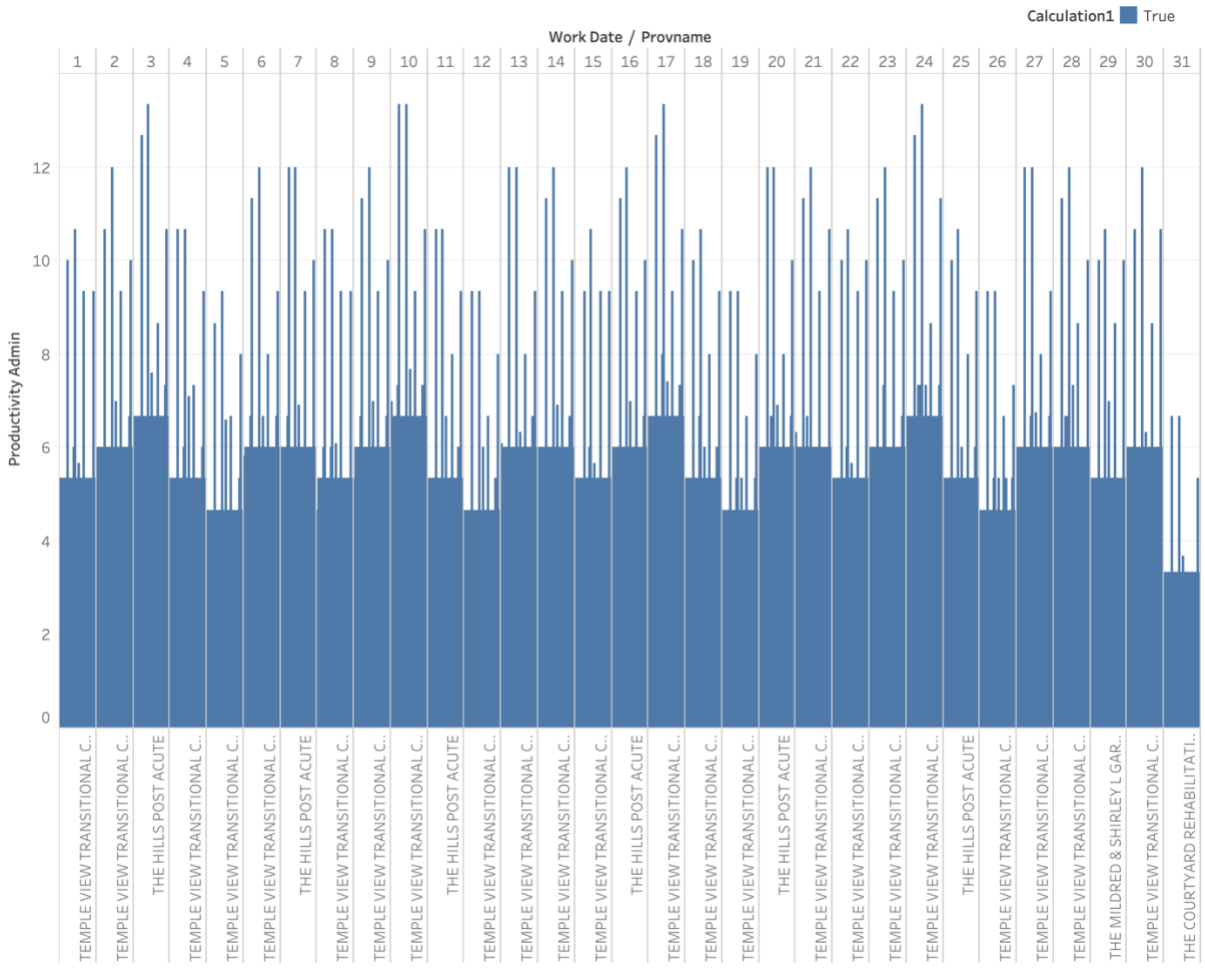

Conclusion

After analyzing the CMS dataset for PBJ analysis with Python version 3.4 and Tableau I was able to gather the following insights.

- To accommodate all residents and staff members the demand exceeds the inhouse staff members by ~50%.
- The highest number of providers have been recorded with highest in California (19000 hrs) and lowest in Nevada.
- The highest number of hours of nursing staff is for Registered nurses whereas the lowest is for Practical Nursing as depicted in the histograms.

Action items

The demand supply chain for healthcare providers across both staffing and non-staffing practitioners are not evenly distributed across all states. To overcome this inadequacy in order to aide the residents a critical assessment should be performing a location-

based analysis to ensure that all the staff members including nursing and non-nursing have approximately the same number of staff members across all designation.

To reduce the disparity in healthcare provision and maldistribution of the nursing and non-nursing staff, it is imperative to have equal dispersion of both.