

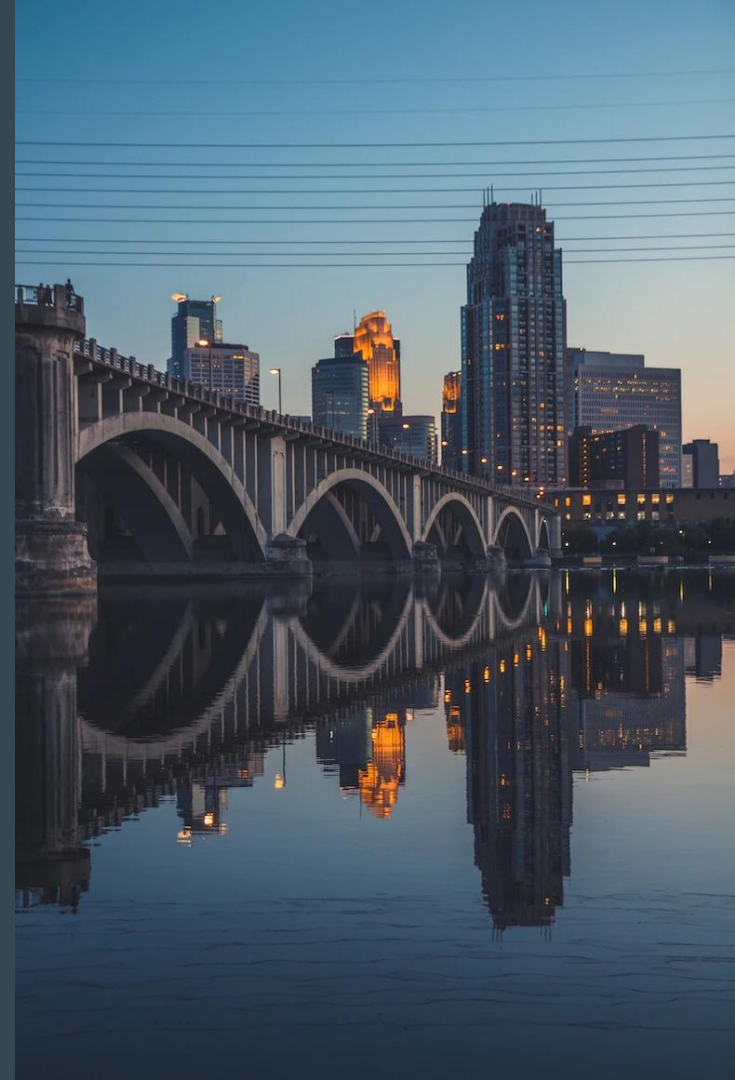
Analyzing Healthcare Services Using Patient ADI Ranks

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Project Overview

- RoundtableRx would like their patient population ADI rankings analyzed to see if they are positively impacting the lives of the most disadvantaged Minnesotans.
- Discuss RoundtableRx's mission.
- Explain ADI rankings and connect them to health outcomes.
- Examine RoundtableRx patient ADI rankings vs MN population rankings.
- Identify where patients are located relative to local repositories.
- Gain insight into how RoundtableRx can better serve Minnesotans that benefit most from their service.





RoundtableRx Overview

RoundtableRx is a non-profit organization that runs Minnesota's Medication Repository. Their mission is to offer safe and affordable medication to Minnesotans in need, provide continuity of care, and reduce waste by redistributing unused medications. Currently, RoundtableRx partners with 22 local repository locations across MN to get unused medications into the hands of uninsured and underinsured Minnesota residents.

Twenty-one other states already have programs similar to RoundtableRx. Iowa's Medication Repository, which the Minnesota program is modeled after, has managed to repurpose nearly \$18 million of medication over the last decade.

Source: <https://www.roundtablerx.org/>

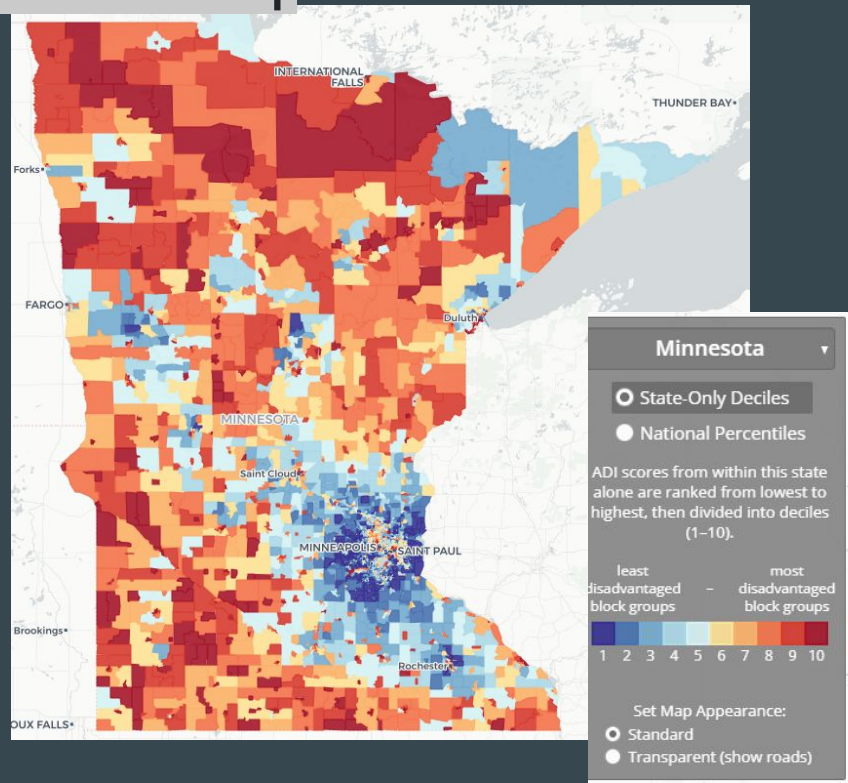
What is ADI?

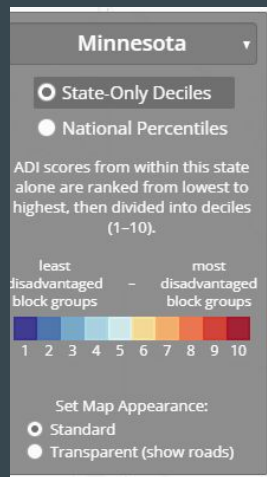
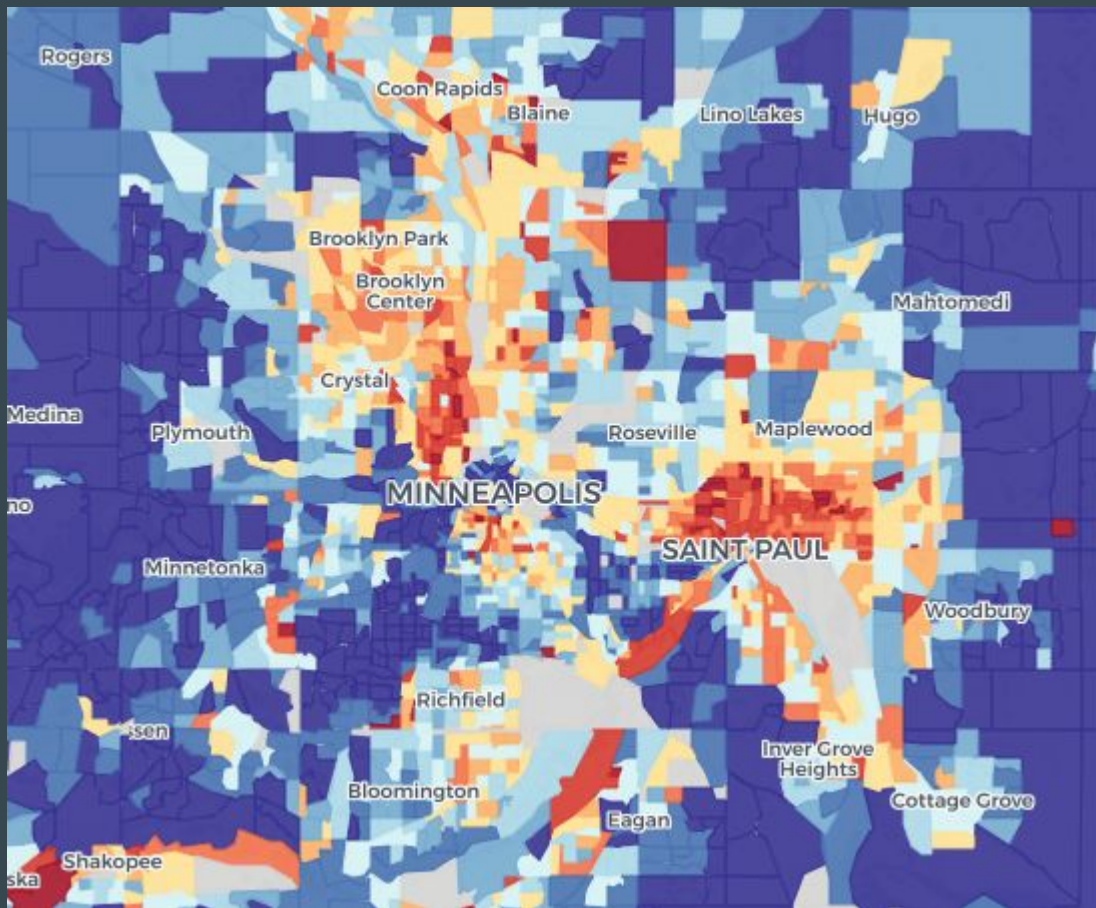
The Area Deprivation Index (ADI) is a tool used to classify neighborhood socioeconomic status at the local or state level. Factors that affect ADI ranks include standards of living, access to high-quality education, and adequate housing. Higher ADI ranks indicate poor socioeconomic standing.

ADI ranks can be used to assess health disparities, improve health outcomes, and provide more informed services to vulnerable neighborhoods. High ranks have been linked to increased rates of diabetes and cardiovascular disease, increased utilization of health services, and earlier death.

Source: <https://www.neighborhoodatlas.medicine.wisc.edu/>

MN ADI Rank Map





Project Objectives

- What are the ADI rankings of RoundtableRx patients?
- What opportunities are there to improve the care that RoundtableRx offers?
- How many patients does Roundtable Rx have in each county?
- What regions of MN does RoundtableRX not serve and how does it impact access to services?
- Where in the state is RoundtableRx most successful in helping the most vulnerable patients?
- What is the average ADI state rank per county?
- How do ADI rankings of RoundtableRx patients compare to those of the general population of MN?
- Is there a correlation between low ADI state rank and quality of prenatal care?



Data Flow

Data Retrieval

Data retrieval process:

- RoundtableRx patients (approx. 130 patients) and State ADI Ranking data
- GeoApify API
- MN Prenatal Care 2020

Data Cleaning

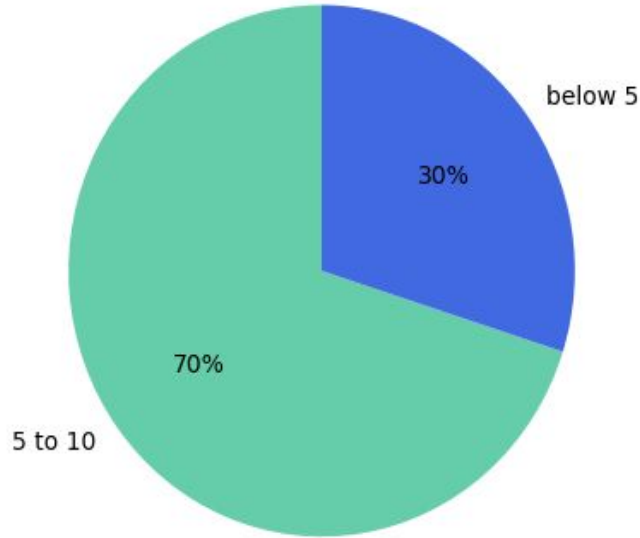
- Used Pandas to drop unnecessary values
- Changed dtypes
- Merged DataFrames as needed

Telling the Story

Leveraged pie and bar charts, scatter plots, Hvplots to identify RoundtableRx's successes and opportunities for growth.

What are the ADI ranks of RoundtableRx's patients?

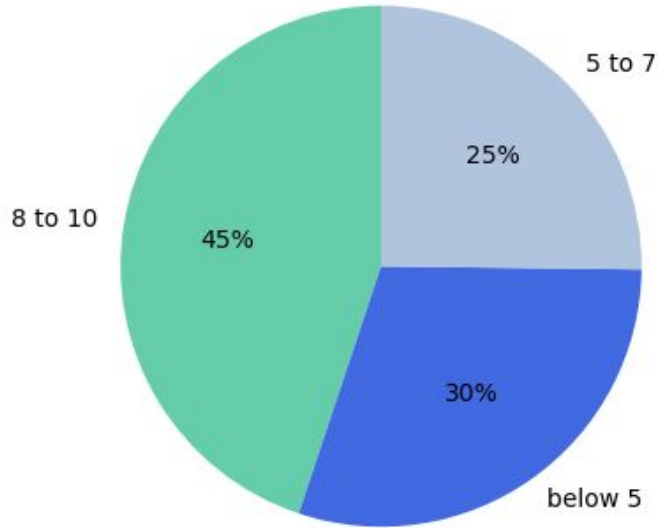
State ADI Ranks of RoundtableRX Patients



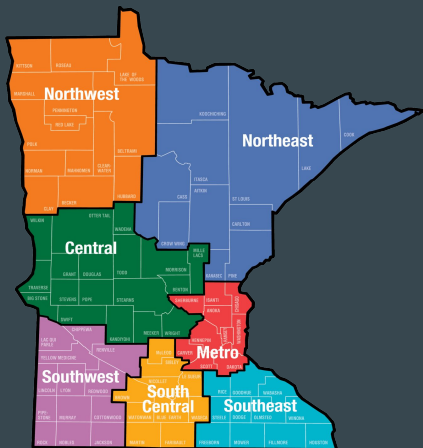
30% of RoundtableRx patients have ADI scores below 5, while 70% have rankings between 5 and 10

What are the ADI ranks of RoundtableRx's patients?

State ADI Ranks of RoundtableRX Patients



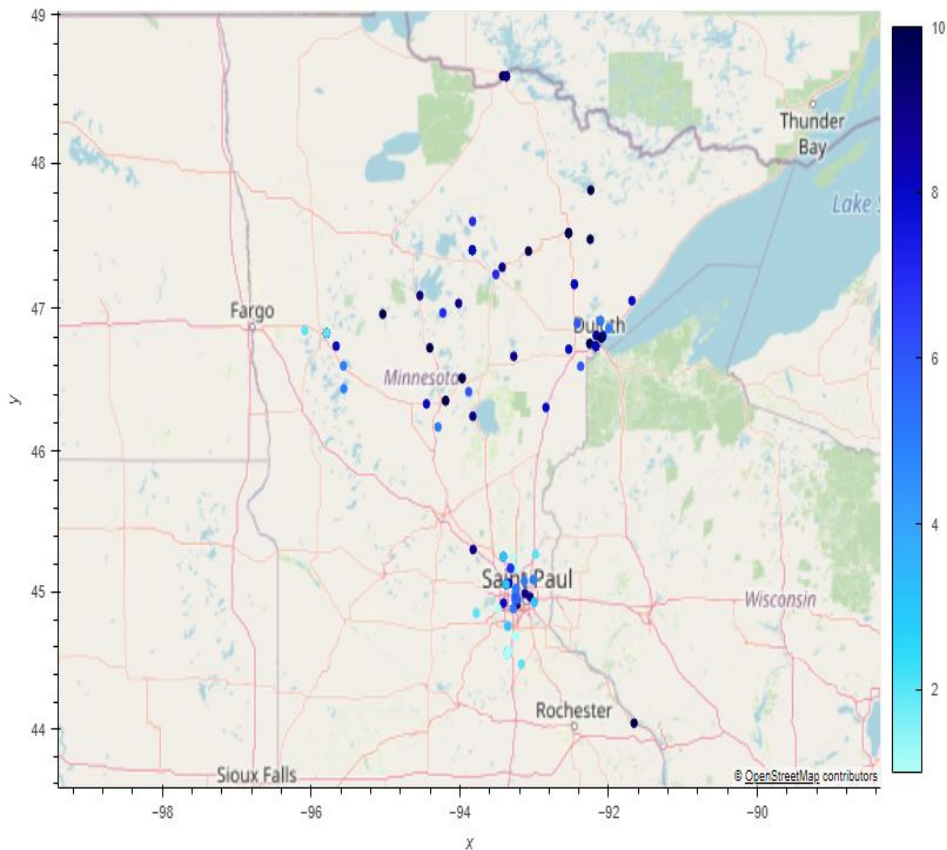
45% of RoundtableRX patients reside in neighborhoods with high ADIs, 25% have moderate ADIs, & 30% exhibit low ADIs



Location of RoundtableRx Patients in Minnesota

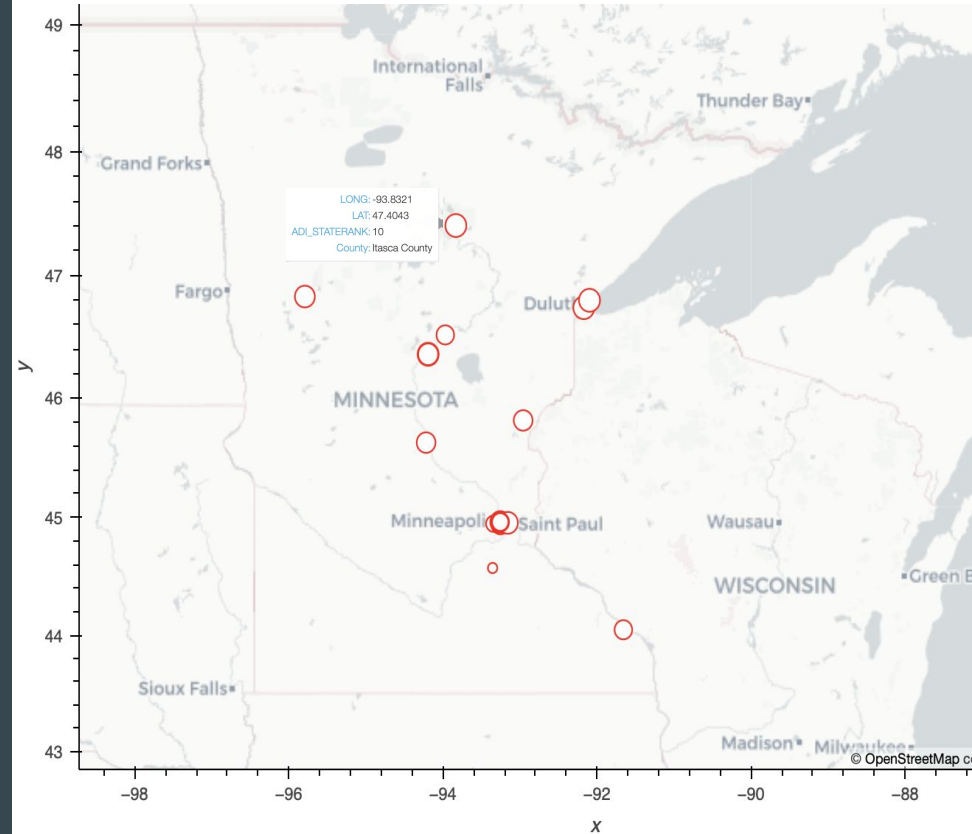
What regions of MN does RoundtableRX not serve and how does it impact access to services?

Map Source: <https://www.mnecb.org/148/Regions>



Location of RountableRx Repositories in Minnesota

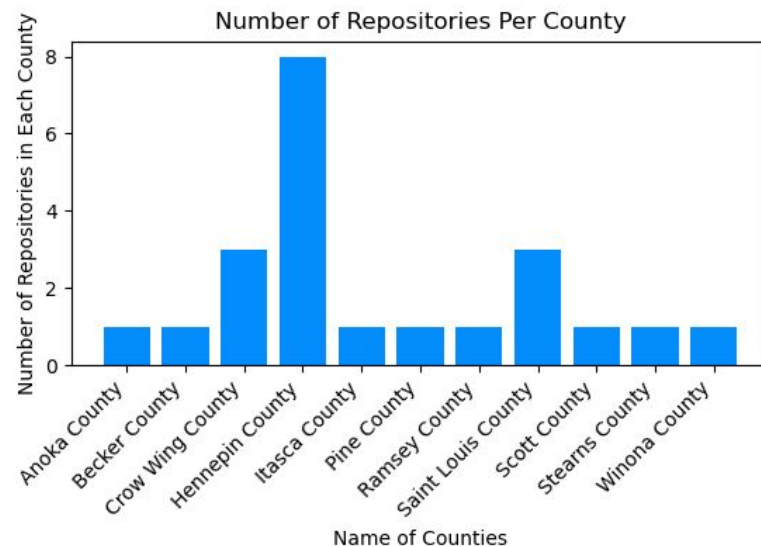
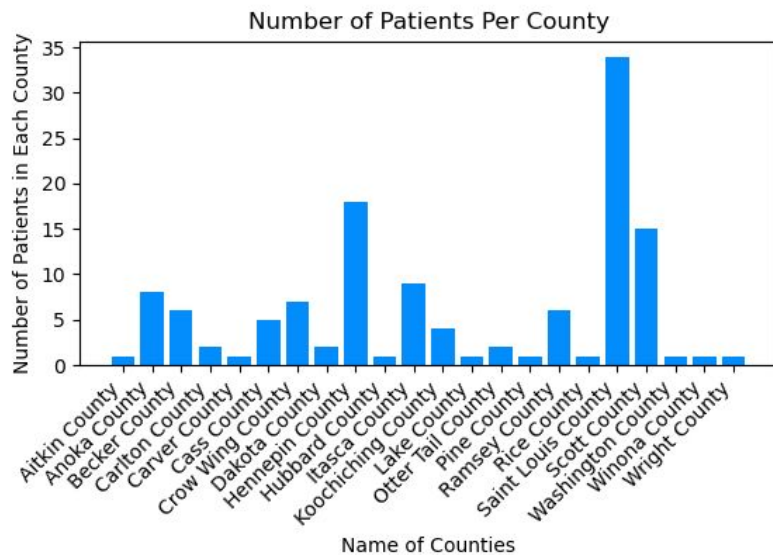
What opportunities are there to improve the care that
RountableRx offers?



Comparing Patients versus Local Repositories Locations

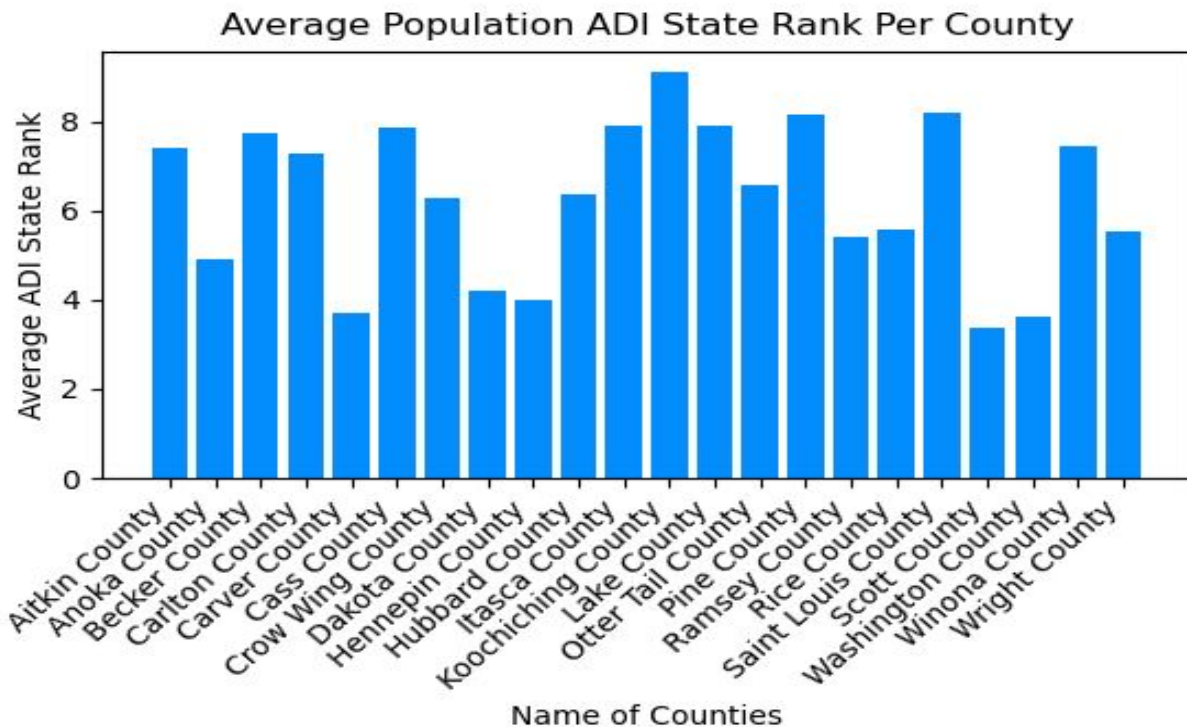
(How many patients does Roundtable Rx have in each county? What opportunities are there to improve?)

Where in the state is RoundtableRx most successful in helping the most vulnerable patients?)



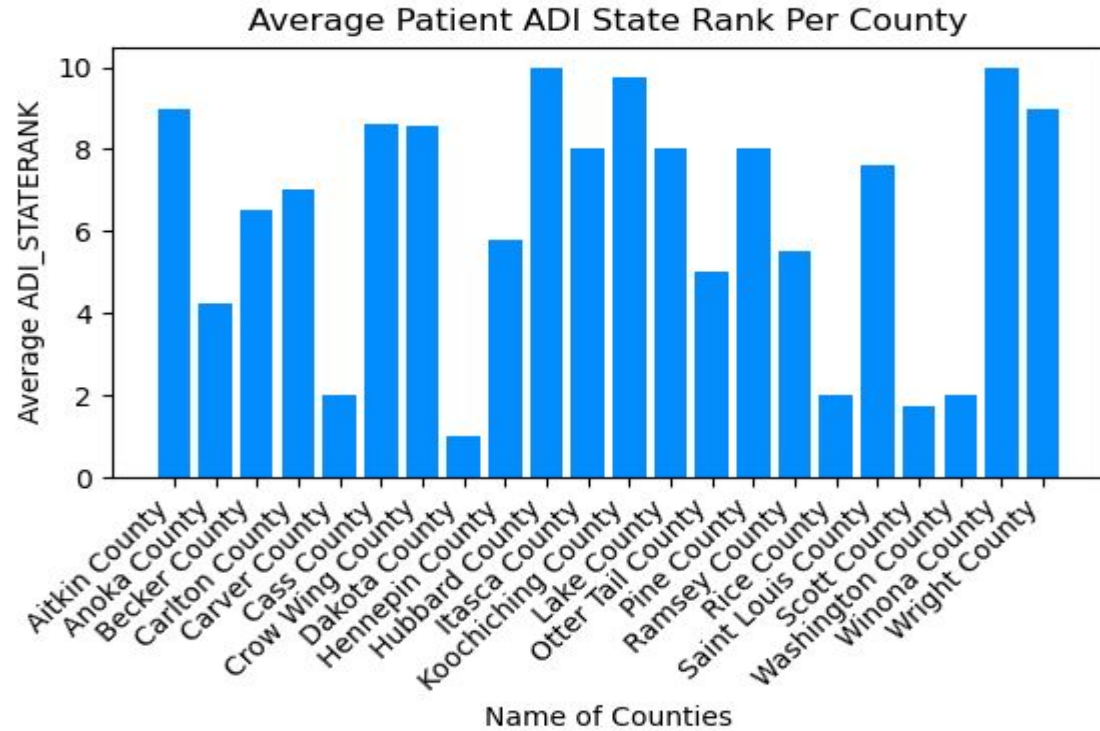
MN Counties Average ADI - Counties with RoundtableRx Patients

(What is the average ADI state rank per county?)



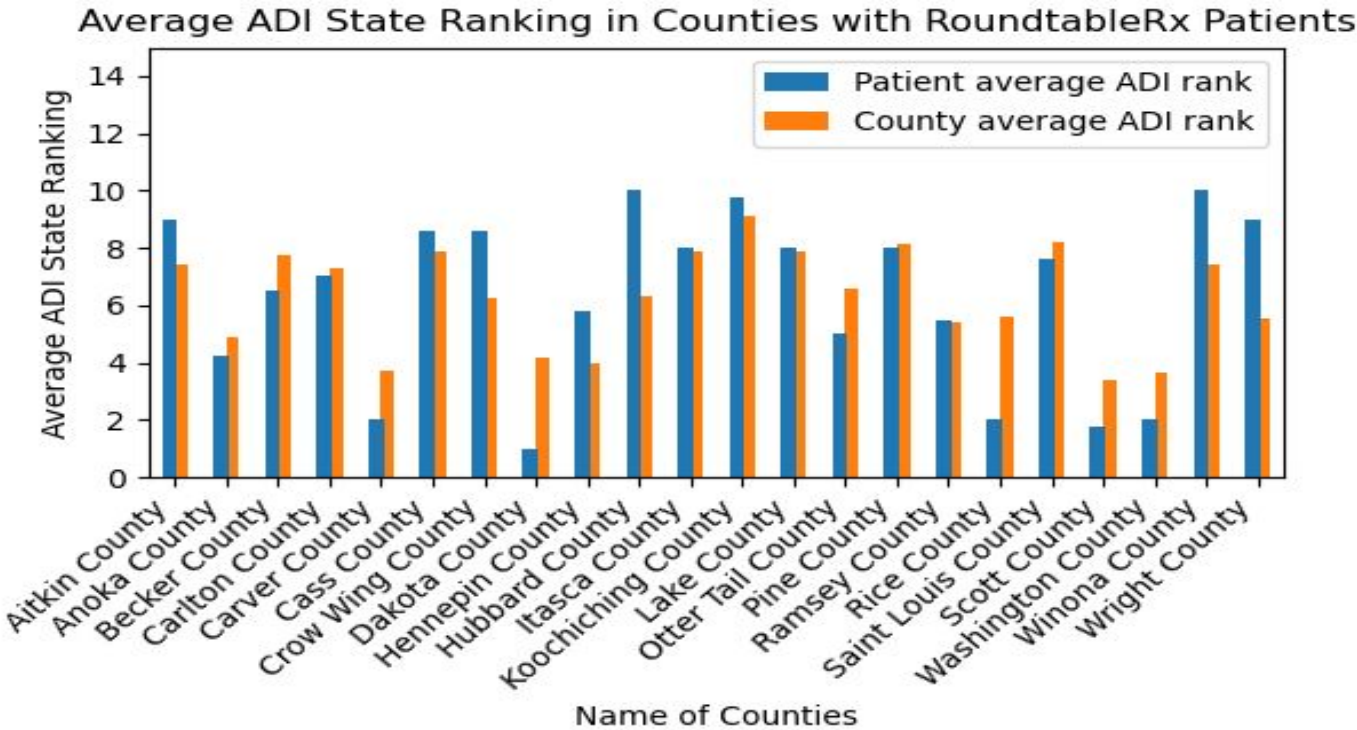
Roundtable Rx Average Patient ADI Score per County

(What is the average ADI state rank of patients per county?)



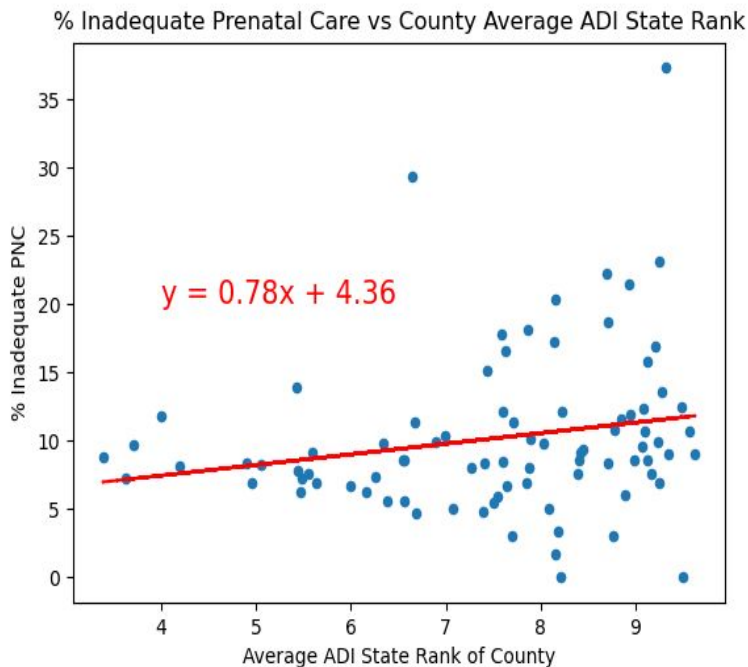
Comparing Average ADI State Rank with Average ADI State Rank of Patients in Each County

(How do ADI rankings of RoundtableRx patients compare to those of the general population of MN?)

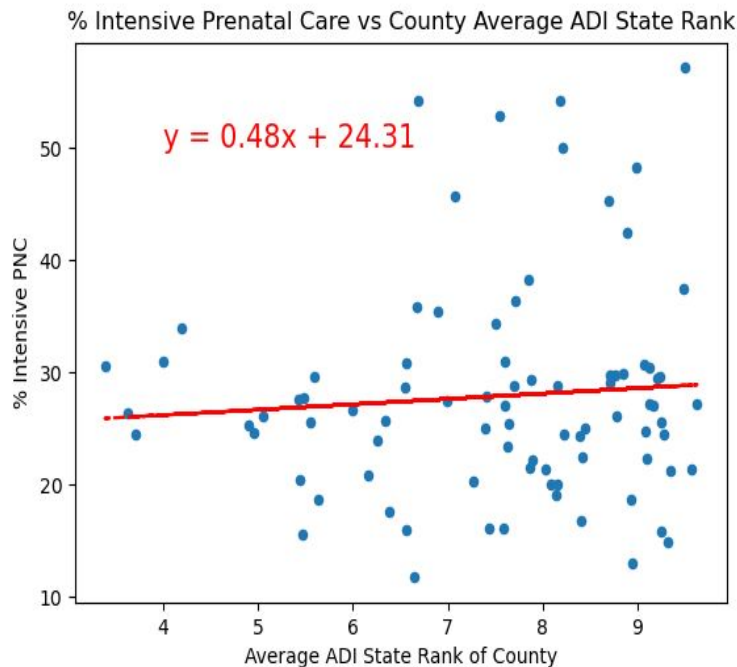


Scatter plot and regression on ADI Score vs Prenatal Care

The Correlation (r score between ADI State Rank and % Inadequate PNC is 0.21



The Correlation (r score between ADI State Rank and % Intensive PNC is 0.08



The r values in both scatter plots is low and hence we can conclude there is no correlation between variables.

Major Findings

ADI & Prenatal Care

- Quality of prenatal care in Minnesota cannot be predicted by the patient's neighborhood ADI ranking.
- There was no correlation between state ADI ranking and quality of prenatal care received by Minnesotans.



Major Findings cont.

RoundtableRx Patient ADIs

RoundtableRx is successfully helping the most vulnerable patients:

- 30% of RoundtableRx's patients have an ADI rank less than 5.
- 70% of RoundtableRx's patients have an ADI rank of 5 or above.
- The average patient ADI state ranking is 6.3
- The most common patient ADI state ranking is 10

Locations of repositories are a significant opportunity for RoundtableRx to serve the most vulnerable patients:

- The metro area and nearby suburbs capture patients with lower ADI ranks.
- Expanding into NW + SW would increase the average ADI ranking of patients, improving this metric of success, and supporting requests for funding.

Limitations

Data Lost During Merge/Cleaning

Not every patient had a ZIP code on file and not every ZIP code has an ADI rank.

Impact on project:

- Incomplete analysis of ALL RoundtableRx patients.
- 127 of 133 patients had complete data and could be analyzed.
- Code written can be re-run as patient population grows, giving more insight into success of RoundtableRx in the future.

Geoapify API

The Geoapify API does not accept 9-digit ZIP Codes.

Impact on project:

- Map of patients does not include all patients, one dot on map means there is at least one patient within that 5-digit ZIP code area.

Limitations cont.

Unnecessary Data

Despite every state having their own ADI rank csv file available, we discovered some ND + SD data in the MN file.

Impact on project:

- When trying to identify county with highest ADI rank, it was a ND county.
- Further data cleaning needed in order to identify the highest ranking MN county and ensure RoundtableRx is servicing those residents.

Data Size for Regression Analysis

Only analyzed 85 data points, one for each MN county.

Impact on project:

- No correlation found, perhaps ADI ranks would correlate with larger population size, such as the whole country instead of just one state.
- Could get national ranks instead and see if there's a correlation between national ADI ranks and prenatal care across the USA.

Conclusion

- ★ RountableRx is making a difference in Minnesota's underserved communities by helping them afford their medications.
- ★ Most patients served reside in neighborhoods with higher ADI rankings.
- ★ No correlation found for ADI rank and prenatal care.
- ★ Most RoundtableRX repositories: Hennepin County
- ★ Most RoundtableRX patients: Saint Louis County
- ★ RoundtableRx should expand repositories to NorthWestern and SouthWestern Minnesota.



Any questions?