

Figure 1. Original Layout

### The steps I followed to build the dashboard:

1. Using SAS, I deleted missing data and redundant data. The missing data was state rates that were "NR", "DS", and "#". Redundant data was state rates that were not included in state median calculations. Keeping this data would result in many of the rates going over 100, while they should be between 0 and 100 to make sense in the dashboard. After the deletions, 3 state rates were still over 100, but they did make sense in their context, so I let them be.
2. To follow the original design (Figure 1), I used SAS to make 6 datasets (Figure 2) out of the original dataset, one for each domain—Maternal and prenatal health, primary care, dental and oral health, acute and chronic conditions, behavioral health, and long-term care.

**DATA** INFORMATION

DATA

MYDATA.CLEANMEASURE

FILTER 1

\*Variable 1: (1 item)

Domain

Comparison:

Equal

Value type:

Select distinct value

Value:

Dental and Oral Health

Logical:

(none)

OUTPUT DATA SET

\*Data set name:

mydata.dental Browse

Variables to include:

All variables

Show Output Data

Show output data

CODE LOG RESULTS OUTPUT DATA

Table: MYDATA.DENTAL View: Column name

Columns

Select all

State

Domain

Reporting Program

Measure Name

Measure Abbreviation

Measure Type

Rate Definition

FFY

Population

Methodology

State Rate

Number of States Reporting

Median

Bottom Quartile

Top Quartile

Property Value

Label

Value

State Domain

1 Alabama Dental and

2 Alabama Dental and

3 Alabama Dental and

4 Alabama Dental and

5 Alaska Dental and

6 Alaska Dental and

7 Alaska Dental and

8 Alaska Dental and

9 Arizona Dental and

10 Arizona Dental and

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Figure 2. Separating the dataset into 6 datasets

- Using Tableau, I made 6 dot plots for the 6 datasets, with state rates on the y-axis, and state names on the x-axis. I also made jitter dot plots, but they ended up looking identical to my traditional dot plots. Each graph had its own filter for selecting a specific measure. Each graph also had a statement indicating whether a higher rate or lower rate was better for the measure selected. After inserting a preliminary geo map, my dashboard Version 1 (Figure 3) was done.

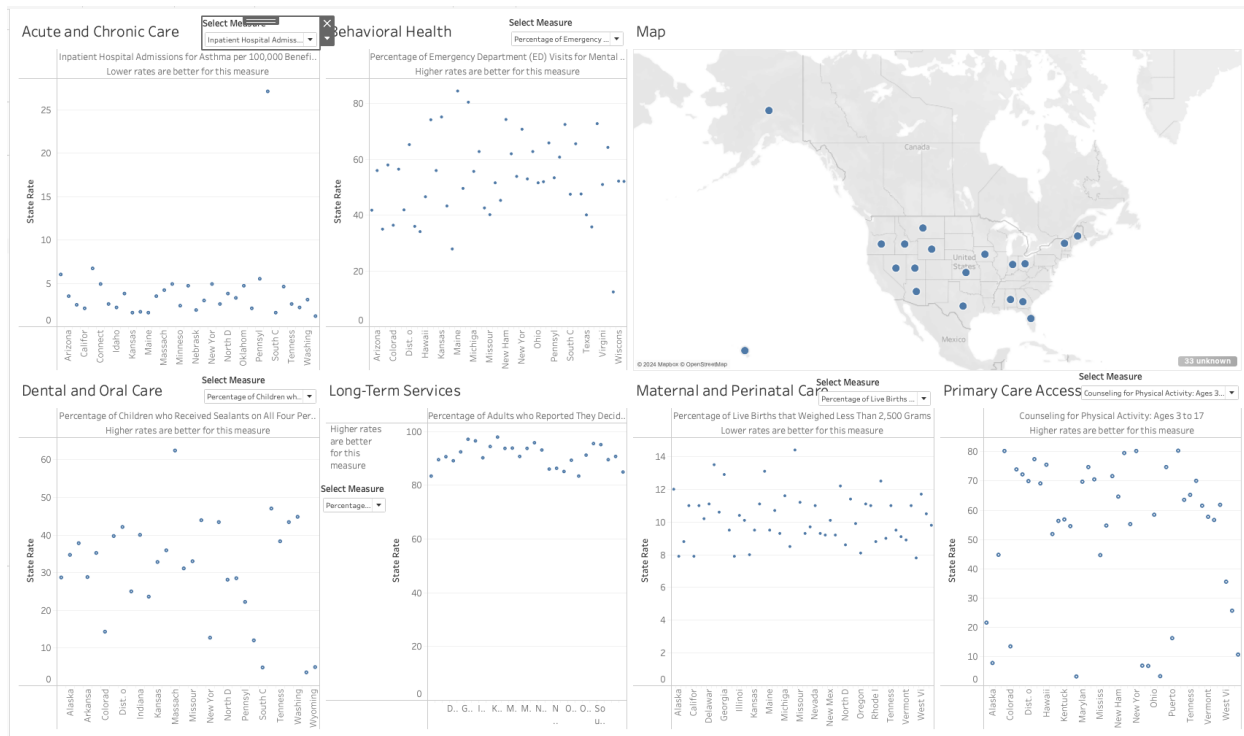


Figure 3. Dashboard Version 1

- After gathering user feedback, aka husband's opinion, I realized the redundancy of 6 dot plots and decided to go with 1 dot plot for all 6 domains. I started exploring additional chart type options for my dashboard. I built a heat map (Figure 4) with states in the rows and domains in the columns. Each field used color and number to indicate overall state performance in these domains. The overall performance score comes from the sum of a state's performance rates. To resolve the issue that some rates were better when lower, I used Tableau to create a new measure "Score": IF [Measure Type] = "Lower rates are better for this measure" THEN 100-[State Rate] ELSE [State Rate] END. The resulting heat map (Figure 4) had many blank fields in them, which upon investigation was due to many states not reporting all their rates. In fact, Montana and Illinois hardly reported any, while Maternal and prenatal care was the only one with perfect reporting across the states.

Heatmap

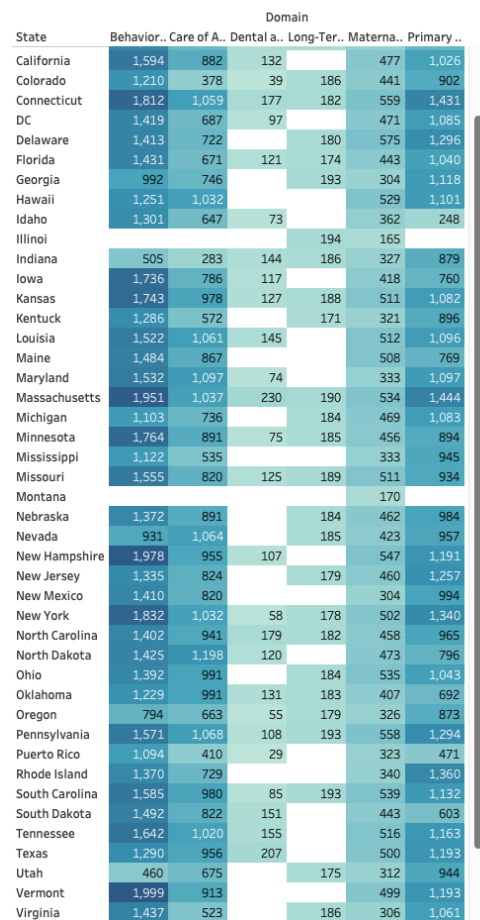


Figure 4. Heat Map

- Since the heat map could not accurately represent state performance due to incomplete reporting, I could not include it on the dashboard. In fact, for the same reason, a geo map would not be able to reflect overall state performance either. I decided to use the geo map to reveal state participation instead. As shown in Figure 5, the map gives a good overview of how states differed in how many measures they reported, with Montana and Illinois standing out in their light coloring.
- The final chart type I added was horizontal bar charts for highlighting measures that states did best and worst in. This was the average of the scores I calculated in Step 4. Each bar had measure name and domain name on its left. My new layout was done (Figure 5).

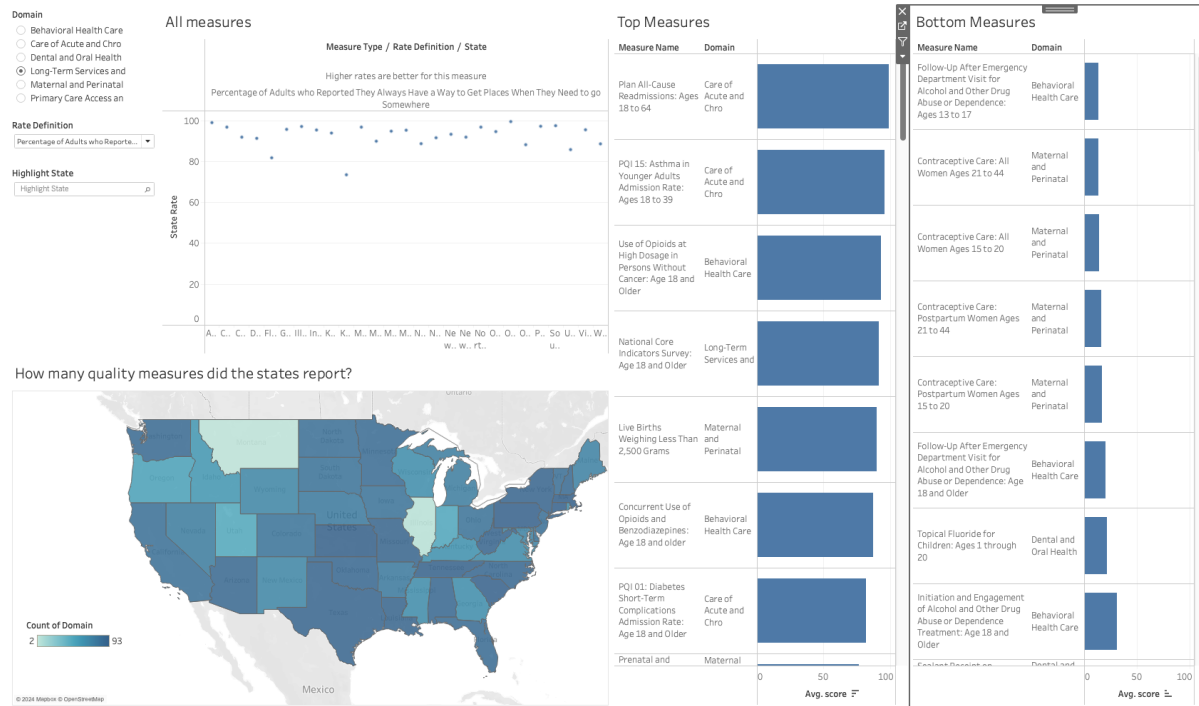


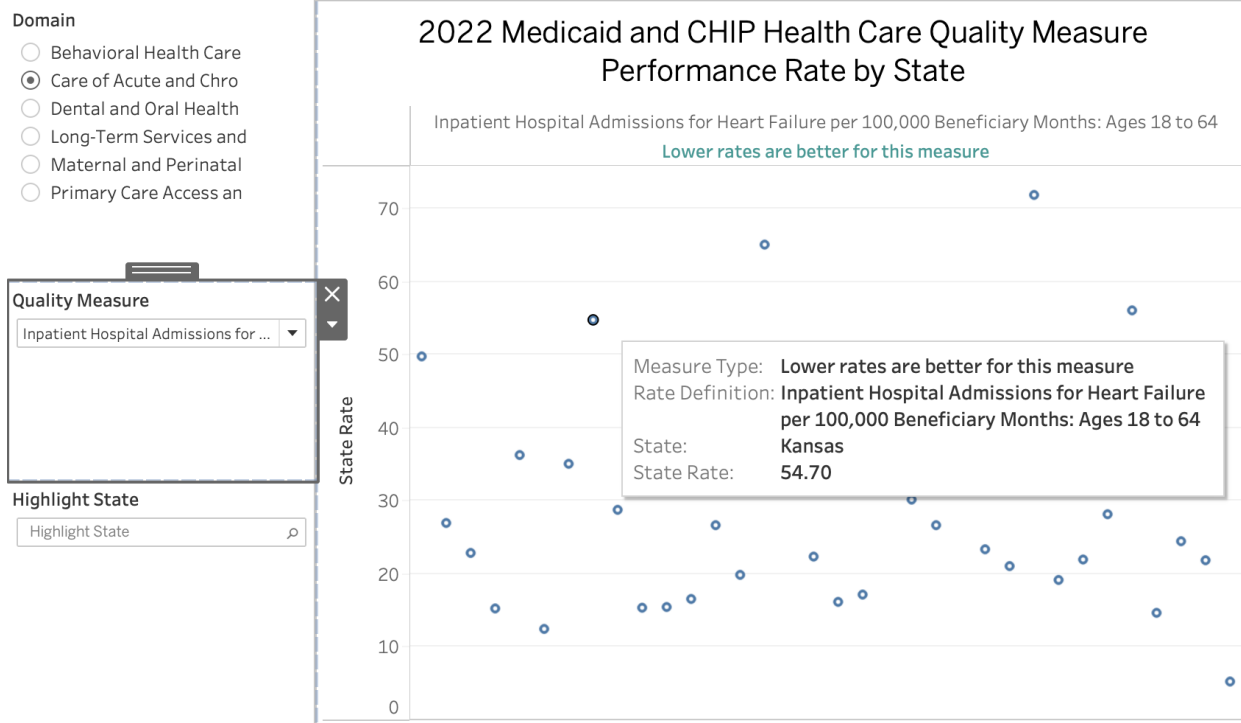
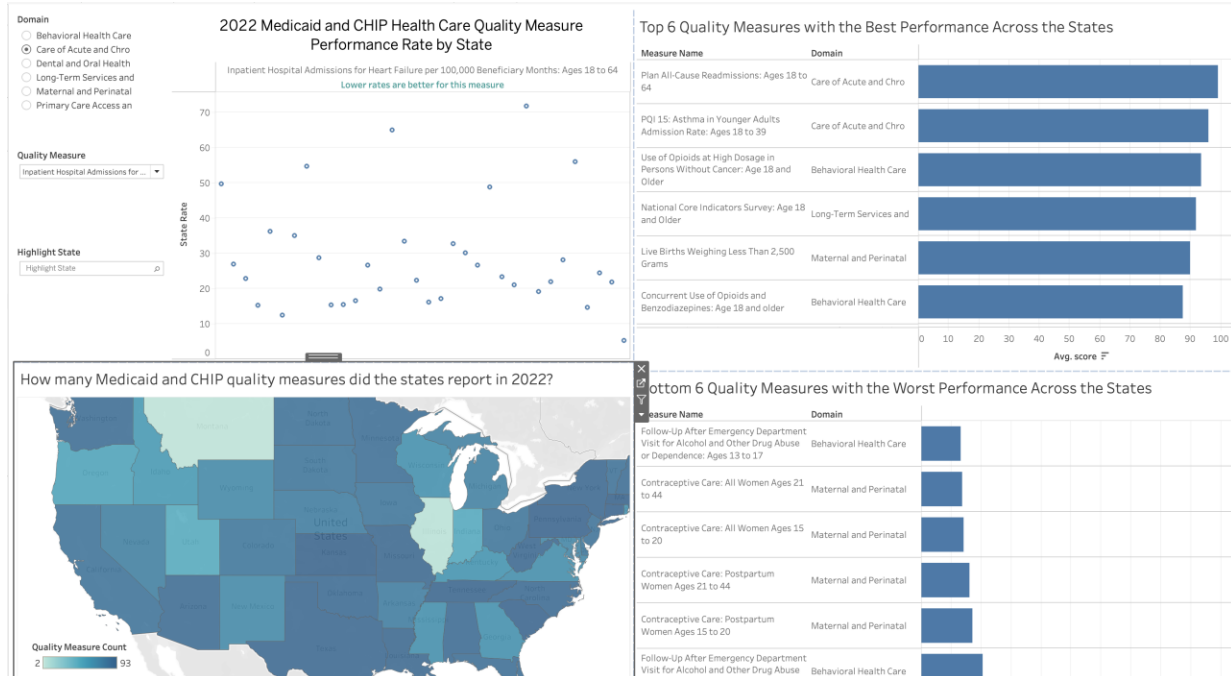
Figure 5. Dashboard Version 2

7. My last step was adjusting the placement of the charts, titles, colors, and filters. Only the dot plot needed filters. One for selecting domain; one for selecting measure. I also gave the option of highlighting a specific state using a scroll down bar on the left.

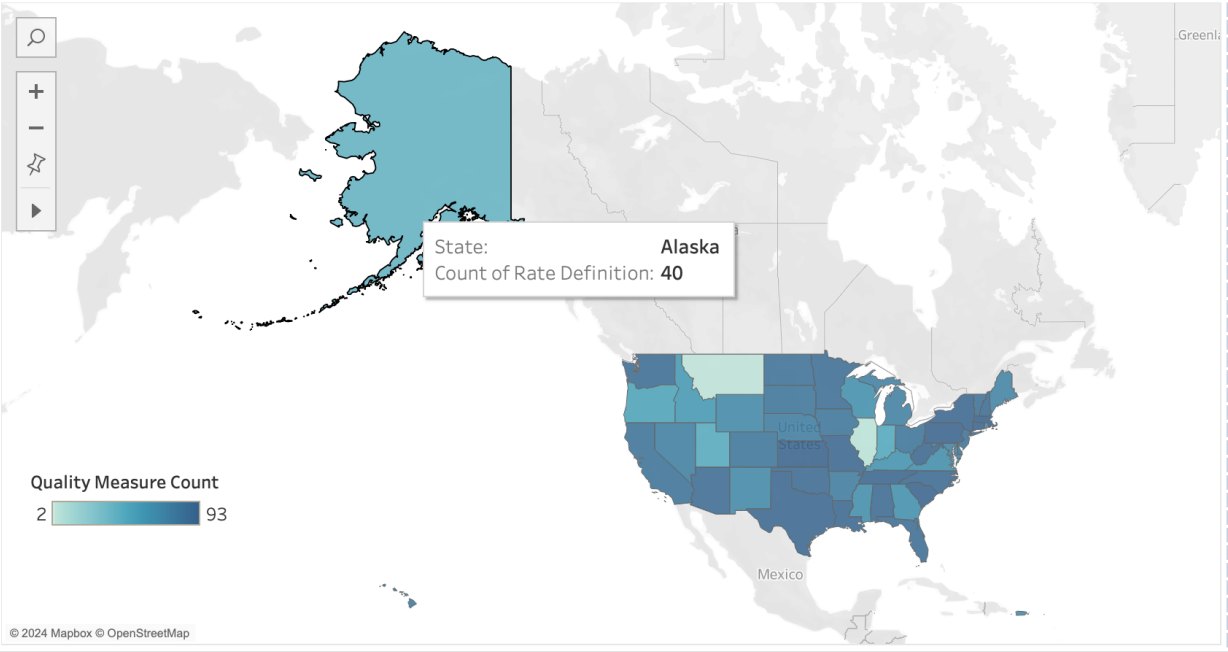
### Deviations from last week's plan:

1. Instead of having 6 dot plots for the 6 healthcare domains, the final dashboard only has one dot plot. Using the filters, users can first select a domain of interest, then drill down to a specific measure.
2. Instead of showing the overall performance of each state, the final geo map is used to convey the participation of each state. This clarification is important for users' overall understanding of the data and of the other 3 charts.
3. Unlike the original plan, the final dashboard has two bar charts, highlighting the quality measures that states were best in and worst in during the year of 2022.

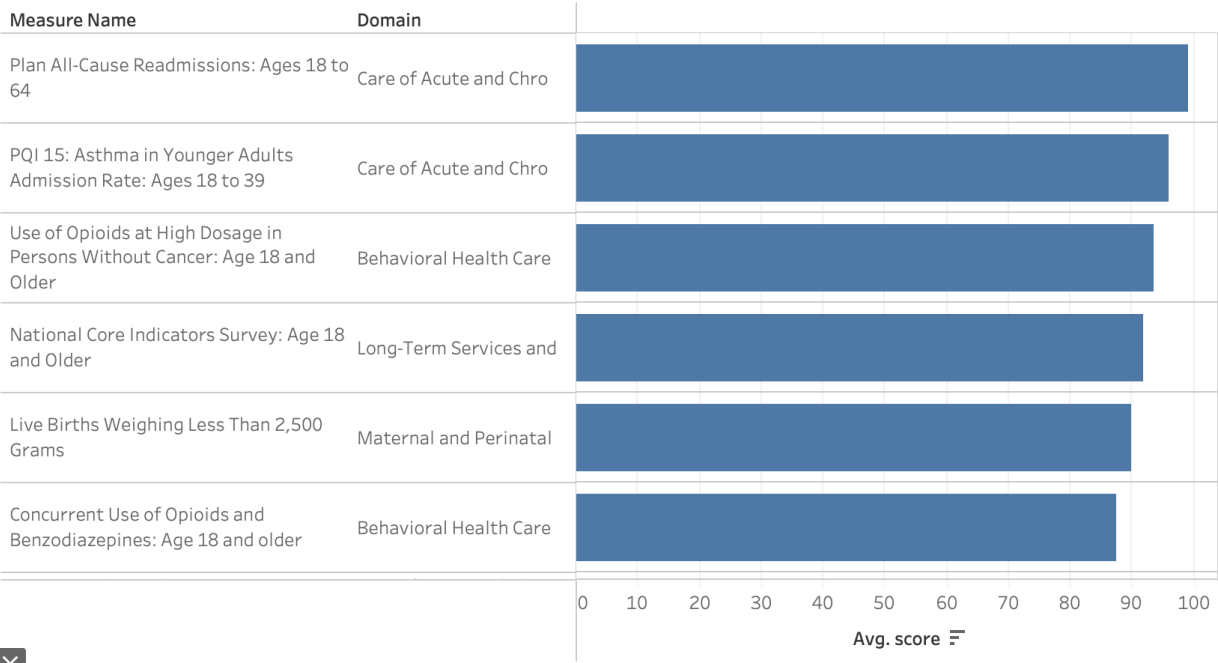
### Final Dashboard and Its 4 Components



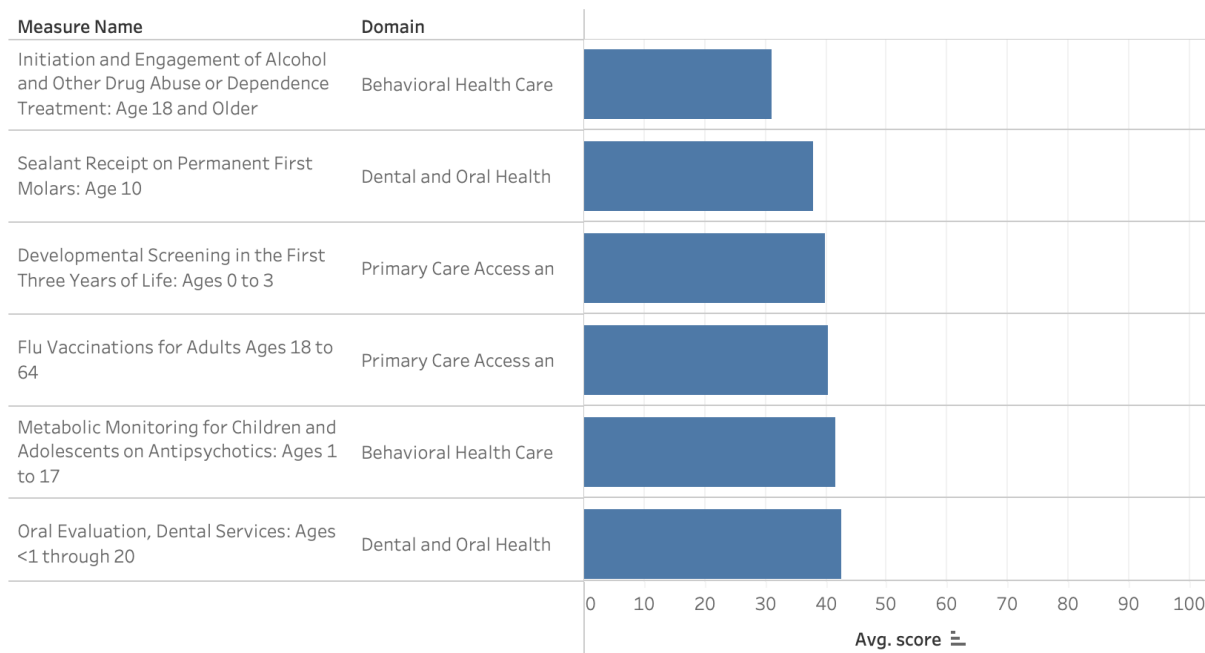
How many Medicaid and CHIP quality measures did the states report in 2022?



Top 6 Quality Measures with the Best Performance Across the States



### Bottom 6 Quality Measures with the Worst Performance Across the States



### Critique

The dashboard does communicate compelling information clearly and quickly. The three chart types—geo map, dot plot, and bar chart, are all straightforward visuals that appropriately convey the key messages. To highlight extreme performance rates further, the dot plot could benefit from assignment of a distinct color to all the outliers.

The final dashboard only provides answers to one of the original objectives: How did each state compare to its peers in each quality measure? It's not able to answer the question of how each state did overall in the 6 categories. To answer this question properly, I would need to compute a new score by calculating the difference between each state rate and the mean rate. The dashboard also added new information that's apart from the original objectives.

The dashboard does organize information to support meaning and usability. I would make one disclaimer that the scores I calculated may not be accurate reflections of how the states performed, for they are not weighted scores. It's beyond my expertise to weigh them properly. Lastly, the dashboard is visually appealing, containing a simple color scheme with variations of a single color, blue. It's simple but not without interesting elements to examine.

### User Analysis

The geo map indicates that in 2022 aside from Montana and Illinois, all the states reported 50% to 100% of the quality measure performance rates. Montana (2 measures) and Illinois (4



measures) hardly submitted any data. Kansas submitted most data--a total of 93 different quality measures.

The bar chart shows that all the states did well preventing readmissions for acute and chronic conditions in their Medicaid/CHIP patients. All the states also did well preventing asthma admission in younger adults. However, states seldom followed up on youth who went to the ER for alcohol/drug abuse. The states also have a lot of opportunities in providing contraceptive care to Medicaid/CHIP women.

The dot plot tells me that my home state, North Carolina, did an above average job in dental/oral care, but was average and below average in all the other categories.