Project #3: INTERACTIVE VISUALIZATION USING TABLEAU

EN 605.662.SU20 Data Visualizations

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Abstract

A Tableau dashboard was created using the Center for Disease Control's (CDC) 500 Cities dataset. This dataset combines city and census tract-level data with 27 chronic disease measures for the 500 largest cities in the United States. The Tableau dashboard is intended to allow users the opportunity to compare national, state, and city measures for chronic disease outcomes and prevention methods.

Description of the Visualization

This project utilized the Center for Disease Control's (CDC) 500 Cities Project data set (CDC, 2016; Wang et al., 2018; Wang et al., 2017; Zhang et al., 2014). This data set reports city and census tract-level data for 27 chronic disease measures in 500 of the largest United States (U.S) cities. To improve local population health, residents and healthcare provides will need to harness the power of current health status data and behavioral risk factors within their own communities. Here, data can be aggregated by State, City, or Census-tract and analyzed across 28 chronic disease measures are related to unhealthy behaviors (5), health outcomes (13), and use of preventive services (10). These measures include major risk behaviors that lead to illness, suffering, and early death related to chronic diseases and conditions, as well as the conditions and diseases that are the most common, costly, and preventable of all health problems.

Using the 500 Cities data set, a Tableau dashboard was created. This dashboard allows users to interact with each of the 28 risk measures by mapping densities according to user-selected factors including city, state, or nationally-calculated risk ratios.

Data

500 U.S. Cities

The 500 Cities Project includes data from 497 of the largest U.S. Cities, as well as data from 3 of the smallest: Burlington, Vermont; Charleston, West Virginia, and Cheyenne, Wyoming. The number of cities per state ranges from 1 to 121. Among these 500 cities, there are approximately 28,000 census tracts, for which data will be provided. The tracts range in population from less than 50 to 28,960, and in size from less than 1 square mile to more than 642 square miles. The number of tracts per city ranges from 8 to 2,140. The project includes a total

population of 103,020,808, which represents 33.4% of the total United States population of 308,745,538.

28 Chronic Disease Risk Factors

The 500 Cities Project includes 28 chronic disease risk factors, which are separated into three categories: health outcomes, prevention, and unhealthy behavior. Each attribute within a category includes 3 measurements: raw-data, adjusted-data, and 95% confidence intervals for adjusted data. Most of the data is presented as a ratio of individuals who reported having a specific feature, divided by the total number of respondents. All respondents are aged ≥ 18 years.

There are 5 unhealthy behaviors included in the data set, which are all positively correlated with chronic disease: binge drinking among adults age ≥ 18 years, current smoking among adults ≥ 18 years, no leisure-time physical activity among adults ages ≥ 18 years, obesity among adults ages ≥ 18 years, and sleeping less than 7 hours among adults ≥ 18 years.

There are 13 health outcomes included in the data set, which are all positively correlated with chronic disease: current asthma among adults aged ≥ 18 years, high blood pressure among adults ages ≥ 18 years, cancer among adults aged ≥ 18 years, high cholesterol among adults aged ≥ 18 years who have been screened in the past 5 years, chronic kidney disease among adults aged ≥ 18 years, chronic obstructive pulmonary disease among adults aged ≥ 18 years, coronary heart disease among adults aged ≥ 18 years, diagnosed diabetes among adults ≥ 18 years, mental health not good for ≥ 14 days among adults aged ≥ 18 years, physical health not good for ≥ 14 days among adults aged ≥ 18 year, and stroke among adults aged ≥ 18 years.

There are 10 attributes indicating the Use of Preventative Services, which are all correlated with chronic disease: current lack of health insurance among adults aged 18-64 years,

visits to the doctor for routine checkups within the past year among adults aged ≥ 18 years, visits to the dentist or dental clinic among adults aged ≥ 18 years, taking medicine for high blood pressure control among adults aged ≥ 18 years, cholesterol screening among adults aged ≥ 18 years, mammography use among women aged 50-74 years, panicolaou smear testing among adult women aged 21-65 years, fecal occult blood test/sigmoidoscopy/colonoscopy among adults aged 50-75 years, older men aged ≥ 65 years who are up to date on a core set of clinical preventative services, and older women aged ≥ 65 who are up to date on a core set of clinical preventative services.

Data Exploration

Data analysis was conducted in R. For purposes of this project, only the age-adjusted risk factor values ("_AdjPrev") were analyzed for each of the 28 attributes. Descriptive statistics were run for each variable in order to obtain: min, max, mean, median, mode, standard deviation, standard error, skew, kurtosis, sum, range, 1st quartile, 2nd quartile, and 3rd quartile (see Table 1 below).

Variable	Data Type	Variable Type	Min	Max	Mean	Median	Std	Description
Access2	Numeric Float	Quantitative Ratio Discrete	4.80	43.90	16.31	15.10	6.27	Lack of health insurance
Arthritis	Numeric Float	Quantitative Ratio Discrete	13.3	33.9	22.1	22.0	3.33	Diagnosed with Arthritis
Binge	Numeric Float	Quantitative Ratio Discrete	6.20	25.40	17.69	17.70	2.61	"Binge Drinking": 5+ (men) or 4+ (women) drinks in the past 30 days
BPHigh	Numeric Float	Quantitative Ratio Discrete	20.70	47.30	30.58	30.00	4.79	High Blood Pressure
BPMed	Numeric Float	Quantitative Ratio Discrete	46.6	69.7	56.5	57.0	4.94	Taking medicine for high blood pressure

Cancer	Numeric Float	Quantitative Ratio Discrete	4.70	6.80	6.058	6.10	0.414	Diagnosed with cancer (besides skin)
CAsthma	Numeric Float	Quantitative Ratio Discrete	6.70	14.20	9.464	9.40	1.186	Currently diagnosed with asthma
CHD	Numeric Float	Quantitative Ratio Discrete	3.50	8.80	5.676	5.700	1.015	Angina or Coronary Heart Disease
CheckUp	Numeric Float	Quantitative Ratio Discrete	54.20	81.30	68.59	67.90	4.673	Visits to a doctor for a routine checkup within the past year
CholScreen	Numeric Float	Quantitative Ratio Discrete	70.20	85.20	79.44	79.80	2.657	"Cholesterol screen": have had their cholesterol checked within the previous 5 years
ColonScreen	Numeric Float	Quantitative Ratio Discrete	43.20	77.70	64.14	64.50	5.783	Fecal occult blood (FOBT)test within the past year, sigmoidoscopy within the past 5 years and FOBT within the past 3 years, or colonoscopy within the past 10 years
COPD	Numeric Float	Quantitative Ratio Discrete	3.10	11.30	6.256	6.100	1.621	Chronic obstructive pulmonary disease (COPD), emphysema, or chronic bronchitis
CoreM	Numeric Float	Quantitative Ratio Discrete	19.40	53.30	34.04	34.00	5.881	"Core Men": Older men aged ≥ 65 years who

								are up to date on a core set of clinical preventative services
CoreW	Numeric Float	Quantitative Ratio Discrete	17.50	46.60	31.93	32.00	4.926	"Core Women": Older women ≥ 65 who are up to date on a core set of clinical preventative services
CSmoking	Numeric Float	Quantitative Ratio Discrete	7.90	29.60	17.26	17.10	4.334	Current smoker
Dental	Numeric Float	Quantitative Ratio Discrete	41.80	81.50	63.28	63.40	7.56	Visits to dentist or dental clinic
Diabetes	Numeric Float	Quantitative Ratio Discrete	5.60	20.30	10.46	10.30	2.53	Diabetes diagnosis
HighChol	Numeric Float	Quantitative Ratio Discrete	24.10	34.10	29.31	29.50	1.928	High Cholesterol
Kidney	Numeric Float	Quantitative Ratio Discrete	2.10	4.80	3.069	3.10	0.483	Chronic kidney disease
LPA	Numeric Float	Quantitative Ratio Discrete	12.90	45.40	26.52	26.20	6.40	No leisure-time physical activity
MammoUse	Numeric Float	Quantitative Ratio Discrete	60.00	83.50	74.44	74.99	3.656	Mammography use among women ≥ 50 − 74
MHlth	Numeric Float	Quantitative Ratio Discrete	8.30	19.60	13.42	13.60	2.184	Mental health not good for ≥ 14 days
Obesity	Numeric Float	Quantitative Ratio Discrete	15.30	49.10	30.24	30.50	6.212	Currently obese (i.e., body mass index ≥ 65 30.0kg/m^2
PapTest	Numeric Float	Quantitative Ratio Discrete	67.70	85.90	78.36	78.60	3.315	Papanicolaou smear test among women ≥ 21-65 years
PHlth	Numeric Float	Quantitative Ratio Discrete	7.00	20.50	12.63	12.70	2.487	Physical health not

								good for ≥ 14 days
Sleep	Numeric Float	Quantitative Ratio Discrete	24.50	50.10	35.52	35.30	4.357	Sleeping less than 7 hours
Stroke	Numeric Float	Quantitative Ratio Discrete	1.80	6.10	3.122	3.100	0.713	Stroke
TeethLost	Numeric Float	Quantitative Ratio Discrete	5.10	31.80	14.50	14.59	4.96	All teeth lost

TABLE 1. Descriptive statistics for all age-adjusted chronic disease risk factors in the CDC 500 Cities Project Data Set

Five Analytical Questions

Question 1

What is the distribution of chronic disease measures across the nation?

Question 2

How do states differ in their distribution of chronic disease measures?

Question 3

How do cities differ in their distribution of chronic disease measures?

Question 4

How does my home state, South Carolina, fare in its distribution of chronic disease measures?

Question 5

How do the cities within my home state, South Carolina, differ in their distribution of chronic disease measures?

Design

To address the five analytical questions listed above, 14 Tableau worksheets were created. These were then combined into 7 Tableau dashboards and then into one Tableau story, which was published on Tableau Public (at https://public.tableau.com/profile/ricca.callis#!/vizhome/Project3Visualizations_16066120782690/StoryCDC500?publish=yes).

Visualizations provided data on a national, state, or city level for each category and chronic disease measure. Visualization techniques included: national choropleth, city by state choropleth, highlight text tables, grouped boxplots, vertical bar charts, and a butterfly chart. All visualizations were created for user-interactivity, such that the user could select region of interest (state and city), category (all, health outcomes, prevention, or unhealthy behaviors), and measure (all, or any of the 28 individual measures).

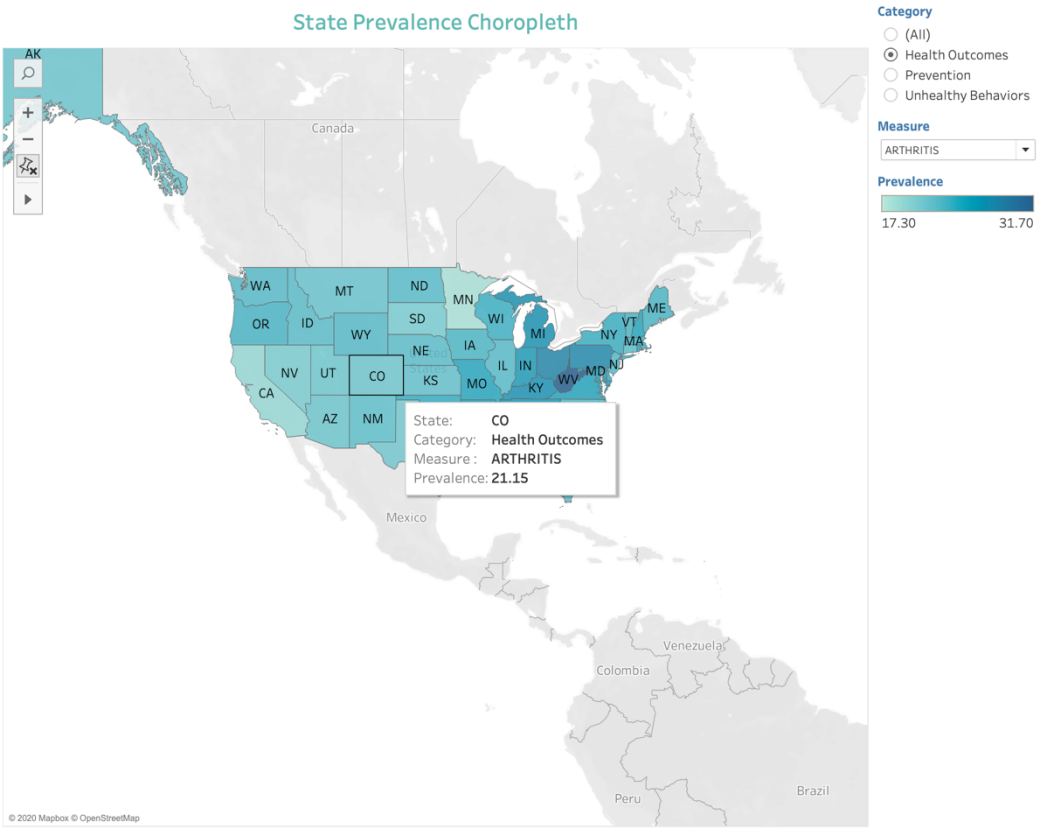
Category, Measure Id, State, and City dimensions were used as global filters for a few of the dashboards, in order to connect data between visualizations.

National Distribution of Chronic Disease Measures

To examine how each chronic disease measure differs across the U.S., a choropleth map was created (see Figure 1). Upon selection of a specific measure, a map of the U.S. is represented where the color of each state corresponds to the ratio between measure prevalence and state population. Light color was used to represent low measure prevalence and dark colors represent high measure prevalence. This was done because we tend to associate darker colors with higher intensities when the background color is light. A continuous color scale was used and the color legend was displayed. Users were given radio button for category selection and a drop-down menu for a corresponding measure selection. Users could select an individual state and be given the exact data value.

The category radio button was included because the measures within each category differ in the direction of impact on health and chronic disease. As all health outcome and unhealthy behaviors measures were variables which negatively impact human health, a high prevalence indicates a highly-negative effect on the health of the residents. Users should be able to decode dark-colored health outcome or unhealth behavior measures as negative, bad, unhealthy, or

something that should be avoided or improved upon. Prevention measure, on the other hand, were variables which positively impact human health, preventing the development of chronic disease. Therefore, a high prevalence of a prevention measure indicates a highly-positive effect on the health of the residents. Users should be able to decode dark-colored prevention measures as positive, good, and/or healthy.



FIGRURE 1. State prevalence choropleth visualization.

While the choropleth described above was useful in examining the distribution of individual measures across each state, it didn't provide national prevalence information. Therefore, a grouped boxplot was also created (see Figure 2). Here, national prevalence's (i.e., combined from all states) are presented on the y-axis. Each individual chronic disease measure is

presented on the x-axis and is grouped by its corresponding category (grouped by location and color). All chronic disease measures in the health outcomes category were presented first and all box and whisker plots were indicated in blue. Prevalence measures were presented next and were color-coded in orange, followed by unhealthy behavior measures in red. The category color-code legend was displayed and users were also provided a drop-down menu to select one, multiple, or all measures for visualization.

As this was a large dataset with a significant categorical variable (category), and because all measures were numeric, ratio variables, a grouped boxplot was selected to summarize the distribution of multiple variables across several categories. This allows the viewer to compare the shape of distributions, find central tendencies, access variability, and identify outliers for each measure.

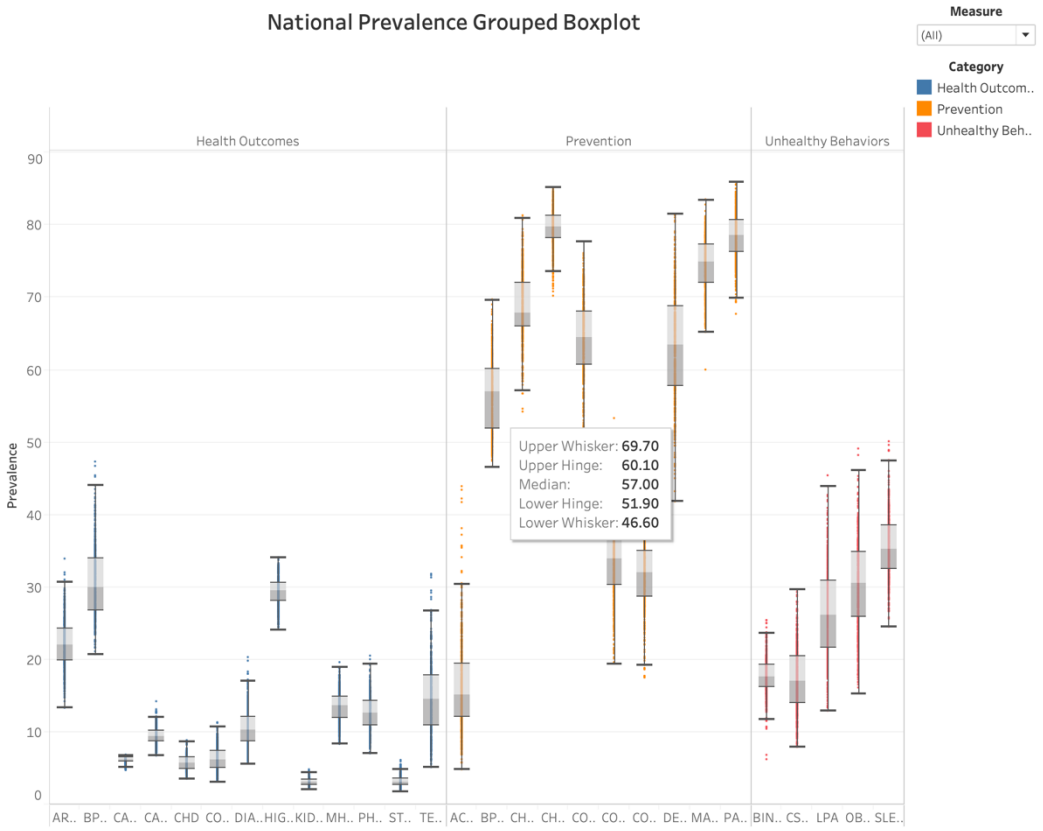


FIGURE 2. National prevalence grouped boxplot. Individual chronic disease measures are presented on the x-axis and are grouped (by location and color) by their corresponding categories. National prevalence is presented on the y-axis.

State by Chronic Disease Measure

To address the question regarding how states differ in their distribution of chronic disease measures, one could use the state choropleth map described above. However, a few other visualizations were also created. A state prevalence highlight text table was created to display data values for each state and each chronic disease measure (see Figure 3). States were presented in rows and measures in columns. The same continuous color scale used in the state choropleth map was utilized here for data consistency. Similarly, users were given a drop-down menu to select all, one, or multiple states for comparison; a radio button for category selection, and a drop-down menu to select all, one, or multiple measures for comparison. Measures were

presented in columns and were grouped by category. The highlight text table allows for specific data encoding by its users but also users an opportunity to see patterns or trends more quickly but it's use of color. In the dashboard, the state prevalence highlight text table is presented along with a similar city prevalence highlight text table, where category and measure selections were used as global filters. This allowed users to compare their own state to other states across the nation, as well as the cities within their state.

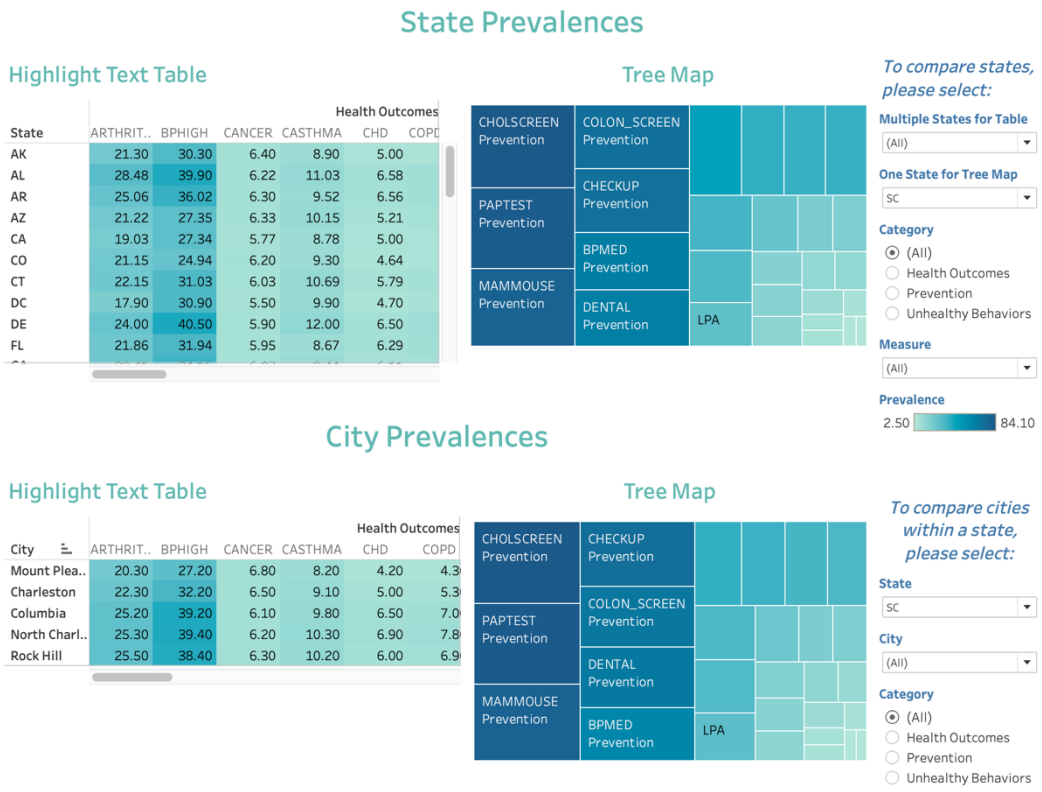


FIGURE 3. State and city prevalence highlight text table.

As can also be observed in Figure 3, a state-specific tree map was also created. Users have the ability to select a state and a metric category. The entire map represents a state, subdivided by the ratios of its chronic disease measures. Each rectangle represents one measure. The size of the rectangle indicates the size of the measure prevalence (i.e., higher prevalence

indicates bigger rectangle size). All measures within a category must be displayed on the tree map to make the data useful. As a result, users only had the option to select for category, not for measure. Thus, a user could use the tree map to identify strongest and weakest prevalences by category within a state. For data consistency, the tree map used the same continuous color scale as the highlight tables and choropleths.

The tree map offers an efficient use of space, decoding many data values at once. Furthermore, it allows users an opportunity to see state-wide patterns more easily than in the text table due to the use of size and color. As the tree map is only useful in displaying one state's data, it only shares one global filter with the state highlight text table. For the entire dashboard, whenever a user makes a selection to the category radio button, all visualizations change accordingly.

A vertical bar chart was also created in order to allow users to more easily decode quantity information for each measure and across measures (see Figure 4). Upon user-specified state, category, and measure selections, all relevant chronic disease measures are displayed on the x-axis (grouped by category), with state prevalence on the y-axis. Similar to the highlight tables dashboard, the state prevalence grouped bar chart was presented on a dashboard along with a similar city prevalence grouped bar chart. Therefore, state, category, and measure dimensions were used as global features. As a result, all user-defined measures are displayed both for the specified state but also for each city within the state. In this way, users could decode individual measure state prevalences, compare prevalences across the state, decode individual measure city prevalences, compare prevalences across the city, compare prevalences across multiple city's, or compare city to state prevalences.

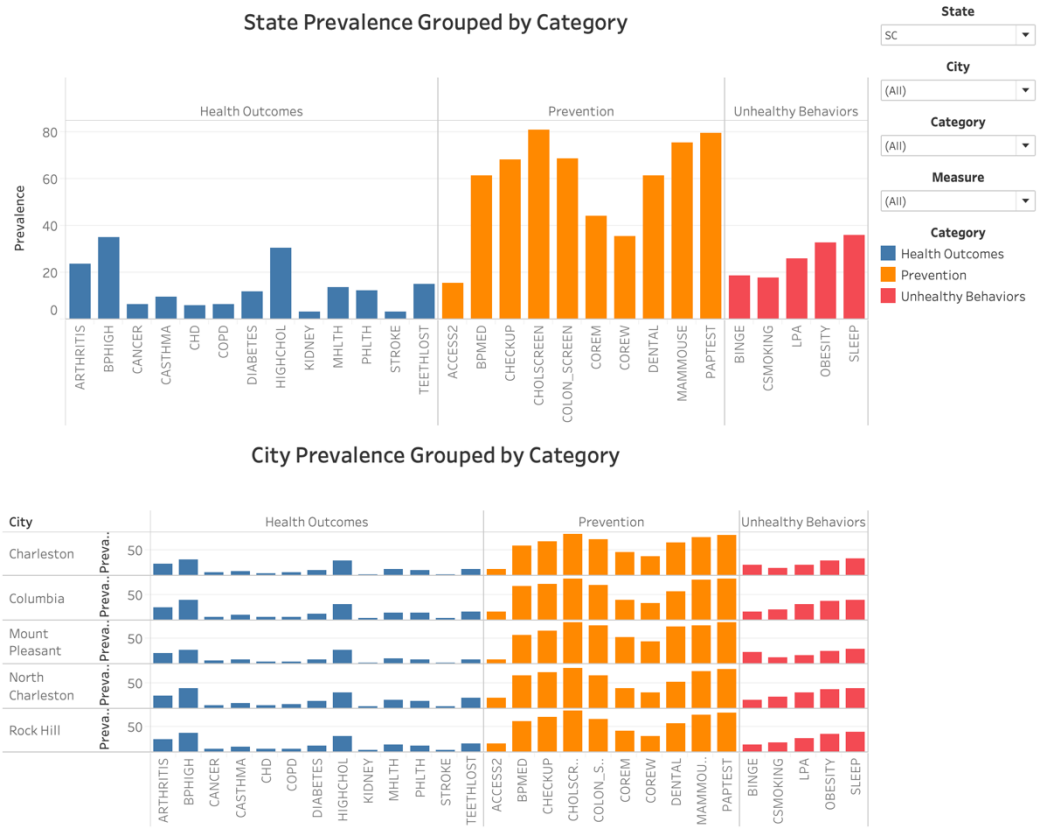


FIGURE 4. State and city prevalence measures grouped by category in a vertical bar chart.

City by State by Chronic Disease Measure

To address the question regarding how prevalences differ across cities within a state, the above-mentioned city prevalence grouped by category vertical bar chart (Figure 4) was used.

A city prevalence highlight text table was also created (Figure 3), in a similar format to that described above for state prevalences. For the cities highlight table, user-selected cities were presented in rows and measures were grouped by category and presented in columns. The same continuous color scale was used to allow users an opportunity to more quickly observe patterns. As both city and state prevalence highlight tables displayed similar information, they were presented on the same dashboard. State, category, and measures all shared global filters. This

allowed users to compare their own state to other states across the nation, their own city prevalences to the entire state prevalences, or compare between cities within a specified state.

A city tree map was also included on the same dashboard (Figure 3) and followed the same design as the state tree map. It too shared state and category global filters. Users have the ability to select a state, a city within that state, and a metric category. The entire map represents one city, subdivided by the ratios of its chronic disease measures. Each rectangle represents one measure. The size of the rectangle indicates the size of the measure prevalence (i.e., higher prevalence indicates bigger rectangle size). All measures within a category must be displayed on the tree map to make the data useful. As a result, users only have the option to select for category, not for measure. Thus, a user could use the tree map to identify strongest and weakest prevalences by category within a city. For data consistency, the tree map used the same continuous color scale as the highlight tables and choropleths.

To better visualize prevalences in all cities across the U.S. in one image, a city prevalence choropleth was also created (Figure 5). For visualization consistency, the city prevalence choropleth design mimicked the state prevalence choropleth design. Cities were represented as dots, located within their respective states, on a U.S. map. Dots were color-filled based on their user-selected measure's prevalence. A continuous color scale was used to identify high prevalences in dark colors and low prevalences in light colors.

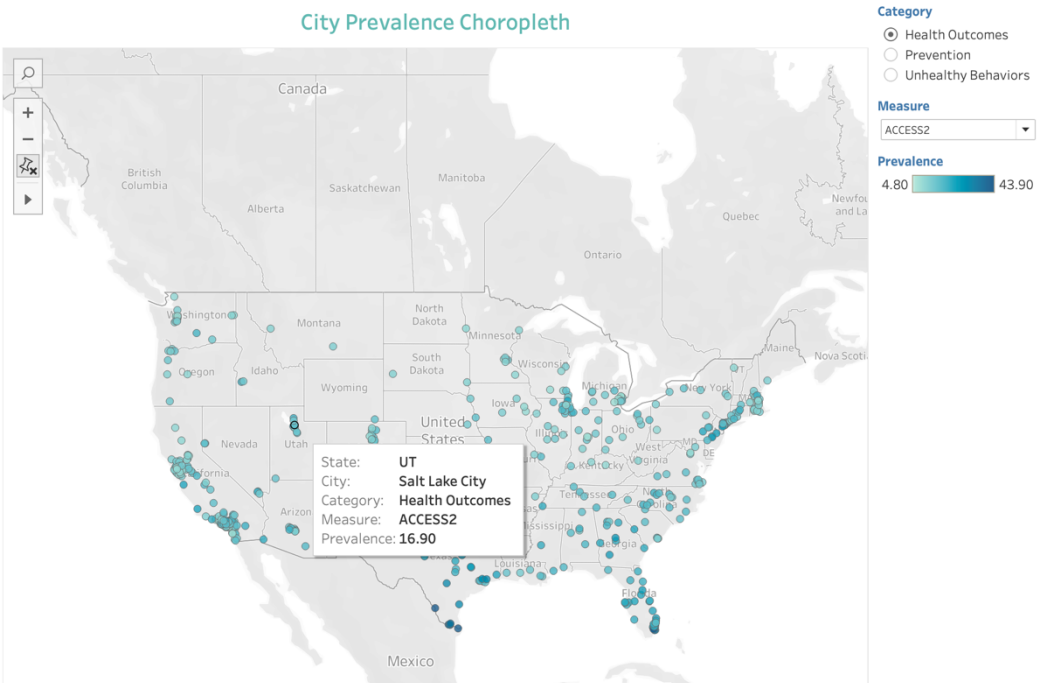


FIGURE 5. City chronic disease measure prevalence choropleth

The city prevalence choropleth is useful when comparing all cities across the U.S. on one chronic disease measure. In order to compare cities within a state on multiple disease measures, however, a grouped vertical bar chart was created (see Figure 6). Upon a state selection, users have the option to view all, one, or multiple cities within the state. Chronic disease measures for each city were presented in a horizontal layout series of grouped vertical bar charts. Prevalence was represented on the y-axis, and each city is represented as a color-coded vertical bar on the x-axis. Bars were grouped by measure, so that users could identify the specific measure's prevalence within the specified city and across each city in the state. As there are so many variables within the data set, bar charts were separated in a horizontal layout and organized by category. The first layout included all health outcome measures, the second included all prevention measures, and the third included all unhealthy behavior measures. For consistency, the color of each city block remained the same across all layouts.

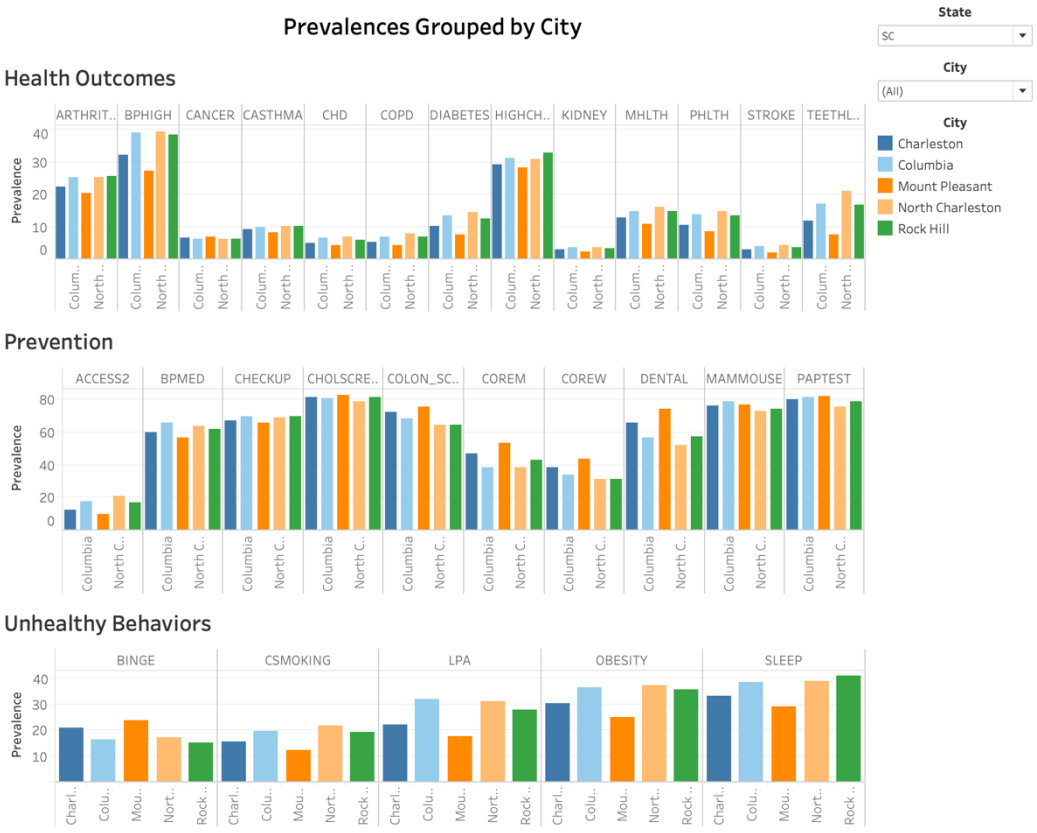


FIGURE 6. Prevalences grouped by city in a series of vertical bar charts.

South Carolina and Chronic Disease

In order to determine explore chronic disease measure in the state of South Carolina, the previously described visualizations were utilized: state prevalence choropleth (Figure 1), state prevalence highlight text table (Figure 3), and state prevalence tree map (Figure 3). A Butterfly Chart was also created to compare each chronic disease measure in the state of South Carolina to its corresponding national prevalence (Figure 7). The Butterfly chart was selected because it allowed for the comparison of two sets of data (South Carolina and National) side by side. It's a type of bar chart which plots the data as two horizontal bars with the same x-axis in the center, resembling butterfly wings. Here, it was used to allow users an opportunity to quickly compare

the differences between South Carolina and National prevalences along the same 28 chronic health parameters.

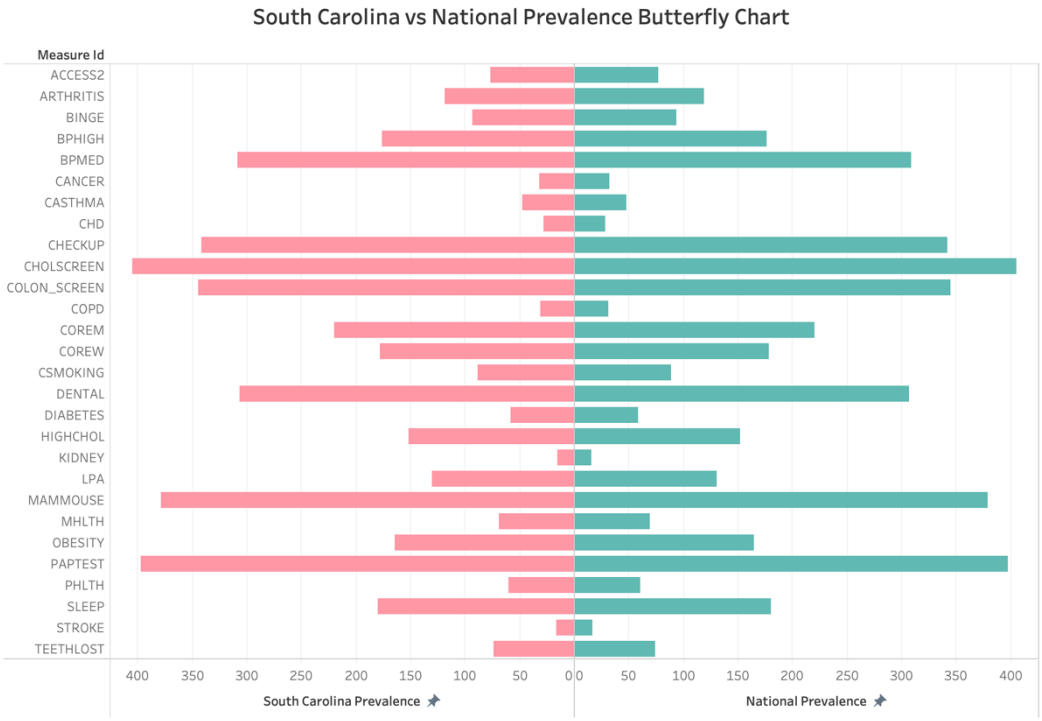


FIGURE 7. South Carolina vs national prevalence butterfly chart.

Cities within South Carolina by Chronic Disease

To address how chronic disease prevalences differ across cities within South Carolina, the previously described visualizations were utilized: city prevalence choropleth (Figure 5), city prevalence highlight text table (Figure 3), city prevalence tree map (Figure 3), and grouped vertical bar chart (Figure 6).

Discussion

As this project utilized a very large data set, it's difficult to make conclusions for each of the five analytical questions presented here as it'd require a drill down for each state, city, and chronic disease measure. To simplify, examples discussed here will be specific to one category (health outcomes) or one measure (stroke) only.

National Stroke Prevalence

Using the national grouped boxplot, we see that stroke is amongst the lowest prevalences compared to all other health outcome variables (see Figure 9). The national mean stroke prevalence is 3.30%. The media stroke prevalence is 3.10, the lower hinge is 2.60, the upper hinge is 3.50, the upper whisker is 4.80, and the lower whisker is 1.80. The distribution appears normally distributed, with very few outliers.

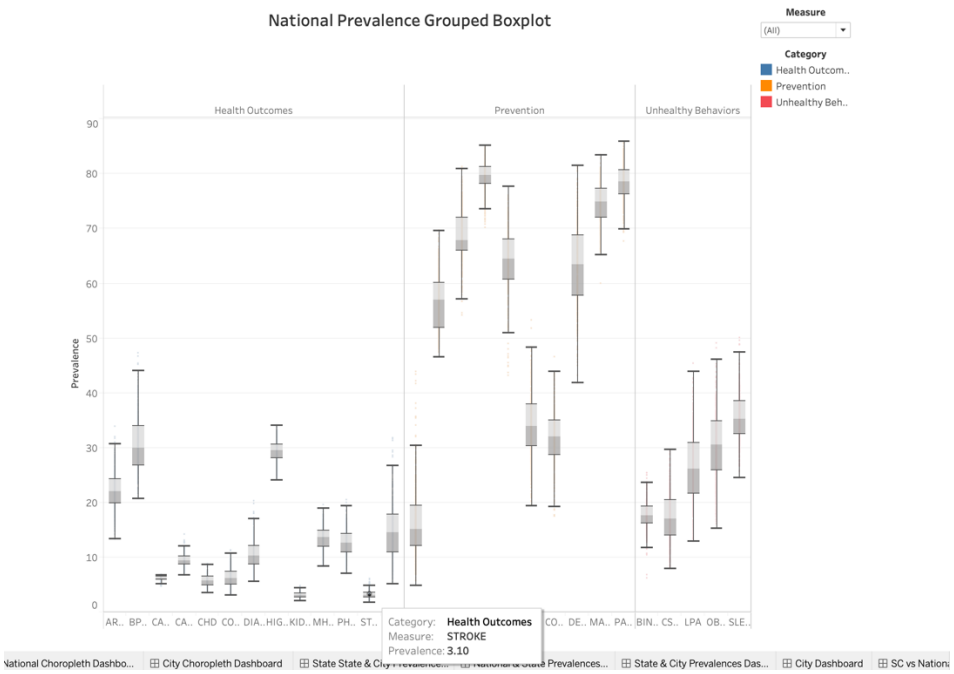


FIGURE 9. National grouped boxplot showing stroke prevalence.

State Differences in Stroke Prevalence

When using the state choropleth map, users can see compare stroke prevalence across the U.S. Generally, stroke prevalences appear higher on the east coast (Figure 10). Mississippi has the highest stroke prevalence (4.8%). Hawaii has the lowest stroke prevalence (2.50%).

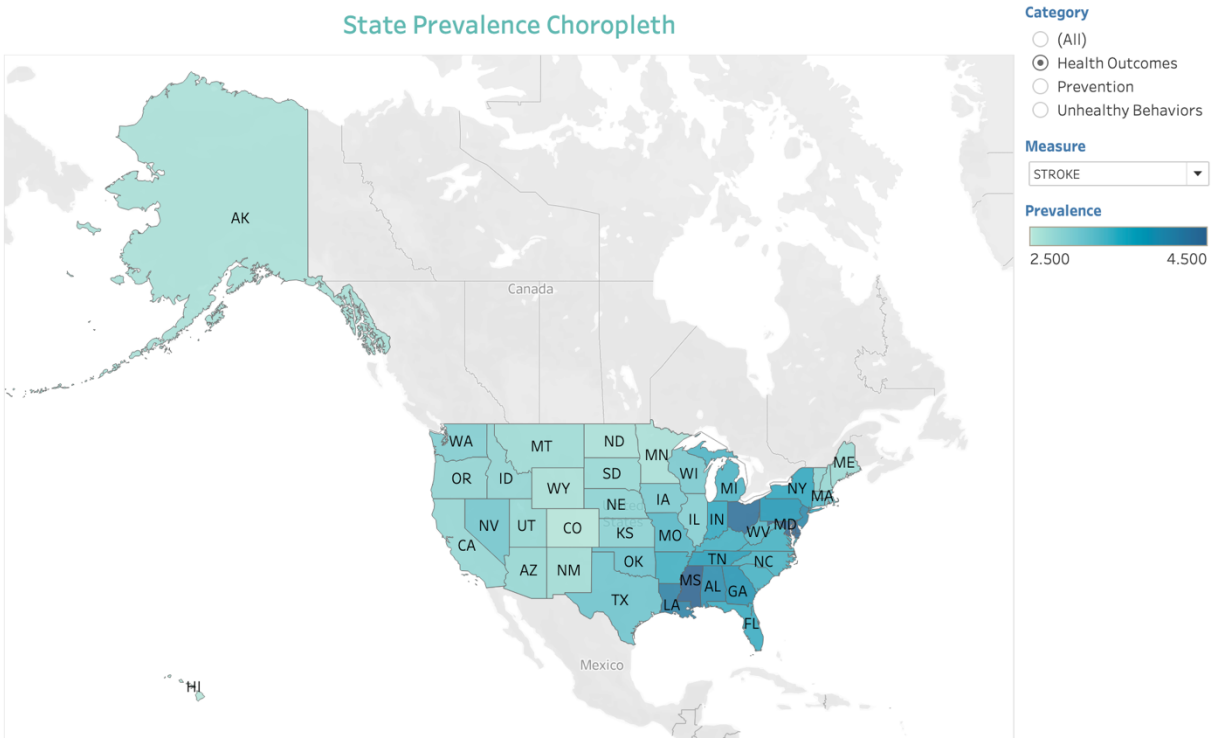


FIGURE 10. State stroke prevalence choropleth

The same information is also presented as a text table in the state prevalence highlight table. Here, the stroke prevalence of each state is displayed in a column (Figure 11). Overall national patterns are more difficult to determine here, but individual states with unusually high or low values can be identified.

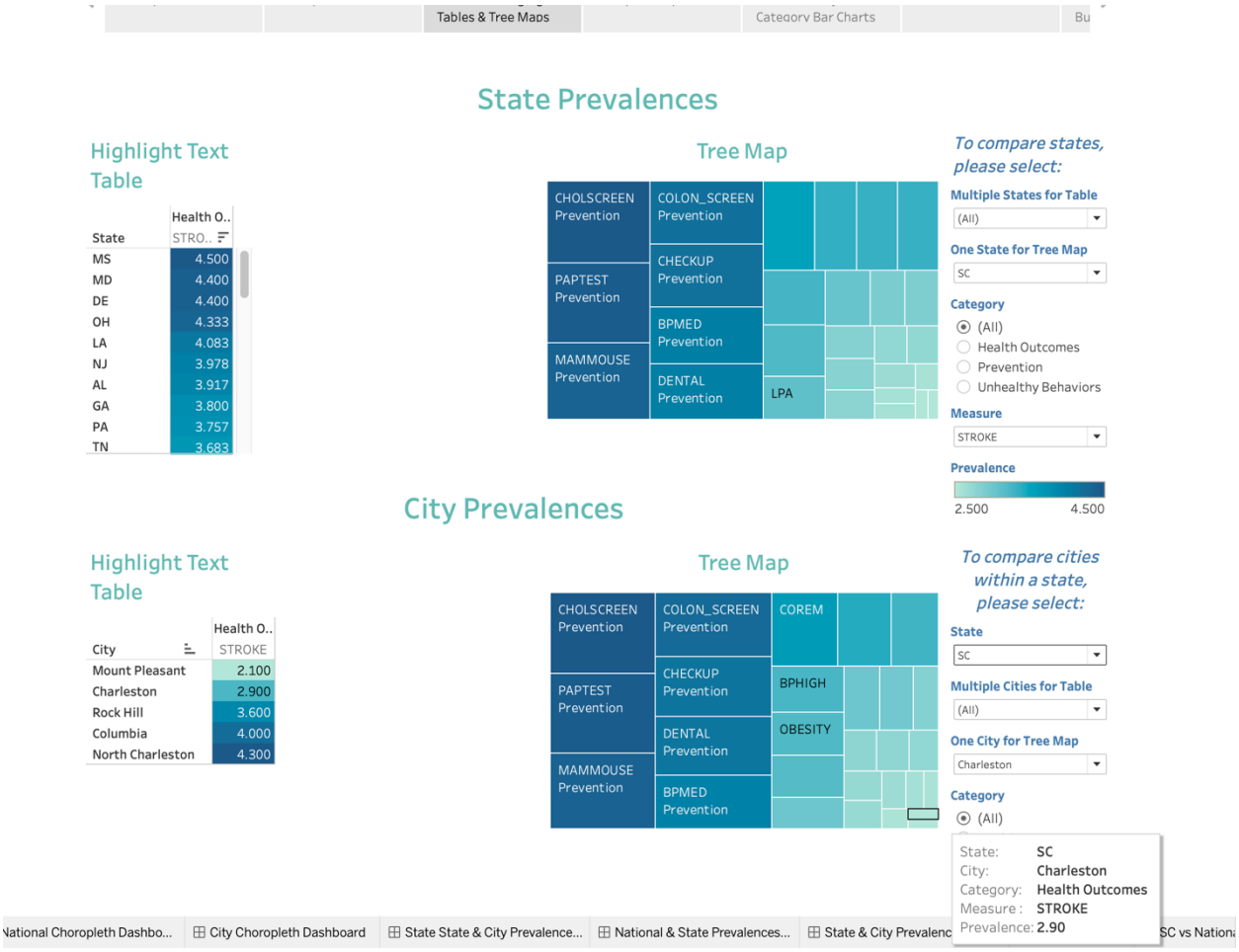


FIGURE 11. State stroke prevalence highlight table in upper-left quadrant of the dashboard.

City Differences in Stroke Prevalence

Although stroke prevalences can be displayed on the city choropleth map, trends and patterns are more difficult to recognize immediately (Figure 12). Users can still interact with the map and gain relevant information through that process, however. It may be more useful to include a new type of visualization which pulls top 5 cities with the highest prevalence for each measure in the data set.

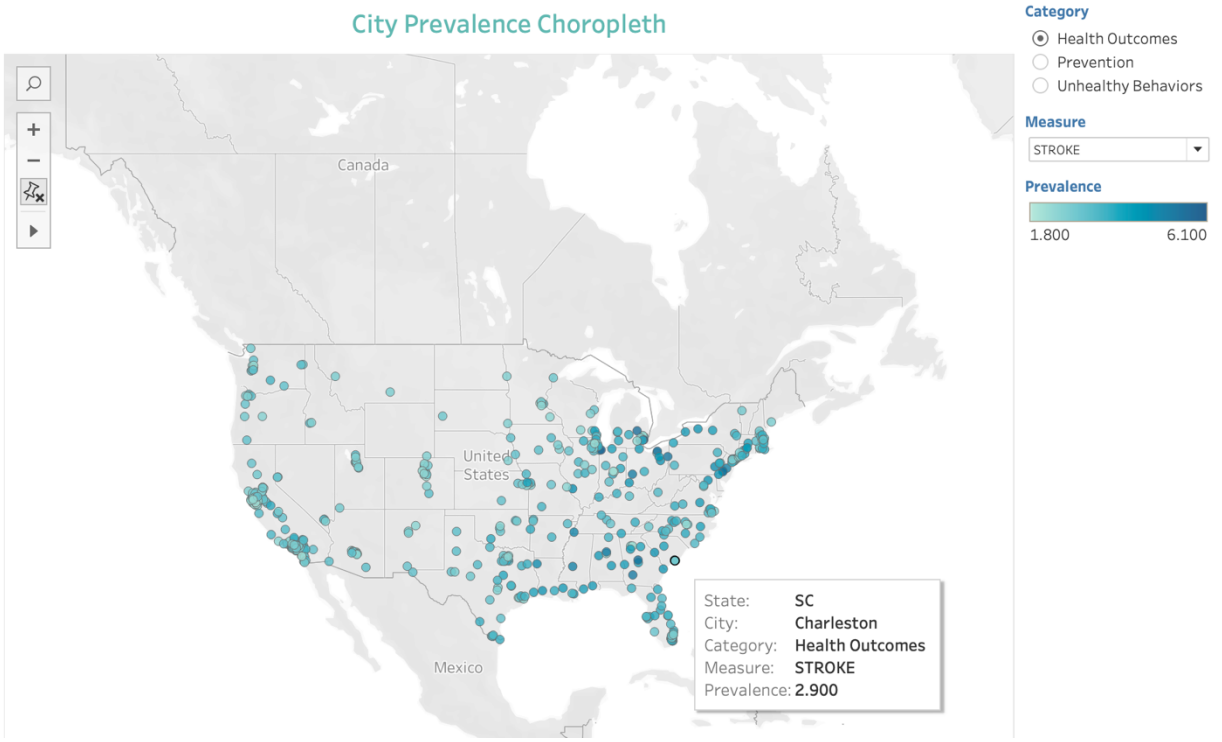


FIGURE 12. City stroke prevalences across the U.S. Data selected for Charleston, SC.

The city prevalence choropleth map is the only visualization included that allows the user to view all cities at once. As there are 500 cities in the dataset, this is the easiest way to provide a space efficient mechanism for easy data decoding. It should be noted, however, that the other visualizations discussed below are useful when comparing cities within a state.

South Carolina Stroke Prevalence

Using the state choropleth map, users can see that South Carolina has a stroke prevalence of 3.380 (Figure 12). South Carolina is located in the south-east region of the U.S. This region has a particularly high density of high stroke prevalence.

Using the South Carolina tree map, we see that stroke is in the bottom-left quadrant of the map (Figure 13). The stroke prevalence rectangle is very small and lightly shaded, indicating that it is one of the least significant health outcomes for the state.

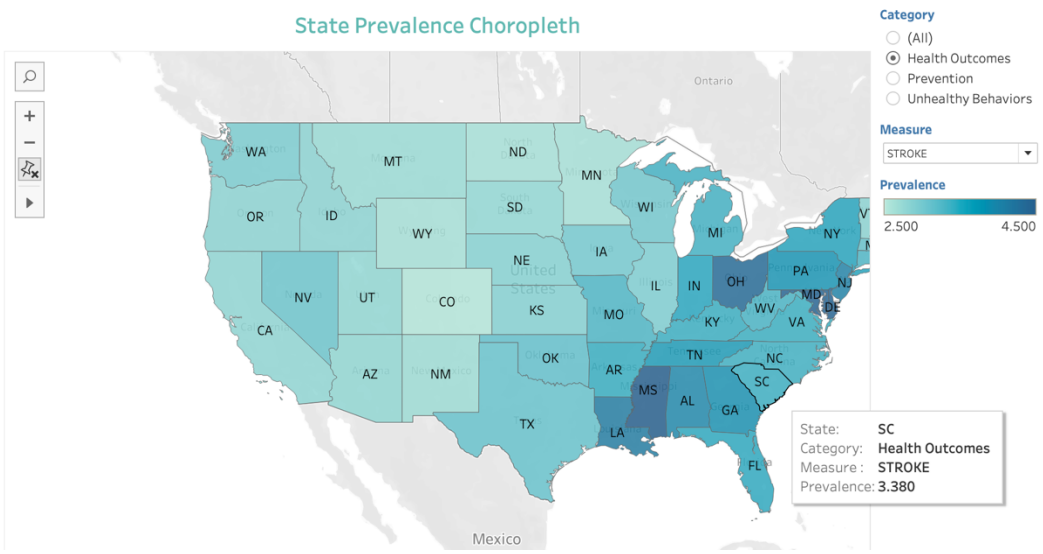


FIGURE 12. State stroke prevalence across the U.S.. Data selected for South Carolina.

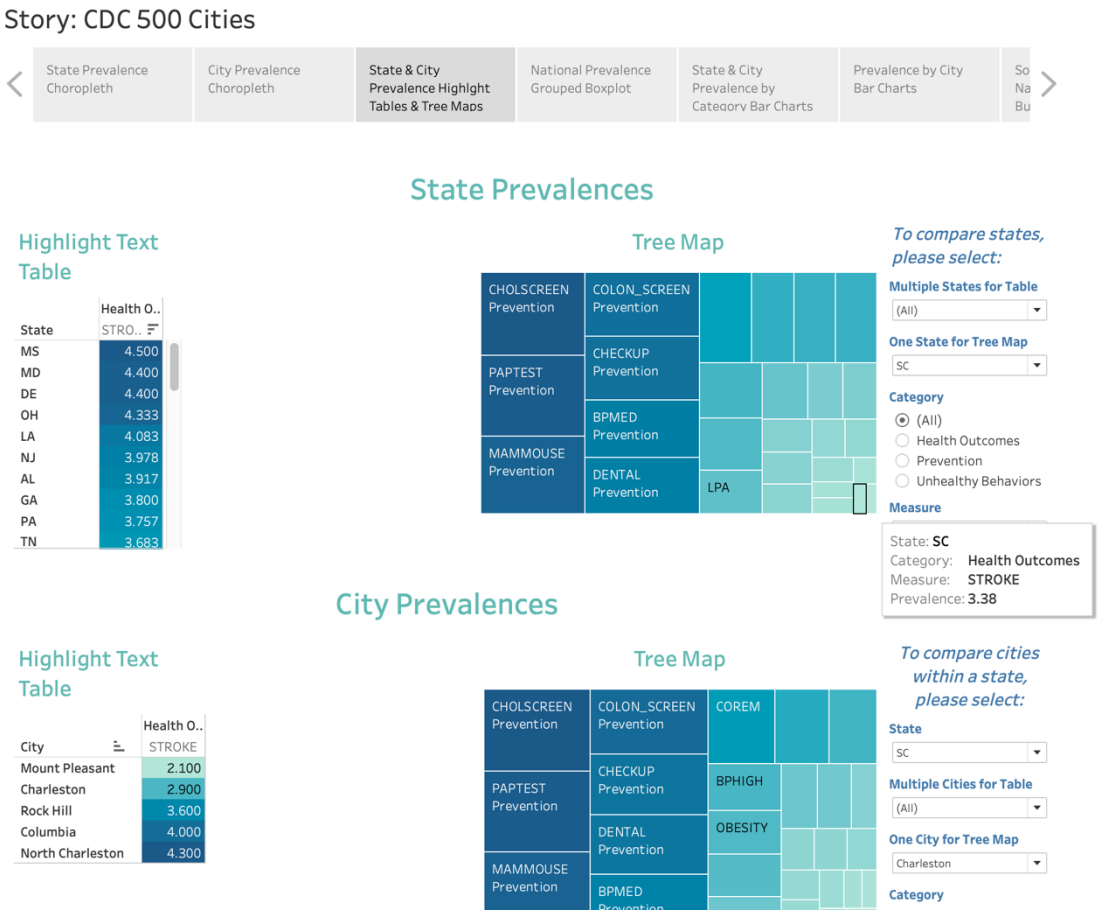


FIGURE 13. South Carolina tree map in the upper-right quadrant of the dashboard. Data selected for stroke prevalence.

The state prevalence grouped vertical bar chart allows a user to identify the South Carolina stroke prevalence (3.38%) and compare it with the prevalences of other health outcome variables (Figure 14). It is observed that stroke prevalence is among the smallest of the vertical height bars presented, indicating low stroke occurrences in the state. Among health outcomes, high blood pressure, seems to have the highest prevalence in the state (35.28%) and kidney disease has the lowest (3.06%). Compared to the other category measures, stroke remains among the lowest of the vertical height bars.

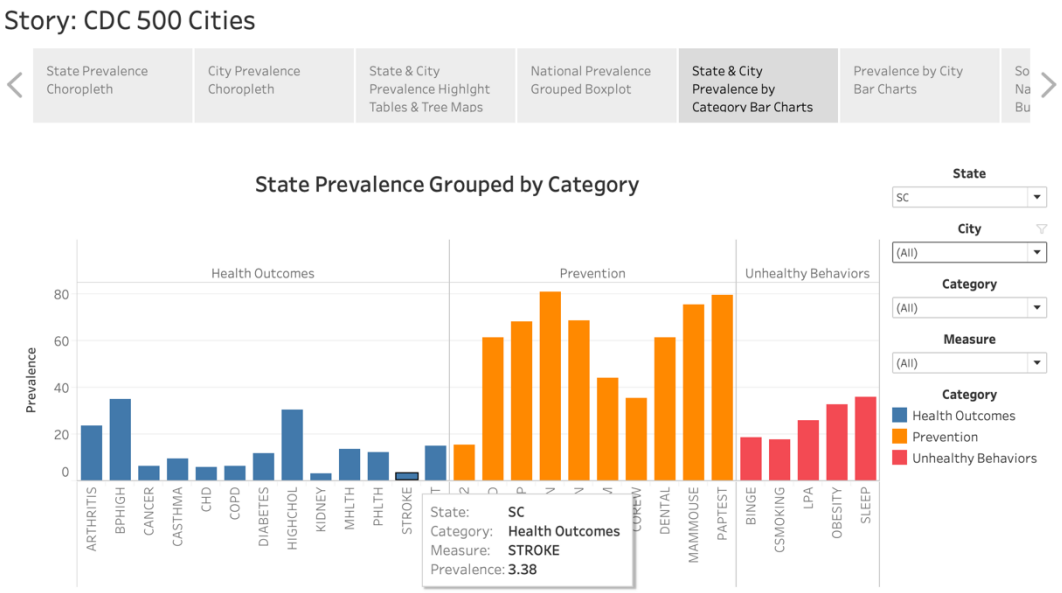


FIGURE 14. South Carolina prevalences grouped by category. Data selected for stroke prevalence.

The butterfly chart allows users to compare South Carolina prevalences to national prevalences (Figure 7). Although not exactly identical, stroke prevalence is similar both nationally and within the state of South Carolina. This same trend appears with all 28 measures examined.

Stroke Prevalence in the Cities of South Carolina

Trends and patterns across cities within South Carolina are difficult to observe using the city prevalence choropleth (Figure 12). However, they are easier to observe using the city highlight text table (Figure 13, bottom left quadrant). This visualization allows the user to see all included cities in a list. Cities are listed in rows and each measure is presented in its own column. For South Carolina, information is presented in descending order for: Mount Pleasant, Charleston, Rock Hill, Columbia, and North Charleston. It is unusual that Charleston was separated into two categories ("Charleston" and "North Charleston"). It is observed that Mount Pleasant has the lowest stroke prevalence (2.100%), whereas North Charleston has the highest (4.300%). This is roughly double the rate of stroke, which is surprising given the close proximity of the two cities.

Users can also use this dashboard (Figure 13) to view a tree map of one user-selected city within the state. Here, all categories of North Charleston measures are represented. Stroke prevalence is shown in the bottom right of the map, with a very light color, indicating a low prevalence. In fact, stroke prevalence remains in the bottom right quadrant of the tree map even when the user toggles the category selection from "All" to "Health Outcomes." Of all represented categories for North Charleston, colon screening, pap test, and mammogram use have the highest prevalences. Interestingly, these are all prevention measures. The highest health outcomes represented for North Charleston include high blood pressure and high cholesterol.

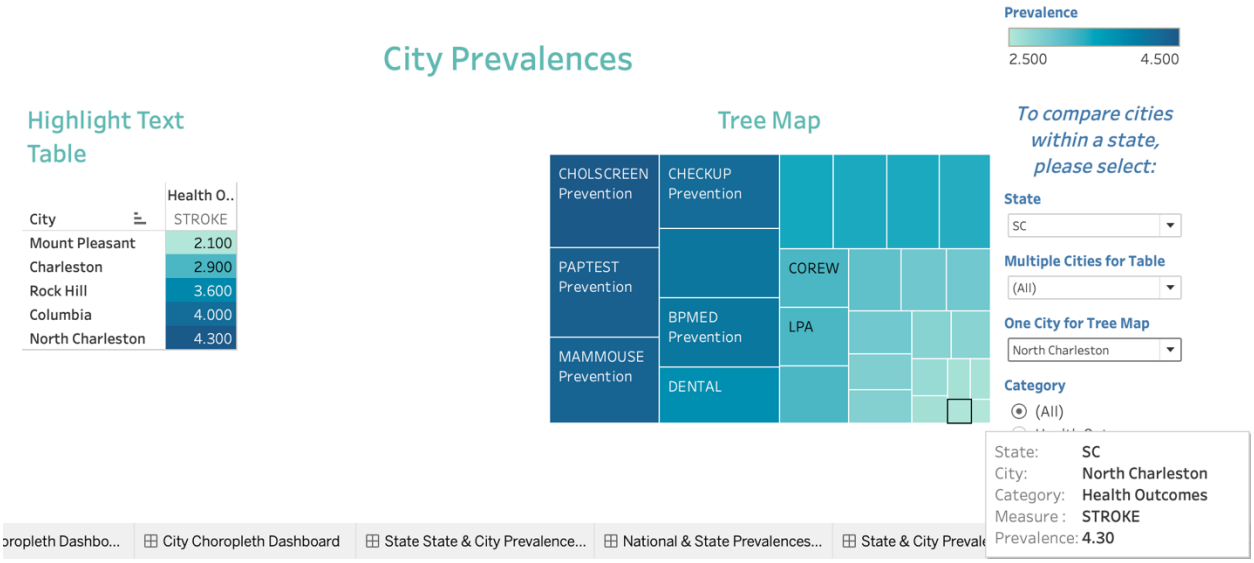


FIGURE 13. City highlight text table in bottom left quadrant showing five cities (Mount Pleasant, Charleston, Rock Hill, Columbia, and North Charleston) in the state of South Carolina. Data values presented here indicate stroke prevalence. City tree map in bottom right quadrant showing one city (North Charleston) in the state of South Carolina. All categories are represented and stroke prevalence is selected, as shown in the bottom right of the tree map.

The City Prevalence Grouped by Category vertical bar chart shows the same five cities in rows but also displays vertical bars for each chronic disease measure (Figure 14). It is observed that stroke is among the lowest prevalences for each city, and across each category. This trend mimics that observed in the state-wide data. It is observed that the stroke prevalence is 2.90 in Charleston, 4.0 in Columbia, 2.10 in Mount Pleasant, 4.30 in North Charleston, and 3.60 in Rock Hill.

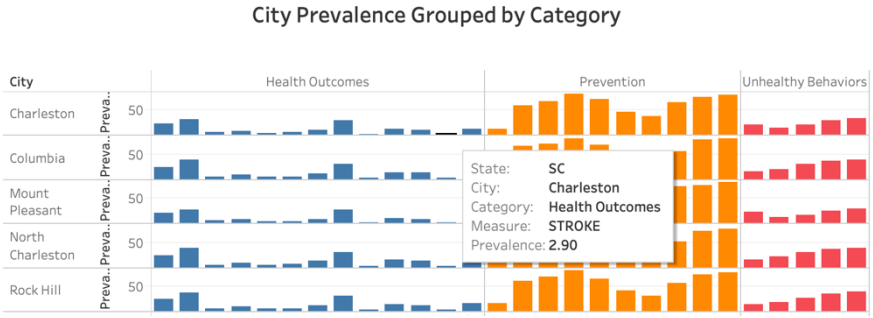


FIGURE 14. City prevalence grouped by category chart displaying all included cities in the state of South Carolina. Current data selection for stroke prevalence in Charleston.

Rather than examining the prevalence of each measure across one city, users can interact with Figure 6 to explore the prevalence of one measure across multiple cities. The same pattern is observed here: stroke prevalences are low for each city, Mount Pleasant has the lowest prevalence, North Charleston has the highest prevalence, stroke prevalence is among the lowest categories and measures for each city.

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