

## ## Project: CDC 500 Cities - Public Health Visualization Enhancement

### Project Overview

This project involved a comprehensive analysis of the CDC's "500 Cities" public health dataset. The primary objective was to leverage Power BI to transform complex raw data into a series of clear, interactive visualizations. The goal was to identify and communicate significant trends in health metrics across the United States, making the insights accessible to a broader audience.

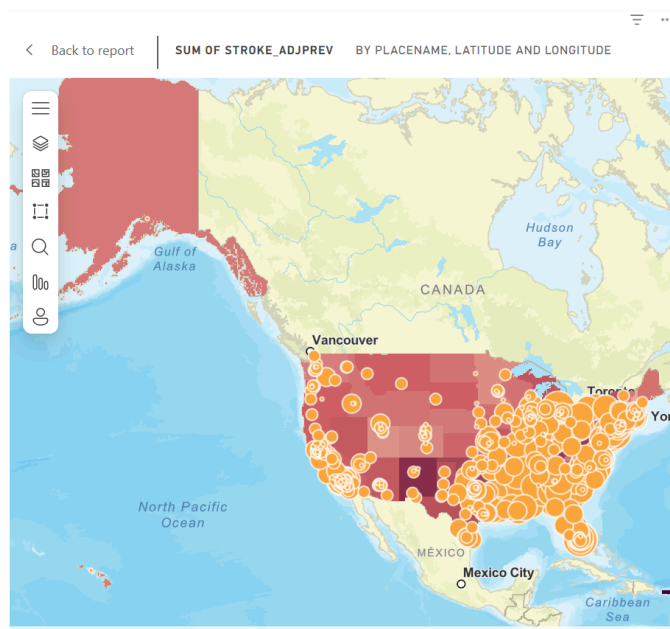
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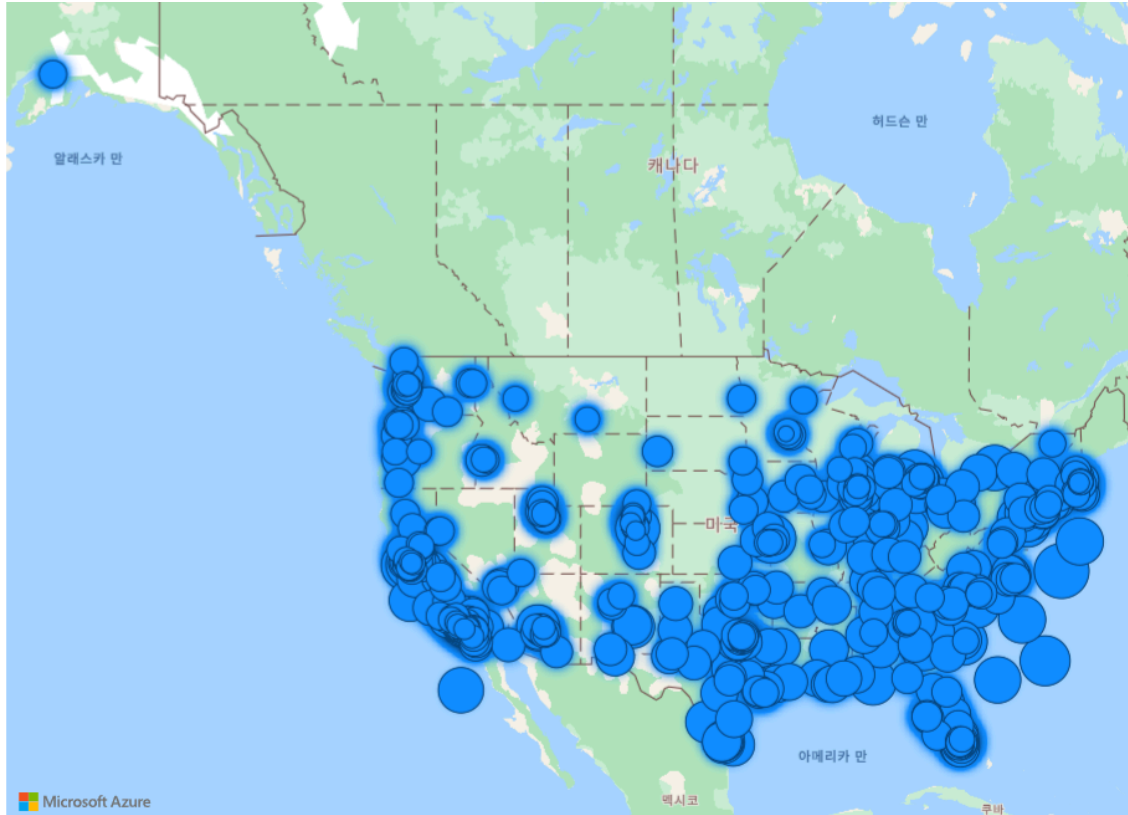
### Key Visualizations & Analytical Process

The analysis focused on creating geospatial maps to visualize prevalence rates and scatter plots to uncover relationships between different health indicators.

### Geospatial Analysis of Stroke Prevalence

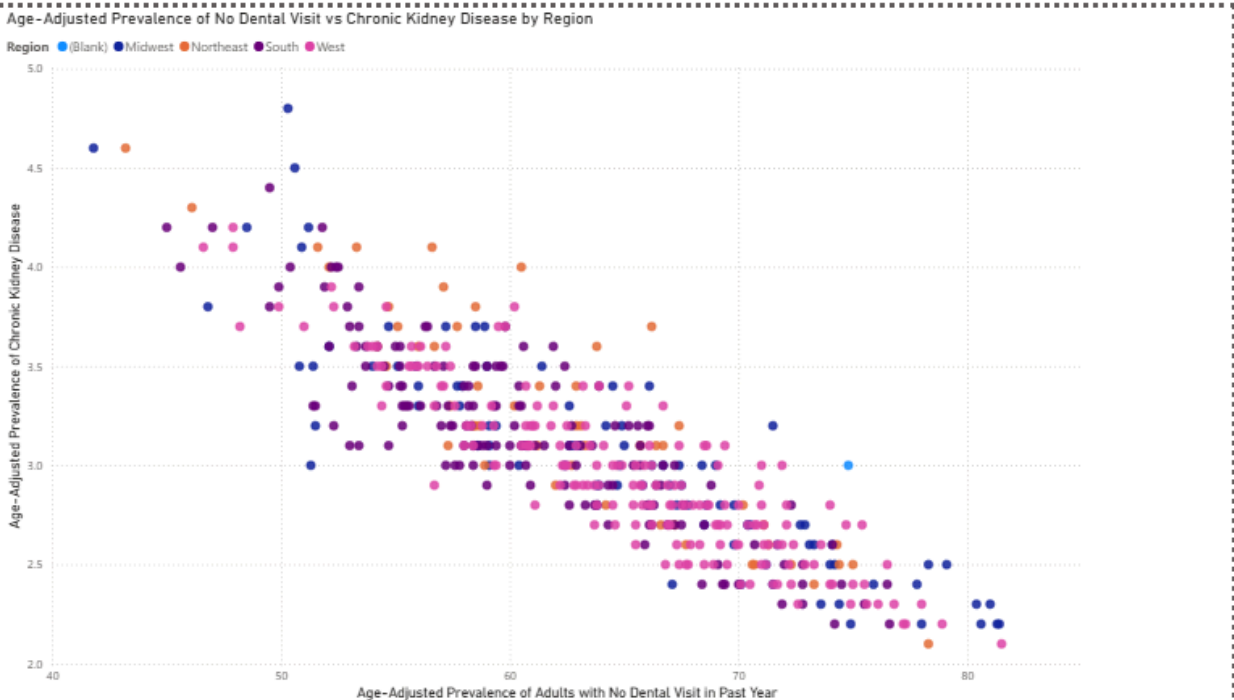
To understand the geographic distribution of health issues, an ARC GIS map was developed to visualize the adjusted prevalence of strokes. The bubble sizes on the map directly correspond to the prevalence rates in each location, providing an immediate visual reference for areas with higher public health concerns.





### Correlation Analysis: Lifestyle and Chronic Disease

To explore potential drivers behind health outcomes, a scatter plot was created. The scatter plot examined the correlation between the prevalence of adults with no dental visit in the past year and the prevalence of chronic kidney disease. This analysis aimed to uncover indirect relationships between preventative health habits and chronic conditions.



## Interpretation of the scatter plots

Across all regions, we can see that the more people visited the dentist, the lower their risk of developing chronic kidney disease. We know that getting checked by the dentist and having chronic kidney disease don't have a direct relationship. However, if people like to visit the dentist often, they might care more about their health than those who don't visit regularly. Therefore, they might be able to prevent Chronic Disease well.

## Visualization Enhancement: From Data Clutter to Clear Insight

The initial scatter plot, while scientifically sound, suffered from **visual clutter** and **limited interactivity**, making the core data insights difficult for a user to extract quickly. The goal of the redesign was to convert this dense statistical view into an accessible and dynamic analytical tool.

## Key Improvements in the Redesigned Visualization

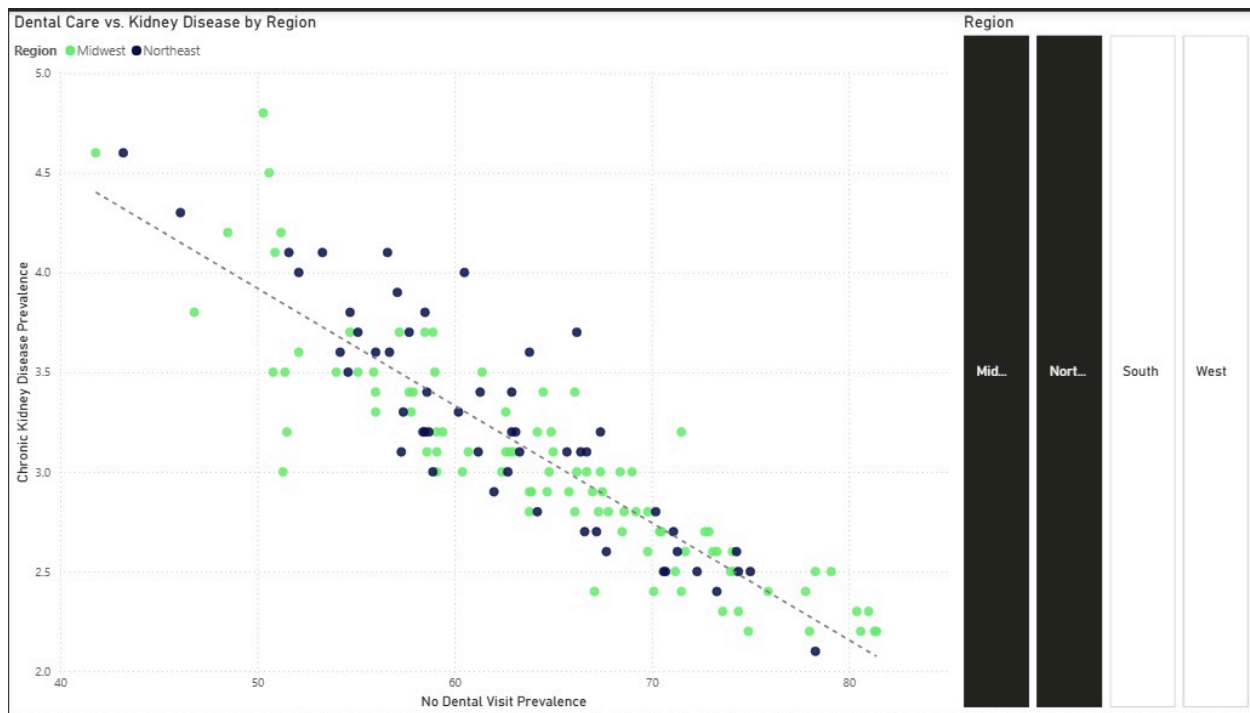
The transformation centered on three key areas: **clarity**, **conciseness**, and **interactivity**.

Enhanced Clarity and Professionalism (Labeling): The original long and technical title (Age-Adjusted Prevalence of No Dental Visit vs Chronic Kidney Disease by Region) was condensed to the clear and action-oriented **"Dental Care vs. Kidney Disease by Region."** Similarly, the overly descriptive axis labels were streamlined to professional, concise forms: **"No Dental Visit Prevalence (Age-Adj.)"** and **"CKD Prevalence (Age-Adj.)"**. This eliminated unnecessary jargon while retaining the critical statistical detail that the data is age-adjusted.

Focus on Core Insight (Trend Line): The original chart required manual interpretation to deduce the relationship between the two variables. We introduced a **dashed trend line** to visually confirm the primary finding: a clear **negative correlation**. This line immediately guides the user to the conclusion that as the rate of no dental visits increases, the prevalence of chronic kidney disease tends to decrease, thus transforming the visual from a data dump into a statement of insight.

Empowering User Exploration (Interactivity): The static nature of the initial chart, compounded by overlapping data points, made regional comparison nearly impossible.

To solve this, a **Tile Slicer** was integrated. This dynamic filtering mechanism allows users to **isolate specific regions (Midwest, Northeast, etc.)** with a single click. This feature not only reduces visual density but also fulfills the project requirement of enabling users to actively ask and answer questions about the data, elevating the visualization from a mere chart to a sophisticated analytical dashboard element. This comprehensive approach successfully converted the challenging initial visualization into an **insight-driven, interactive tool**, significantly boosting its analytical effectiveness and user experience.



## Key Finding & Interpretation

The most significant insight was discovered through the analysis of dental visits and chronic kidney disease.

Across all regions, a clear trend emerged: **as the percentage of adults with no recent dental visit increased, the prevalence of chronic kidney disease also tended to be higher.** While not a direct causal link, this strong correlation suggests that regular preventative care habits, such as dental visits, are indicative of broader positive health behaviors that may reduce the risk of chronic diseases. This finding highlights the importance of promoting general preventative health to address a wide range of conditions.

## Conclusion

This project successfully demonstrated the power of Power BI as an end-to-end tool for transforming complex datasets into an interactive and insightful analytical report. By identifying a key correlation between preventative care habits and chronic disease, the analysis provided a valuable, data-driven insight that could inform public health strategies.