[Website](https://jhippler.github.io/DS4200FinalProject/visualization5.html)

**Visualization Design Documentation**

*General Design Principles*

Across all visualizations, we maintained:

1. A consistent blue/orange color scheme for Alzheimer's diagnosis status
2. Clear titles and descriptive labels
3. Appropriate scales and axes
4. Interactive elements that enhance exploration
5. Complementary visualization types that address different analytical needs
6. Responsive design for various screen sizes

**Visualization 1: Global Prevalence Map**

**Design Approach:** We implemented a choropleth map using D3.js to show the global distribution of Alzheimer's diagnosis rates. This visualization type was chosen because:

* It provides an immediate geographic understanding of prevalence variations
* Color intensity effectively communicates the severity of diagnosis rates
* Interactive tooltips allow users to see precise percentages for each country

The blue color scale was chosen for consistency with our project's color theme, with darker shades indicating higher prevalence rates.

**Visualization 2: Age Distribution by Diagnosis with Country Filter**

**Design Approach:** We created a violin plot with a dropdown filter using Vega-Lite to show age distributions by Alzheimer's diagnosis status. Key design decisions include:

* Violin plots effectively show the full distribution shape rather than just averages
* The country filter (with "All" option) allows users to compare distributions across regions
* The side-by-side comparison of diagnosed vs. non-diagnosed populations clearly shows the age shift
* Consistent color coding (blue for non-diagnosed, orange for diagnosed) maintains visual continuity

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**Visualization 3: Categorical Risk Factor Analysis**

**Design Approach:** We used normalized stacked bar charts with an interactive category selector to analyze lifestyle and environmental factors. Design considerations include:

* Normalized bars (100% scale) allow fair comparison across categories with different sample sizes
* The dropdown selector enables exploration of multiple risk factors in a single visualization
* Preserving consistent coloring (blue/orange) helps maintain visual connection across visualizations
* Categories with three levels (High/Medium/Low or similar) are clearly distinguished

Special attention was given to highlighting Social Engagement Level and Depression Level, as these psychological factors show important patterns in relation to Alzheimer's risk.

**Visualization 4: Risk Factors Across North American Countries**

**Design Approach:** We designed a scatter plot with connecting lines to compare risk factor prevalence across countries. Key design elements include:

* Points with different colors for each risk factor type enhance differentiation
* Connecting lines emphasize trends across countries for the same risk factor
* Consistent Y-axis scaling enables accurate cross-factor comparisons
* Clear labeling and legend help identify patterns in prevalence rates

This approach effectively highlights that family history and hypertension are consistently the most prevalent risk factors (~30%) across all three countries.

**Visualization 5: Alzheimer's Family History Risk Across Age Groups**

**Design Approach:** We created a dual-panel visualization combining a bar chart and stacked bar chart with an interactive age group filter. Key design decisions include:

* Left panel shows overall Alzheimer's rates by age group to establish the baseline relationship
* Right panel uses stacked bars to show the family history dimension for a selected age group
* Interactive age group selector (with "All" option) enables targeted analysis
* The "All" option was added to show the aggregate effect of family history across all age groups
* Consistent color scheme maintains visual coherence with other visualizations