Visual Design Basics & Tableau.

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Q2. Staffing needs across each of the individual states:

The project aims to prepare for the upcoming influenza season by determining when and how many temporary medical staff to allocate to hospitals across the United States**.**

- What question(s) or project goal(s) relate to this spatial aspect? Did you address any of them in your previous analysis?
    - In the previous analysis, we concluded that individuals aged 65 and older are at a higher risk of mortality from influenza infection due to their vulnerability. However, the data did not specify which states faced a higher risk, an important aspect to explore in the next phase of our analysis.

- List at least one way in which visualizing the data by states might help.
    - Visualizing the data by states can help identify geographic regions where individuals aged 65 and older are at a higher risk of influenza-related mortality, potentially revealing patterns of vulnerability. This insight could assist in predicting which areas may experience higher demand, hence when and how many temporary medical staff to allocate to hospitals across the United States, thereby improving outcomes for this age group and lowering influenza death rates overall.

- What would you be visualizing (or comparing) across each state?
    - Influenza death rates among those aged 65 and older, compared across states. A ***choropleth map*** would be ideal to visualize these data, shading states based on mortality rates to quickly show which states are more severely impacted, allowing for a clear visual comparison across geographic regions of the stakeholders to see. Here is why it would be effective:
        - **Geographic Comparison**: A choropleth map provides an intuitive way to compare the death rates between states, highlighting patterns or clusters of higher risk areas.
        - **Colour Gradients**: By using a gradient colour scale (e.g., from light to dark), the map can easily convey varying levels of influenza mortality, helping users identify states with higher death rates at a glance.
        - **Data Segmentation**: The map can be further segmented to show death rates specifically for the 65+ age group, ensuring the visualization remains focused on the most vulnerable population.

This approach would effectively communicate the geographic distribution of influenza mortality, enabling better decision-making and resource allocation for vulnerable populations.

Q3. Further Analysis:

- Does influenza peak in every state during the same month? Is there a way to show a time component visually?
    - We can begin by scatter plots to analyse the seasonality of influenza in each state, identifying the peak periods for influenza activity across different regions. Following this, bar charts can be employed to visualize the number of states experiencing peak influenza in each month.
    - **Scatter plots** showing the correlation between:
        - Elderly population size vs. influenza deaths across various states
        - Total population vs. influenza deaths across various states
    - **Bar charts** displaying:
        - Total influenza deaths across different states
        - Age distribution in states and corresponding influenza death rates

These insights will support more efficient allocation of medical resources, ensuring they are directed to states when they are most needed throughout the flu season. This spatial-temporal relationship could influence staffing needs at different times in different states.

(NB. I have found another way this could be done, using a choropleth map with time sliders, which in the future with the correct skill set and program maybe another option to visibly represent this data for stakeholders on this project). (Choropleth maps with time sliders using Plotly | by Lucas Bromerchenkel | Medium)

- How to double-check that the sample size is sufficient to support the strength of the conclusions?
    - I need to ensure the data includes sufficient representation from all geographic regions and adequately captures individuals aged 65 and older. This requires:
        - Verify that each state's data includes a large enough sample of individuals aged 65+ to allow for valid comparisons. If certain states have much smaller populations or fewer data points, this could introduce bias.
        - Look for potential sampling biases (e.g., are rural areas or smaller states underrepresented?).
    - **Box Plots (Mortality Rates Across the U.S.)** to show the confidence intervals for the mortality rates in each state. This allows me to visually assess whether the sample sizes in each state are large enough to provide reliable estimates. Narrower intervals indicate greater confidence in the mortality rate estimates, while wider intervals may suggest inadequate sample size.

    By taking these steps, I can ensure that your sample size is large enough and that my findings about geographic variations in influenza-related mortality among individuals aged 65 and older are robust and well-supported.