

## **Physical Health and Alzheimer's Mortality Rate**

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### **Summary:**

This project aims to analyze the relationship between Alzheimer's mortality rates and the physical health factors of a state, while also analyzing the population's age. We will analyze data from the National Centers for Environmental Information, the Center for Disease Control and Prevention, and the United States Census Bureau.

Our first hypothesis is that there is a negative relationship between the percentage of people who bike or walk to work and Alzheimer's mortality rate. The larger the proportion of people who bike or walk to work, the lower the Alzheimer's mortality rate will be. We predict that the magnitude of the effect will be stronger for states that are more physically active. To test this, we will run an interaction model.

Another hypothesis is that there is a positive relationship between age and Alzheimer's mortality rate. The higher the proportion of a population that is 65 years or older, the higher we predict the Alzheimer's mortality rate to be. We also hypothesize that there is a positive relationship between obesity and Alzheimer's mortality rate. The higher the proportion of the population that is obese, the higher we predict the Alzheimer's mortality rate to be.

### **Findings:**

According to the data, we found a main effect of biking/walking to work, a main effect of physical activity, and a strong crossover interaction. Among the more physically active states, the larger proportion of citizens who bike or walk to work is only slightly associated with a lower Alzheimer's mortality rate. Among the states that are less physically active, there was a much larger effect (the larger proportion of citizens who bike/walk to work is strongly associated with a lower Alzheimer's mortality rate). Therefore, our hypothesis was incorrect.

Contrary to our hypothesis, we did not find a relationship between the proportion of a population that is 65 years or older and Alzheimer's mortality rate. After looking into the codebook, we found that the Alzheimer's data set is not only adjusted for population but also age. The data removed the effect of age, so comparing age to Alzheimer's mortality rate will no longer yield significant results. Consistent with our hypothesis, we did find a positive relationship between obesity levels of a state and Alzheimer's mortality rate.

### **Concerns:**

Several possible confounds could account for the relationship between the percentage of people who bike or walk to work and Alzheimer's mortality rates. The percentage of people who bike or walk to work did not include data on age, but it is assumed that the majority of people are under age 65. We argue it is the decisions one makes when younger that determine future health outcomes. Therefore, we have reason to believe the association between the percentage of people who bike or walk to work and Alzheimer's mortality rates is valid. That is, those states with a

high percentage of bikers or walkers most likely were the same when those 65 and older were of working age. Physical activity data for people 65 and older should be looked at to determine how these rates are related to Alzheimer's mortality rates. Moreover, factors like access to healthcare and household size could have a stronger relationship with Alzheimer's disease mortality. To address the concern about confounds, we added another data set on healthcare expenditures per capita by state. This data set reported the average amounts spent on healthcare per person, calculated by dividing the aggregate estimates by the population of the region. We found a strong negative relationship between the amount of money spent and Alzheimer's mortality rate. This allowed us to see what factors other than physical health could explain the differences in Alzheimer's mortality rates by state.

### Citations

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