ALZHEIMER'S DISEASE

A STUDY OF MORTALITY IN TEXAS COUNTIES
INTRODUCTION

• More than five million Americans have Alzheimer’s disease.

• The total annual cost of Alzheimer’s and other dementias adds up to more than $148 billion.

• Alzheimer’s disease poses an increasing burden on the health care industry due to the number of people at risk and nature of the disease.
WHAT IS ALZHEIMER’S

• A degenerative disease that slowly alters the brain.

• The disease is apparent when the brain tissue exhibits:
  • Neurofibrillary Tangles
  • Neurotic Plaques
  • Senile Plaques (Brack, 1997)

• Early in the course of the disease unrelated conditions tend to be the cause of death. (Hoyert, 1997)
RISK PREDICTORS

POPULATION

HUMAN ECOLOGY FRAMEWORK

HABITAT
- Water Quality
- Air Quality

BEHAVIOR
- Occupation
- Head Injury

Age
Gender
Ethnicity
RESEARCH HYPOTHESIS

• *Hypothesis 1:* Alzheimer’s mortality rates will be influenced by dissolved aluminum concentration in the groundwater. Counties with high levels of Aluminum will have high mortality rates.

• *Hypothesis 2:* Race/ethnicity is a predictor of Alzheimer’s mortality. Counties with higher minority populations have higher mortality rates.

• *Hypothesis 3:* Gender is a predictor for Alzheimer’s mortality. Females have higher Alzheimer’s mortality rates than males.

• *Hypothesis 4:* Alzheimer’s mortality rates are increasing through time.
METHODOLOGY & DATA SOURCES

- Mortality data - State Department of Health
- Demographic data - Census
- Aluminum data - Texas Groundwater Database
- Aluminum levels summarized by county
AGE ADJUSTED ALZHEIMER'S DEATH RATE
1999-2003
Deaths per 100,000, Age adjusted to 2000 standard
RESULTS & FINDINGS

ALUMINUM

- No correlation was found between aluminum rate in ground water and Alzheimer’s mortality. 
  \[(r=0.071, p=0.264)\]
RESULTS & FINDINGS

RACE/ETHNICITY

• A negative correlation was found between percent Hispanic and Alzheimer’s mortality ($r=-.127$, $p=.043$)

• A positive correlation was found for percent White and Alzheimer’s mortality ($r=.132$, $p=.036$)

• There was a positive correlation between percent Black and Alzheimer’s disease ($r=.187$, $p=.003$)
RESULTS & FINDINGS

GENDER

• Results of Wilcoxon test found that women had higher Alzheimer’s death rates. 
  \( z=9.064, p=.000 \)

• Average woman’s Alzheimer’s mortality rate was 24.8.

• Average man’s Alzheimer’s mortality rate was 16.5.
FEMALE AGE ADJUSTED ALZHEIMER'S DEATH RATE
1999-2003

Legend
- 0.0 - 28.0
- 28.1 - 56.0
- 56.1 - 84.0
- 84.1 - 112.0

Miles
0 50 100 200
RESULTS & FINDINGS

TIME

• Results of Wilcoxon test found that Alzheimer’s mortality rates increased through every time period.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>p-Value</th>
<th>z-Value</th>
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ALZHEIMER'S AGE ADJUSTED DEATH RATES
1985-1989

Legend
- 72.1 - 90.0
- 54.1 - 72.0
- 36.1 - 54.0
- 18.1 - 36.0
- 0.0 - 18.0

Miles
0 50 100 200
CONCLUSION

• Alzheimer’s mortality rates appear to be influenced by race/ethnicity, gender, and time.
• Groundwater data was not ideal for the study.