

Presentation on Seasonal Variation in Aging-Associated Health Measures: Alzheimer's and Mental Health Patterns

Group Members:

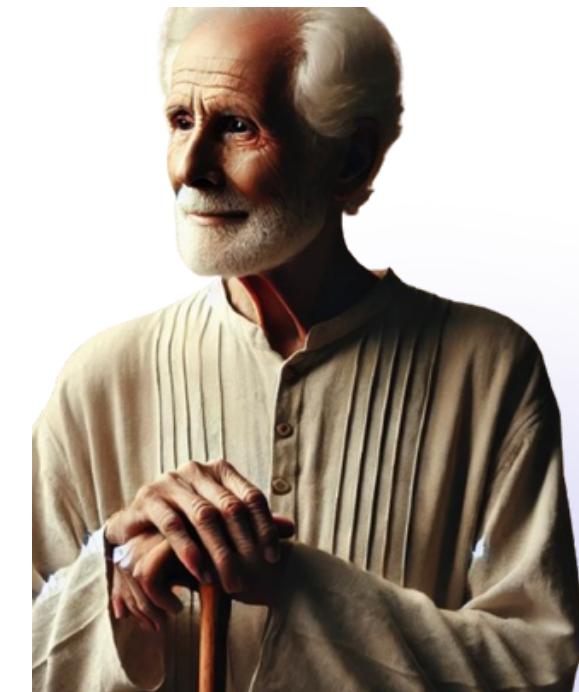
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Introduction

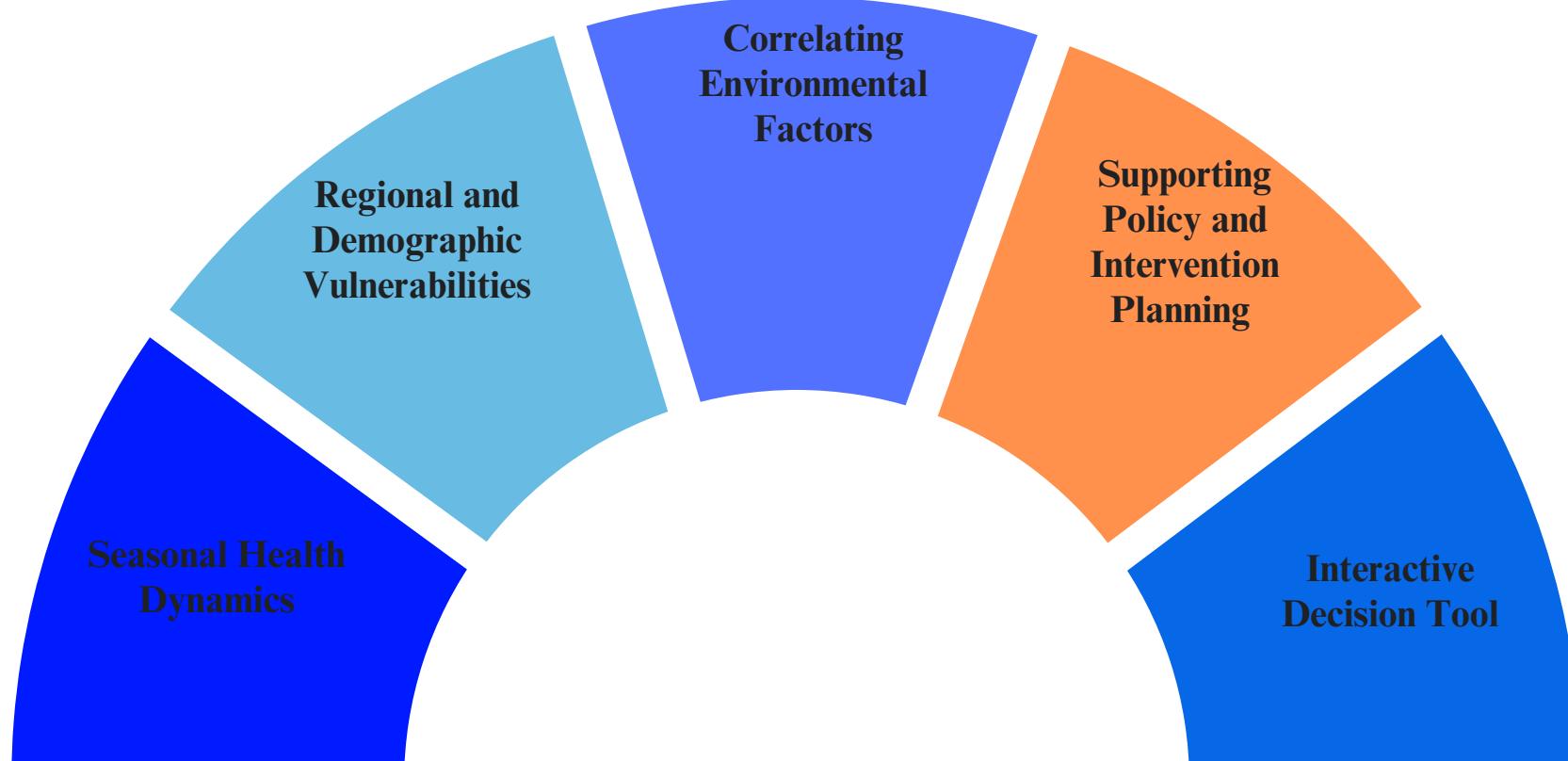
Addressing the urgent issues of an aging population by revealing insights from age-associated health indicators, with an emphasis on mental health and Alzheimer's

Key Points:

Healthcare systems face issues as the population ages.

Mental health and Alzheimer's disease are important areas of focus.

Objectives:



Problem Statement

Mental health issues and Alzheimer's disease are critically increasing in the aging population. According to recent research, these circumstances could change seasonally depending on demographic and environmental factors.

“Develop a scalable data-driven solution to analyze the impact of demographic and seasonal factors on trends in mental health and Alzheimer's disease among older populations, using advanced ETL, predictive modeling, and visualization techniques.”



Healthcare



Policy Making



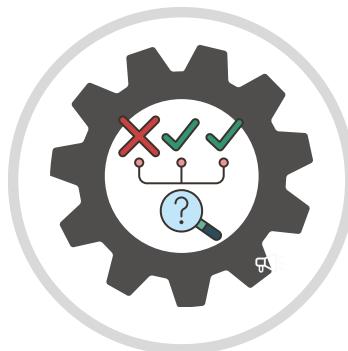
Resource Allocation

Methodology - Using Python



Data Collection

Alzheimer's Disease
and Healthy Aging
Data (data.gov)



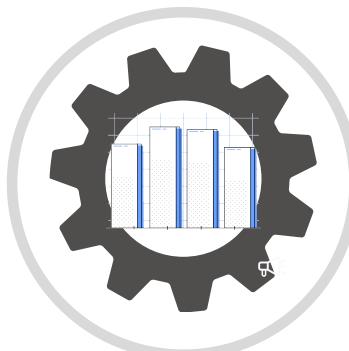
Exploratory Data Analysis

- Univariate Analysis
- Bivariate Analysis
- Multivariate Analysis



Data Preprocessing

- Cleaning
- Deduplication
- Standardization



Visualization Modeling

- Developed Power BI dashboards to display spatial, demographic, and Geographic trends interactively



Insights and Deployment

- Highlighted health disparities and health patterns for decision-making

Methodology - Power Bi

Data Integration

- Imported datasets from CSV files and online repositories
- Established relationships using common fields like location and year

Data Cleaning

- Renamed columns and filtered irrelevant records
- Removed duplicates and treated missing values using Power Query Editor

Transformation & Preparation

- Created calculated fields for seasonal and year-over-year analyses
- Used DAX for custom measures and advanced analytics

Dashboard Design

- Line Graphs: Seasonal trends in Alzheimer's and mental health
- Heatmaps: Geographic health disparities
- Bar Charts: Demographic comparisons by gender and race
- Drill-through Pages: In-depth analysis by regions or years.
- Interactive Filters: Enabled refinement by year, location, and demographics

Testing & Validation

- Ensured data accuracy, usability, and device compatibility.
- Delivered actionable insights for policymakers and healthcare providers.

Dashboard



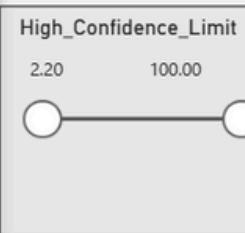
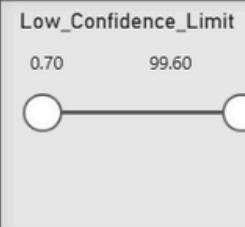
Dashboard



Seasonal Variation in Aging-Associated Health Measures: Alzheimer's and Mental Health Patterns



States	Sum of Data_Value
Alabama	51,106.20
Alaska	42,822.00
Arizona	73,376.80
Arkansas	46,785.10
California	71,679.80
Colorado	55,341.20
Connecticut	64,443.70
Delaware	50,913.60
District of Columbia	43,810.40
Florida	66,058.60
Georgia	58,487.90
Guam	29,632.90
Hawaii	64,452.50
Idaho	31,770.70
Illinois	56,171.10
Indiana	55,420.10
Iowa	34,676.20
Kansas	63,808.20
Kentucky	46,182.80
Louisiana	49,099.60
Maine	31,541.70
Maryland	74,347.00
Massachusetts	57,430.50
Total	2,738,391.30

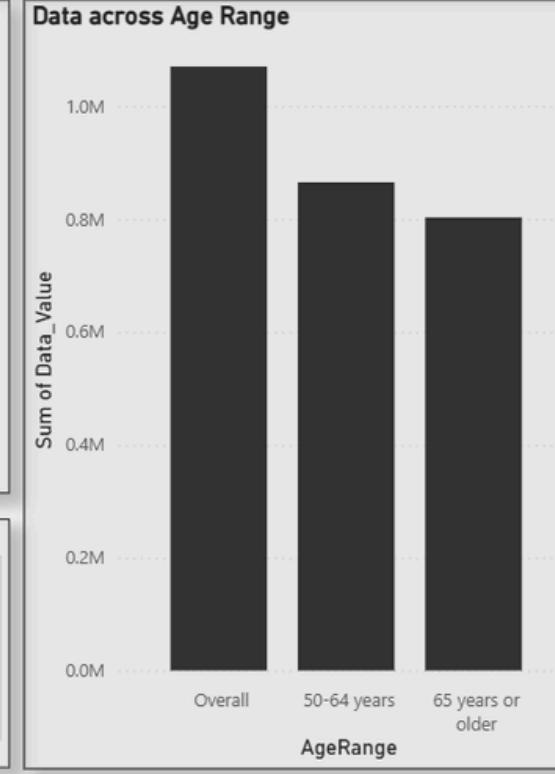


- AgeRange
- 50-64 years
 - 65 years or older
 - Overall

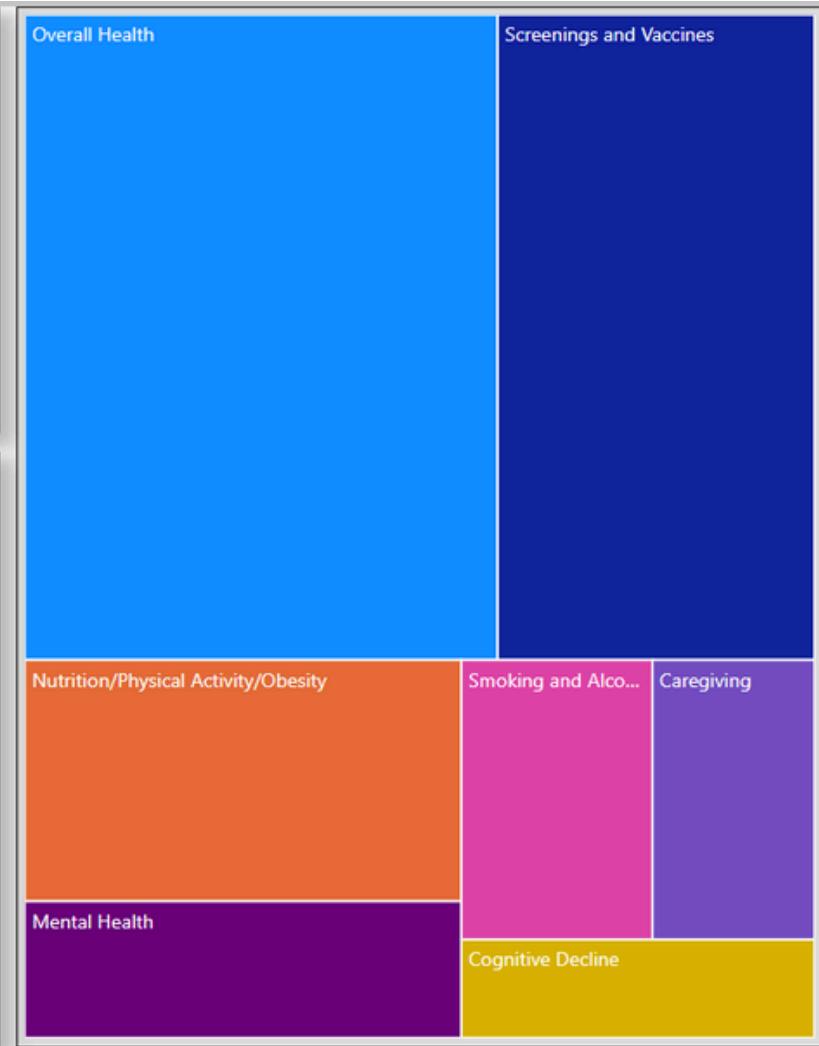
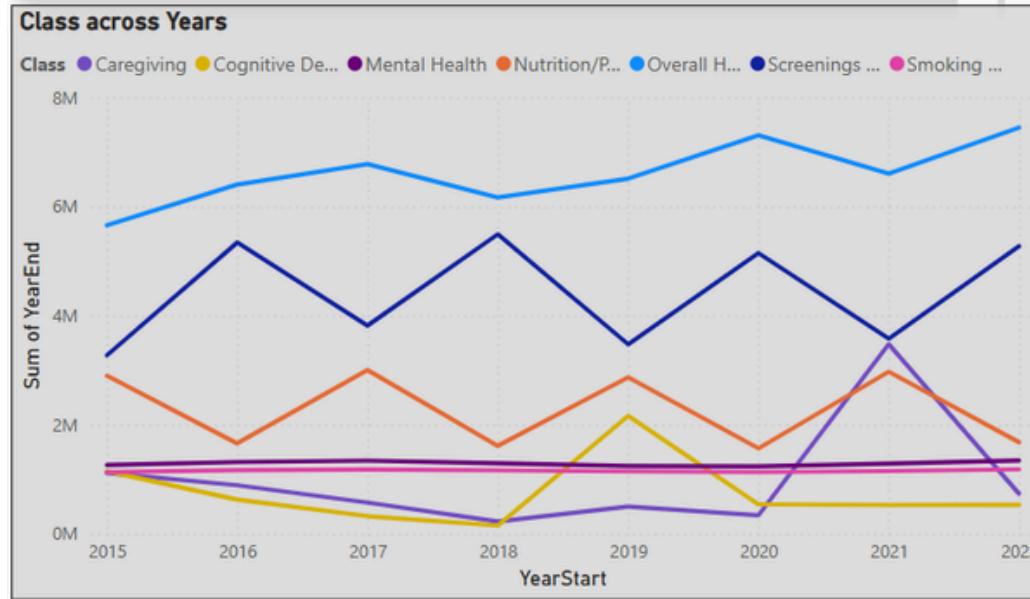
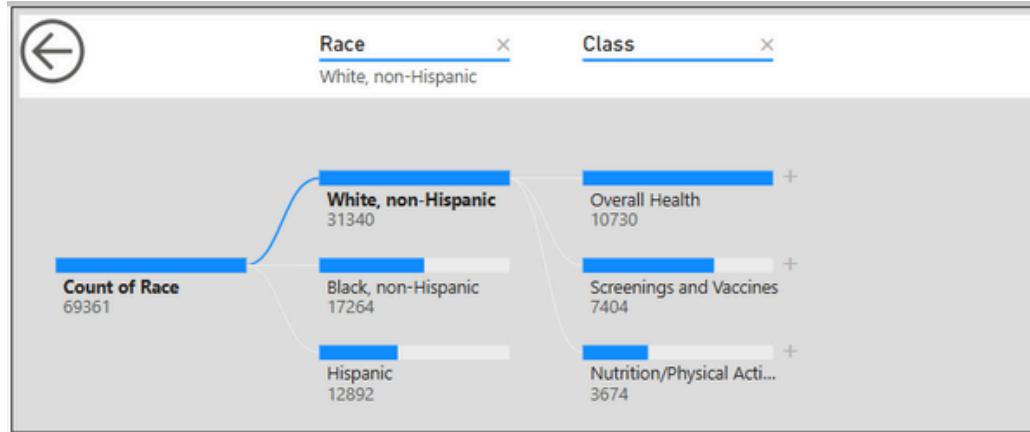
Race

Native Hispanic
Black Islander
Alaskan Asian
Am Pacific
White

- Race
- Asian/Pacific Islander
 - Black, non-Hispanic
 - Hispanic
 - Native Am/Alaskan Native
 - White, non-Hispanic



Dashboard

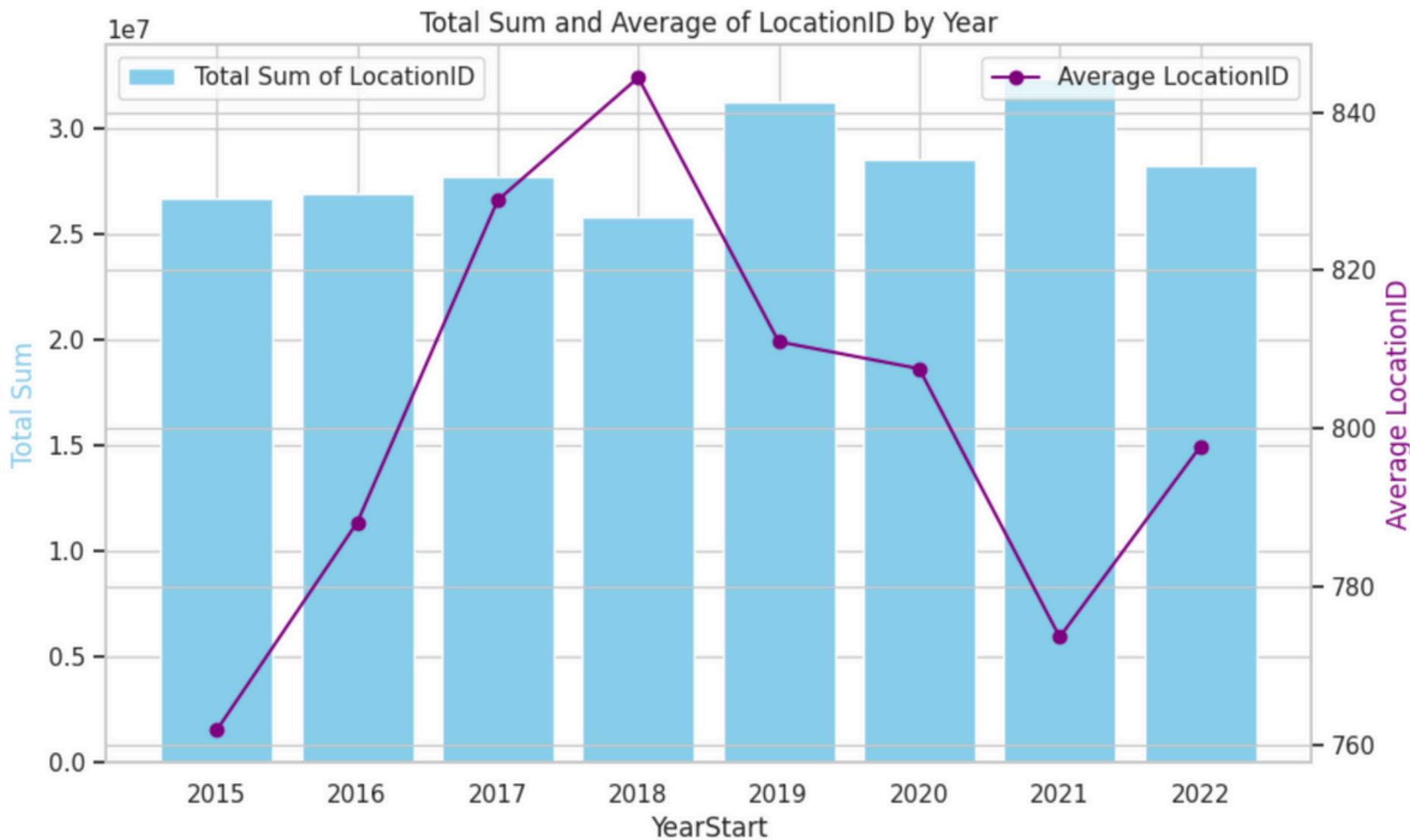


Dashboard

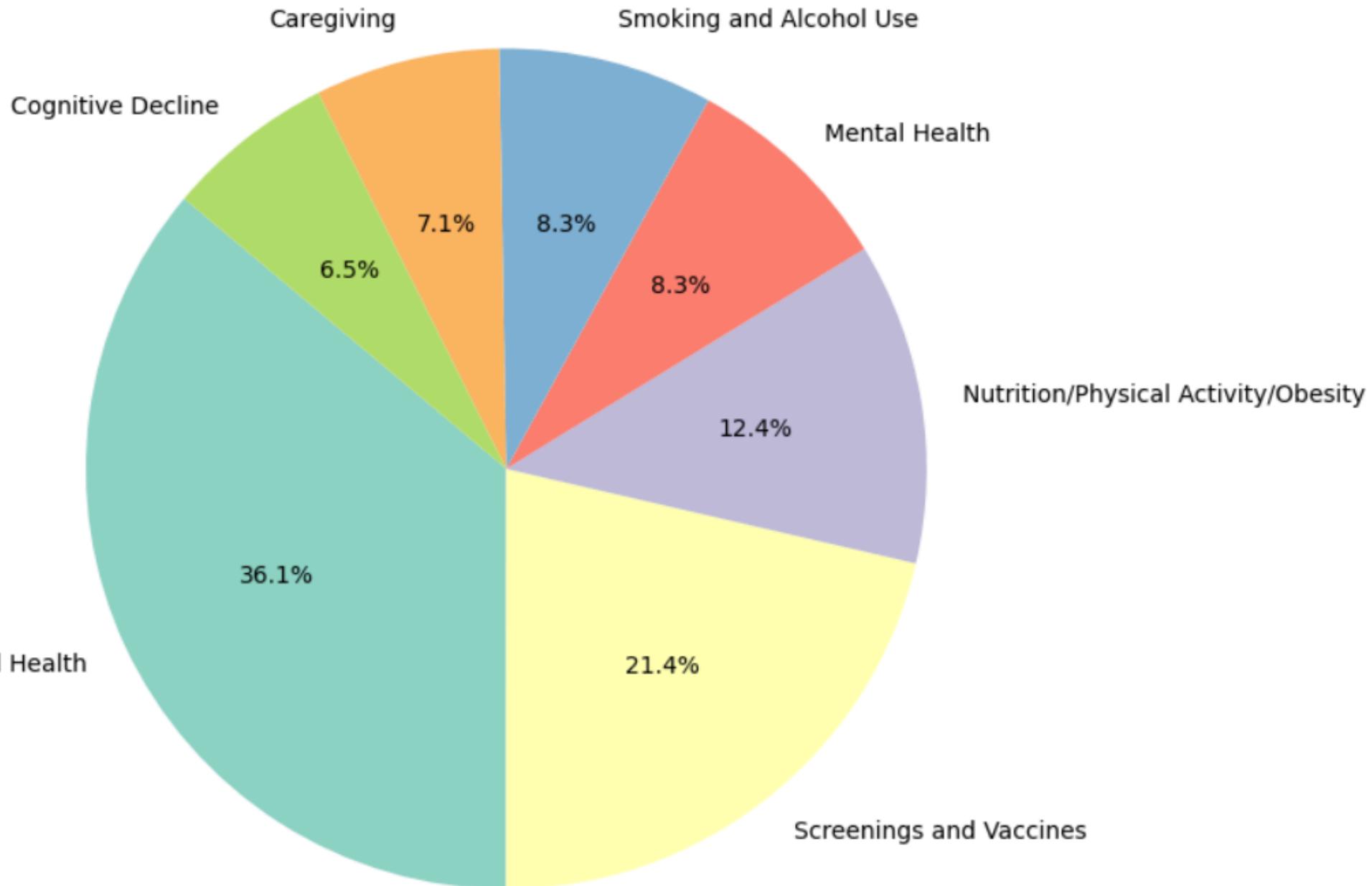
Class		Count of AgeRange	
Caregiving		3890	
Duration of caregiving among older adults		724	
Expect to provide care for someone in the next two years		846	
Intensity of caregiving among older adults		686	
Provide care for a friend or family member in past month		1021	
Provide care for someone with cognitive impairment within the past month		613	
Cognitive Decline		2977	
Functional difficulties associated with subjective cognitive decline or memory loss among older adults		666	
Need assistance with day-to-day activities because of subjective cognitive decline or memory loss		661	
Subjective cognitive decline or memory loss among older adults		974	
Talked with health care professional about subjective cognitive decline or memory loss		676	
Mental Health		5115	
Frequent mental distress		2391	
Lifetime diagnosis of depression		2724	
Nutrition/Physical Activity/Obesity		9049	
Eating 2 or more fruits daily		1517	
Eating 3 or more vegetables daily		1186	
No leisure-time physical activity within past month		3218	
Obesity		3128	
Overall Health		26205	
Arthritis among older adults		2474	
Disability status, including sensory or mobility limitations		2871	
Fair or poor health among older adults with arthritis		1816	
Fall with injury within last year		832	
Oral health: tooth retention		1718	
Physically unhealthy days (mean number of days)		3072	
Prevalence of sufficient sleep		1725	
Recent activity limitations in past month		2581	
Self-rated health (fair to poor health)		3173	
Self-rated health (good to excellent health)		3415	
Severe joint pain among older adults with arthritis		1179	
Taking medication for high blood pressure		1349	
Comorbid Conditions		17542	
Total		69361	
Cholesterol checked in past 5 years			
87.92		96.14	
Low_Confidence_Limit		High_Confidence_Limit	
Taking medication for high blood pressure			
81.20		91.61	
Low_Confidence_Limit		High_Confidence_Limit	
Mammogram within past 2 years			
66.41		80.44	
Low_Confidence_Limit		High_Confidence_Limit	
Self-rated health (good to excellent health)			
64.66		78.90	
Low_Confidence_Limit		High_Confidence_Limit	
Oral health: tooth retention			
63.86		77.88	
Low_Confidence_Limit		High_Confidence_Limit	
Duration of caregiving among older adults			
63.59		79.68	
Low_Confidence_Limit		High_Confidence_Limit	
Diabetes screening within past 3 years			
61.51		76.02	
Low_Confidence_Limit		High_Confidence_Limit	
Colorectal cancer screening			
60.00		74.93	
Low_Confidence_Limit		High_Confidence_Limit	
Prevalence of sufficient sleep			



Chart



Proportion of Health Classes in California



Innovation in Data Interpretation



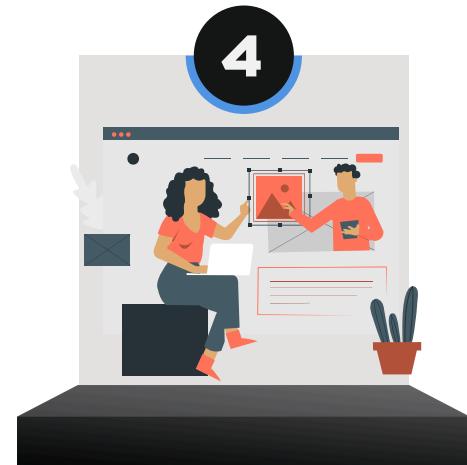
Demographic Analysis



Interactive Power BI
Dashboard



Data-Driven Policy
Support

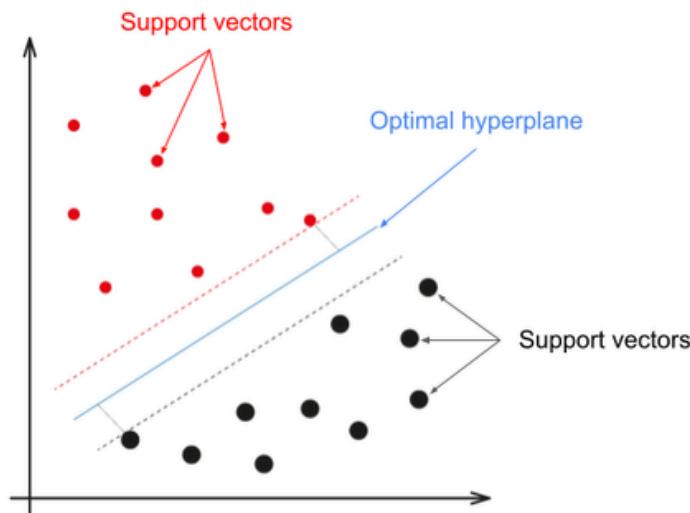


Engaging Visual
Storytelling

Model Selection

Support Vector Machine (SVM)

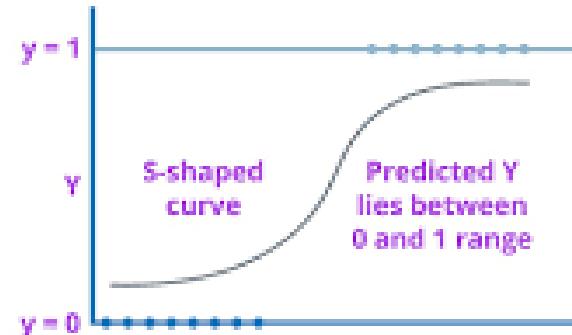
It handles a variety of demographic and health characteristics and is efficient in the binary categorization of high-risk situations in health data. To capture intricate relationships between information like location, health topic, and confidence bounds, C and kernel settings were adjusted.



Logistic Regression

Ideal for forecasting high-risk status across demographic groupings, this model is straightforward and easy to understand. Creates probability ratings based on variables such as age group, health topic, and confidence intervals, giving information about the chance that people or groups are high-risk.

Logistic Regression



Expected Outcomes & Benefits

- Seasonal Trends Regional and Demographic Insights Found
- Based on their health and demographic characteristics, divide people into high-risk and low-risk categories to assist identify the populations that most require focused treatments.
- Better Planning for Policies
- Interactive and easily accessible decision-making tool

Next Steps and Future Impact

- Verification with Healthcare Participants
- Extend Dataset for More Comprehensive Analysis
- Create a Framework for Reporting

Future Impact

- Improved Healthcare Planning's Impact
- Knowledgeable Policy Choices
- Better Results for Community Health

Open for Q/A session

