

Excessive Alcohol Use

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Problem Introduction



What is our business problem?

Excessive alcohol use can have severe effects on an individual's health.

To further understand the problem:

- Analyze the effects of excessive alcohol consumption in the U.S.
- Understand the health influences and risks
- Understand how different groups and demographics' drinking habits differ



Why is it worth further research?

Purpose

- Public health purposes
- Education
- Healthcare support



How could we solve this problem?

Create a dashboard that

- Shows the relationships between demographics and drinking habits
- Visualizes overall drinking habits in the US
- Shows causes of death due to excessive drinking



Datasets Used





Datasets

- 1) **US Binge Drinking Frequency by State - CDC**
<https://www.cdc.gov/alcohol/data-stats.htm>
- 2) **Alcohol Drinking Status Among Adults (Age 18+) in the US by Selected Characteristics, 2015 to 2019 - CDC**
<https://www.cdc.gov/nchs/nhis/SHS/tables.htm>
- 3) **US Mortality Rates by Cause (Filtered for Alcohol-Related Causes), 1990 to 2020 - IHME**
<https://ghdx.healthdata.org/record/ihme-data/united-states-life-expectancy-by-state-white-black-hispanic-race-ethnicity-1990-2019>



Methods Used





Methods

- Dashboard - R and RShiny
- Data Analysis
 - Data cleaning/tidying
 - Exploratory Analysis
 - Relationships between variables
 - Understand the data tables
 - Visualizations
 - Static and Interactive
 - Clear and Digestible

Functions - Create Visualizations

```
library(ggplot2)
library(maps)
library(RcolorBrewer)
library(dplyr)
library(plotly)

create_fresh_map <- function(data, var) {
  # Get US map data
  us_map <- map_data("state")

  # Assign a color ID to each state
  unique_states <- unique(us_map$region)
  color_ids <- 1:length(unique_states)
  names(color_ids) <- unique_states
  us_map$color_id <- color_ids[us_map$region]

  # Create a color palette with 50 colors
  pastel_colors <- colorRampPalette(brewer.pal(9, "Pastel1"))(50)

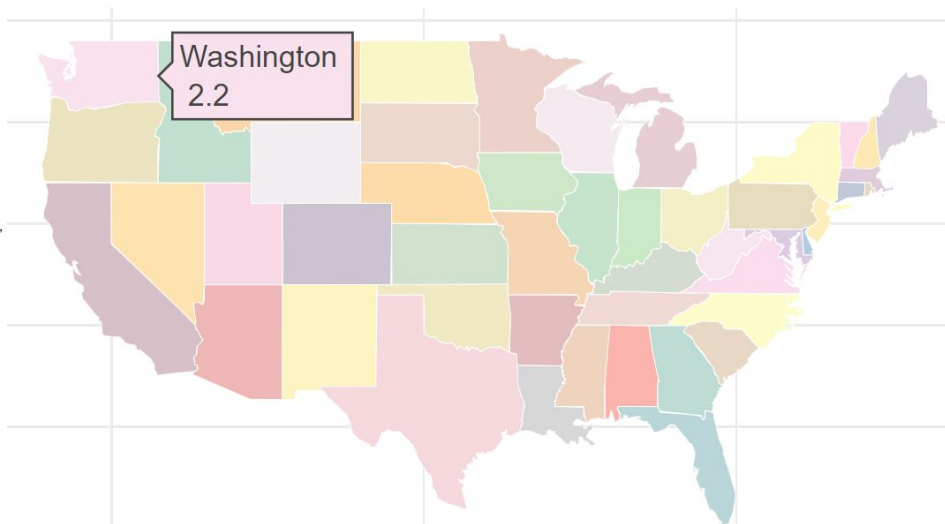
  # Merge map data and input data
  data$region <- tolower(data$state)
  merged_data <- us_map %>%
    left_join(data, by = "region")

  # Create a map of the United States
  p <- ggplot() +
    geom_polygon(data = merged_data, aes(x = long, y = lat, group = group, fill = as.factor(color_id), text = paste( state, "<br>",
    coord_fixed(1.3)) +
    scale_fill_manual(values = pastel_colors) +
    theme_minimal() +
    theme(
      legend.position = "none",
      plot.title = element_text(hjust = 0.5)
    ) +
    labs(x = "Latitude", y = "Longitude")

  # Using plotly to make graphs interactive
  p <- ggplotly(p, tooltip = "text")
  # Set the height of the plot to be 2 times the default height
  # p <- p %>% layout(height = 2 * 450) # 450 is the default height, you can adjust the number based on your requirement

  return(p)
}

# Example usage
#data <- alcoholByStategallons
#var <- "alcoholConsumptiongallons"
#create_fresh_map(data, var)
```



UI - Categories & Server

```
##### First tab content#####
```

```
tabitem(tabname = "maps",
  h2("U.S. Drinking Habits overall"),
  # alcohol gallon consumption map Tab Box
  fluidRow(
    box(
      title = "Gallons Consumed per Person per Year", status = "danger", solidHeader = TRUE,
      collapsible = TRUE,
      tabBox(
        title = NULL,
        # The id lets us use input$tabset4 on the server to find the current tab
        id = "tabset4", height = "250px", width = 1100,
        #New Map
        tabPanel("Interactive US Drinking Map", " ",
          plotlyoutput("interactive_map_home", height = 300, width = 1100)
        ),
        #Map function
        tabPanel("Static US Drinking Map", " ",
          plotoutput("usPlot", height = 300, width = 1100)
        )
      ),
      width = 1100,
      style = "margin-bottom: 250px;", # Move the next row down by 250px
    ),
    # region pie chart
    fluidRow(
      column(width = 6,
        box(
          title = "Drinking Habits by U.S. Region", status = "warning", solidHeader = TRUE,
          selectInput("category", "Select a category: Region", c("west", "Midwest", "south", "northeast")),
          collapsible = TRUE,
          plotoutput("regionChart", height = 300, width = 400),
          width = 600
        )
      ),
      column(width = 6,
        box(
          title = "U.S. Regional Frequency by Drinking Habit", status = "warning", solidHeader = TRUE,
          selectInput("category8", "Select a category: Drinking Frequency", c("Lifetime Abstainer", "Former Infreq", "Current Infreq")),
          collapsible = TRUE,
          plotoutput("regionChart2", height = 300, width = 400),
          width = 600
        )
      )
    ),
    # First page end
  ),
```

```
##### Server #####
```

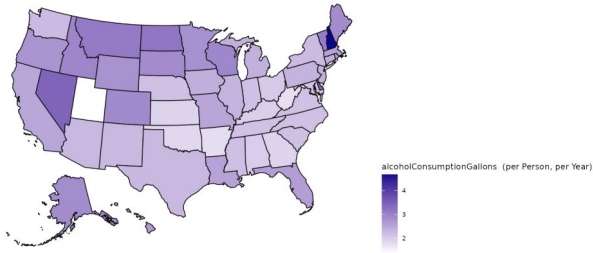
```
# Define server input and output
server <- function(input, output, session) {
  # Home page
  output$interactive_map_home <- renderPlotly({
    data <- alcoholByStateGallons
    var <- "alcoholconsumptiongallons"
    create_fresh_map(data, var)
  })
  #Second page alcohol consumption map tab box 4
  output$tabset4Selected <- renderText({
    input$tabset4
  })
  # First page alcohol consumption map
  output$usPlot <- renderPlot({
    choropleth_map(alcoholByStateGallons, "alcoholconsumptiongallons")
  })
  # First page region pie chart
  output$regionChart <- renderPlot({
    createPieChart(subsetRegion, input$category)
  })
  # First page region bar chart
  output$regionChart2 <- renderPlot({
    regionHabs(input$category8)
  })
  #Second page education status tabbox
  output$tabset1Selected <- renderText({
    input$tabset1
  })
  # Second page education status bar chart2
  output$educationChart <- renderPlot({
    chooseSub(subsetEdu, input$category1)
  })
  # Second page education bar chart2
  output$education2 <- renderPlot({
    eduHabs(input$category7)
  })
  #Second page Family income tab box 2
  output$tabset2Selected <- renderText({
    input$tabset2
  })
}
```

UI - Categories & Server

Gallons Consumed per Person per Year

Interactive US Drinking Map

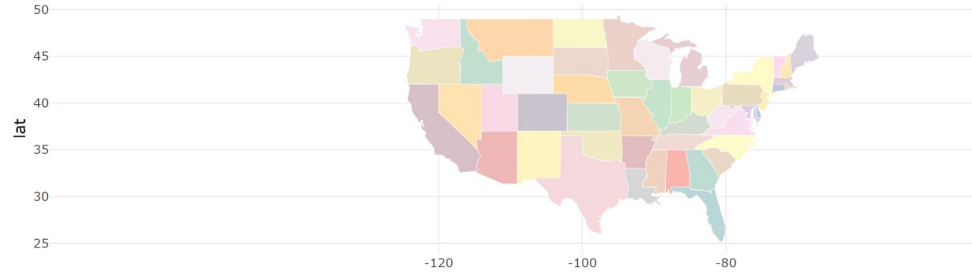
Static US Drinking Map



Gallons Consumed per Person per Year

Interactive US Drinking Map

Static US Drinking Map

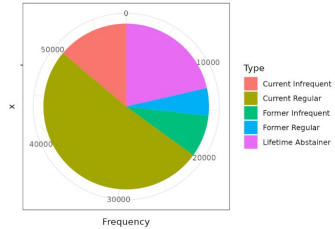


Drinking Habits by U.S. Region

Select a category: Region

West

Pie Chart of West

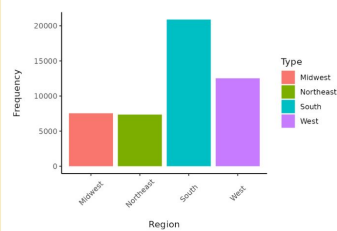


U.S. Regional Frequency by Drinking Habit

Select a category: Drinking Frequency

Lifetime Abstainer

Regional Frequency by Habit





Results





Results & Conclusions

- Northwest citizens consume more alcohol by gallons than the other regions in average.
- For most demographics, individuals identified most with the “**Current Regular**” drinking habit, followed by “Lifetime Abstainer” .
- Main demographics of current regular alcohol users: **age 18-44 married people with higher education background and higher family income.**
- As a general trend, causes of death due to excessive alcohol use have **steadily increased** from 1990 to 2020.



RShiny App Demo