



STAT 630

FINAL PROJECT PRESENTATION

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THE MORE YOU DRINK...



OR



????

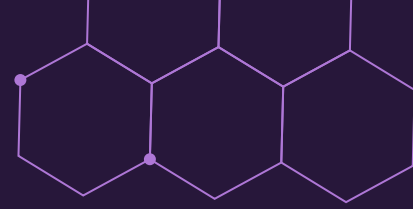


“ Moderate drinking (no more than two glasses of wine or beer a day) can drop a person's risk of early death by around 18%. ”

*—University of California Irvine's Institute for Memory
Impairments and Neurological Disorders*

“ Drinking linked to 7 types of cancer ”

—American Society of Clinical Oncology



*“Is **alcohol consumption**
associated with a **shorter life**
expectancy?”*

—Research Question

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DATA

- **193 Countries from 2000 - 2015.**



Health Data



World Health Organization



Economic Data



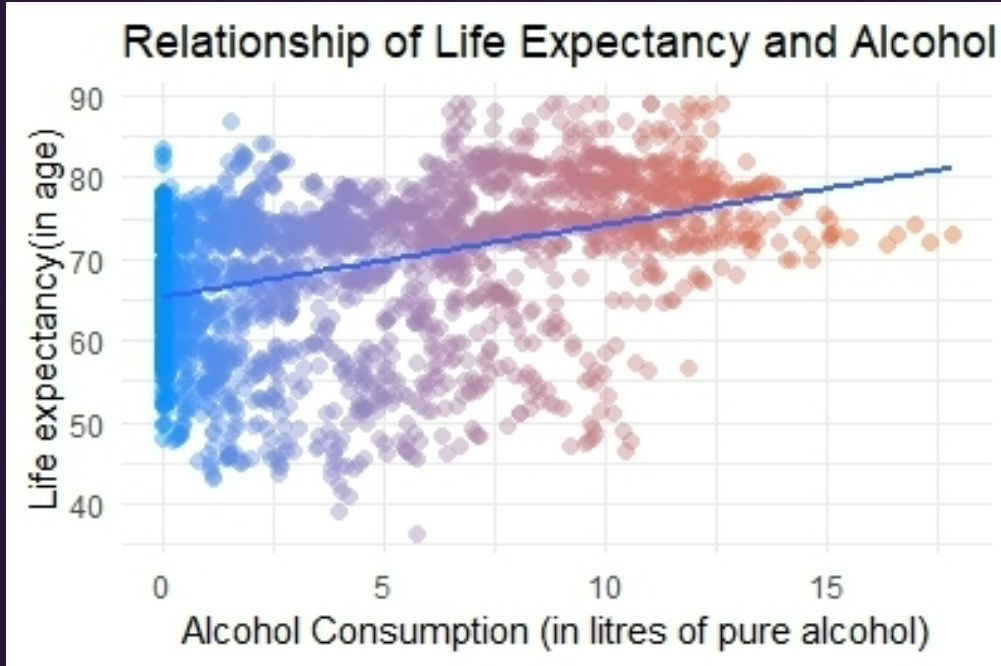
United Nations

- **Method of Collection :**
Stratified Sampling Method

How?

1. *Recorded general information (GDP, Alcohol Consumption, etc) of each countries*
2. *Doing Survey to a representative sample of adult population (15+years) to get health data in each countries*

Plot & Summary Statistic



Globally

The average **life expectancy** of countries is **69.34** years old

The average **Alcohol consumption** of countries is **4.54** litre (for each person in countries older than 15 years old)

SUMMARY STATISTICS

Of potential confounders

Variables	Type	Description	Mean(SD) /n(n%)
<i>Income Composition of Resources</i>	Continuous	Index of human development (0 to 1)	0.63(0.18)
<i>Status</i>	Categorical	Developed/ Developing country	Developed : 438 (17.04%) Developing : 2131 (82.95%)
<i>BMI</i>	Continuous	Body mass index	38.13(19.75)
<i>Education</i>	Continuous	Number of years of education	12.12(2.80)

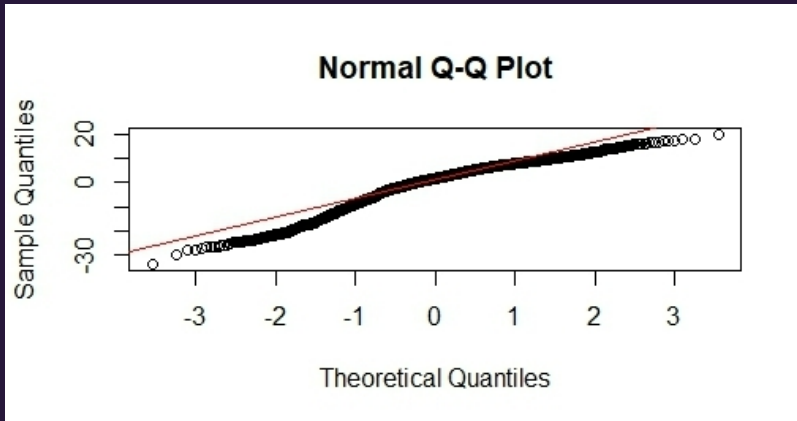
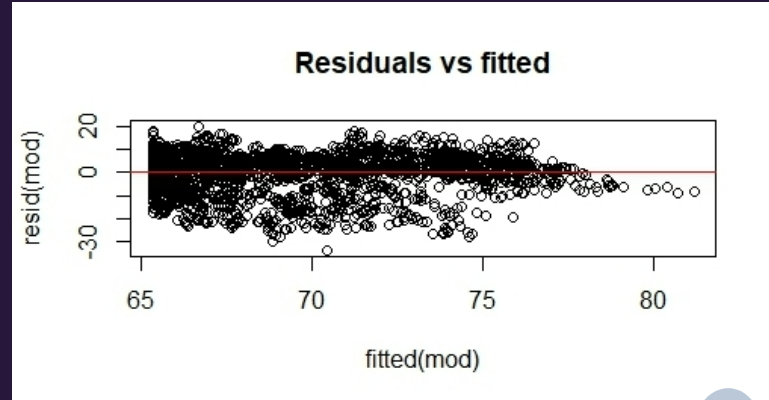
Population model

$$\text{Life expectancy}_i = \beta_0 + \beta_1 \text{Alcohol Consumption}_i + \varepsilon_i, \varepsilon_i \sim \text{iid } N(0, \sigma)$$

Hypothesis

1. $H_0 : \beta_1 = 0$ (**no linear relationship** between life expectancy and alcohol consumption)
2. $H_a : \beta_1 < 0$ (**there is a negative linear** relationship between life expectancy and alcohol consumption)

Conditions



“The data is independent!”

Proceed with cautions



Estimated models

$$\widehat{\text{Life Expectancy}} = 65.31 + 0.8882 \text{ Alcohol Consumption}_i^x$$

P - Value & Test Statistic

<i>P-value</i>	<i>Test statistic</i>
≈ 1	20.78

Confidence Interval

“ We are 95% confident that with each litres increases in alcohol consumption, the life expectancy predicted to increases on average by 0.8043 to 0.9720 ”



Decision

$P\text{-value} \approx 1$. Fail to reject H_0 . We do not have enough evidence that there is a negative relationship between life expectancy and alcohol consumption



“Then what is their relationship?”

Correlation coefficient = 0.4027406

“Higher consumption of alcohol leads to longer life expectancy ! ”

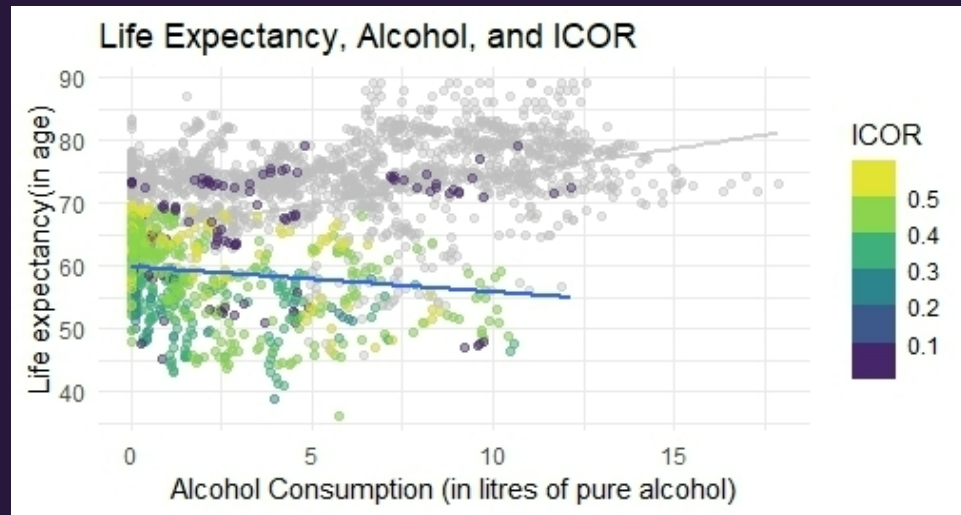
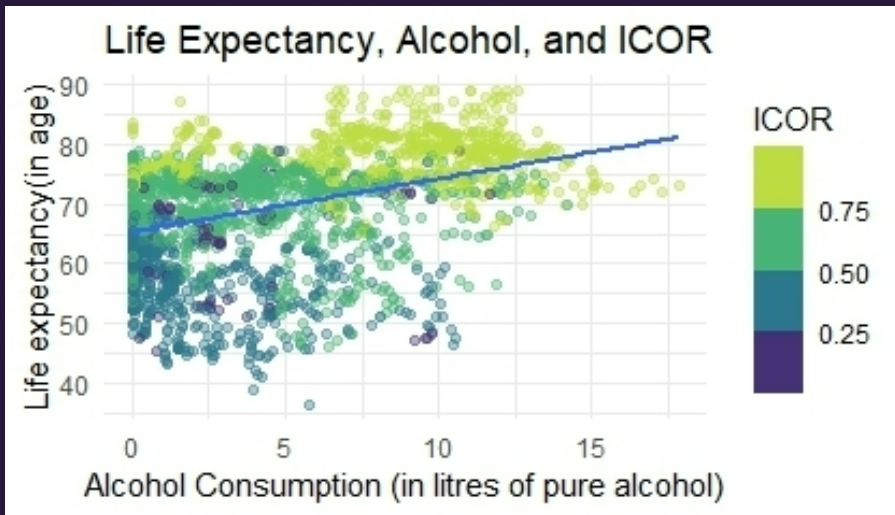




“Should you start to drink?”

Let’s try to include one more variable into our analysis...

Life Expectancy, Alcohol based on ICOR



Low ICOR < 0.550 (Based on WHO)

“ There is a weak negative relationship of Alcohol Consumption in low ICOR countries to Life Expectancy”

Summary statistic

Based on high/low ICOR

	<i>Low ICOR (< 0.550)</i>	<i>High ICOR (>= 0.550)</i>
Alcohol Consumption	Mean = 2.3 sd = 2.6	Mean = 5.5 sd = 4.1
Life Expectancy	Mean = 58.96 Sd = 7.42	Mean = 73.89 sd = 5.9

“Alcohol consumption and life expectancy is higher in high ICOR countries”



Conclusion

*“Is **alcohol consumption** associated with a **shorter life expectancy**?”*

Alcohol consumption associated with longer life expectancy

*“Then should you **start to drink/ consume more alcohol**?”*

No, because there are many related factors (confounding variables) that need to be considered in knowing Alcohol Consumption & life expectancy relationship

(ex: ICOR, Types of Alcohol consumed, Health Care System, Health conditions, BMI, etc)

Limitations



This dataset contains data
from year 2000-2015.




Some observations are
removed as there are
missing values or not
recorded.



REFERENCES



- <https://www.kaggle.com/datasets/kumarajarshi/life-expectancy-who?resource=download>
 - <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4402015/>
 - <https://vitalflux.com/linear-regression-hypothesis-testing-examples/>
 - <https://slidesgo.com/theme/artificial-intelligence-ai-technology-consulting#search-AI&position-9&results-12&rs=search>
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THANK YOU



Ideas for future work

