



# **H1N1 AND SEASONAL FLU VACCINES PROJECT**

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# CONTENT

1. Project Understanding
2. Data Analysis
3. Data Preparation
4. Modeling and Evaluation
5. Conclusion and Recommendations



# PROJECT UNDERSTANDING



# OVERVIEW

This project addresses the challenge of suboptimal seasonal flu vaccine uptake, a critical public health issue that exacerbates morbidity, mortality, and economic burden annually. Using data from the National 2009 H1N1 Flu Survey, which includes demographic, behavioral, and attitudinal factors, the project aims to build a predictive model to identify key drivers of vaccine uptake. Framed as a binary classification problem, the analysis seeks to uncover actionable insights to inform public health strategies, improve vaccination campaigns, and enhance preparedness for future pandemics

# PROBLEM STATEMENT

Seasonal influenza vaccination is a cornerstone of public health efforts to reduce the burden of flu-related illness. However, vaccination rates vary significantly across different population groups, influenced by factors such as demographics, health behaviors, and personal beliefs. Public health officials face the challenge of designing targeted interventions to improve vaccine uptake, particularly among populations with historically low vaccination rates.

# RESEARCH QUESTION

Can we predict whether an individual received the seasonal flu vaccine based on their demographic characteristics, health behaviors, and opinions about vaccines?

# KEY OBJECTIVES

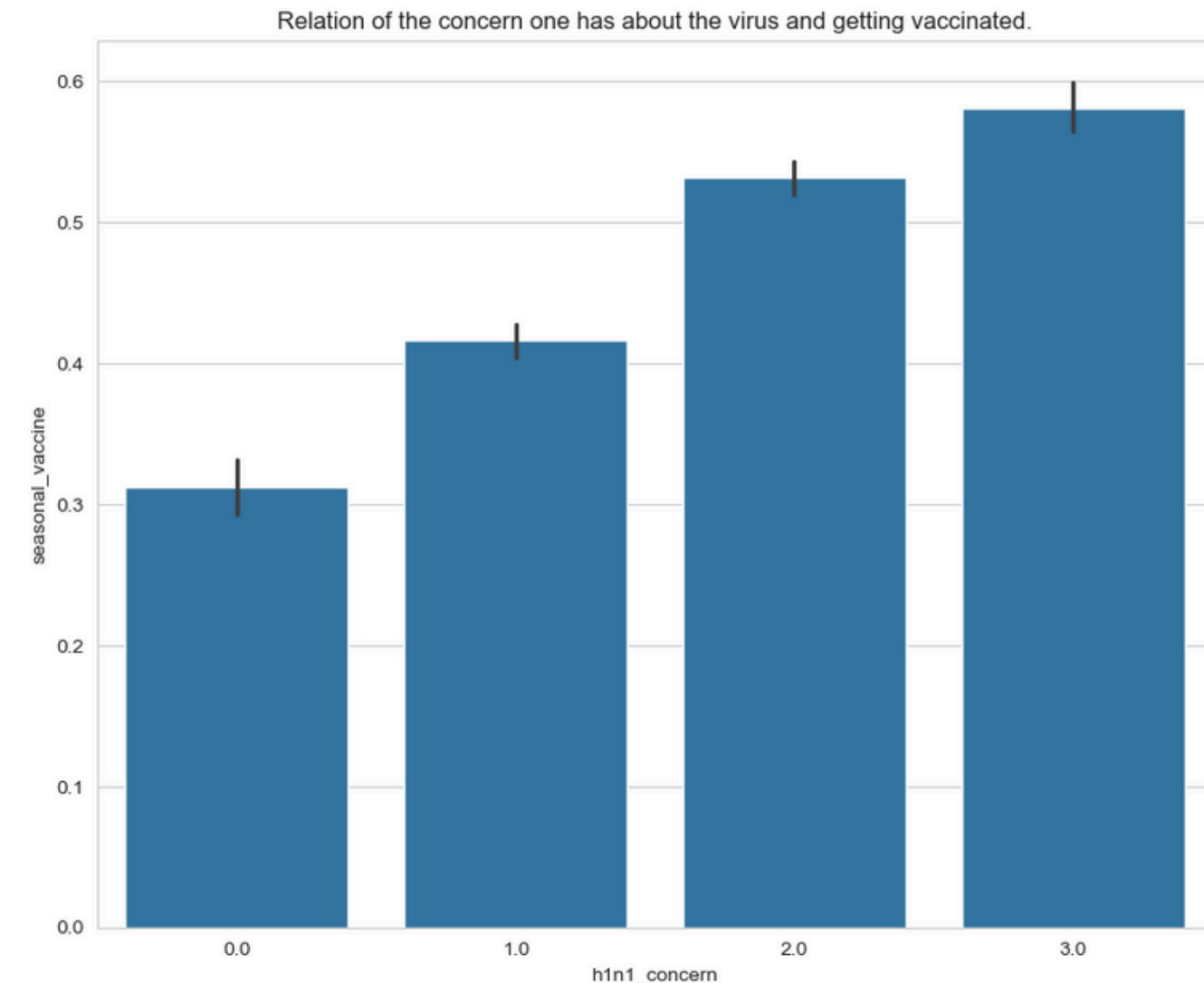
1. Identifying Predictors: Determine the most influential factors driving seasonal flu vaccine uptake.
2. Building a Predictive Model: Develop a binary classification model to predict vaccination status accurately.
3. Actionable Insights: Provide evidence-based recommendations to public health officials for improving seasonal flu vaccination rates.

# DATA ANALYSIS



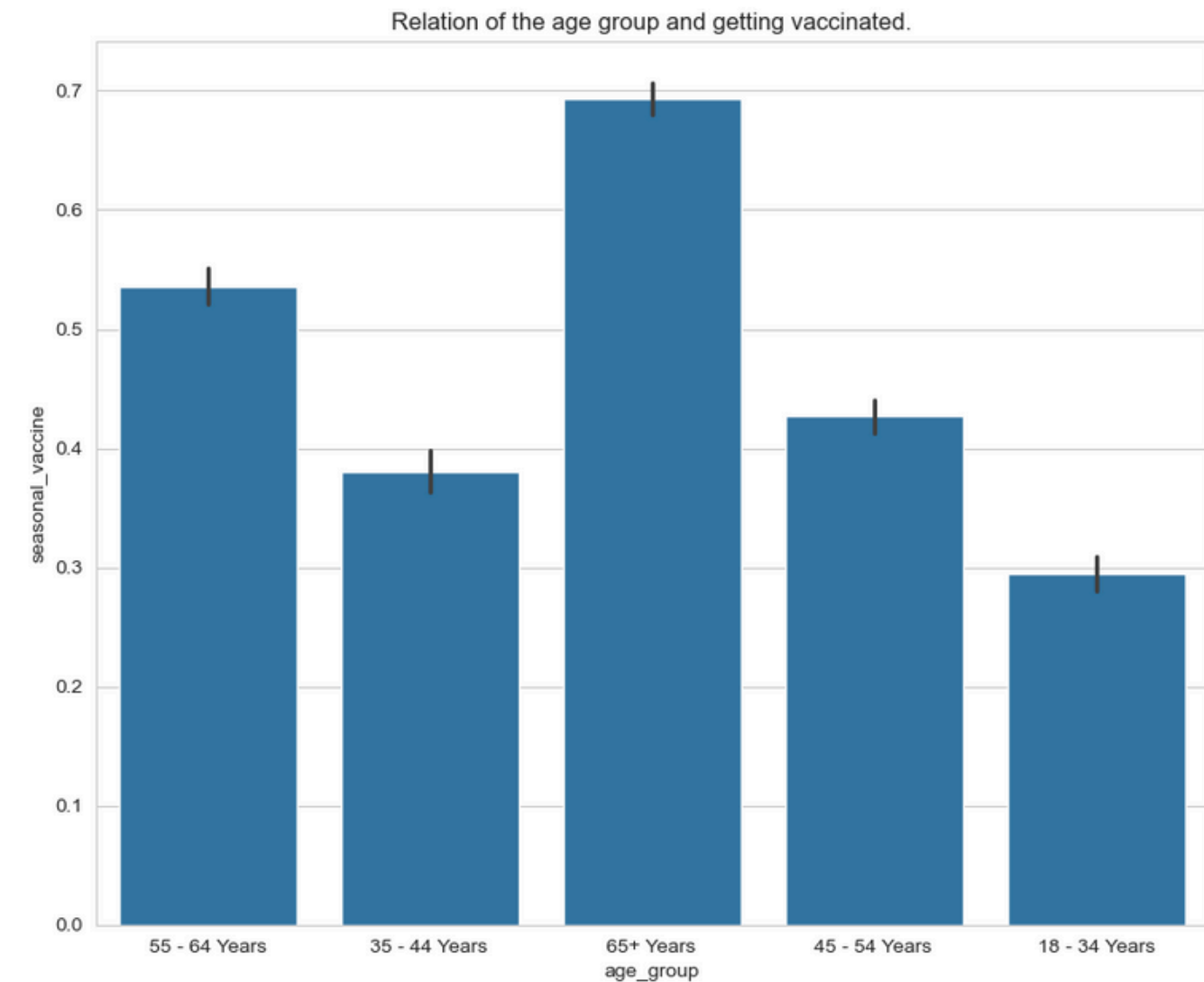
# CONCERN ABOUT THE VIRUS AND GETTING VACCINATED

People with the most concern about the virus have a higher chance of getting the seasonal flu vaccine.



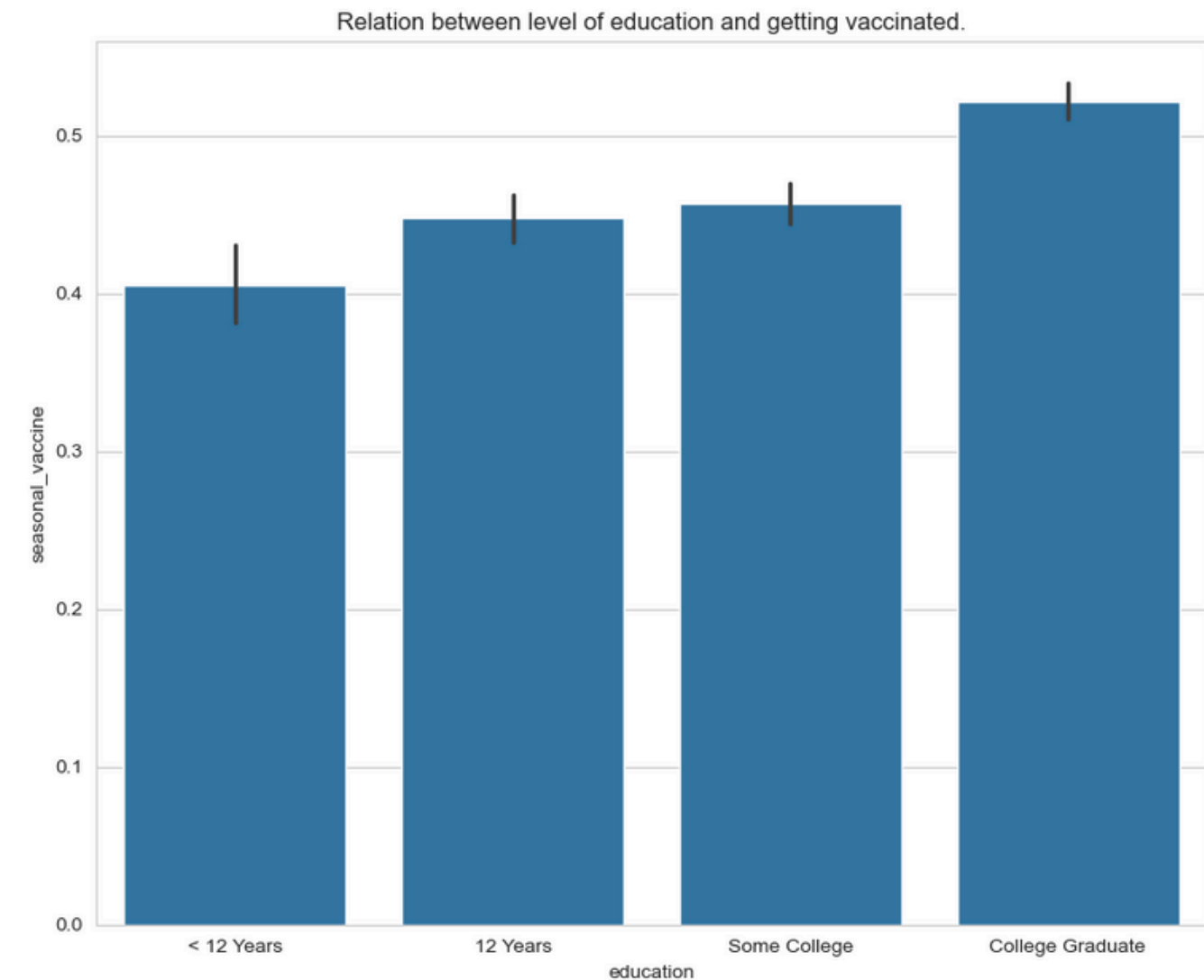
# AGE GROUP AND GETTING VACCINATED

People over the age of 65 have received a shot of seasonal flu vaccine.



# LEVEL OF EDUCATION AND GETTING VACCINATED

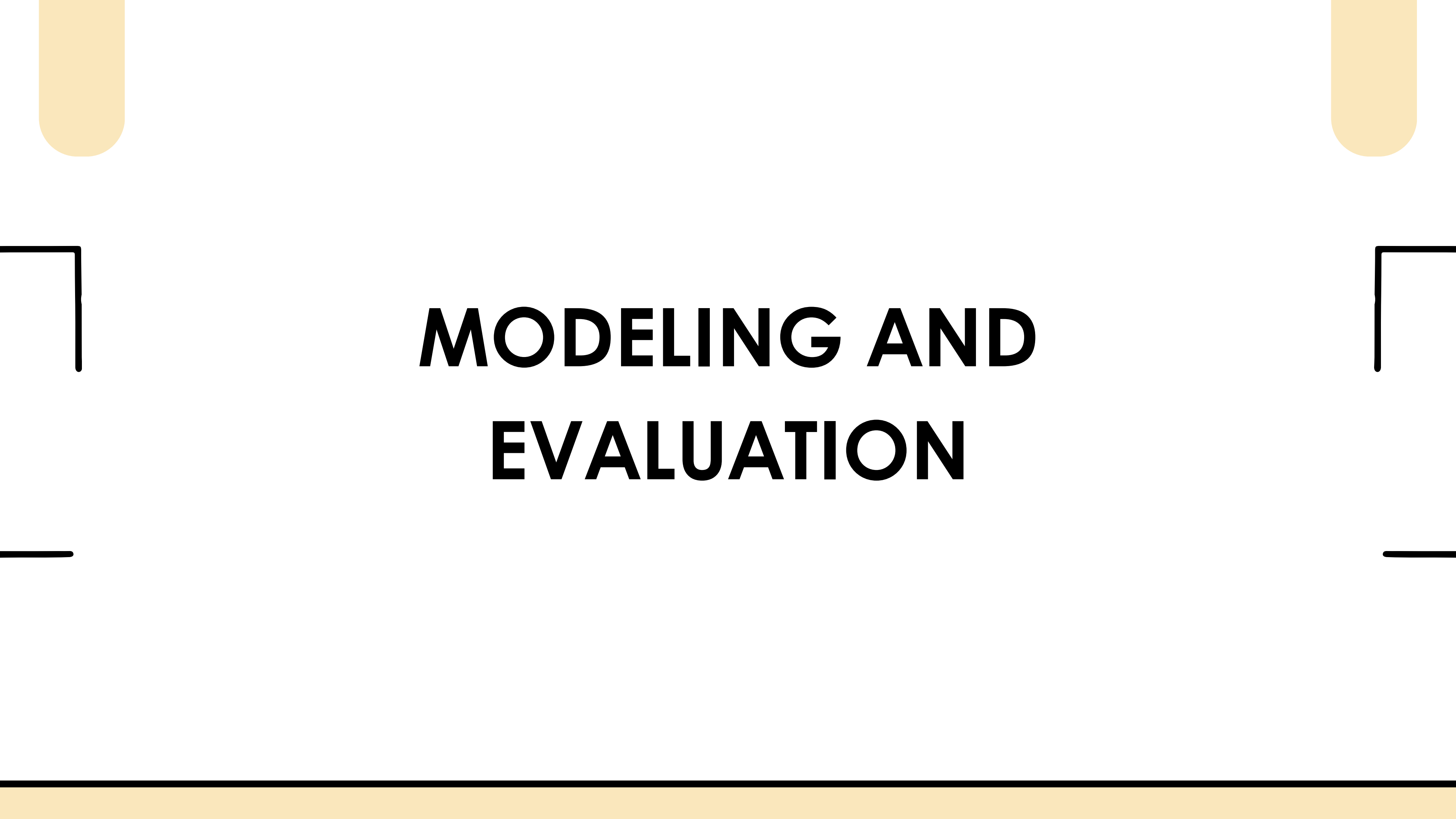
People with higher education have a more likelihood of getting the seasonal flu vaccine.



# DATA PREPARATION

# DATA PREPARATION






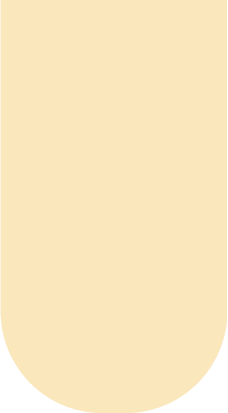
1. Handling Missing Values
2. Feature Selection
3. Encoding Categorical Variables
4. Scaling
5. Handling Class Imbalance




# **MODELING AND EVALUATION**

# MODELING AND EVALUATION

- The model with the best performance was the Random forest classifier. A model with the best parameters was instantiated.
- The accuracy of the final model is at 80.7%



# **CONCLUSION AND RECOMMENDATIONS**





# CONCLUSION

- Demographic Influences: Individuals with higher levels of education are significantly more likely to receive the seasonal flu vaccine. Age plays a critical role, with people aged 65 years and older being the most likely to get vaccinated.
- Industry and Occupational Factors: Individuals working in the healthcare industry are more likely to get vaccinated.
- The model's accuracy in predicting vaccination status highlights its potential to identify under-vaccinated groups, allowing public health officials to tailor interventions and allocate resources more effectively.

# RECOMMENDATIONS

1. Targeted Outreach: Develop campaigns focused on populations with lower vaccination rates.
2. Workplace Vaccination Programs: Expand successful healthcare industry vaccination programs to other workplaces, emphasizing convenience and accessibility.
3. Youth Engagement: Create specific initiatives aimed at younger age groups who may not perceive the flu vaccine as necessary, using digital media and community events.
4. Education Campaigns: Emphasize the safety, efficacy, and benefits of seasonal flu vaccines through tailored educational materials.



**THANK YOU.**