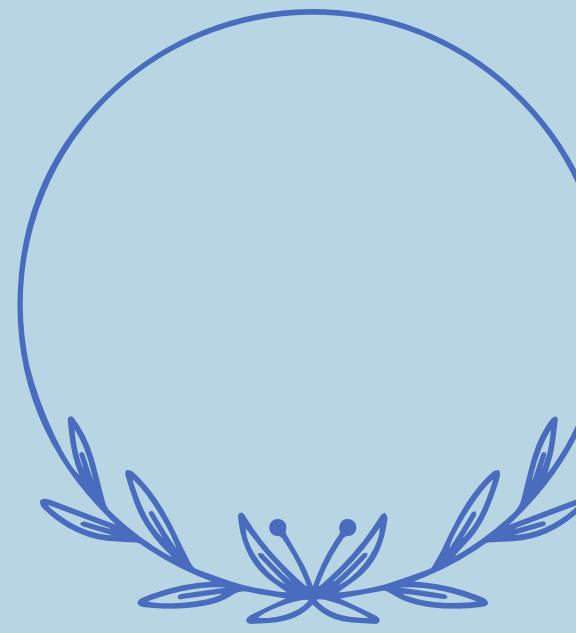


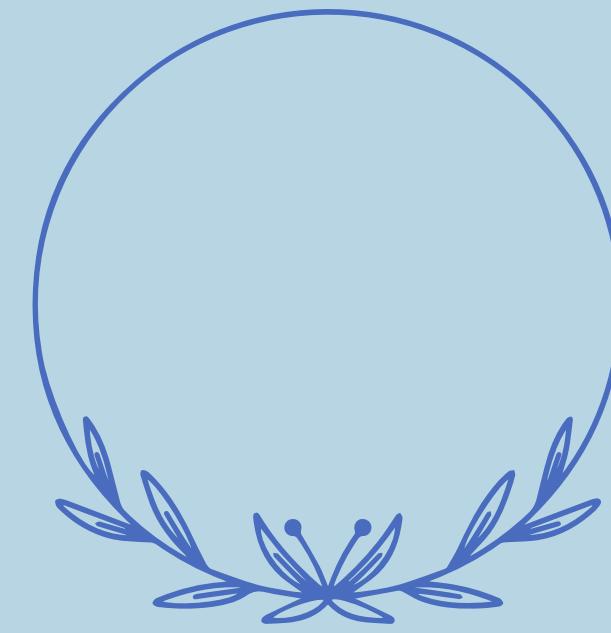
# **Analysis of H1N1 Vaccine based on Behavioral Factors**



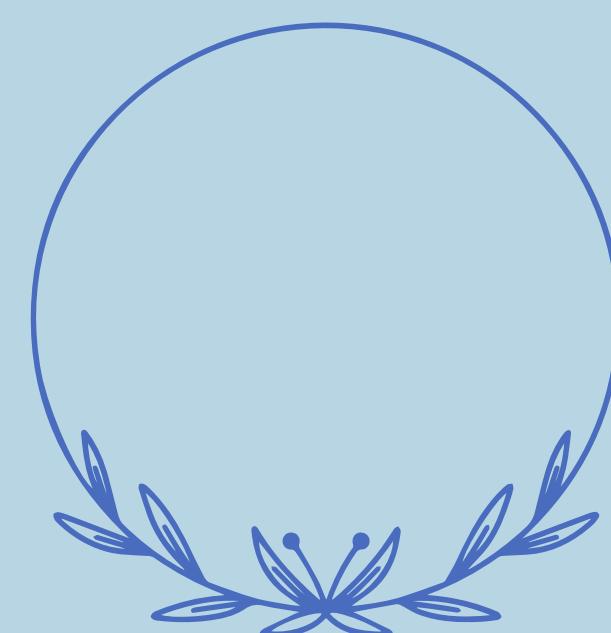
# Our Team



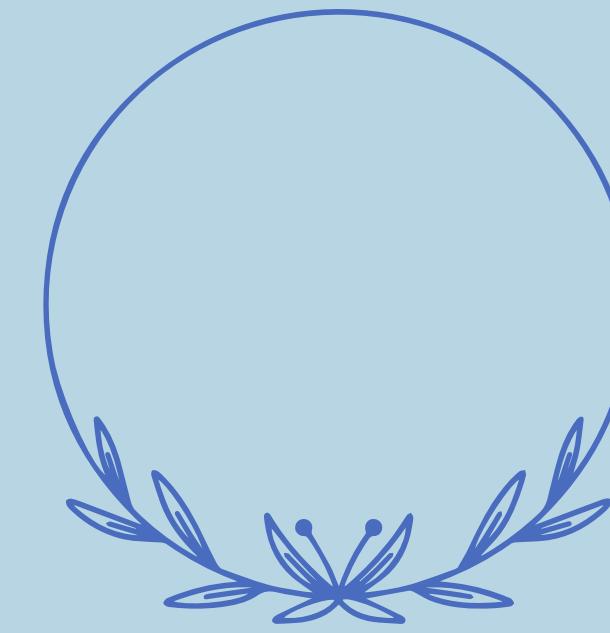
**Anthony  
Ngatia**



**Joy  
Kipkemboi**



**Jessyca  
Aperi**



**Rotich  
Naomi**

# Process

- Business understanding
- Objectives
- Data understanding
- Exploratory Data Analysis
- Modelling
- Findings
- Recommendations



## BUSINESS UNDERSTANDING

**As the world struggles to vaccinate the global population against COVID-19, an understanding of how people's backgrounds, opinions, and health behaviors are related to their personal vaccination patterns can provide guidance for future public health efforts. We aim to predict whether people got H1N1 vaccines using data collected in the National 2009 H1N1 Flu Survey.**

# BUSINESS OBJECTIVES

- To build a classification model to predict whether an individual will presumably get H1N1 vaccine or not.

# Specific objectives

- To import and clean the dataset to prepare the data for analysis and modeling.
- Model the data using Decision trees, Random Forest, and Logistic Regression.
- To perform feature selection of our dataset.
- To validate our model using different metrics.

# Data understanding

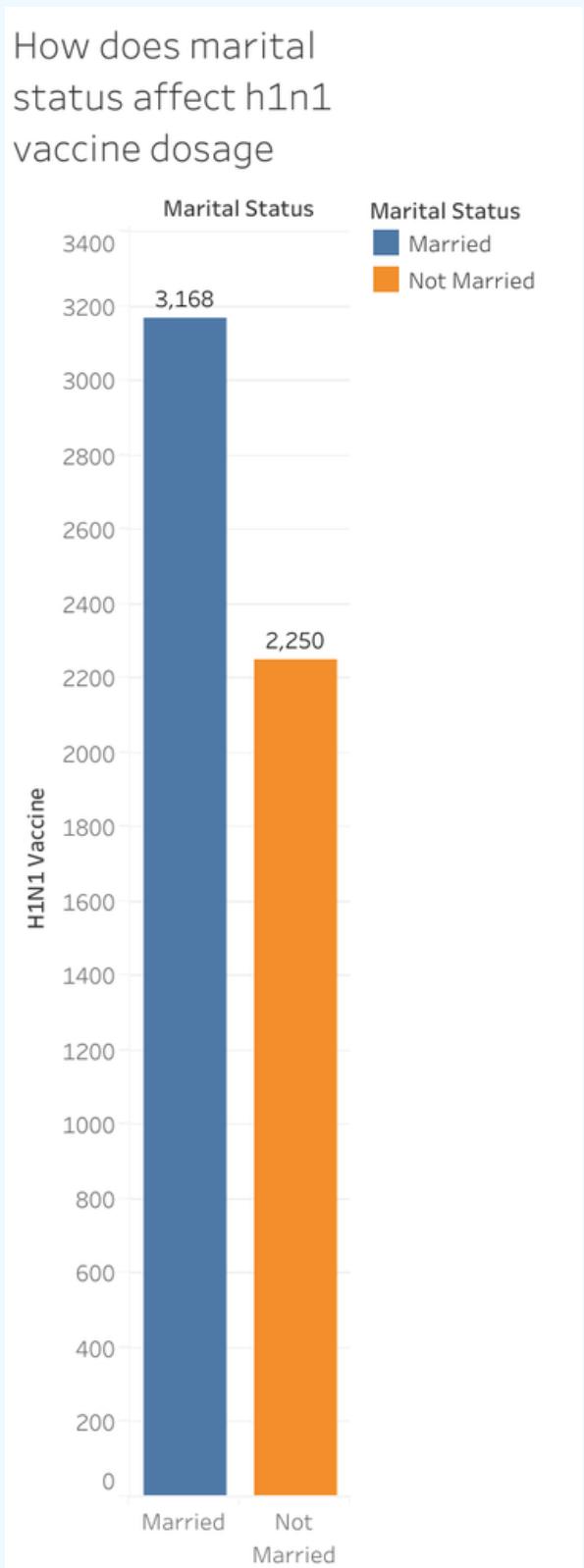
**For this project, we are using the available dataset in Kaggle.**

**The dataset is the H1N1 and seasonal flu vaccines.  
The link is attached in the CRISP - DM report**

# **Exploratory Data Analysis**

# **Social factors that affect the h1n1 vaccine dosage**

- RACE
- INCOME POVERTY
- HOUSE OWNERSHIP
- GENDER
- EMPLOYMENT
- STATUS
- AGE GROUP
- MARITAL STATUS

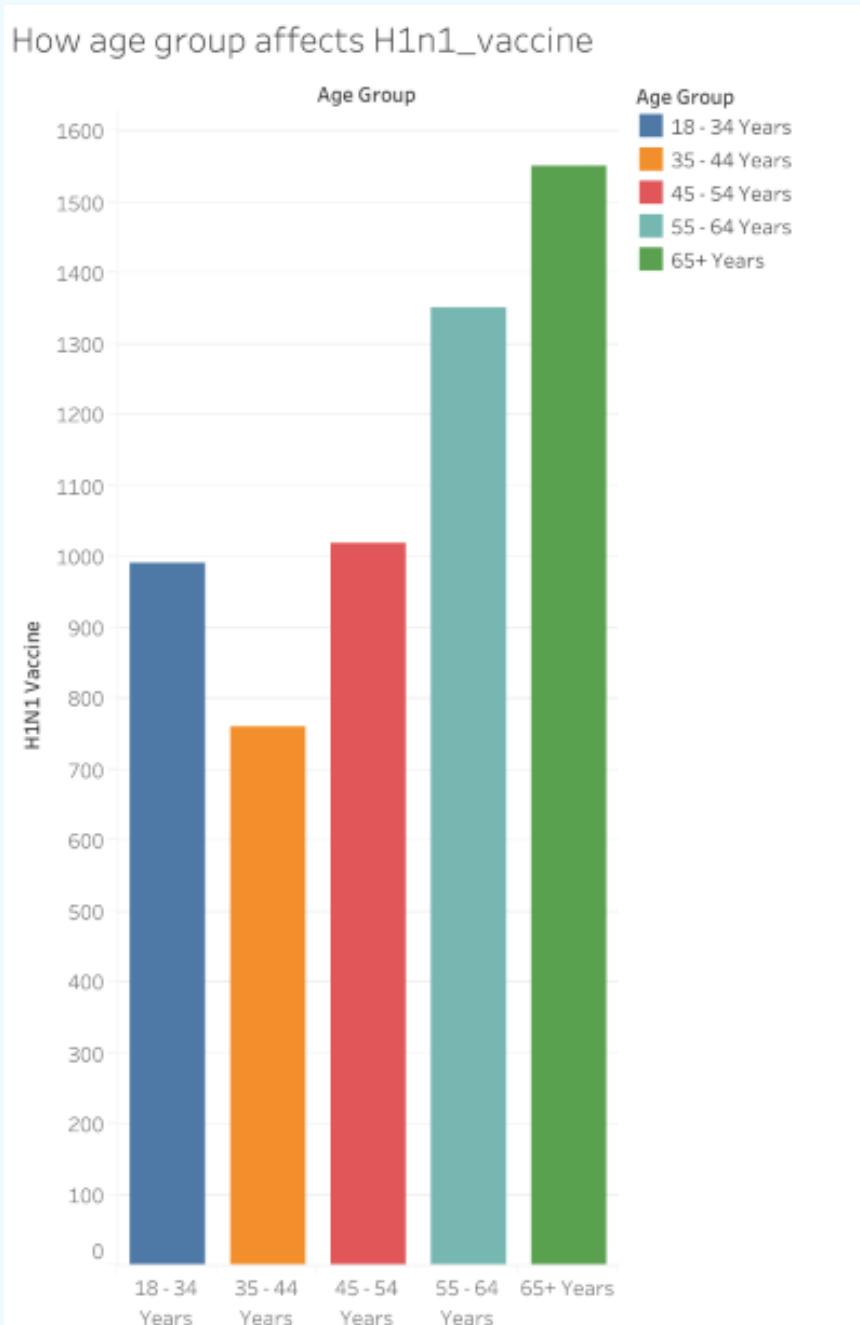


# Marital status

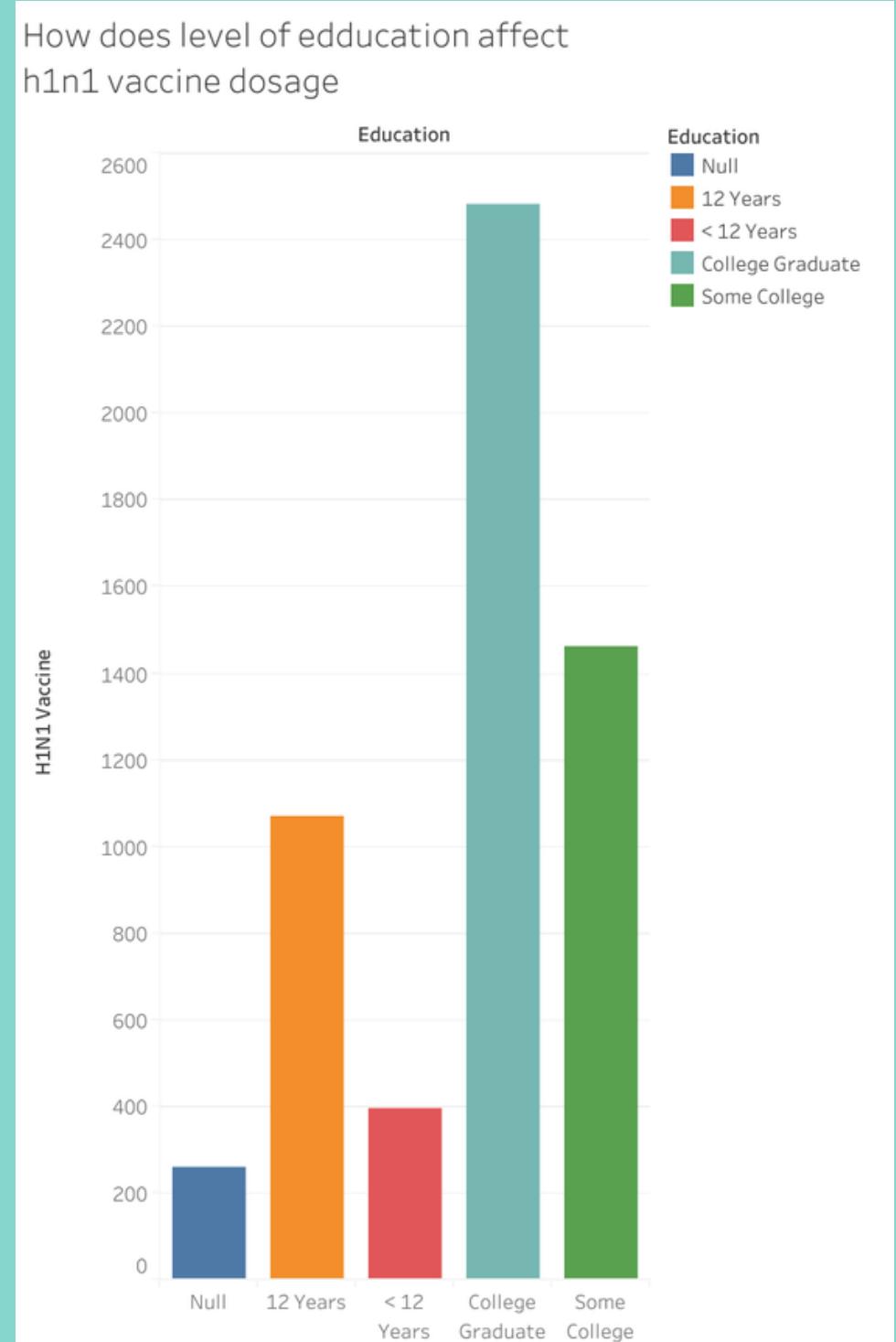
Most people who took the vaccine are married

# Age group

From this we can see that the people in the age group 65 and above years took the most vaccine

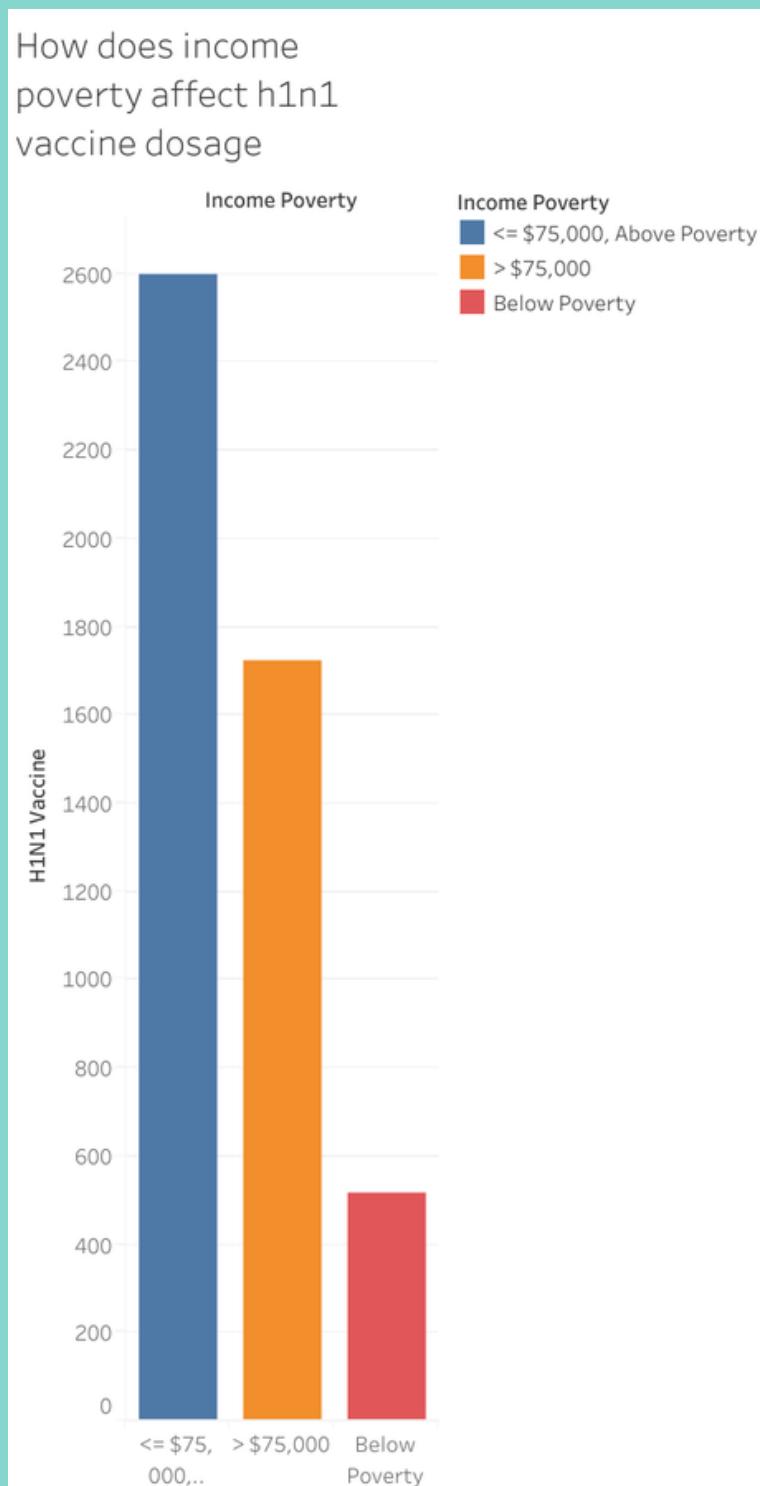


# Level of education

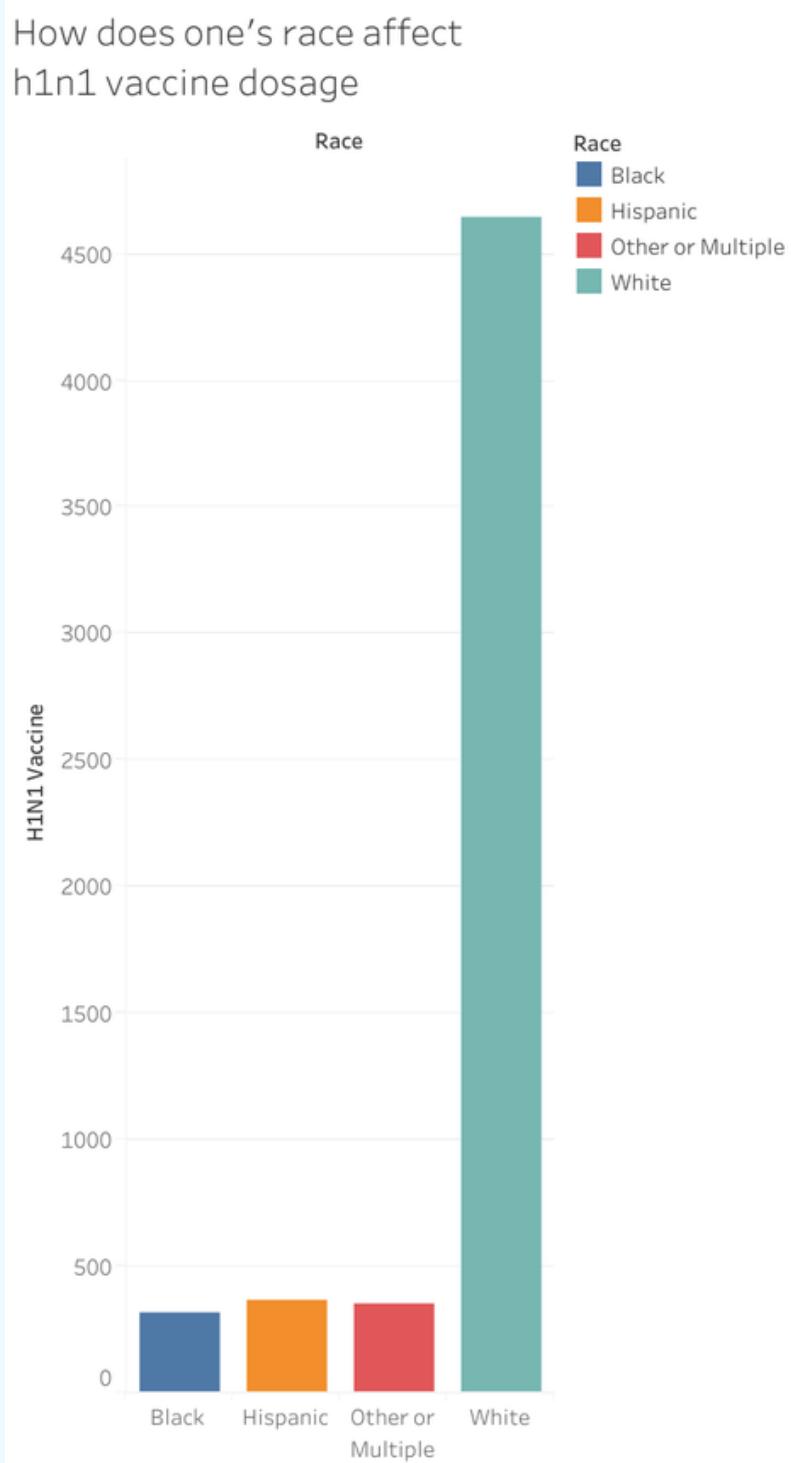


From this we can see that the people whose education level was college had the highest number of people who took the vaccines

# Income poverty



We can see that those with an income of above 75000 had the highest number of people who took the vaccine

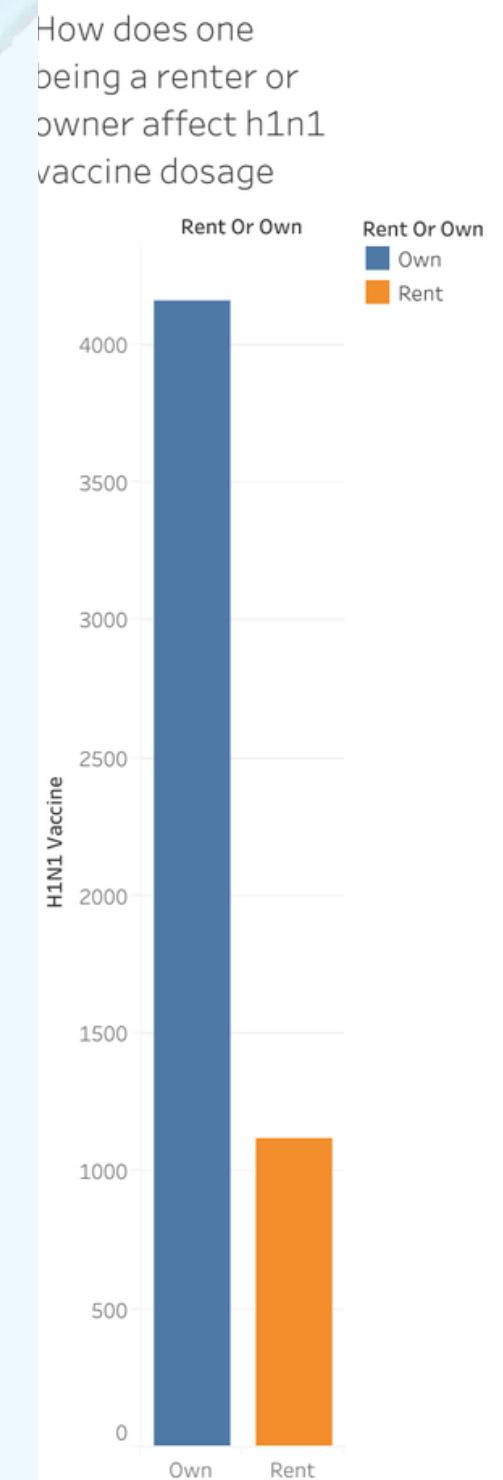


# Race

From the plot , we can see that the whites took the vaccines in a very large amount compared to other races.

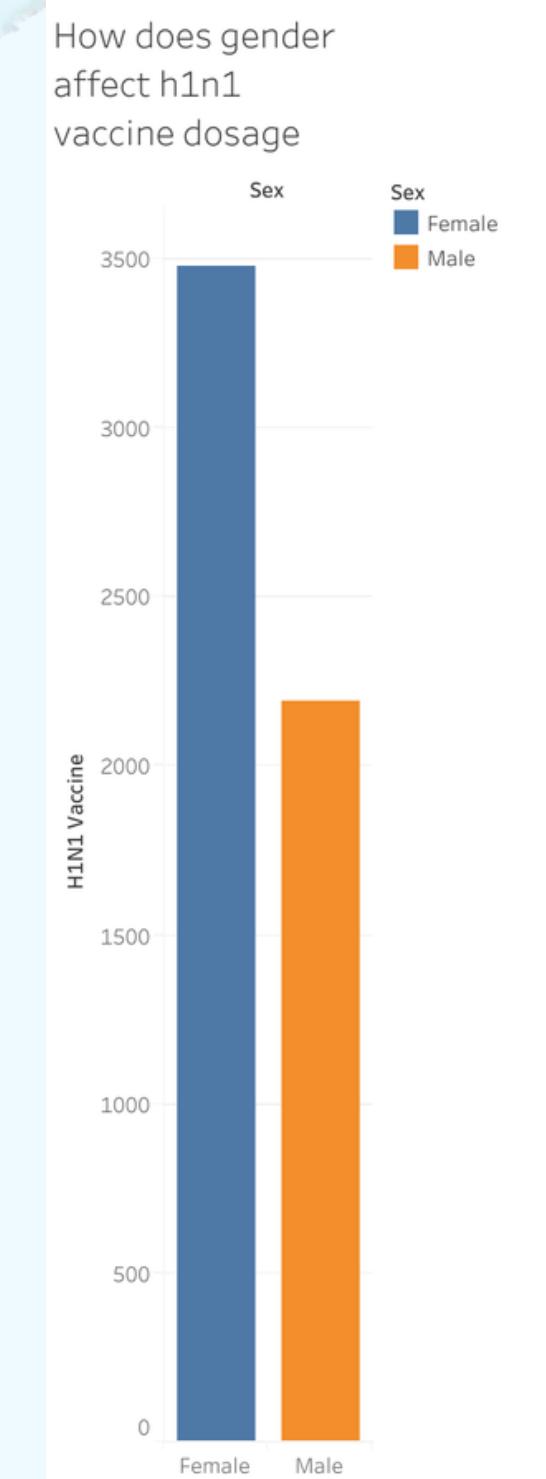
# House ownership

We can see that home owners had the highest number of people who took the vaccine.

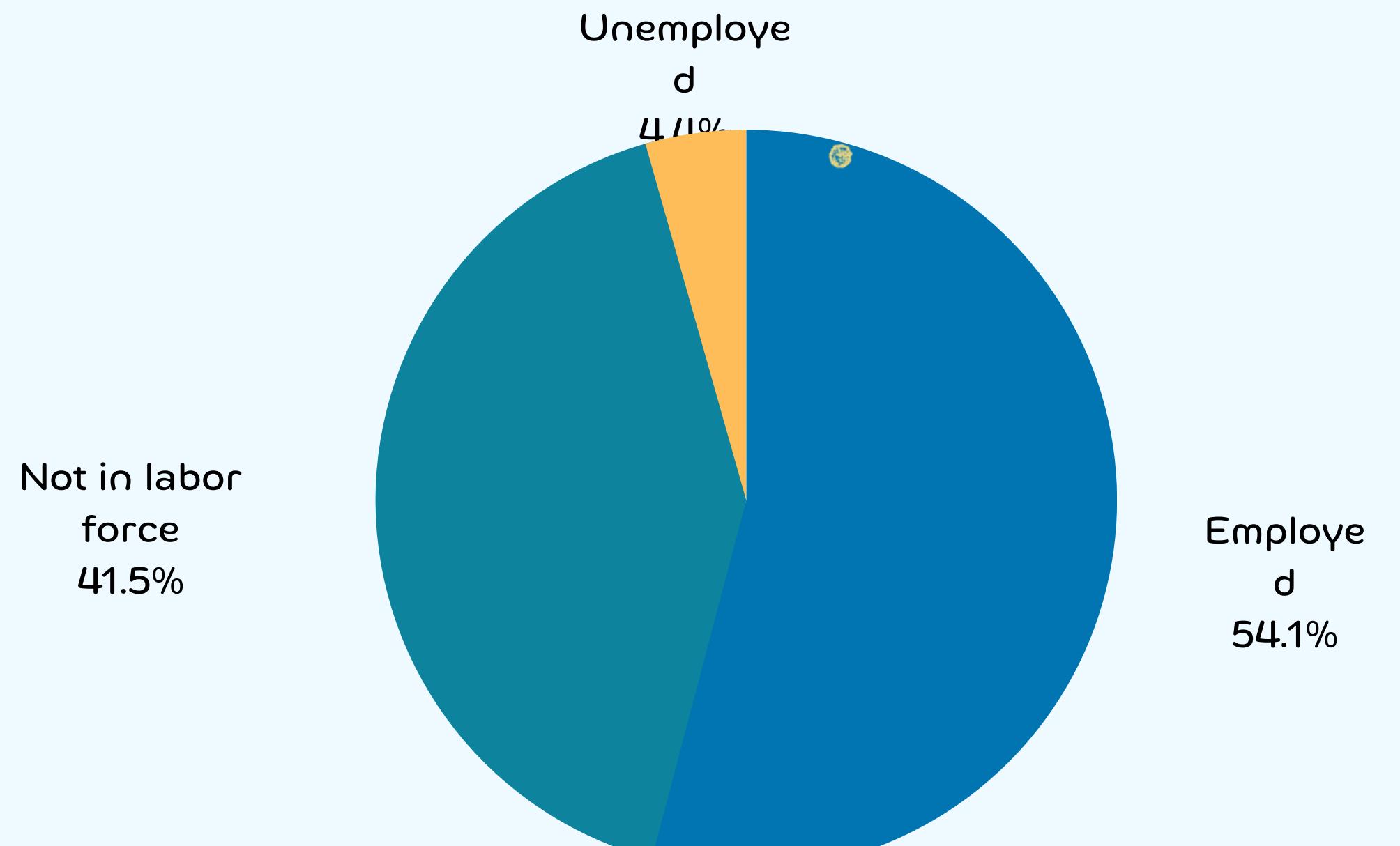


# Gender

We can see that the female gender had the highest number of people who took the vaccines.



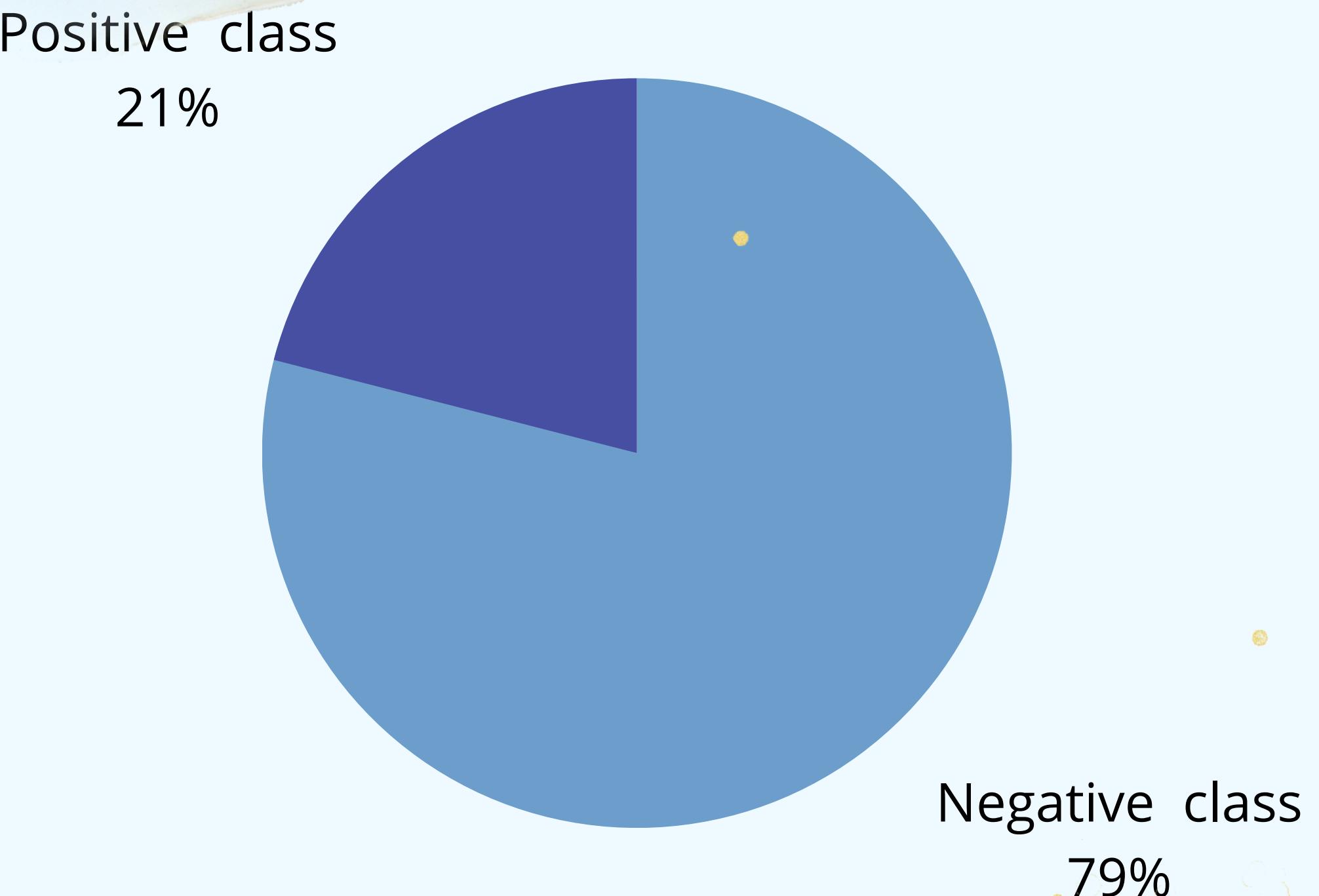
# Employment status

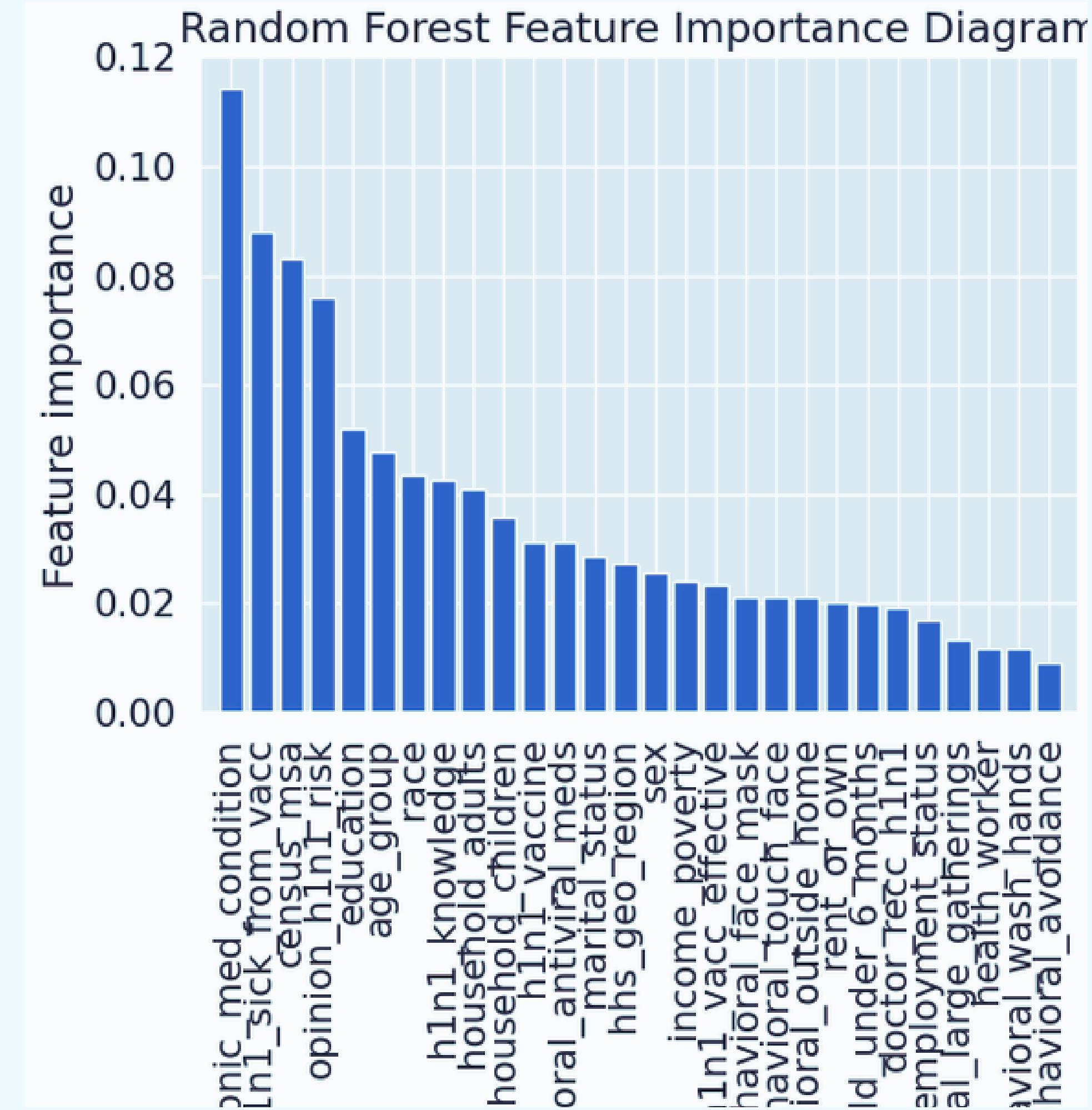


From this plot we can see that the number of employed people who took the vaccine is more than those who are unemployed and not in labor force.

# Pie plot showing the imbalanced distribution

From the pie chart, we have the negative class having the biggest portion followed by the positive class.





# MODELING

We used three modeling techniques  
namely:

- Logistic Regression
- Decision Trees
- Random Forest

# METRIC PERFORMANCE

## Logistic Regression   Decision Tree

**Test accuracy:**

0.775797513853527

**Test precision:**

0.4810964083175803

**Test recall:**

0.7184191954834157

**Test f1 score:**

0.5762807812057741

**Train Accuracy:**

0.8380777277626323

**Test Accuracy:**

0.8124906395087614

**Train Recall\_score:**

0.811957141951436

**Test Recall\_score:**

0.6005645730416372

**Train Precision\_score:**

0.8567128236002408

**Test precision\_score :**

0.5536759921925829

## Random Forest

**Train Accuracy:**

0.8219171243135297

**Test Accuracy:**

0.8241725325745095

**Train Recall\_score:**

0.22903453136011276

# FINDINGS

- Age is a significant predictor of H1N1 vaccine uptake, with older adults more likely to get vaccinated compared to younger adults.
- Health behaviors such as wearing a face mask, washing hands frequently, and avoiding crowded places during an outbreak are associated with increased H1N1 vaccination uptake.
- Certain chronic medical conditions such as asthma and diabetes are associated with increased H1N1 vaccination uptake.
- Married individuals were more likely to get vaccinated compared to those who are unmarried.
- The employed were more likely to get vaccinated compared to those who are unemployed or not in the labor force.

# **RECOMMENDATIONS**

- **Use of sensitisation and targeted marketing campaigns to address the specific demographic and socioeconomic factors associated with H1N1 vaccine uptake.**
- **Increasing the geographical access to vaccination by making it more accessible to people in different locations.**
- **Offering incentives such as discounted health insurance premiums to promote the uptake of the vaccine.**
- **Demystifying myths and misinformation that exists concerning the vaccination, that could contribute to hesitancy in uptaking the vaccine.**
- **Partnering with public health agencies to develop and implement vaccination programs in areas that are not easily accessible. This could be implemented by the use of mobile vaccination clinics.**

