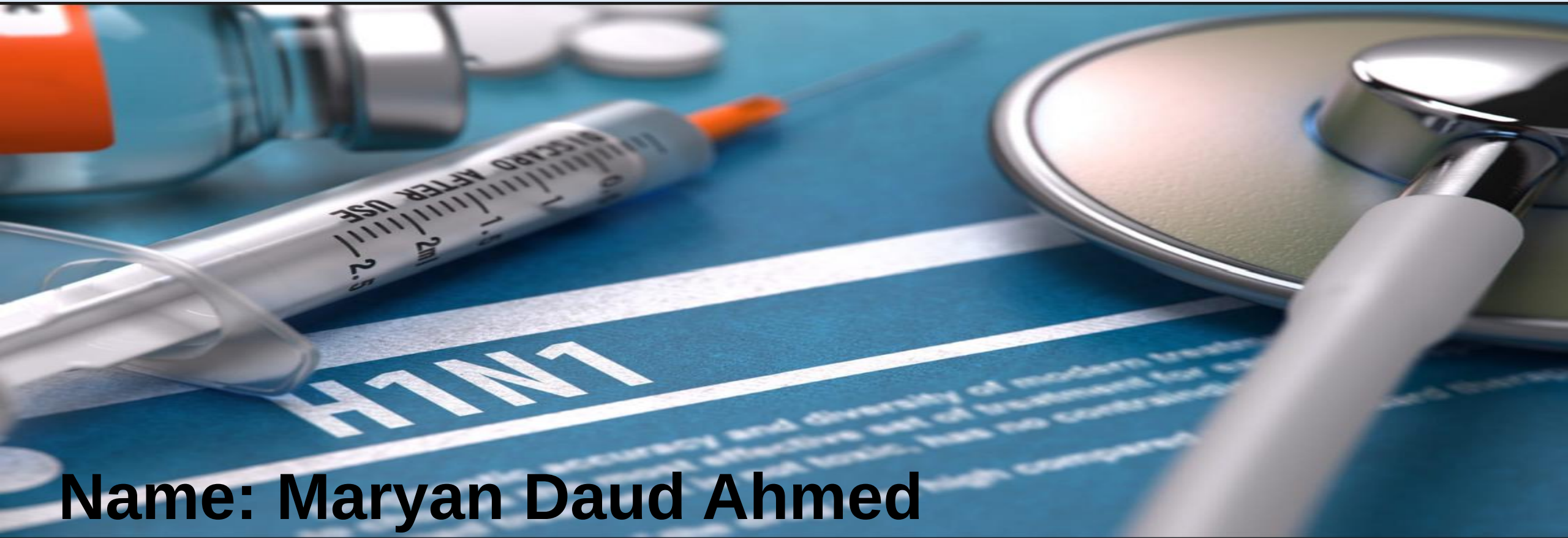
H1N1_Seasonal_Flu_Phase_3_Project
Assessing Factors contributing to uptake of HIN1 and Seasonal Flu vaccine



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Overview

- Globally vaccination, is a key public health measure to fight infectious (CDC)
- Vaccines provide immunization in a community through "herd immunity“
- In 2009 pandemic caused by the H1N1 influenza virus, "swine flu” began
- Its estimated that in the first year, it caused 151,000 to 575,000 deaths globally(CDC)
- In October 2009, vaccine for the H1N1 flu virus became, in 2010 the United States conducted the National 2009 H1N1 Flu Survey
- The study aimed to
  - Analyze factors that influence individuals' decision-making processes regarding getting vaccinated against H1N1 and seasonal flu
  - Develop targeted strategies and interventions to increase vaccination rates

Problem Statement

- Seasonal flu places a substantial burden on the health of people each year
- CDC estimates that flu has resulted in 9 million – 41 million illnesses, 140,000 – 710,000 hospitalizations, with 12,000 – 52,000 deaths annually 2010 – 2020
- Despite the availability and effectiveness of flu/H1N1 vaccines, a significant portions of the population not vaccinated
- To address this problem, it is crucial to investigate the reasons behind non vaccination
- Identify the key factors driving individuals' opinions, perceptions, and behaviors related to vaccination
- Develop strategic interventions to target different cohort and improve vaccine uptake

Objectives

Broad Objectives

1. To determine factors contributing to uptake of HIN1 and Seasonal Flu vaccine

Specific Objectives

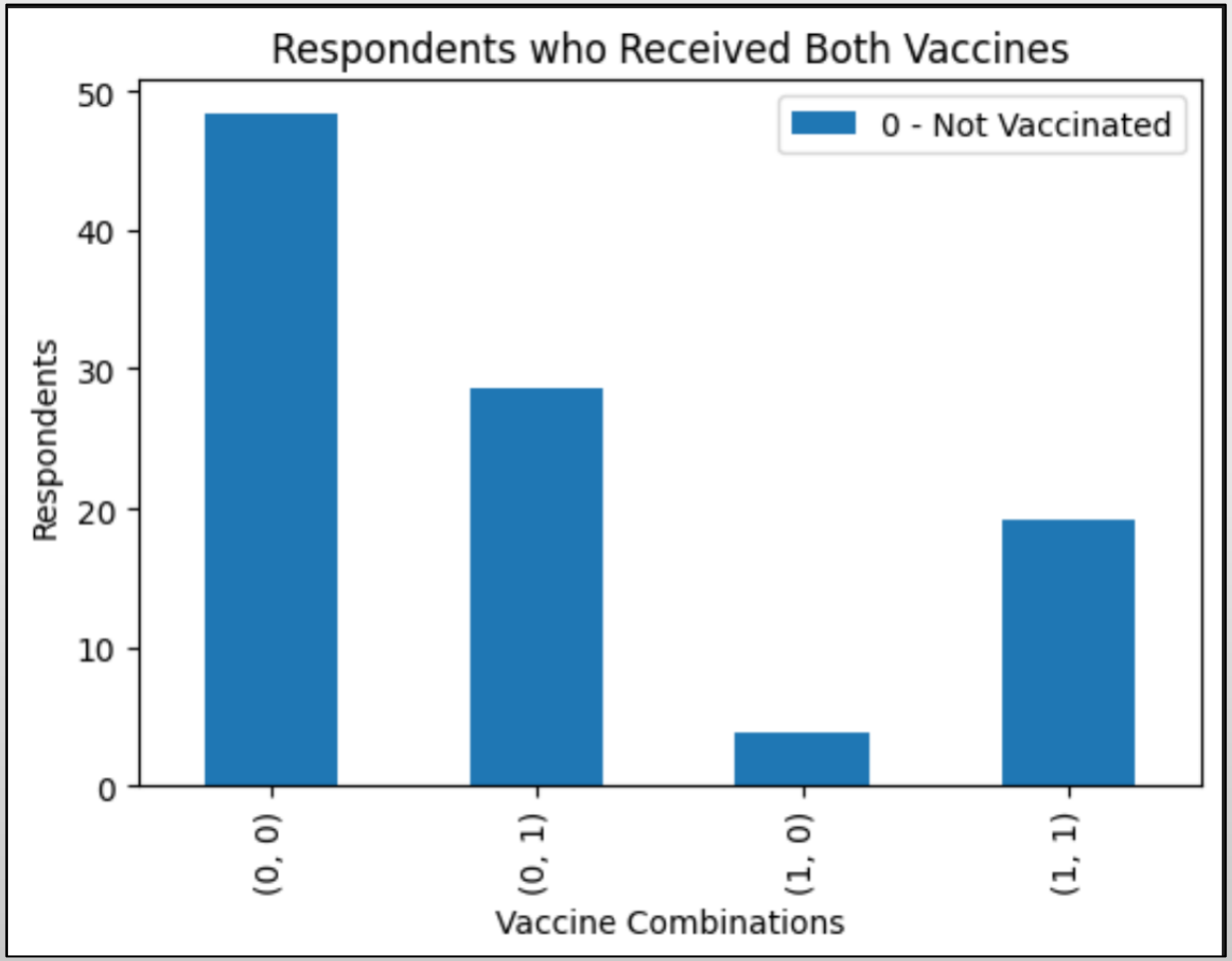
1. Determine demographic factors (age, gender, occupation) that determine vaccine uptake
2. Determine Knowledge, Opinions and Behaviors that influence vaccine uptake
3. Predict factors that influence individuals to take H1N1 and seasonal flu vaccines
4. Evaluate accuracy and performance of predictive models

Data Understanding

- Data sets from phone survey where respondents were asked whether they had received the H1N1 and seasonal flu vaccines
- Respondents answered additional questions covered their social, economic, and demographic background
- Opinions on risks of illness and vaccine effectiveness, and behaviors towards mitigating transmission was assessed
- Data Analysis: Univariate, bivariate and multivariate analysis was conducted
- Predictive models ; logistic regression model and decision tree model were created and performance evaluated
- Data Source: https://www.drivendata.org/competitions/66/flu-shot-learning

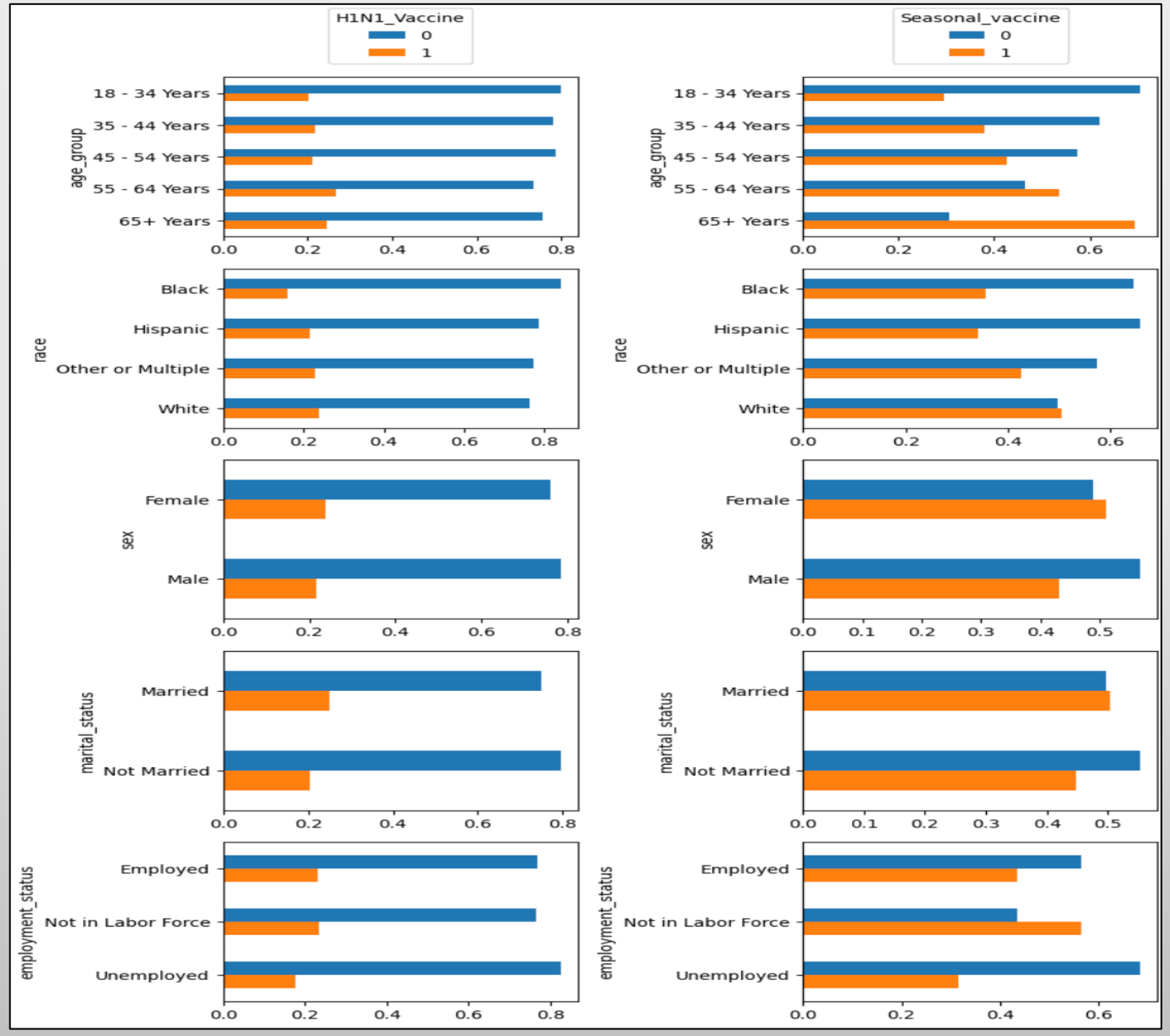
Univariate Summary

- 21% of respondents received only H1N1,
- Almost half 46% received only Seasonal Vaccine
- On combination about 18% of respondents received both vaccines
- About 48% receiving at least one of either vaccine
- Majority of the respondents were aged 55 years and above and female



Bivariate Results

- Higher vaccination coverage observed among:
- White Race
- Older age groups >55 years
- Married respondents
- Among employed and not in labor force
- Respondents with perceived risk and understanding vaccines



Behavior and Vaccine uptake Correlation Matrix

High correlation between:

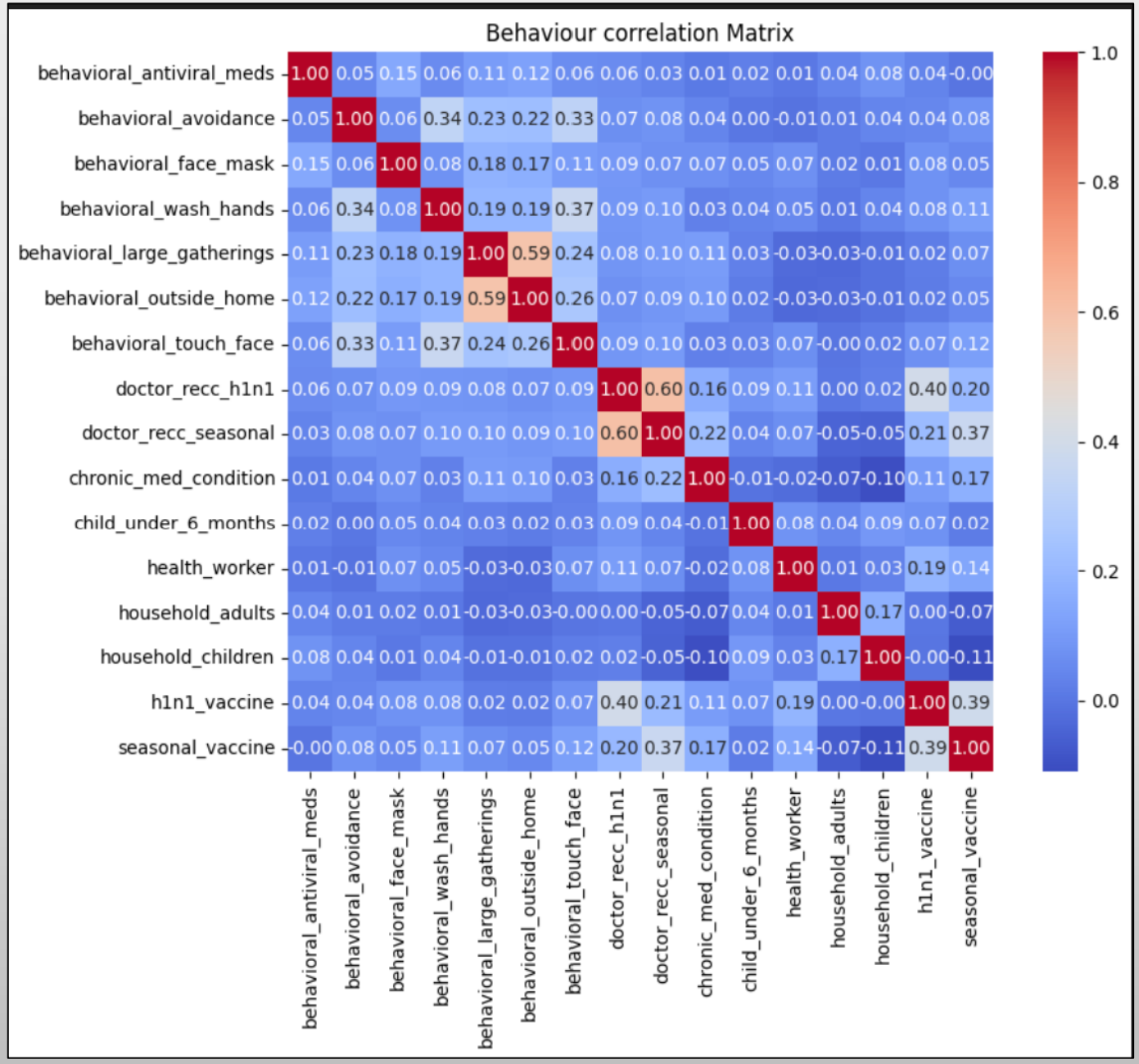
- Doctors' recommendation and vaccination
- Respondents with chronic illness and vaccination

Moderate correlation between:

- Being a healthcare worker and vaccination

Low correlation between:

- Preventive behaviors and vaccination



Modelling Analysis

- Created two predictive models
- Models used

1. Logistic regression model
2. Decision tree model

- Both models had Accuracy of 100% in predicting vaccine uptake data
- Cross validation of model conducted:

1. Cross Validated accuracy scores: 1
2. Mean accuracy: 1

Conclusion

- Low vaccine uptake among younger population, people of black race, and unemployed individuals
- Tertiary education was found to be a strong predictor of vaccination, those with tertiary and secondary level of education being more inclined to get the vaccine
- Increased uptake of seasonal flu vaccines as compared to H1N1 vaccine
- Those who perceived vaccination as a way of preventing disease and were at risk of infection without the vaccine were more likely to be vaccinated
- Respondent who had recommendations from health care workers to get vaccinated understood that vaccination plays a crucial line of defense from infections and took the vaccines

Recommendations

- There is a need to tailor educational intervention programs for specific target groups targeting the low-income groups, African Americans and unemployed in vaccination drives/ acceleration campaigns
- Use of information, Education and communication (IEC) materials such as visual Aids, posters, flyers and media for ease of understanding and to effectively communicate and educate public on role of vaccination
- Continuous advocacy and social mobilization with context specific tailored messaging such as effectiveness of vaccines ,perceived risks of opting out of vaccination drives and, clarifying misconceptions, creating awareness on flu symptoms and prevention measures as this were drivers of increased uptake
- Creating awareness about diseases of like nature such as seasonal flu and H1N1 should also be targeted alongside promoting inoculation to increase vaccine acceptance. Considering that seasonal flu had more acceptance than H1N1
- Recommendation of health workers in reinforcing vaccine uptake has been highlighted; therefore, healthcare workers should be prepared and knowledgeable as to participate in a discussion on vaccination together with the patient, in their daily health check-ups and Introduction of vaccination at service delivery points especially for adult targeted vaccines such as flu and h1n1 vaccines, which will in turn lead to reduced missed opportunities for vaccination

Thank You