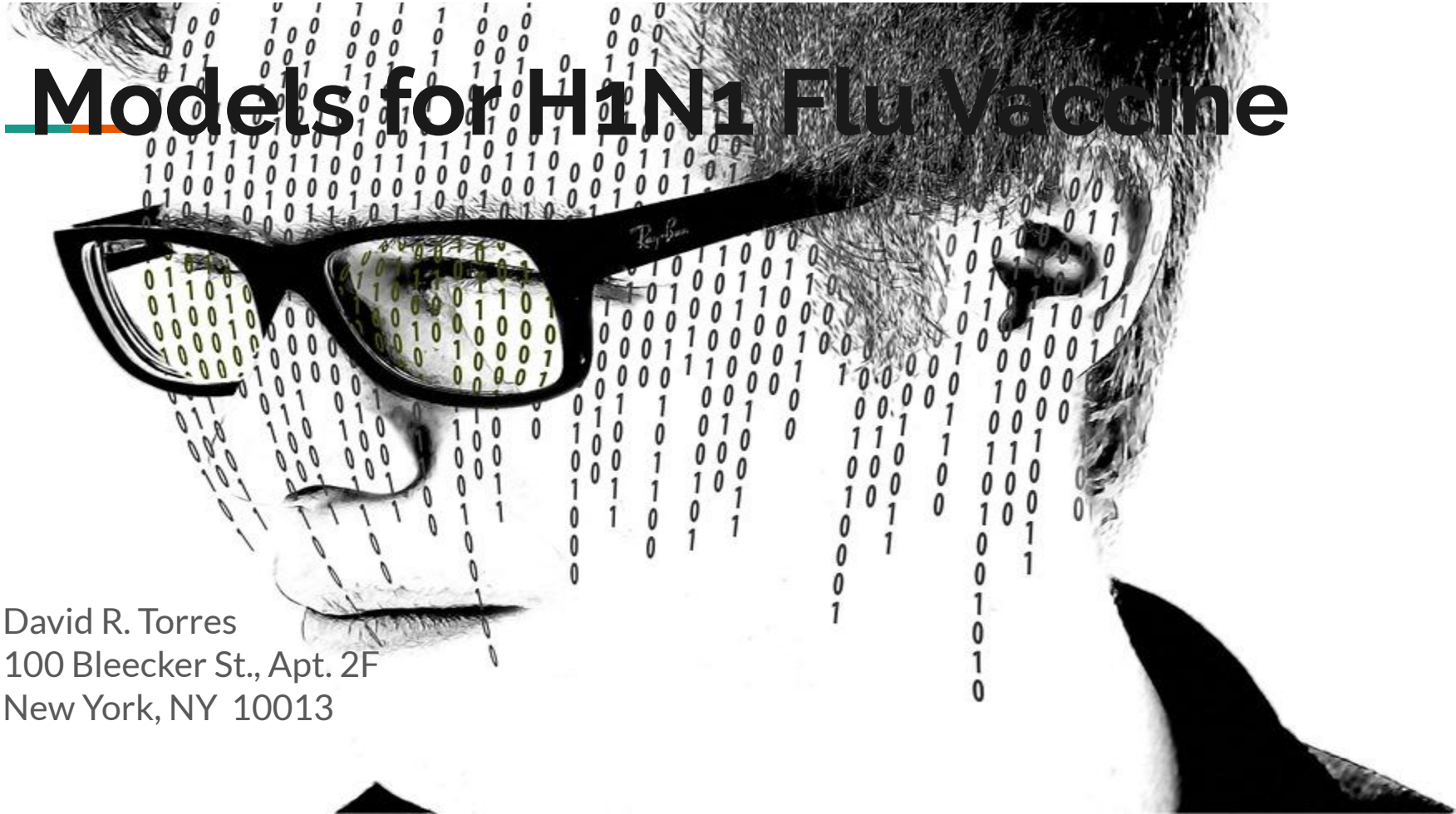
# Models for H1N1 Flu Vaccine



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# Introduction

Summit Medical Association asked me to analyze existing data on individuals who got H1N1 Flu vaccine and those who didn't. .

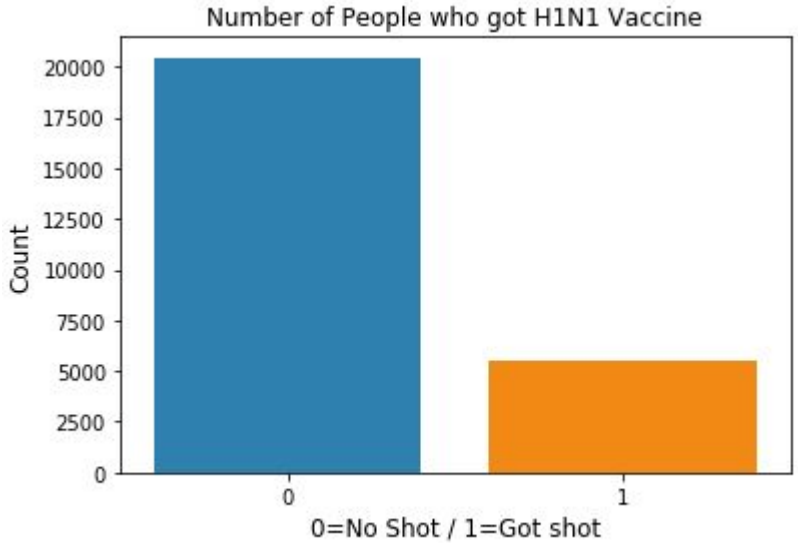
I will  provide you with facts, insights, which factors had a significant impact on people deciding whether to get vaccine and recommendations to increase rates.

I will run models to predict whether an individual based on features will get the H1N1 Flu vaccine or not.  This provides insights into which factors had the strongest impact on a person's decision to get vaccine.

Data set consist of 36 features and 26,707 rows.  The features range from income level, age, gender, employment status to education levels. Each row in the dataset represents an individual who responded to the National 2009 H1N1 Flu Survey.

## Number of People who received H1N1 and didn't

26,707 people responded to survey.
21% received H1N1 and 78% didn't.

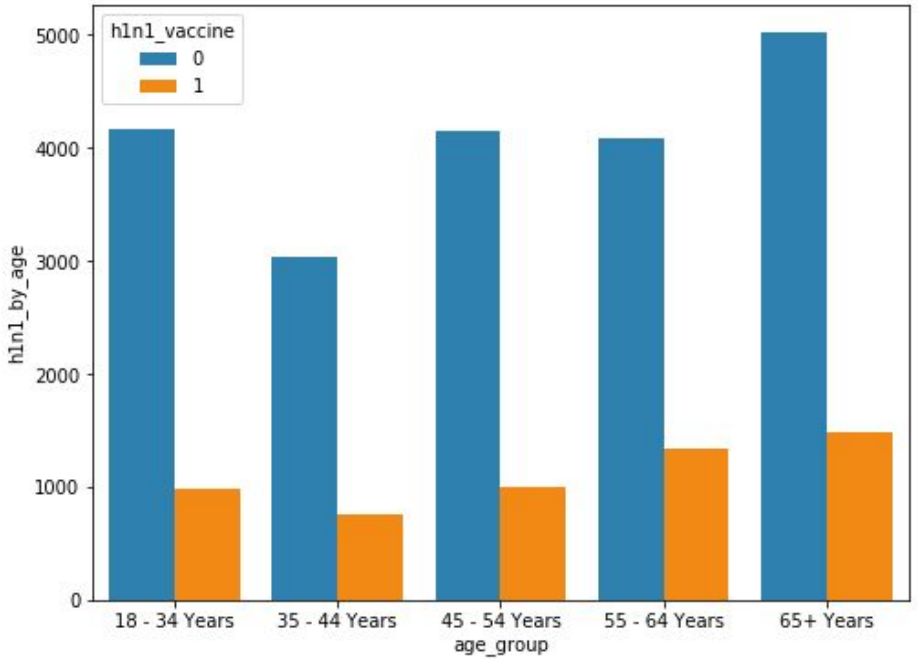


# Age Groups

**5 Age Groups**

**65 +**
largest group
6,498 responders, 25% of feature
22% got H1N1 and 77% didn't.

**55 - 64**
2nd  largest group
5421 responders, 20% of feature.
25% got H1N1 and 75% didn't.

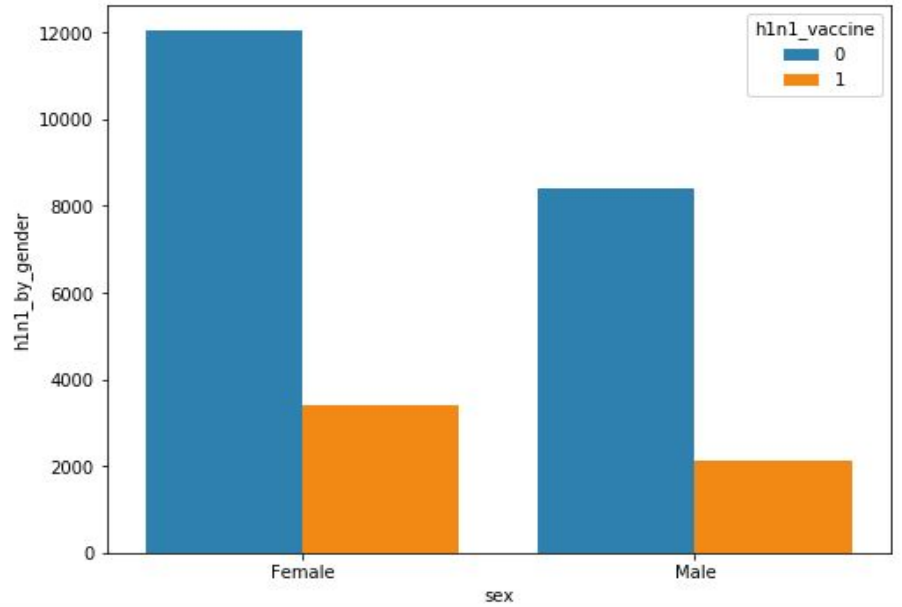


# Gender

**Females** 59% of feature
**Males** 40.5% of feature

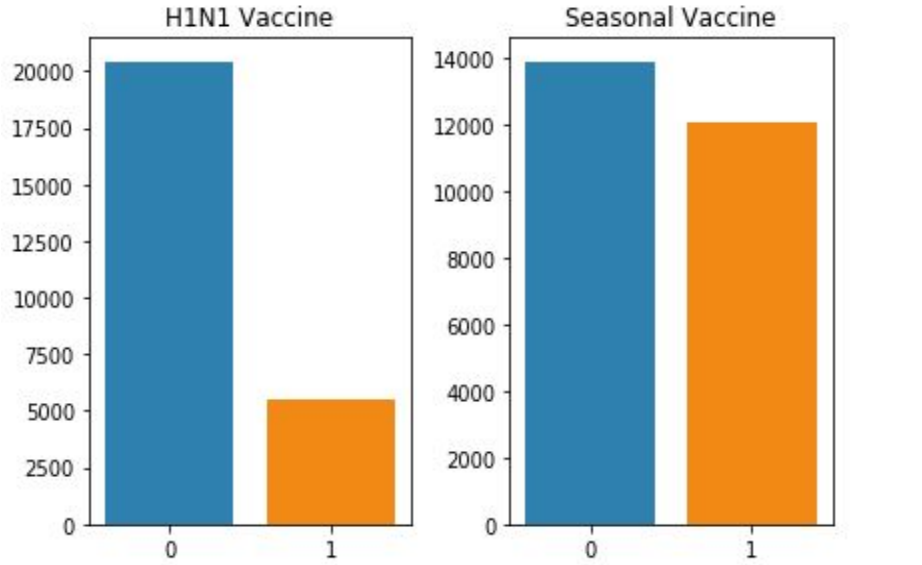
15,449 Females
78%  no vaccine and 22% did.

10,536 Males
80%  no H1N1 and 20% did.



# H1N1 v. Seasonal Flu

78%  no  H1N1 vaccine and 21% did.
54%  no Seasonal vaccine and 46% did.

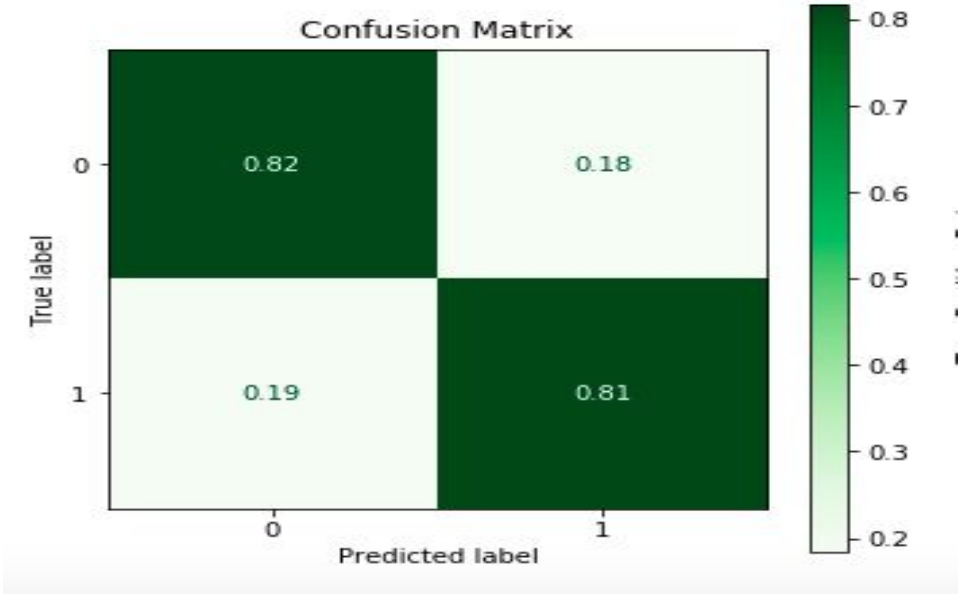


# Logistic Regression Model and Confusion Matrix

**Overall Model Accuracy:** 80%

**Confusion Matrix Metric:**

Category 1 (H1N1) Accuracy: 81%,
Category 0 (No H1N1) Accuracy: 82%



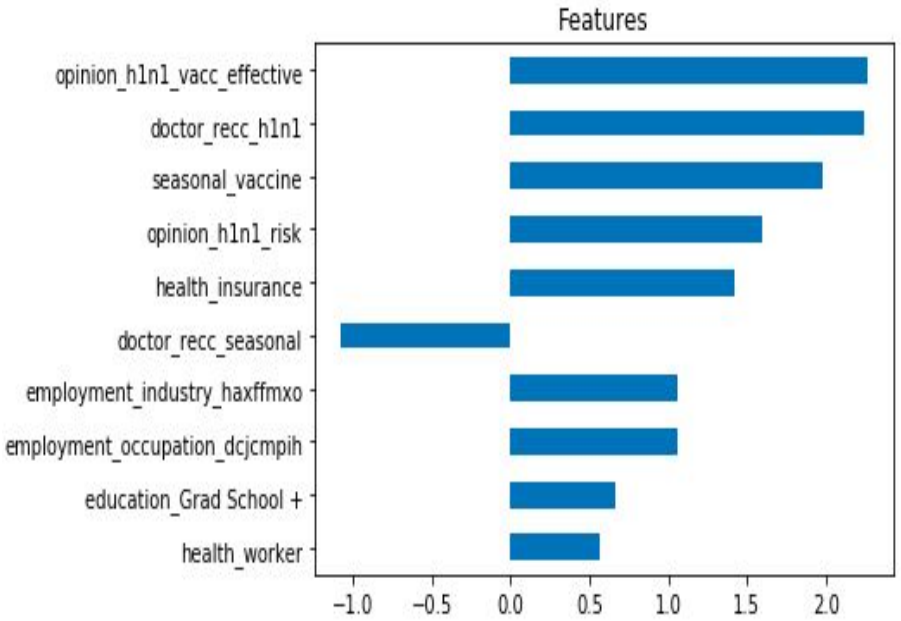
# Feature Importance

**Highly Correlated Features with Target:**
Opinion_h1n1_effective,
Doctor_recc_h1n1,
seasonal_vaccine

Ages, Sex, Education not highly correlated

**Model with 10 features:**
Model with top 10 features: 86%

Predicting who got vaccine: 54%



# Recommendations

In light of pandemic and upcoming flu season increase efforts for H1N1 Flu vaccination rates because rates are low. Specially, reported numbers for elderly are very low.

Research people's attitudes on effectiveness and risks of vaccine. I read in 2018 that the flu vaccine/H1N1 vaccine for that year wasn't very good in providing immunity. What is the impact of this on future vaccinations?

Whether patient has health insurance is important. Increase efforts for low-cost or free vaccinations.

if doctors recommended seasonal vaccine, it negatively impacted people's decisions' to get H1N1. Research do patients only want 1 shot or the other?

Outreach to Doctors/Medical professionals. Are they recommending both H1N1 vaccine and seasonal flu vaccines to patients or just the seasonal? This is impacting patients' decision to get H1N1.

Research if population understands difference between H1N1 vaccine and seasonal flu vaccine. Does the population think that they're the same vaccine. Is there a different shot for each vaccine?

# Closing

Thank you for your interest.  If you have any questions, don’t hesitate to contact me at below information.

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# Future Research

The data set I worked with was for year 2009. I want to research if there's more recent data on flu vaccines and graph vaccine levels over years. Have the vaccination rates gone up or down.

I read in 2018 that the flu vaccine/H1N1 vaccine for that year wasn't very good in providing immunity. How did/will this information impact future vaccinations.

Also, compare model outcomes  for the various years.