H1N1 *flu* VACCINE PREDICTION PRESENTATION

Group 2 Presentation

FROM 8TH SEP TILL 12TH SEP 2025

Meet the Team

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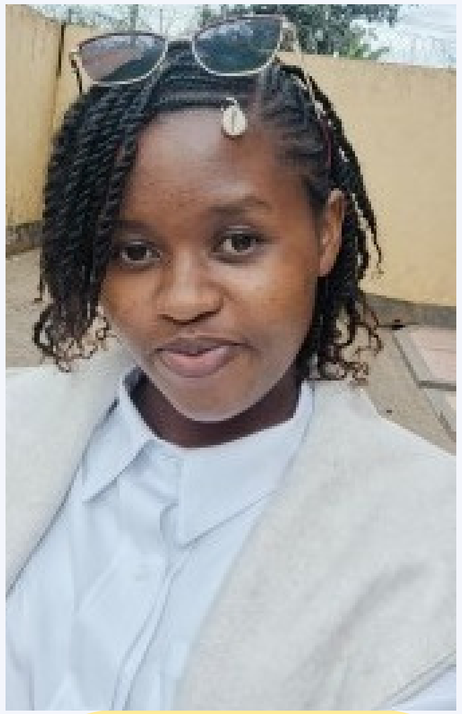

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Business Understanding

- In 2009, the world faced a pandemic caused by the H1N1 influenza virus (swine flu)
- This led to an estimated 151,000–575,000 deaths globally in its first year.

- A vaccine for H1N1 was introduced in October 2009. Shortly after, the U.S. National 2009 H1N1 Flu Survey was conducted to measure who received the H1N1 vaccine.

- The survey also collected information on people's demographics, health status, behaviors, and opinions.

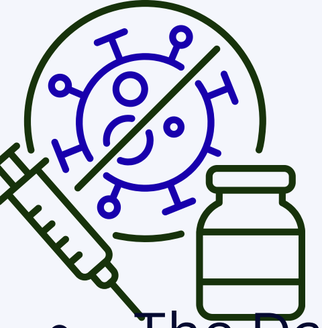
- Studying this data helps us understand why some groups chose vaccination while others did not, and provides guidance for future public health efforts.

Project Goals

- Main objective: To build a predictive model that identifies the key factors influencing **H1N1 flu vaccine** uptake and to understand patterns of vaccine hesitancy.

- Specific Objectives :

1. To analyze the effect of demographic factors(i.e., age, education, income) on vaccine uptake.
2. To analyze the effect of opinions and beliefs (e.g. vaccine effectiveness, risk perceptions, safety concerns)on vaccine uptake.
3. To investigate the influence of health status and behaviors(e.g., chronic conditions, mask use, handwashing) in influencing vaccination uptake.
4. To investigate the influence of Doctor's recommendations in influencing vaccination uptake.



Data Understanding and Overview

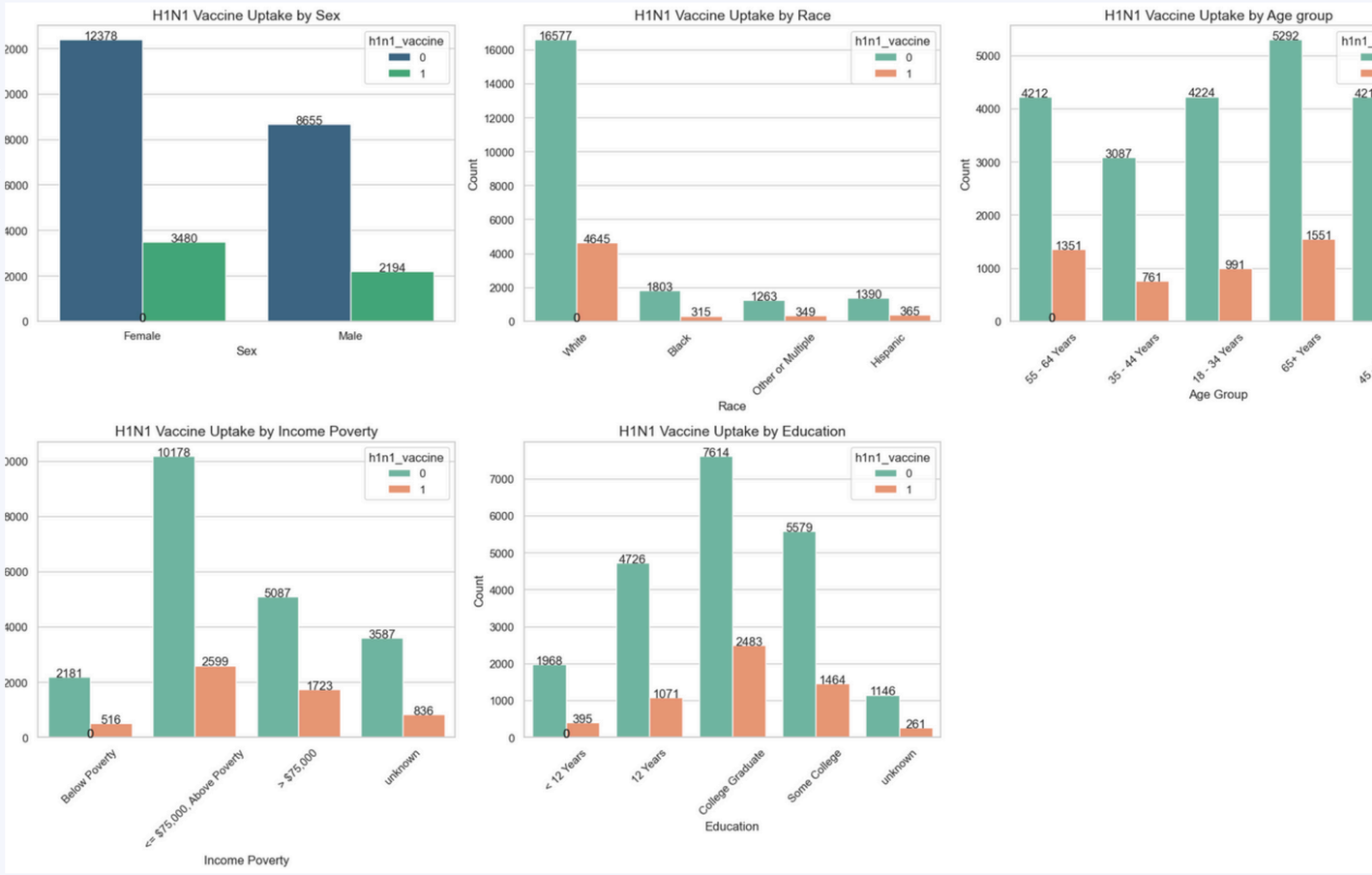
- The Data is on National 2009 H1N1 flu Survey in USA. But was picked from Kaggle.
- The data had two target variable, The Seasonal vaccine and the H1n1 vaccine. We chose to use the h1n1 vaccine as our target variable .
- The Data has 26707 records or entries and 38 columns or features.
  No Duplicated columns found.
- We conducted data cleaning on the missing values by filling the categorical variables with unknown, dropped columns that we unnecessary (i.e. The seasonal vaccine related column)
- Lastly on data cleaning we filled the numeric categorical data with mode.
- We also conducted data preprocessing (i.e. scaling , Balancing the target variable and encoding)

Findings

Demographic Factors on Vaccine Uptake

- Demographic factors:

- Older respondents (45-64,65+yrs) show a higher vaccine uptake than the young(18-34,35-44yrs).
- Females have a slightly higher vaccine uptake than Males.
- Higher educational levels(college Graduate and some college) have a higher uptake of vaccine than those with ≤ 12 yrs of education.
- On income poverty, the group with (<=75000$ above poverty) have a slightly higher number of people vaccinated than the other groups .
- Among the demographic factors these factors act strong on prediction than the rest of them like (Housold_adults, Housold_children ,e.x.t)



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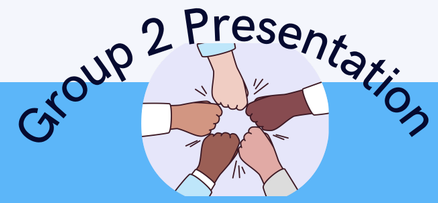
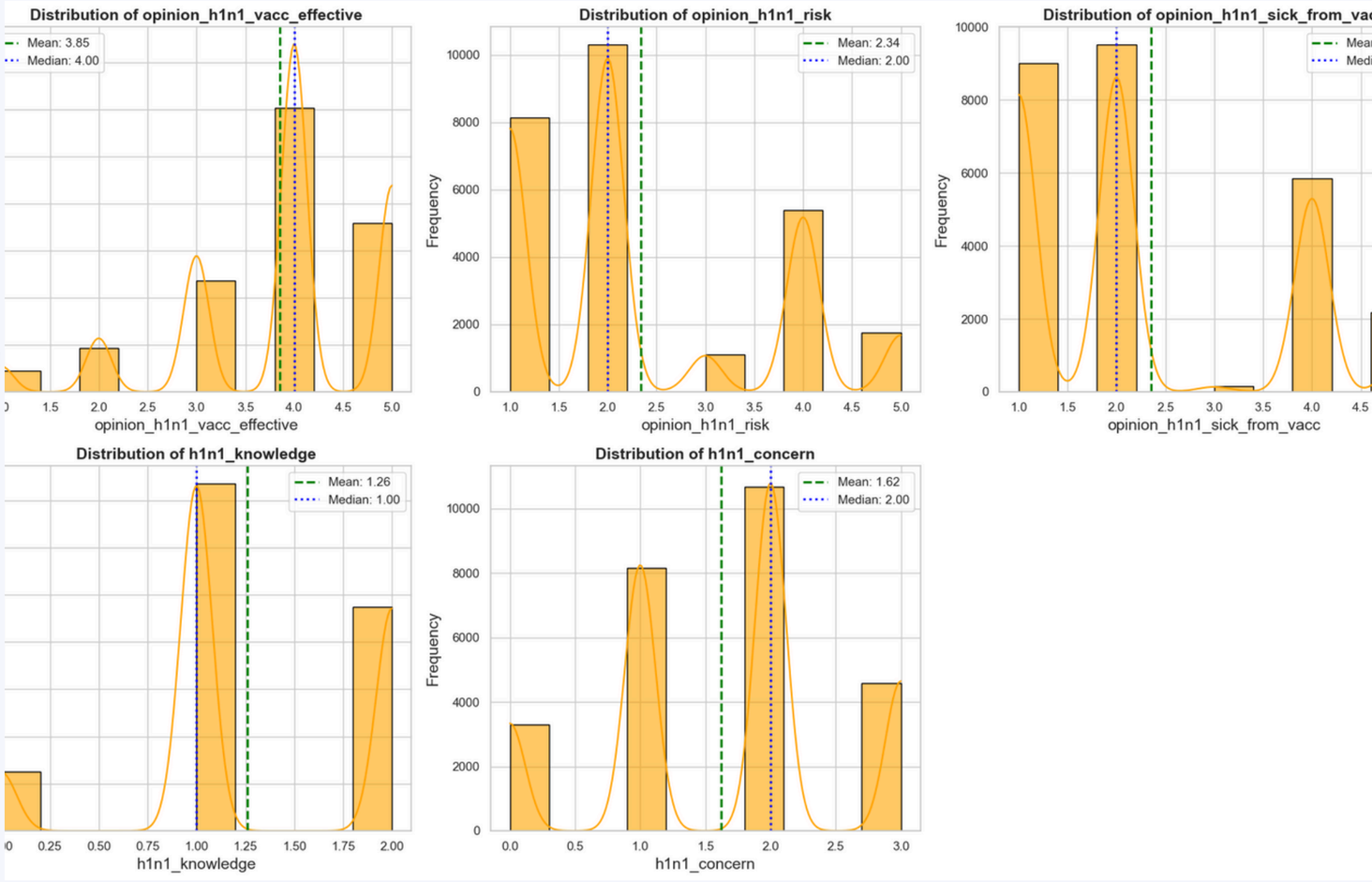


Perceptions and opinions

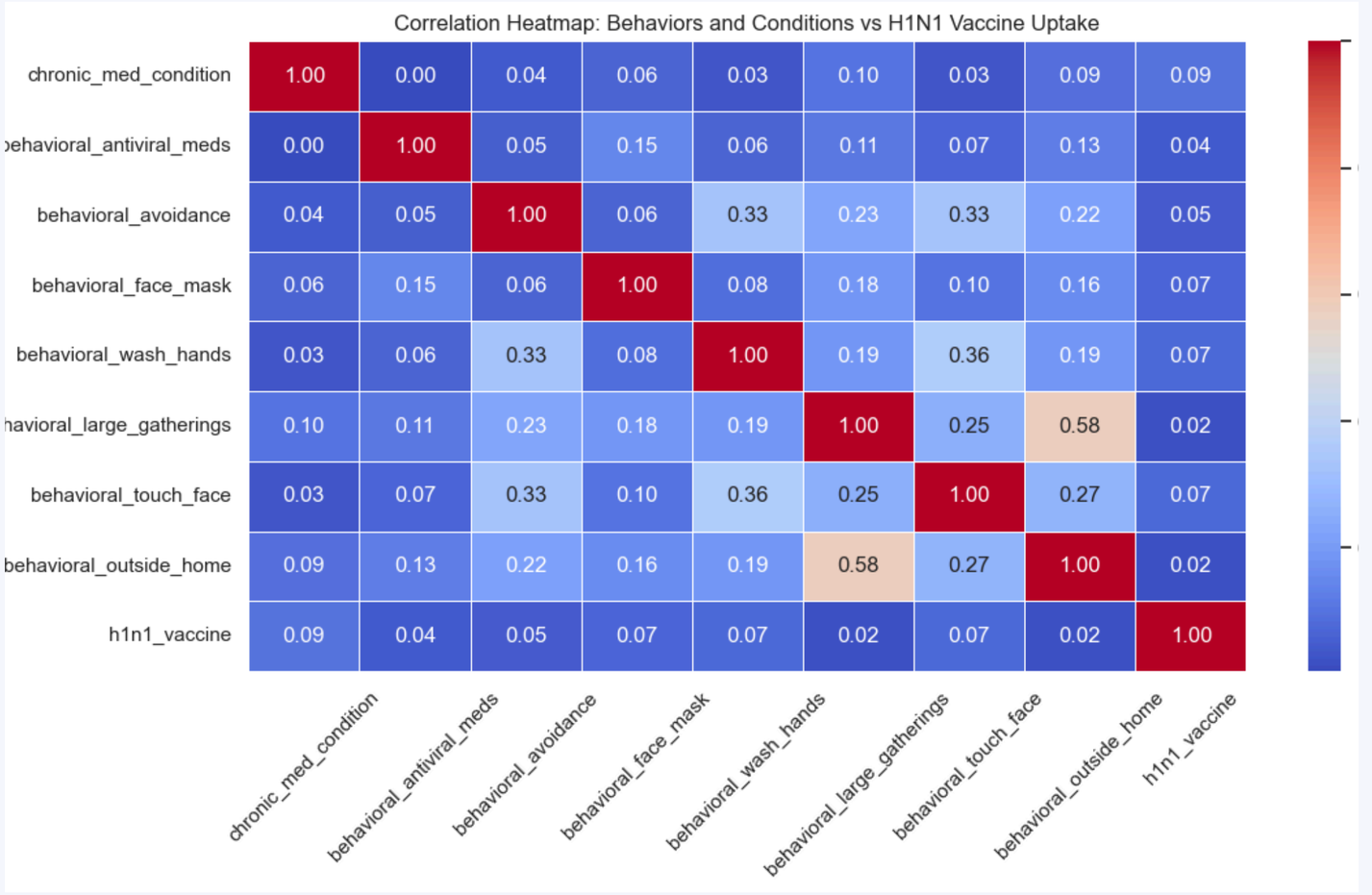
- Perceptions and opinions:
- Opinion of vaccine Effectiveness is the strongest driver of vaccine uptake with(Median=4.0, coefficient = +0.73)
- The opinion of vaccine risk sows an average risk perception with(median=2.0) but with a positive coeff 0f +0.66.
- Opinion of h1n1 sick from vaccine has a median of 2.0 and a regression coeff (-0.08) showing concern reduces the chances of vaccination though not strongly.
- For the h1n1_knowledge, the distribution shows most respondents report low knowledge about it.
- For h1n1_concern ,shows a right skewness hence average concern .Its moderate.



Health status and behavioral factors

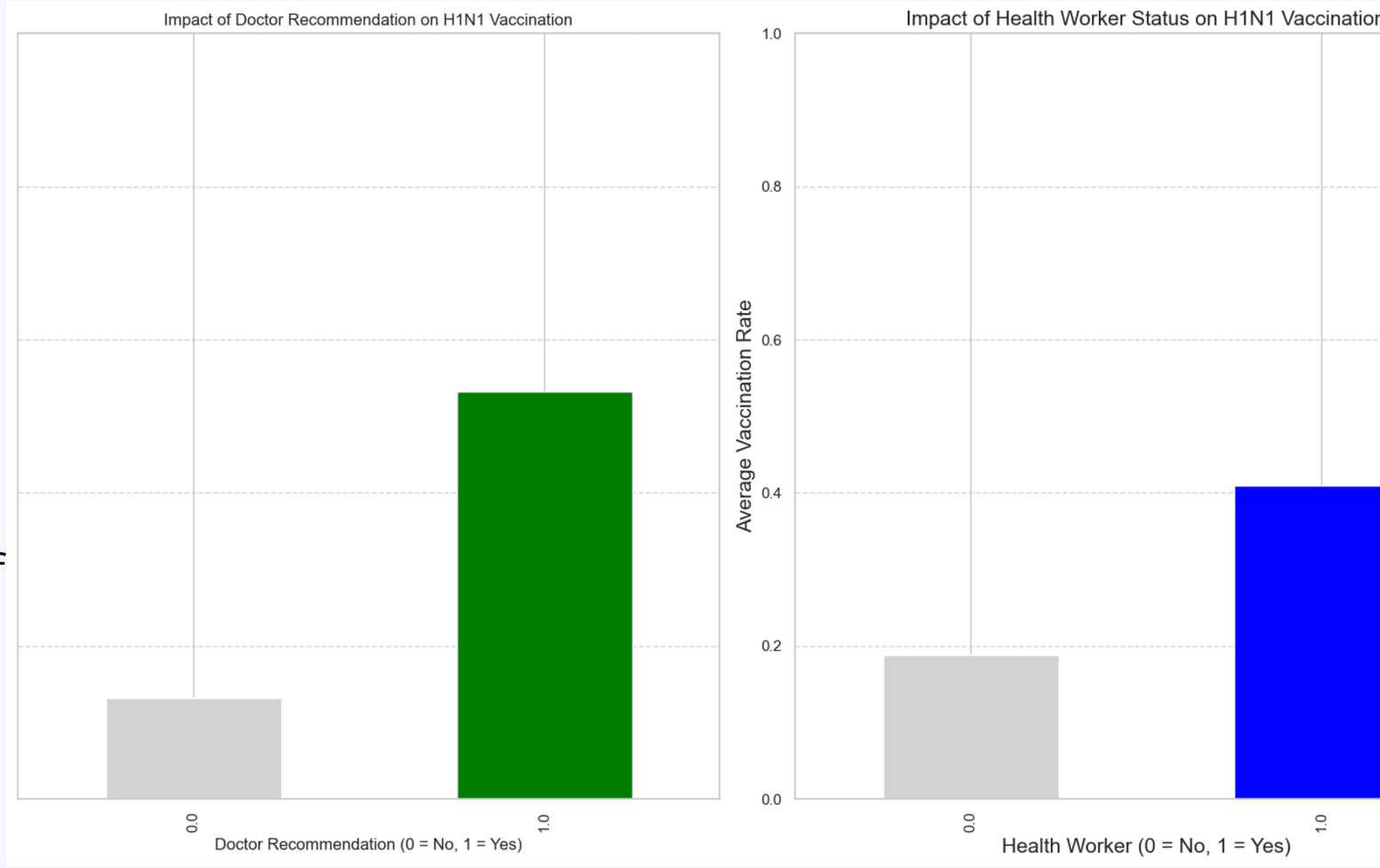
- Health status and behavioral factors:

- People with chronic conditions were slightly more to take the vaccine (r=0.10)
- Protective behaviors such as Mask use(r=0.07),wash of hands(r=0.07) and others showed small positive links to vaccination.
- However the effects were weak overall, meaning that while health risks and protective habits encouraged uptake, they were not strong predictors of vaccination uptake.



Doctor’s recommendations and health work influence

- Doctors recommendations and health worker status :
- Those who receive doctors Recommendations had a significantly higher average rate of vaccination.
- This means that, Medical Advice is trusted.
- Those working in health industries also have a significantly higher average rate of vaccination.
- This reflects the great awareness /access to vaccine within the health care facilities.

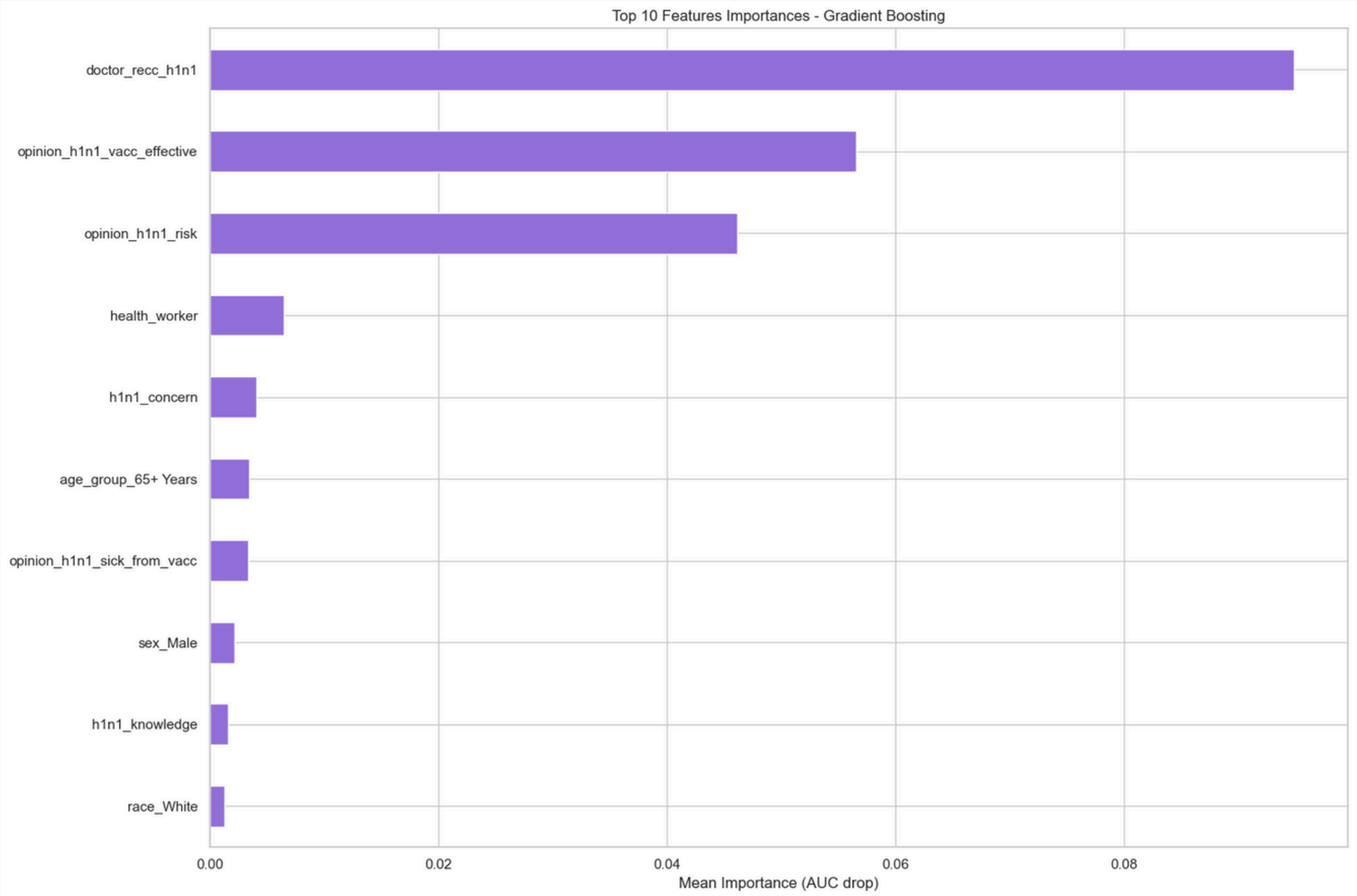


Feature Importance

- The Doctor’s recommendation is the strongest driver for vaccination uptake .

- Features like(Opinionh1n1vacc effective ,opinion risk and h1n1sickfrom vaccine) ranked highly indicating that people’s beliefs play a major role in the uptake.

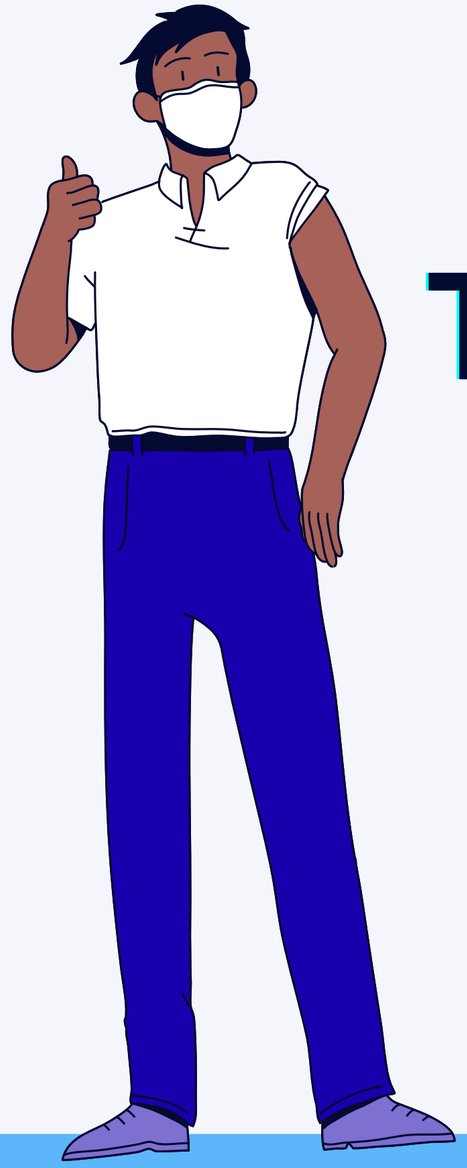
- Demographic features like (age group_65+ yrs, sex male, race white) had lower importance compared to behavioral and medical opinions.
- This suggests that attitudes and trust are more influential than age or race alone.



Recommendations and conclusion

- Doctor’s role: Encourage doctors to actively recommend the H1N1 vaccine.
- Effectiveness Messaging: Share clear evidence that the vaccine works.
- Risk Awareness: Emphasize the dangers of H1N1 infection.
- Close Knowledge Gaps: Provide simple education and target groups with hesitancy and low awareness.

NB// here is a video Link for a H1N1 flu vaccination in details



Thank you for Your Time

Questions or comments?

GET IN TOUCH!