PREDICTING VACCINE UPTAKE USING BEHAVIORAL AND BACKGROUND DATA

David Mburu

Overview

- Vaccination is a key public health measure used to fight infectious diseases. Vaccines provide immunization for individuals, and enough immunization in a community can further reduce the spread of diseases through “herd immunity”
- A better understanding of how various characteristics are associated with personal vaccination patterns can provide guidance for public health efforts.

Business and Data Understanding

- The Kenya Medical Research Institute wants to find out the characteristics that influence people's response to vaccination drives to enhance how they go about public health vaccination efforts in future.

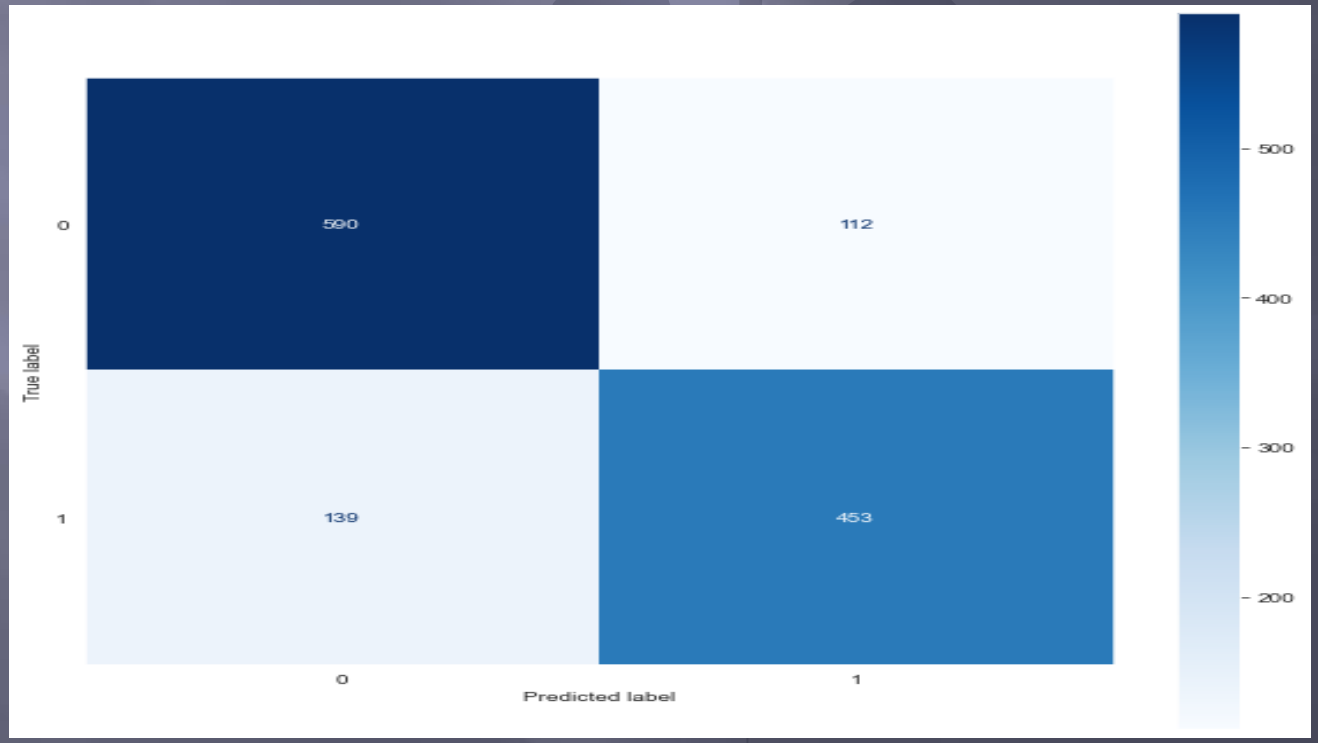
- I have used a dataset from the drivendata website that contains 26707 rows and 36 columns representing people’s answers to medical survey questions.

Objectives

- 1. Find the best model to predict cases where a person is unlikely to get the vaccine
- 2. Find out which age groups are less likely to get vaccinated
- 3. Find out how people's beliefs about vaccines affect their likelihood to get vaccinated
- 4. Find out how people's attitudes about a disease influence their vaccination decision

Modeling

- The best model could predict how likely people are to get vaccinated with an accuracy of 80.6%.
- For predicting only the unlikely vaccination cases, it was 84% accurate.

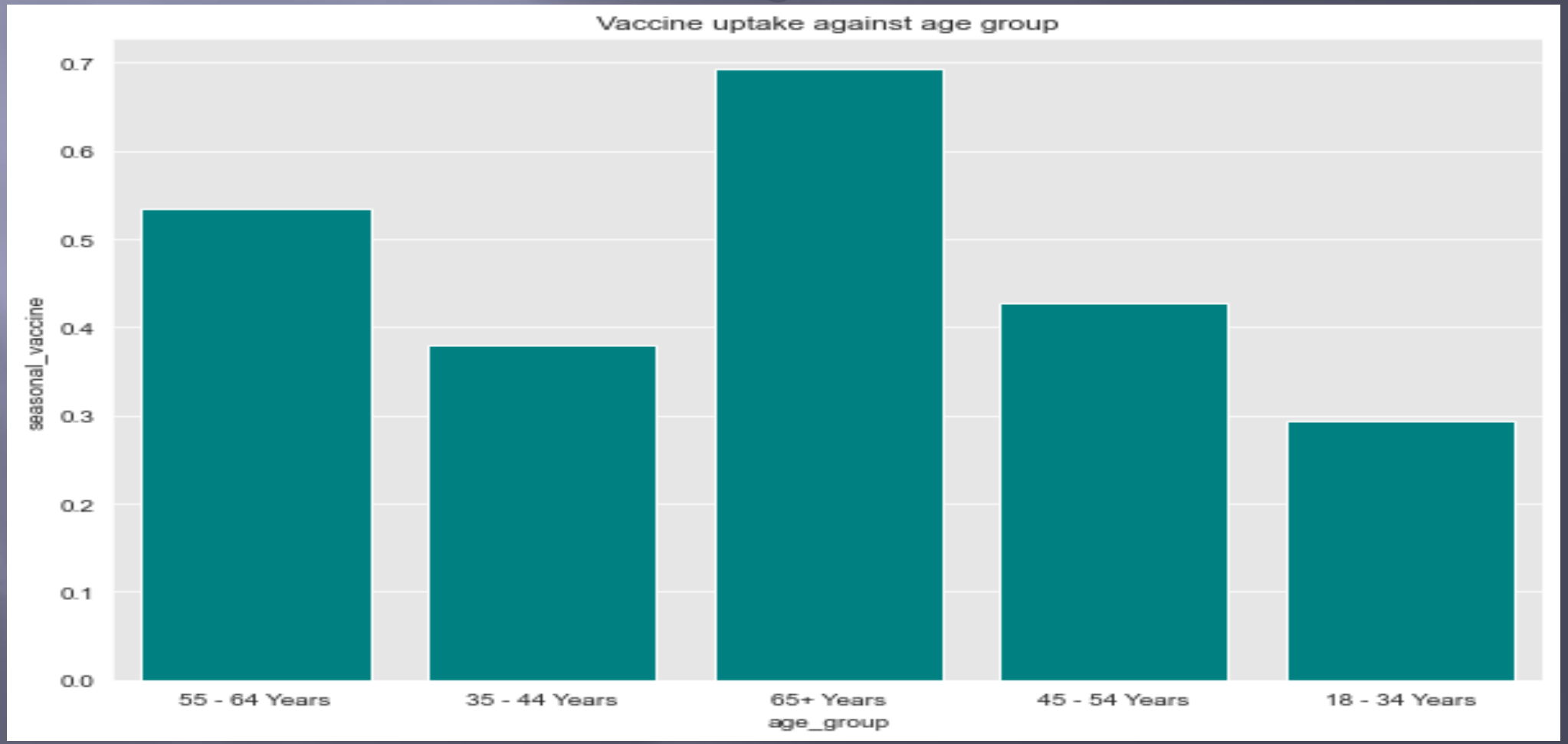


Model Evaluation

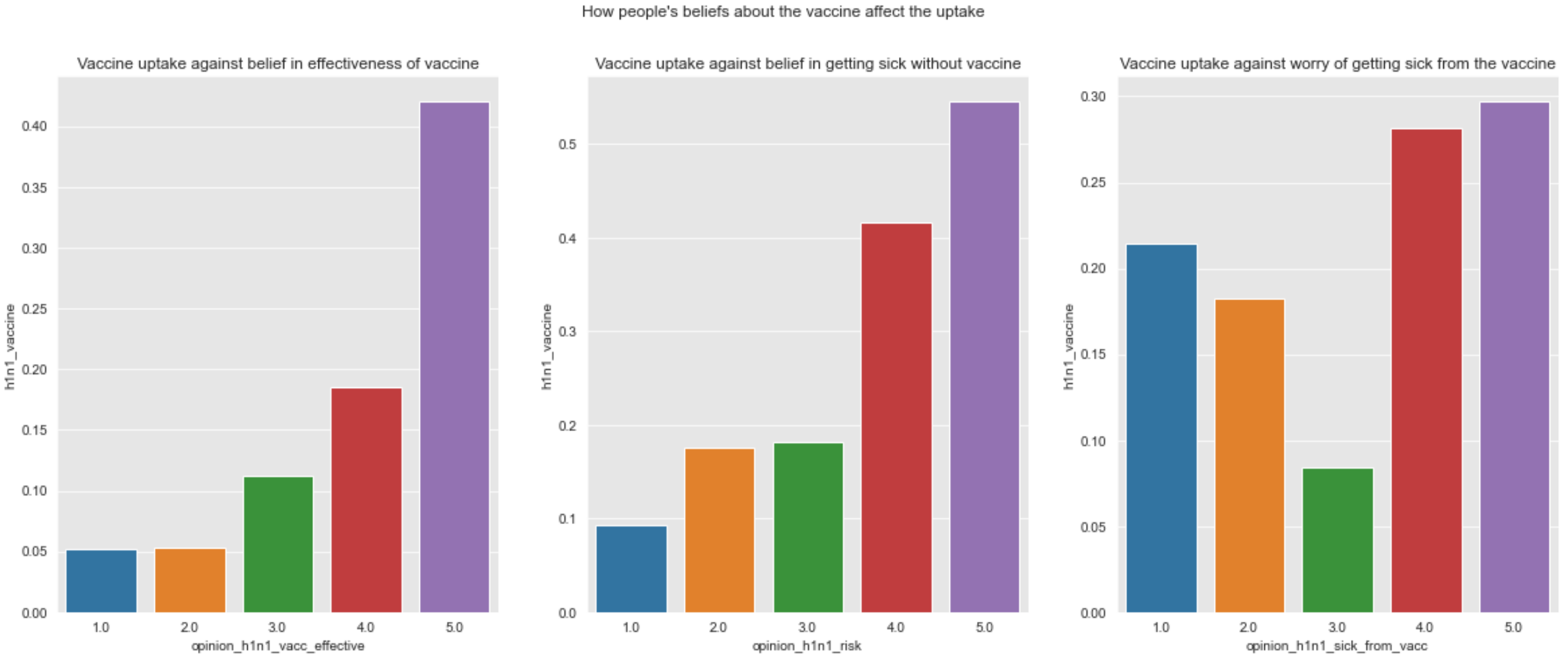
- Out of the 702 people who did not get vaccinated, the model correctly predicted 590 of them.
- The model is more likely to falsely classify someone as not likely to vaccinate than falsely classify someone as likely to vaccinate(139 vs 112)
- This ensures vaccination drives capture a wide range of people including some who would have gotten vaccinated anyway hence limiting the number of people who get left out.

Findings

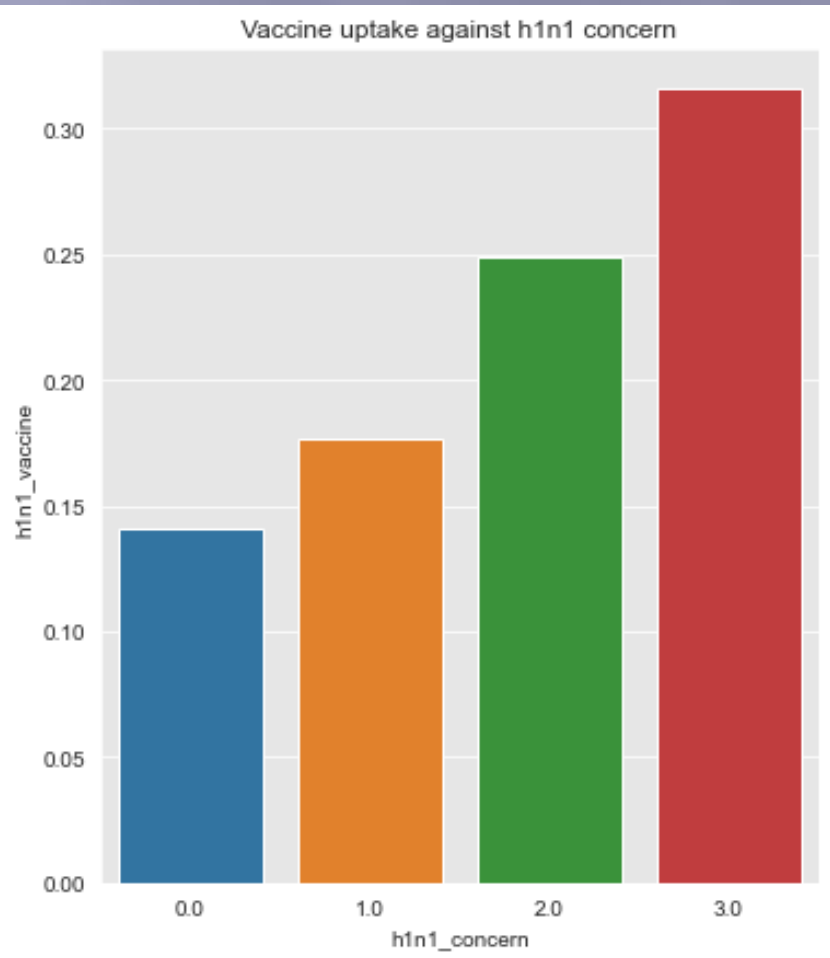
- The age groups 18 – 34 and 35 -44 are the least likely to get vaccinated

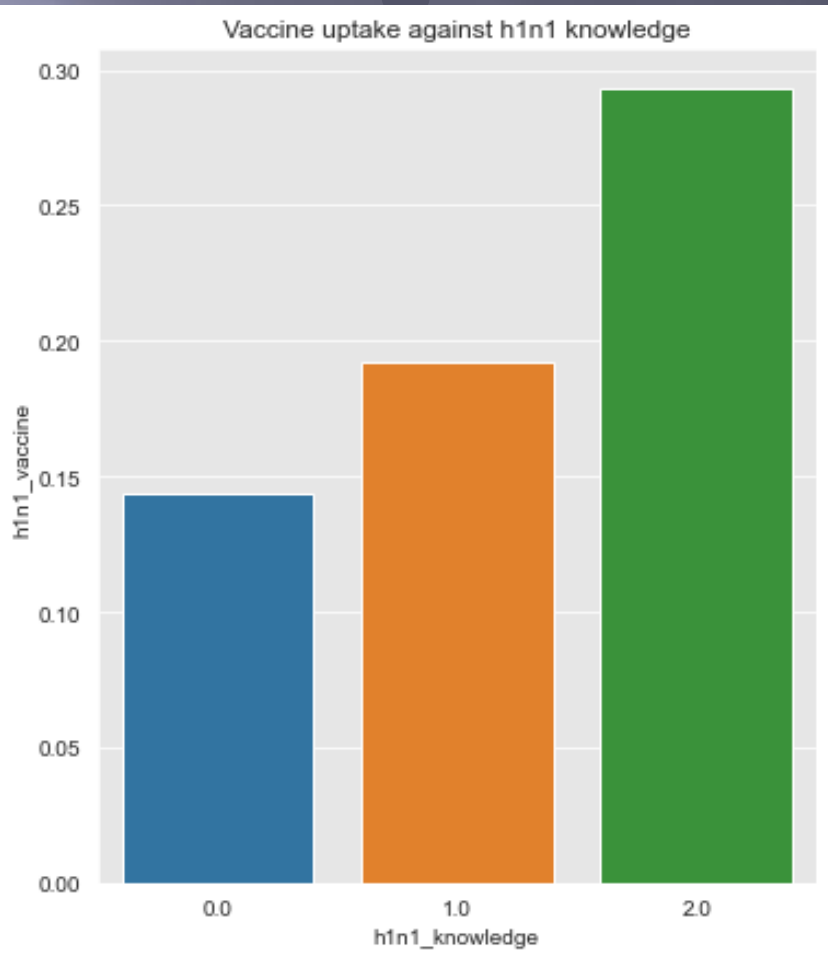


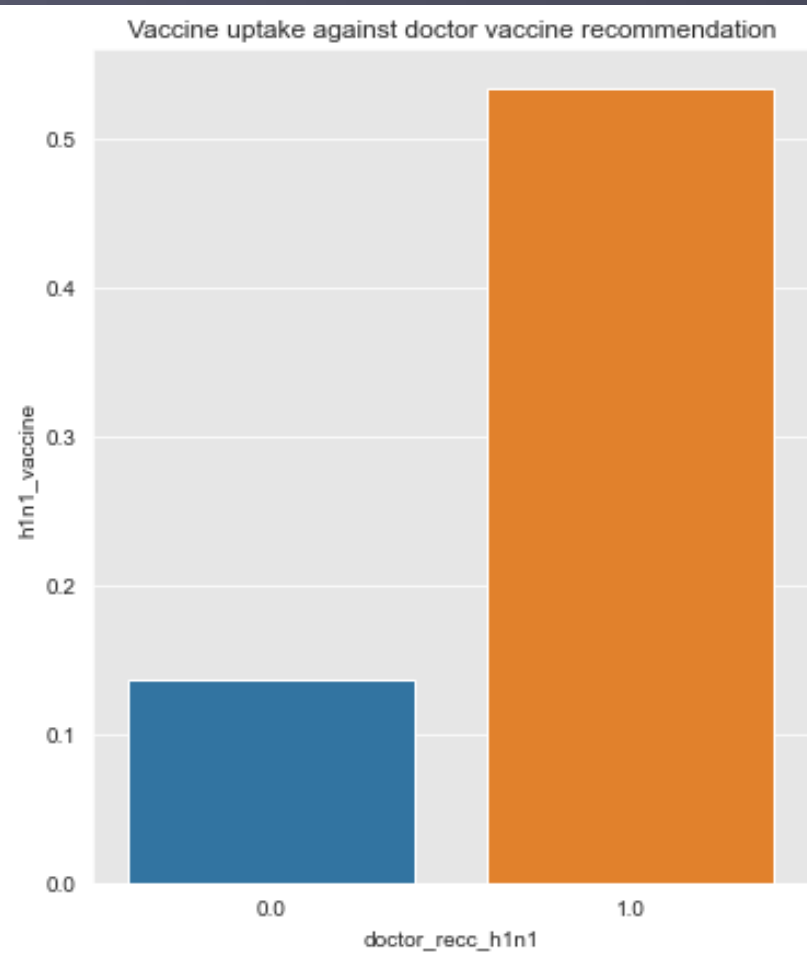
People’s beliefs about not needing the vaccine or getting sick because of the vaccine negatively impact vaccine uptake



- People’s attitudes about diseases and downplaying their impact also negatively impact vaccine uptake
- A doctor’s recommendation greatly impacts vaccination likelihood







Recommendations

- 1. Spread awareness about the effects about a disease to ensure people take vaccination seriously.
- 2. Engage in vaccination information campaigns to combat people's negative beliefs about vaccines.
- 3. Target people aged 18-44 as these are the least likely to get vaccines.
- 4. Subsidize vaccine costs to ensure people with a low economic status can get the vaccine.
- 5. Subsidize households with more than three people to ensure they all get vaccinated.
- 6. Encourage doctors and other medical professionals to personally recommend the vaccine to people.

Thank you

Any Questions?

David Mburu

LinkedIn: linkedin.com/in/david-g-mburu-b1268a1b7

Email: daveygmburu@gmail.com