Vaccine Prediction Insights

Data Science/Public Health

Creator: Anne Nyokabi

CONTENT

01

Project Overview

H1N1 and Seasonal Flu Dataset

Dataset Overview

Comprehensive dataset capturing vaccination behaviors for H1N1 and seasonal flu, including demographic information, opinions, and health practices of respondents.

Prediction Goals

My analysis aimed to predict vaccine uptake using personal information, helping identify factors that influence vaccination decisions among different population segments.

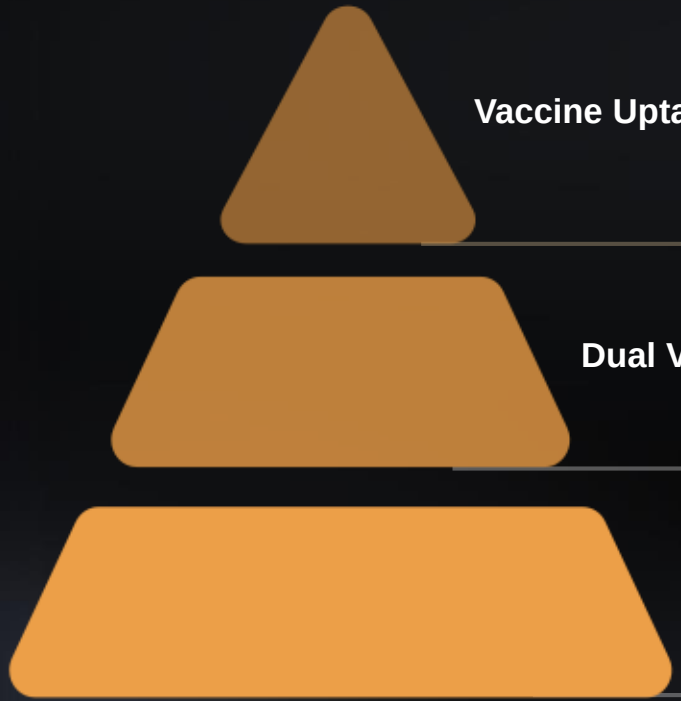
Logistic Regression Results

Achieved 86.69% prediction accuracy (AUC) using logistic regression, identifying key factors that significantly influence vaccination decisions across diverse populations.

Decision Tree Insights

Decision tree model achieved 78% accuracy, providing visual, interpretable patterns showing how different factors interact to affect vaccination choices.

Prediction Goals



Vaccine Uptake Prediction

My primary goal was to predict who received H1N1 and seasonal flu vaccines based on demographic information, attitudes, and health behaviors.

Dual Vaccine Analysis

I aimed to understand factors influencing both H1N1 and seasonal flu vaccine acceptance to identify patterns across different population segments.

Model Performance Targets

I developed predictive models with high accuracy (78%) and strong discriminatory power (AUC 0.8669) to support targeted vaccination campaigns.

Healthcare Policy Implications

Data-Driven Vaccination Strategies

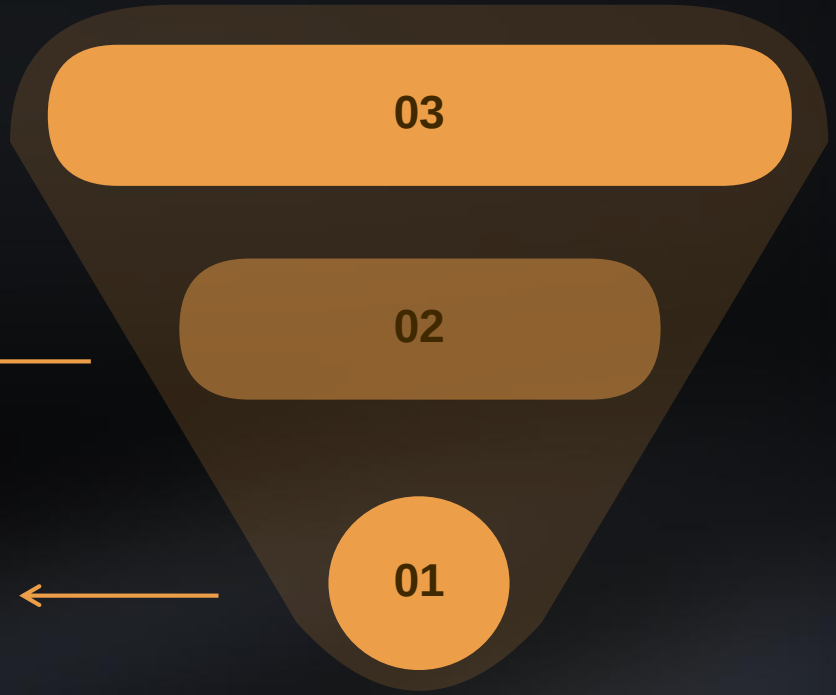
My predictive models can help target vaccination campaigns more effectively, reaching populations most likely to decline vaccines and addressing their specific concerns.

Resource Allocation Recommendations

Models identifying key factors influencing vaccination decisions enable strategic resource distribution, optimizing healthcare budgets while maximizing vaccination rates.

Personalized Health Communication

My 78% accurate model reveals demographic and belief patterns that can inform tailored public health messaging to address specific concerns about vaccines.



02

Methodology and Results

Logistic Regression Performance

01

What is Logistic Regression

A statistical method that predicts binary outcomes (yes/no) by calculating probability. In my study, I predicted whether someone received H1N1 or seasonal flu vaccines.

02

AUC Score Explained

My model achieved 0.8669 AUC, meaning it correctly distinguished between vaccinated and unvaccinated individuals nearly 87% of the time, a strong result.

03

Key Predictive Factors

The model identified important factors influencing vaccination decisions, including age, education level, healthcare access, and attitudes toward vaccine effectiveness and safety.

Decision Trees Accuracy

Understanding Decision Tree Accuracy

My decision tree model achieved 78% accuracy in predicting vaccine uptake, correctly identifying nearly 8 out of 10 individuals' vaccination status.

Comparing Model Performance

While decision trees offer more interpretable results, Logistic Regression achieved an AUC of 0.8669, and it excels when relationships are relatively straightforward and additive.

What an 86% Accuracy Means

This accuracy level indicates my model correctly predicted whether a person received vaccines in 86% of cases, based on their demographics and health behaviors.

Key Predictive Factors

01

Opinion Factors

People's beliefs about vaccine effectiveness and safety were strong predictors of vaccination status, showing how perceptions influence health decisions.

02

Demographic Indicators

Age, education level, and employment status emerged as significant predictors, with higher education correlating with increased vaccination rates.

03

Health Behavior Patterns

Prior vaccination history and regular doctor visits strongly predicted H1N1 and seasonal flu vaccine uptake, demonstrating the importance of established health routines.

03

Insights for Decision-Making

Vaccination Behavior Patterns

01

Analysis of demographic patterns showing which population groups are more likely to receive H1N1 and seasonal flu vaccines based on my predictive models.

Who Gets Vaccinated?

02

The most significant predictors of vaccination behavior identified through our logistic regression model, including attitudes, healthcare access, and previous health behaviors.

Key Influencing Factors

03

My models achieved 86% prediction capability for determining vaccination likelihood, helping target public health interventions more effectively.

Accuracy of Our Predictions

Population Segment Analysis

Key Population Segments Identified

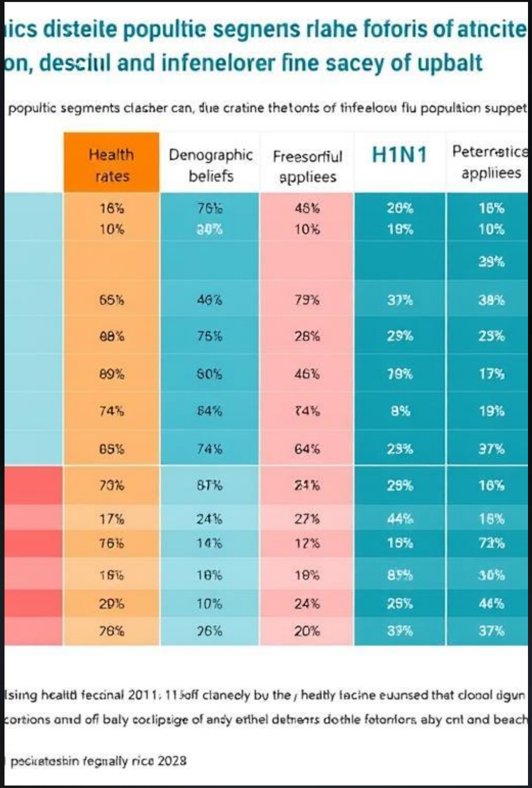
My analysis revealed distinct population segments with varying vaccination rates based on demographics, health beliefs, and behaviors that influenced H1N1 and seasonal flu vaccine uptake.

Age and Education Factors

Higher education levels correlated strongly with increased vaccination rates across all age groups, with seniors showing the highest uptake regardless of other factors.

Risk Perception Impact

Individuals who perceived higher personal risk from influenza were significantly more likely to get vaccinated, especially for H1N1, as confirmed by our logistic regression model.



Health rates	Denographic beliefs	Freesorfiul appliees	H1N1	Peterrstics appliiees
16% 10%	76% 30%	45% 10%	20% 19%	16% 10%
				29%
65%	46%	79%	37%	38%
68%	75%	28%	29%	23%
69%	60%	46%	79%	17%
74%	64%	74%	8%	19%
65%	74%	64%	23%	37%
70%	87%	21%	29%	16%
17%	24%	27%	44%	18%
76%	14%	17%	15%	72%
16%	10%	19%	85%	30%
20%	10%	24%	25%	46%
76%	26%	20%	39%	37%

Targeted Intervention Opportunities

Part 01

High-Risk Population Identification

My models identified key demographics less likely to vaccinate, allowing targeted outreach to vulnerable groups with personalized education and access solutions.

Part 02

Addressing Vaccine Hesitancy

Data revealed specific concerns driving hesitancy. Interventions can address misconceptions about vaccine safety and effectiveness through tailored communication strategies.

Part 03

Resource Allocation Strategy

Predictive models help optimize distribution of limited vaccine resources by identifying communities with lowest vaccination rates and greatest need.

Thanks !