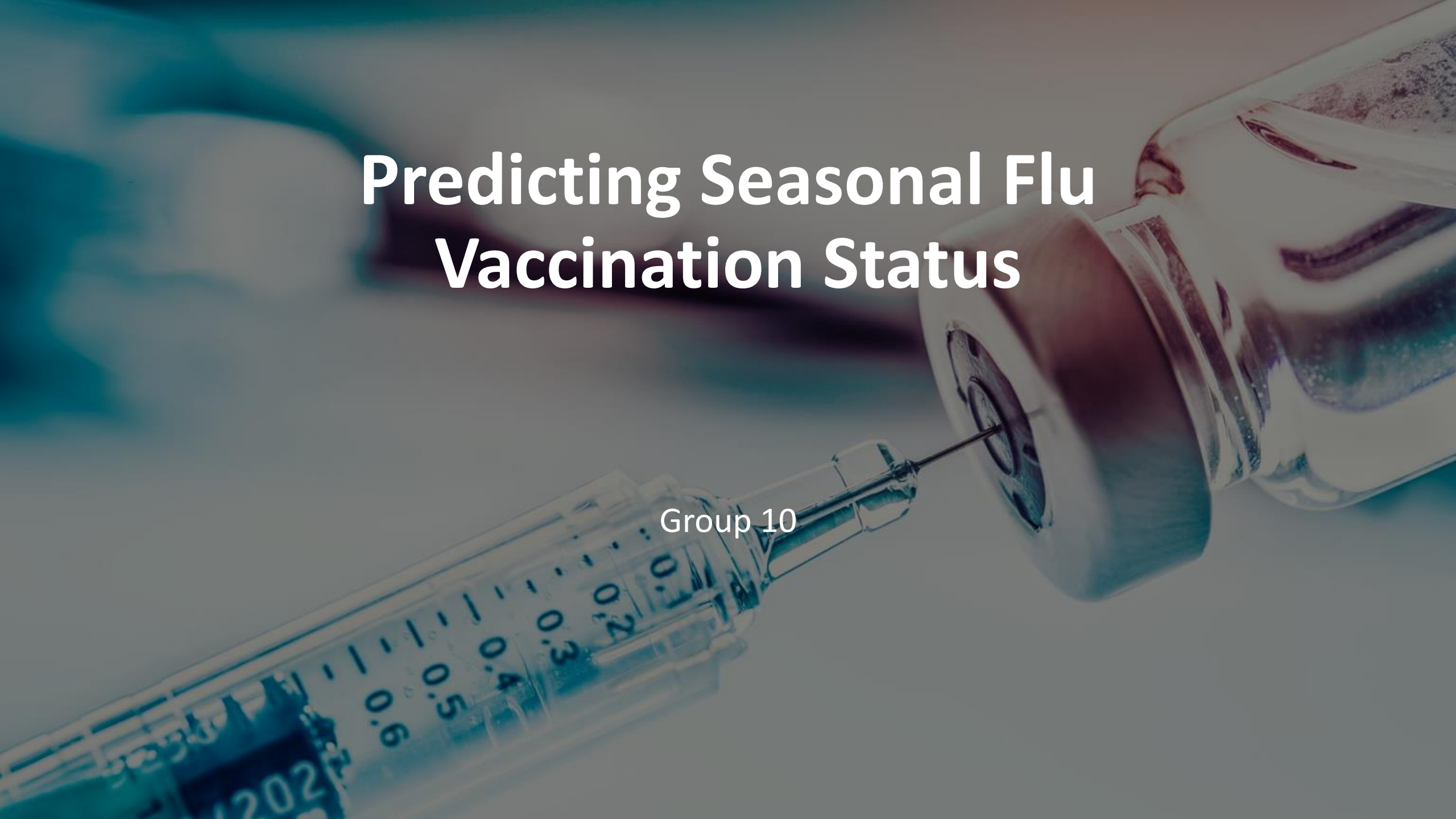


Predicting Seasonal Flu Vaccination Status

Group 10





Overview

- ✓ The goal of this project is to predict how likely individuals are to receive their flu vaccines. Specifically, we'll be predicting for the Seasonal vaccine target variable. An understanding of how people's backgrounds, opinions, and health behaviour can provide guidance for future public health efforts and how they are related to their personal vaccination patterns.

Business Understanding

- ✓ The aim of this project is to predict whether individuals received the seasonal flu vaccine using data obtained from DrivenData. By understanding the factors that influence vaccine uptake, public health efforts can be better tailored by the Ministry of Health in Kenya, to increase vaccination rates and protect the population against influenza. Other benefits from this analysis include



Business Objectives

1. To determine the key factors that influence an individual's decision to get vaccinated for the seasonal flu.
2. To determine how preventive measures impact an individual's decision to get vaccinated.
3. To develop a robust predictive model that accurately estimates the probability of individuals receiving their seasonal flu vaccines.



Data Understanding

- The records/rows contain the results of a survey conducted in 2009 which collected some basic demographic information as well as information specific to an individual's risk of developing flu-related complications, for instance, having a chronic medical condition, the level of concern/knowledge about the flu, and some behavioural attributes like buying a face mask and avoiding close contact with people with flu-like symptoms.
- Labels are binary variables, with 1 indicating that a person received the respective flu vaccine and 0 indicating that a person did not receive the respective flu vaccine.
- Majority of data is categorical (binary).



Benefits of the Research

- ✓ Informing targeted public health campaigns on factors that affect vaccination rates among different populations



Benefits of the Research

Inform Efficient Resource Allocation:

- ✓ By understanding the factors that affect efficient distribution of the vaccine among vulnerable populations



Benefits of the Research

- ✓ Suggest Useful Policy Recommendations



Features

Features that were the most important in predicting vaccination status include:

1. Doctor's recommendation
2. Opinion on vaccine effectiveness
3. Health worker
4. Health Insurance
5. Perceived risk of getting sick from flu vaccine
6. Income Level
7. Education Level
8. Race
9. Chronic Medical Condition
10. Behaviour (Touching Face)





Modelling

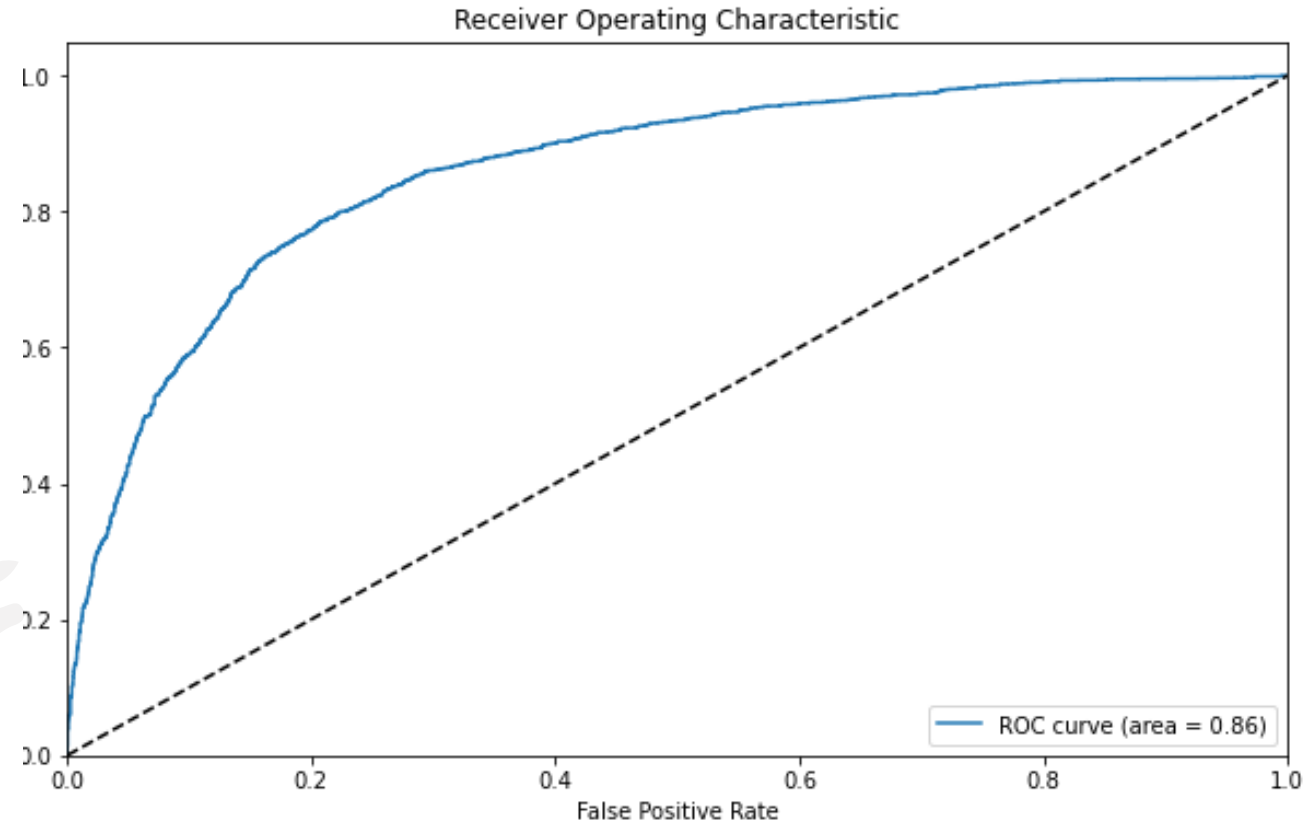
Models were evaluated based on their ROC-AUC values:

- Baseline Logistic Regression – 84.9%
- Decision Tree – 82.5%
- K Nearest Neighbour – 80.8%
- Random Forest – 85.1%
- XGBoost – 85.5%



Best Model : XGBoost

- Best Receiver Operating Characteristic- Area Under Curve score : 85.5%
- With a discrimination ability score of 85.5%, our model effectively distinguishes between vaccine uptake and non-uptake based on input features.
- Important features provide insights on the key factors contributing to high vaccine uptake and improving model predictions.



Recommendations

Collaboration with Healthcare and Insurance Providers:

- ✓ Ministry of Health to partner with healthcare and insurance providers.
- ✓ Increase insurance coverage to encourage medical checkups and doctor's recommendations.
- ✓ Promote and increase seasonal flu vaccine uptake.





Recommendations

Identify High-Risk Groups:

- ✓ Utilize predictive model to identify historically low vaccine uptake groups.
- ✓ High-risk groups: infants (<6 months), elderly (>65 years), healthcare practitioners, and individuals with chronic conditions.
- ✓ Promote seasonal flu vaccine uptake among these groups

Recommendations

Targeted Messaging and Outreach:

- ✓ Develop tailored communication strategies to address specific concerns.
- ✓ Address myths about vaccination and promote flu prevention practices.
- ✓ Increase seasonal flu vaccine awareness and uptake.



Recommendations

Effective Resource Allocation:

- ✓ Utilize predictive model for efficient resource allocation.
- ✓ Allocate resources based on high vaccine-uptake areas to minimize wastage.





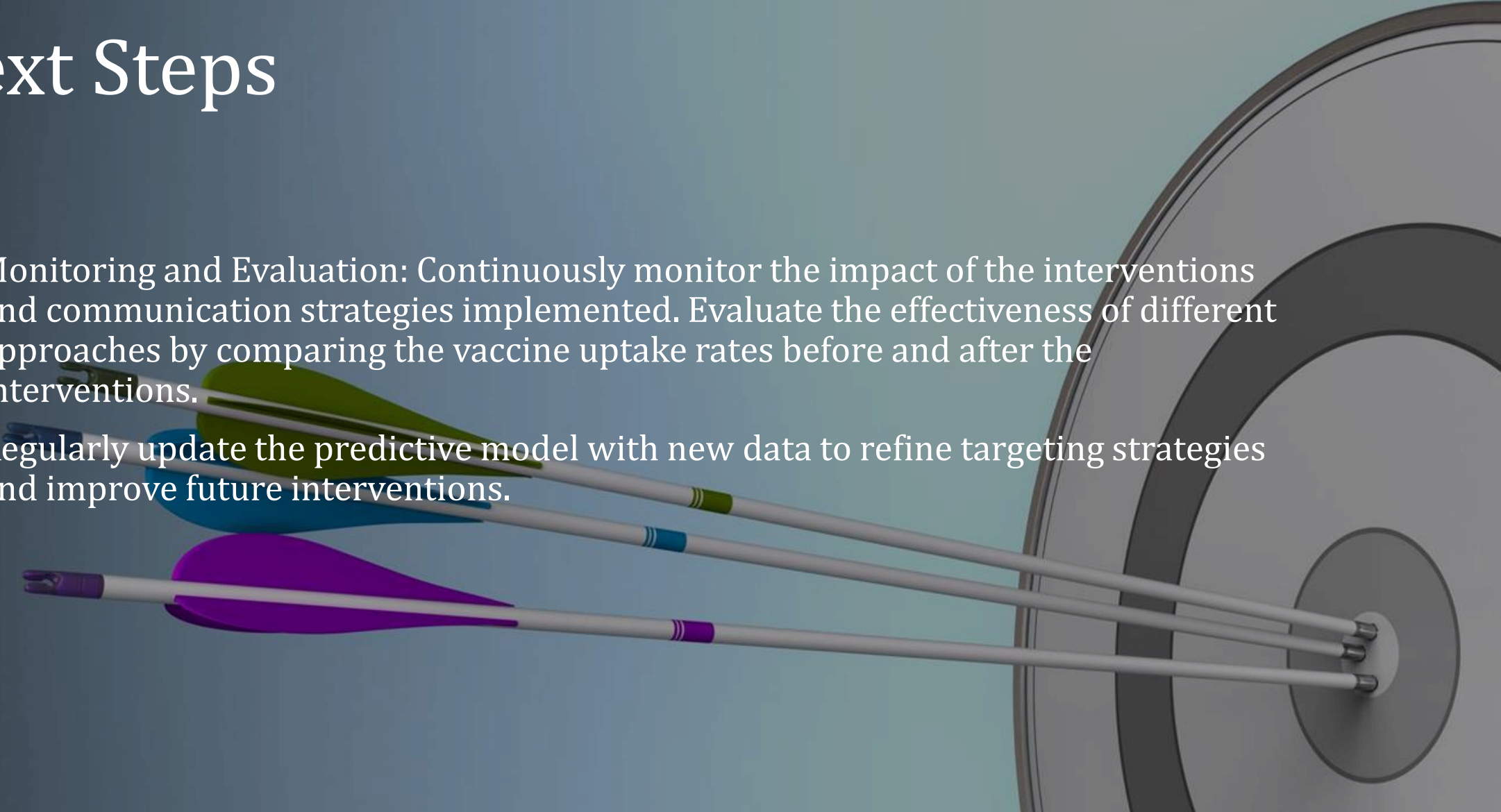
Recommendations

Policy Formulation

- ✓ Prioritize policy development for public behaviour regarding flu prevention.
- ✓ Emphasize measures like face masks, minimizing gatherings, and handwashing.
- ✓ Ensure widespread vaccination coverage to prevent uncontrolled disease spread.

Next Steps

1. Monitoring and Evaluation: Continuously monitor the impact of the interventions and communication strategies implemented. Evaluate the effectiveness of different approaches by comparing the vaccine uptake rates before and after the interventions.
2. Regularly update the predictive model with new data to refine targeting strategies and improve future interventions.





Thank You!

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