EARLY CANCER DETECTION USING HEALTH AND LIFESTYLE FACTORS

By Haya Hadaya

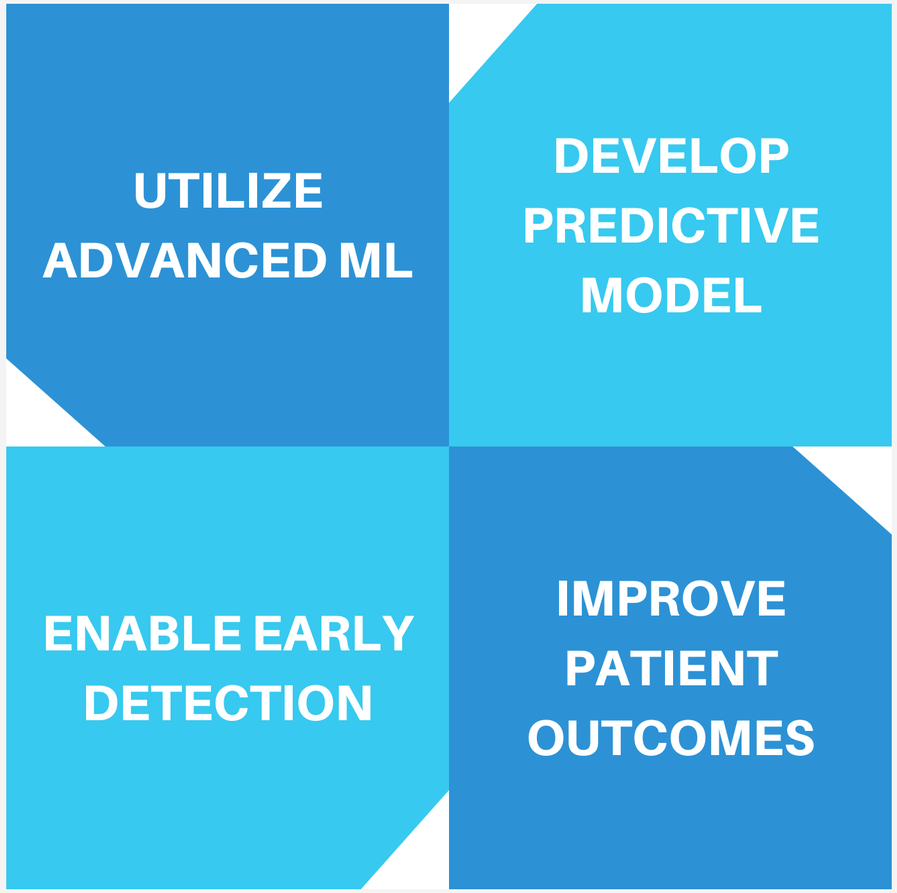
Problem Statement Overview

⏰ Late Diagnosis: Impairs treatment, worsens outcomes.

🔍 Early Detection Challenge: Delays care, raises expenses.

✅ Importance: Timely detection important for better outcomes, cost-efficiency.

Proposed Solution



Early Diagnosis Impact

💰 **Resource Shift: Early intervention reduces costs**

⏳ **ML Detection: Slows cancer, betters outcomes.**

📊 **Risk Awareness: Informs healthier choices.**

🎯 **Personalized Treatment: Early detection tailors therapies.**

ANALYSIS

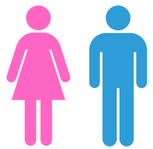
Dataset Overview

Features and Target Variable

1- Lifestyle Factors :

- Health Conditions
- Healthcare Practices
- General Lifestyle Choices

2-Demographic Factors



Target Variable : Cancer (Cancer Risk)

Dataset source and Description

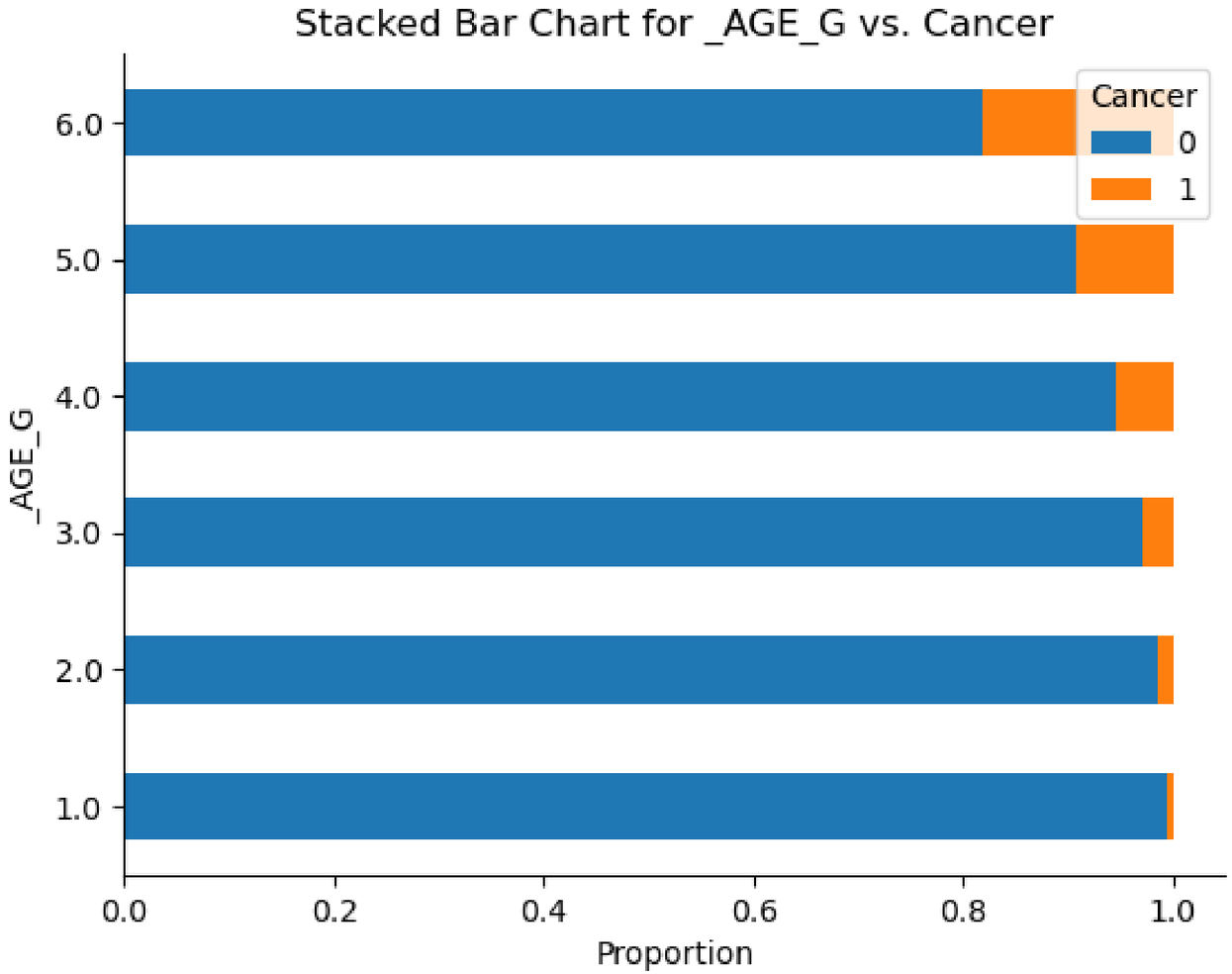
- The Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS) for the year 2021.

- The dataset has 438,693 rows and 303 columns , and it was condensed down to just 18 columns

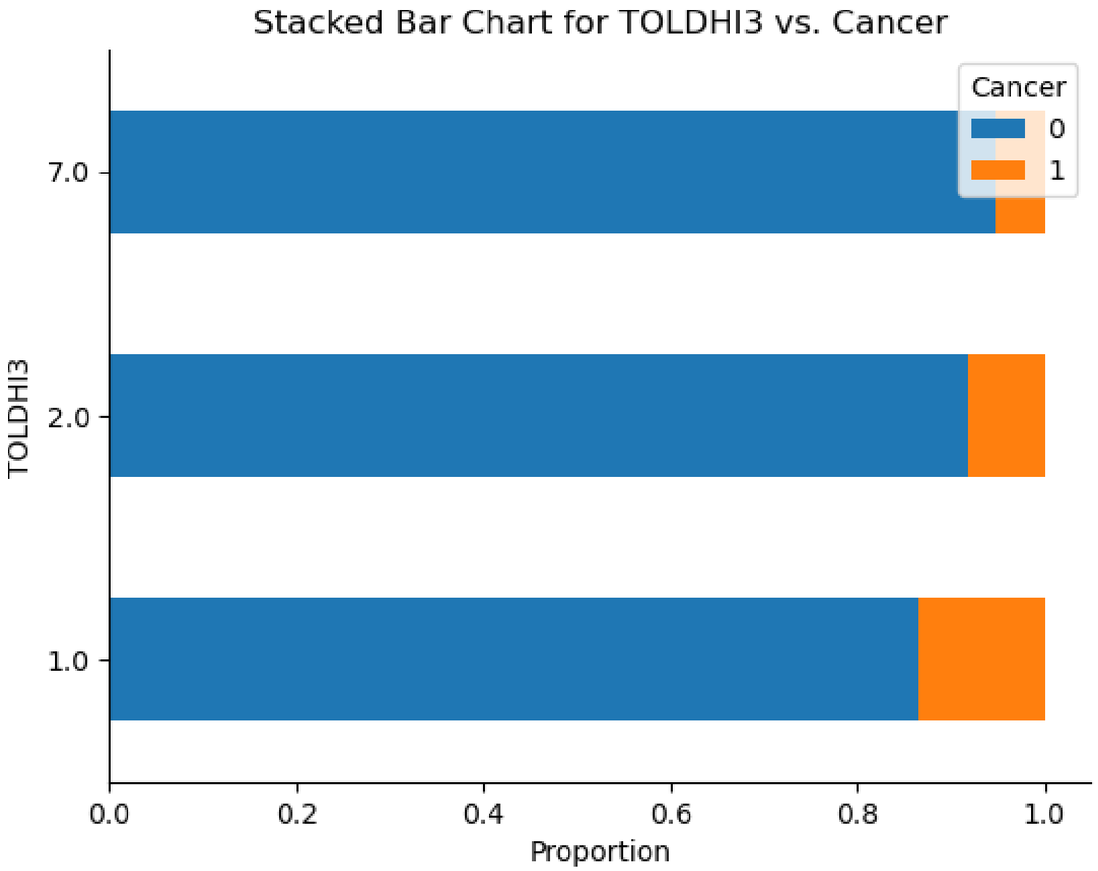
Preprocessing Procedures

1. **MISSING VALUES** — Imputation and Removal
2. **ONE-HOT ENCODING** — Dummy Variables
3. **FEATURE ENGINEERING** — Grouping Infrequent Values
4. **PRINCIPAL COMPONENT ANALYSIS (PCA)**

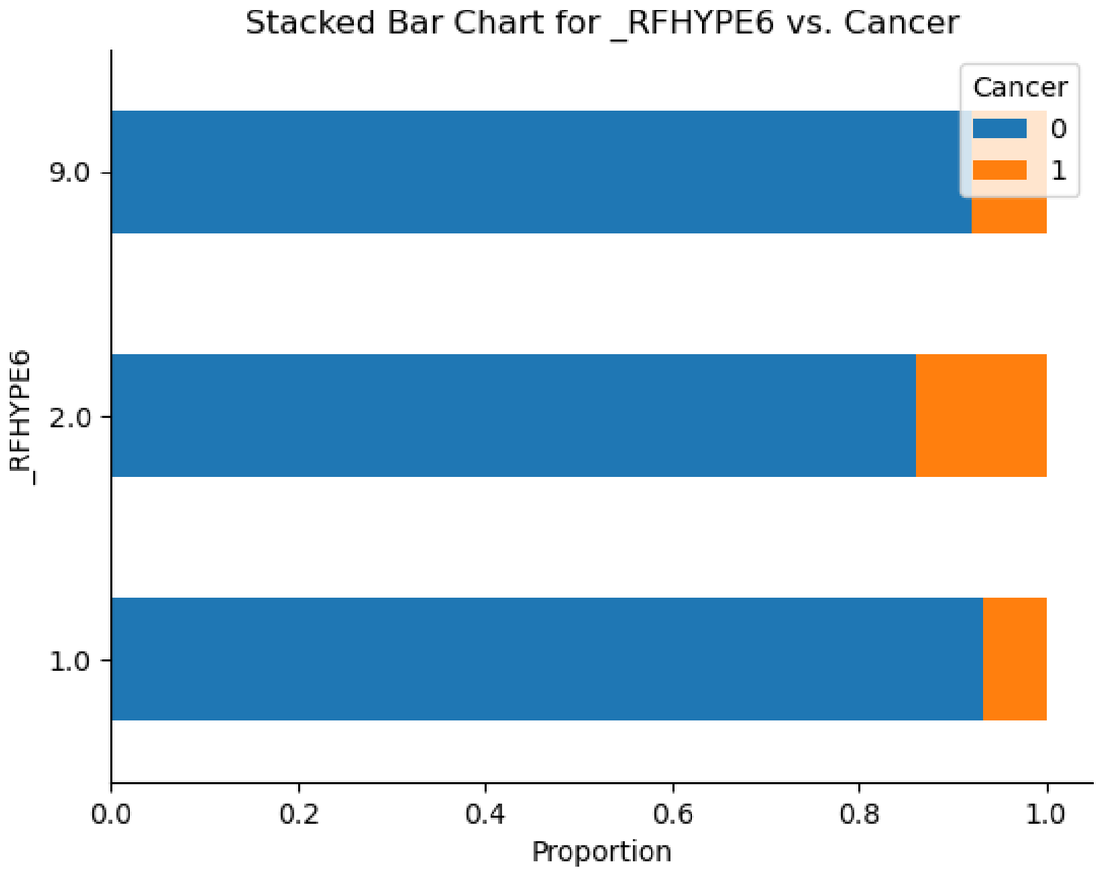
Top Key Findings from EDA



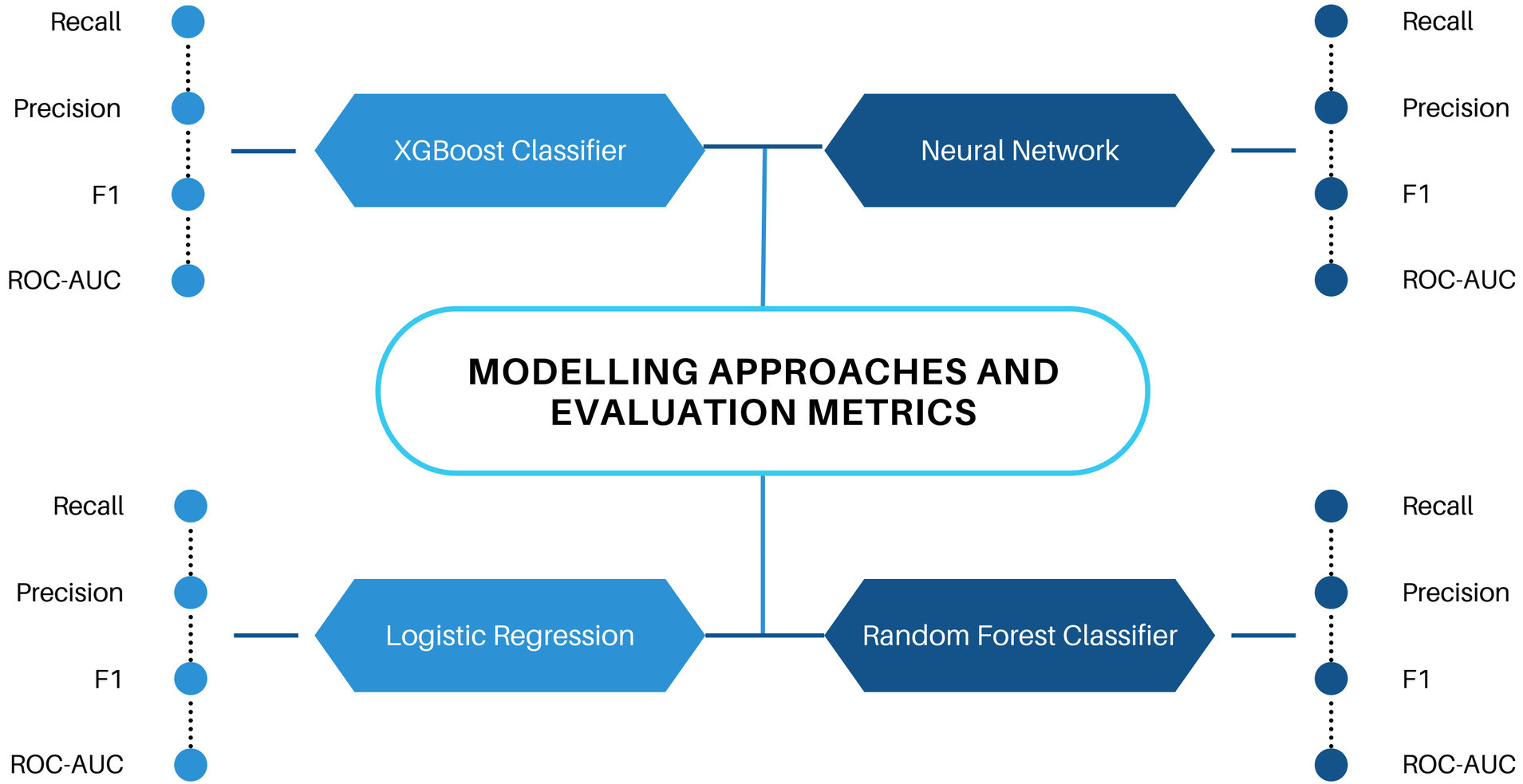
There is a higher association between older age groups and cancer presence.



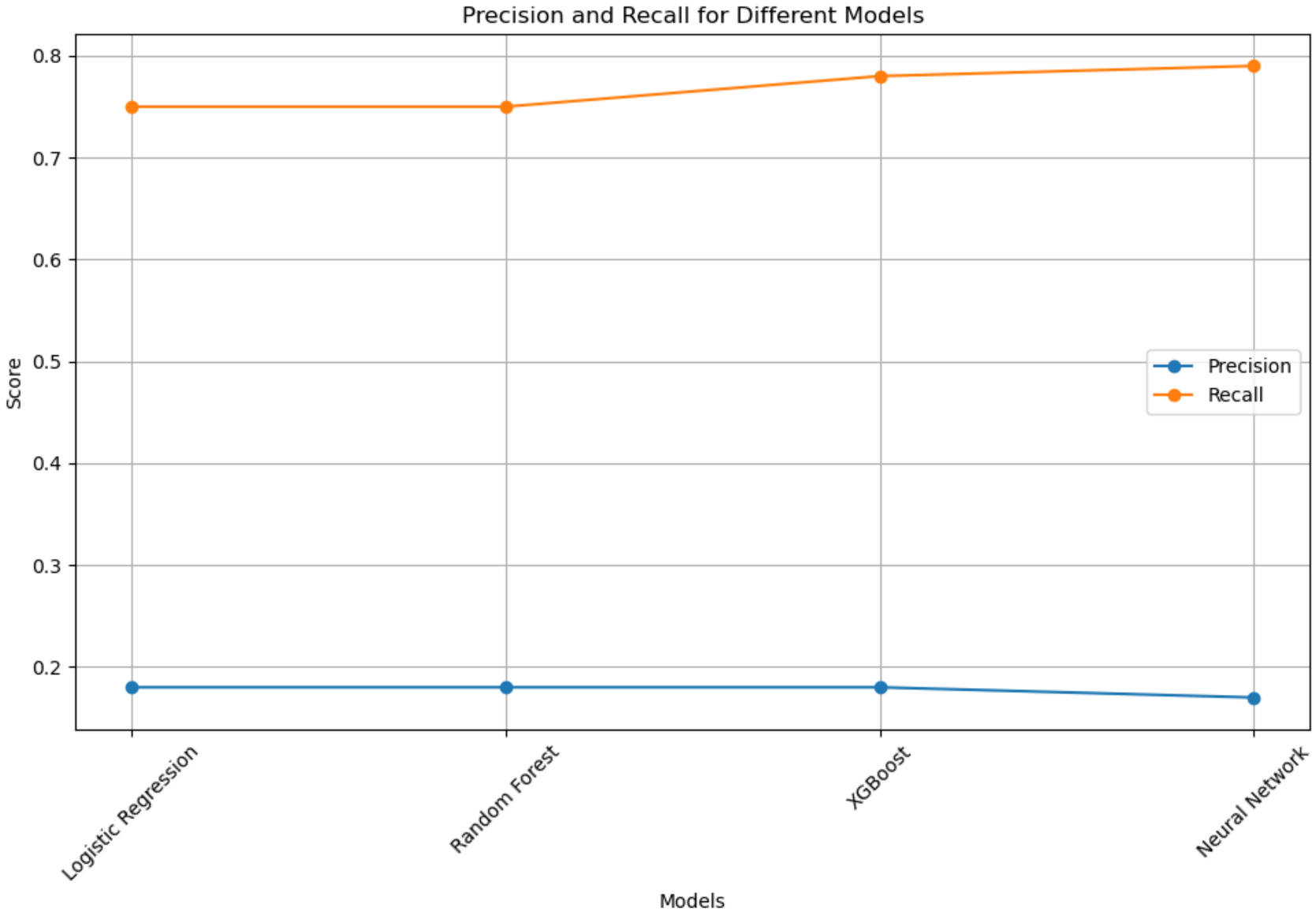
High cholesterol levels among cancer patients



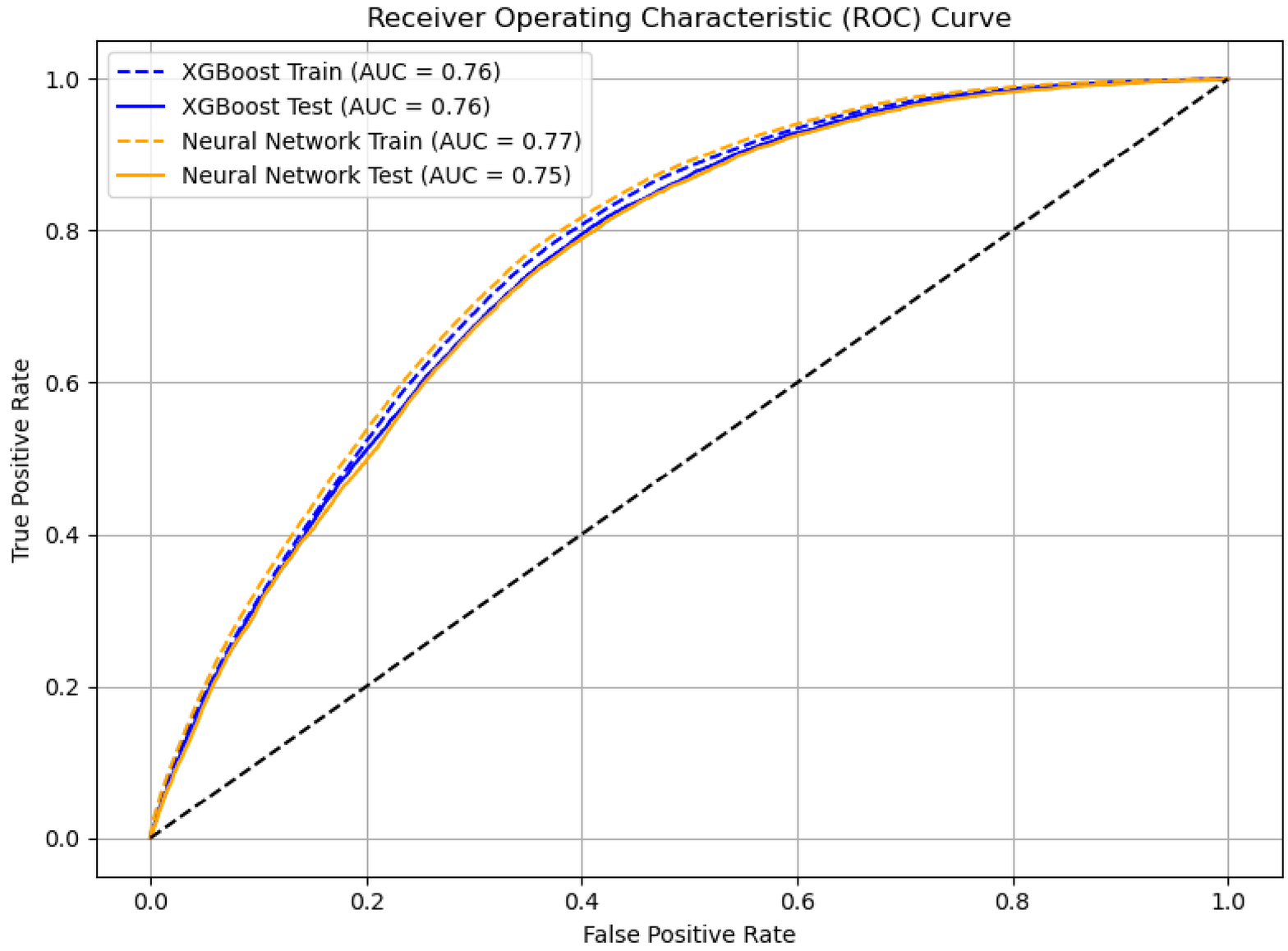
High blood pressure among cancer patients

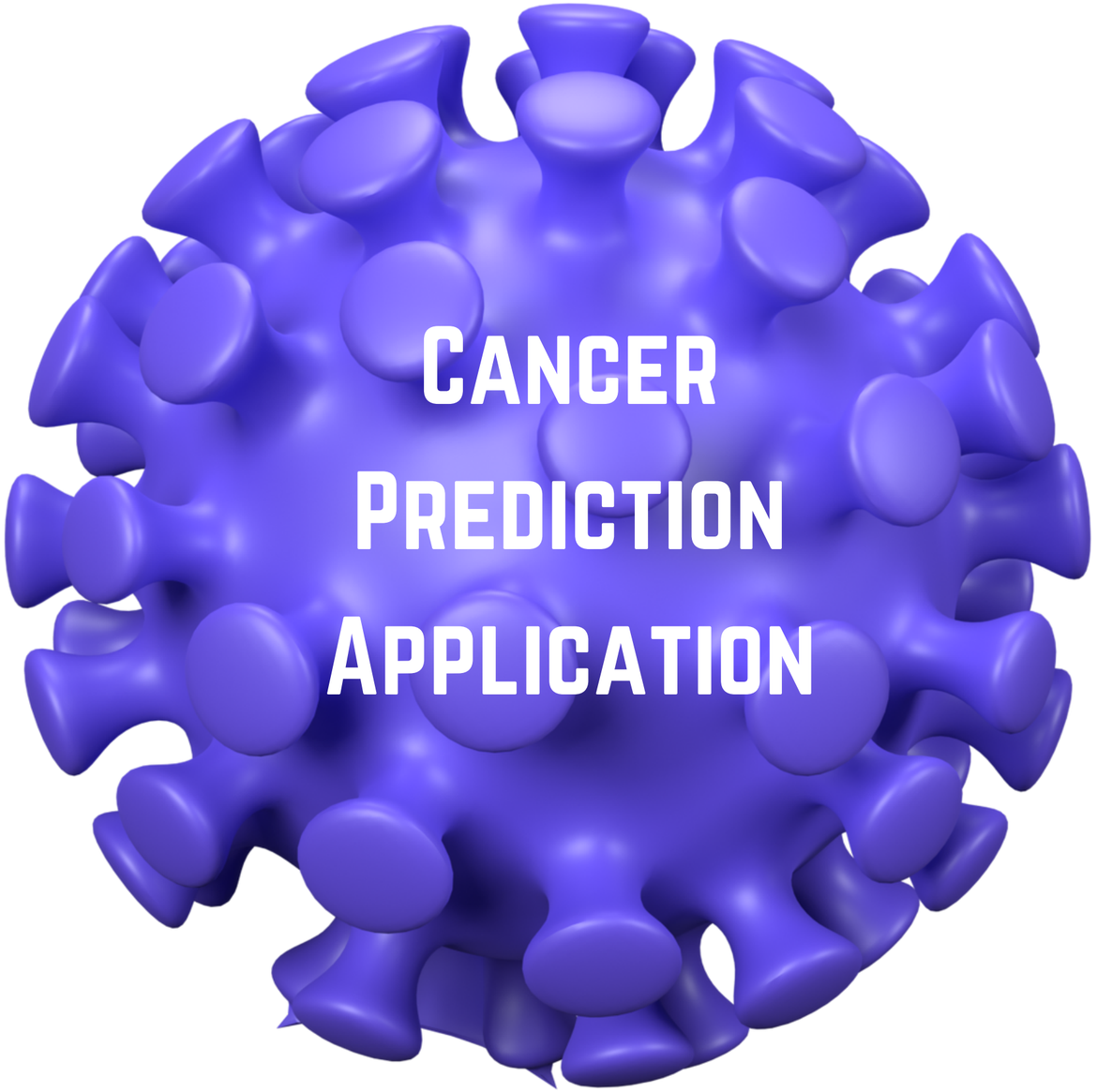

Recall
Precision
F1
ROC-AUC
XGBoost Classifier
Neural Network
Recall
Precision
F1
ROC-AUC
MODELLING APPROACHES AND EVALUATION METRICS
Recall
Precision
F1
ROC-AUC
Logistic Regression
Random Forest Classifier
Recall
Precision
F1
ROC-AUC

Recall and Precision Scores for Different Models



Comparison of (ROC) Curves for XGBoost and Neural Network Models




Cancer
Prediction
Application

NEXT STEPS FOR FUTURE WORKFLOW

Thank You