## Task 4: SMART Question 2

Do people with family history receive treatment or not?

### Task 4.1: EDA

**A diagram of a number of numbers

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A graph showing a family history

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### Task 4.2: Statistical Testing

**H₀: Family history and Treatment are independent.**

**H₁: Family history and Treatment are not independent.**

The p-value is 0.00, which is less than the significance level (0.05). This suggests that the null hypothesis is rejected, indicating a significant relationship between family history and treatment.

### Task 4.2: Modeling and Evaluation

To analyze the relationship between family history and treatment, two classification models were used: Logistic Regression and Random Forest.

#### Model 1: Logistic Regression

Number of Features Selected: 12

Response Variable: Treatment

Predictors: Most important features were used

**A graph with blue bars

Description automatically generated**

Top Features: Family History, Gender, Mental Health Interview

The model achieved an accuracy of 68% and ROC AUC of 0.72

#### Model 2: Random Forest

**A graph with a bar graph

Description automatically generated**Number of Features Selected: 12

Top Features: Family History, Care Options, Gender

**A graph showing the value of a receiver

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Accuracy: 72% and ROC AUC: 0.75

From the Random Forest model, the most influential features in determining whether individuals with a family history of mental health issues receive treatment are:

Family History,

Care Options,

Gender

### Task 4.3: Conclusions

The analysis reveals a strong relationship between family history and treatment. Individuals with a family history of mental health issues are more likely to seek treatment. Random Forest performed better than Logistic Regression, achieving higher accuracy and ROC AUC scores. Care options and gender also play significant roles in predicting treatment outcomes.