

FACTORS INFLUENCING WAIT TIMES FOR ENTRY INTO SUBSTANCE ABUSE TREATMENT FACILITIES

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AGENDA

- Introduction
- Data Overview
- Methods
- Results
- Conclusion



INTRODUCTION



“A staggering 43% of U.S. adults who say they needed substance use or mental health care in the past 12 months did not receive that care, and numerous barriers to access stand between them and needed treatment”

- National Council for Mental Wellbeing, May 2022



BARRIERS TO ENTRY

- Cost
- Availability
- Lack of diversity
- Proximity to care
- Wait times



- **Goal:**
to predict entrance wait times based on patient-specific information
- **Outcome:**
model needs further development before implementation



DATA OVERVIEW



DATA OVERVIEW

- Collected by Substance Abuse and Mental Health Service Administration (SAMHSS)
 - Official agency of the United States government
- Provides information about individuals discharged from substance abuse rehabilitation facilities in the year 2021
- Facilities were all state-funded or received some state-funding
- Data was provided to SAMHSS by the facility

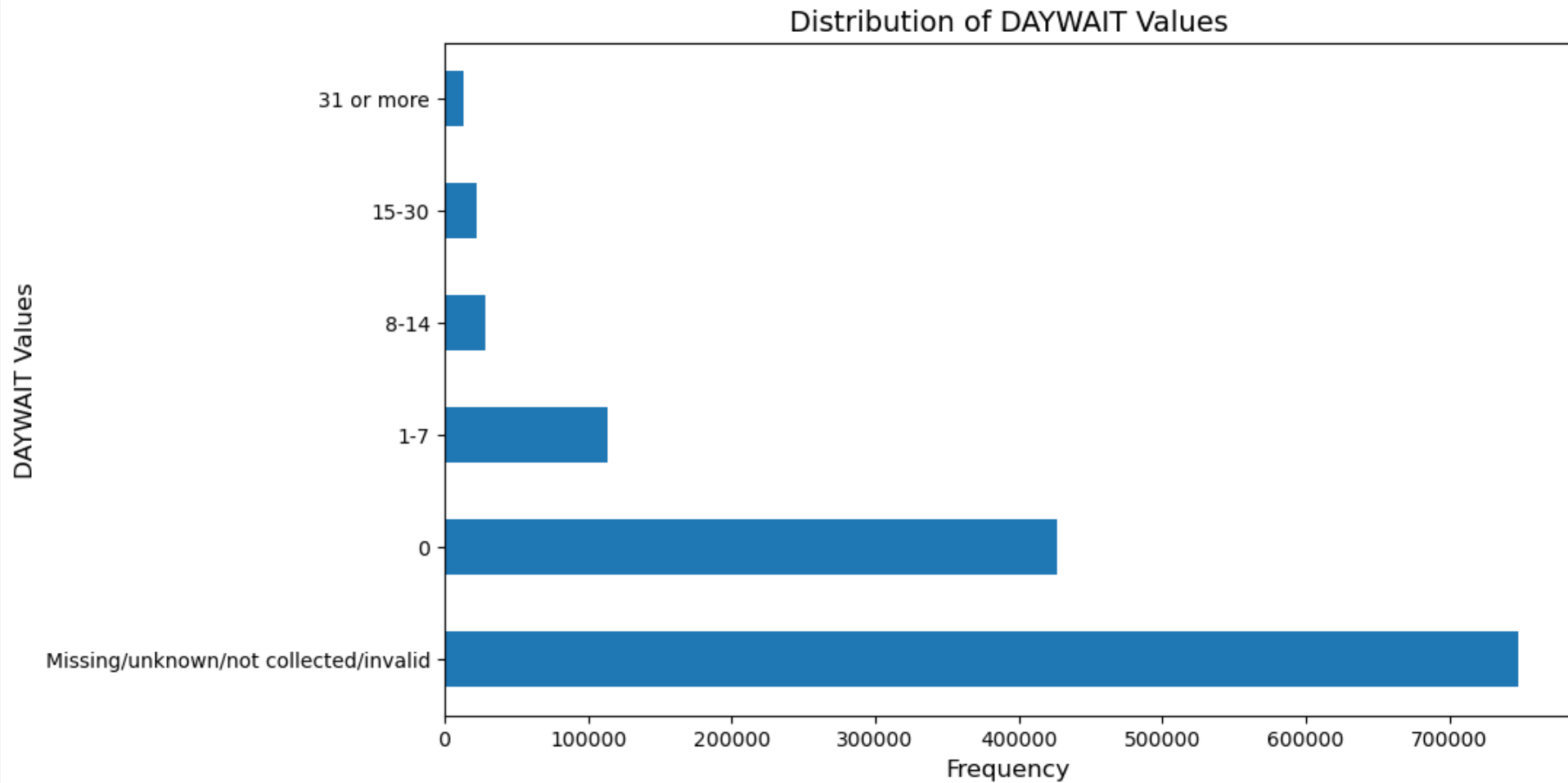


FEATURES

- 1.35 million rows
- 76 features
 - 74 categorical
 - Mix of ordinal and cardinal
- Classifications from point of admission and point of discharge
- Target feature: Treatment entrance wait times



TARGET FEATURE: DAYWAIT



METHODS

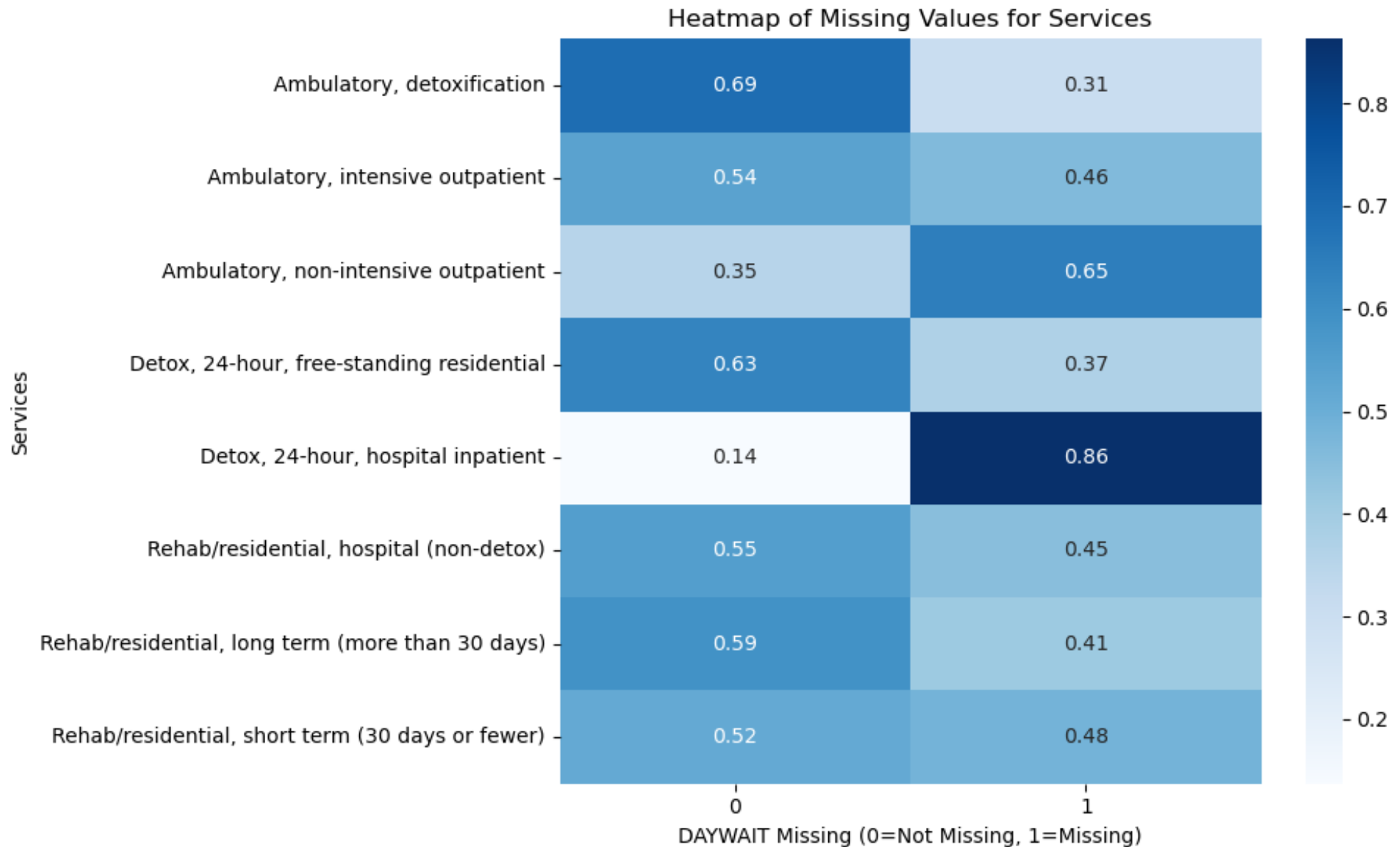


METHODS

- Missing values
- Cramer's V for redundant features
- Chi-Square & p-value



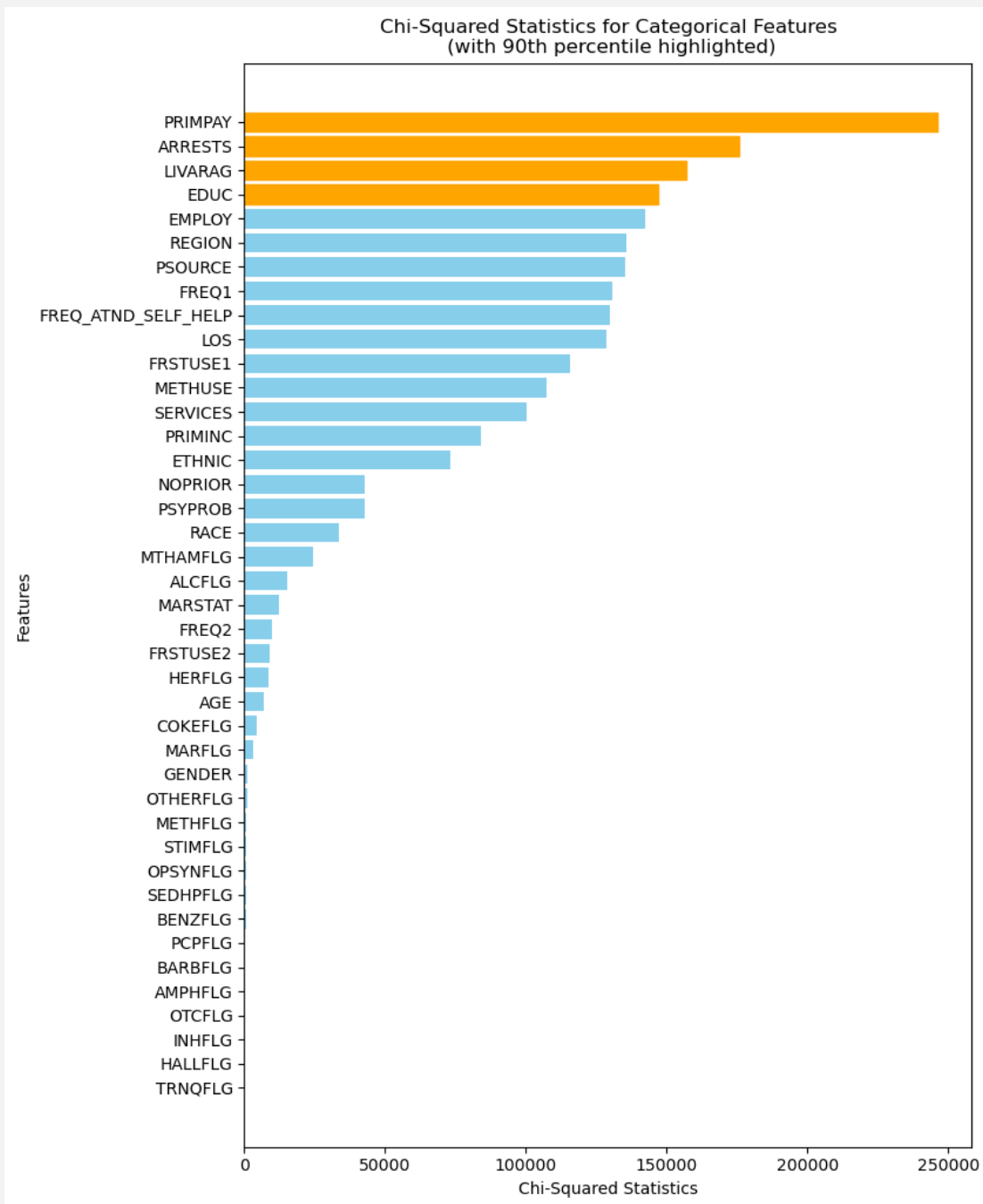
MISSING VALUES



CRAMER'S V

Feature 1	Feature2	Cramers V
ALCFLG	ALCDRUG	0.9999999
DIVISION	REGION	0.9999997
SUBI	OTCFLG	0.505392
VET	LIVARAG	0.502132
ROUTE2	MARFLG	0.518019





CHI-SQUARE & P-VALUE



MODEL SELECTION

- Logistic Regression
- Random Forest Classifier



EVALUATION

- Accuracy
- Precision
- Recall
- F1-Score



RESULTS



LOGISTIC REGRESSION

Class	Precision	Recall	F1 - Score	Support
-1	0.9	0.71	0.79	149622
0	0.73	0.36	0.48	85463
1	0.18	0.31	0.23	22643
2	0.06	0.29	0.09	5613
3	0.04	0.12	0.07	4428
4	0.03	0.32	0.05	2581
Accuracy			0.54	270350
Macro Avg	0.32	0.35	0.28	270350
Weighted Avg	0.72	0.54	0.61	270350



RANDOM FOREST

Class	Precision	Recall	F1 - Score	Support
-1	0.93	0.79	0.86	149622
0	0.79	0.47	0.59	85463
1	0.23	0.35	0.28	22643
2	0.07	0.29	0.11	5613
3	0.06	0.22	0.09	4428
4	0.05	0.33	0.09	2581
Accuracy			0.63	270350
Macro Avg	0.35	0.41	0.34	270350
Weighted Avg	0.78	0.63	0.69	270350



RANDOM FOREST - MISSING VALUES

Class	Precision	Recall	F1 - Score	Support
0	0.74	0.69	0.71	120728
1	0.76	0.81	0.79	149622
Accuracy			0.75	270350
Macro Avg	0.75	0.75	0.75	270350
Weighted Avg	0.75	0.75	0.75	270350



RANDOM FOREST

Class	Precision	Recall	F1 - Score	Support
-1	0.76	0.81	0.79	149622
0	0.56	0.72	0.63	85463
1	0.27	0	0	22643
2	0.33	0	0	5613
3	0.7	0.04	0.07	4428
4	0.25	0.33	0.09	2581
Accuracy			0.68	270350
Macro Avg	0.48	0.26	0.25	270350
Weighted Avg	0.64	0.68	0.63	270350



CONCLUSION



RECOMMENDATIONS

- Remove missing values
- Use SMOTE to handle class imbalance
- Perform VIF to check for collinearity



REFERENCES

- *More than 4 in 10 U.S. adults who needed substance use and mental health care did not get treatment.* National Council for Mental Wellbeing. (2022, May 31). <https://www.thenationalcouncil.org/news/more-than-4-in-10-us-adults-who-needed-substance-use-and-mental-health-care-did-not-get-treatment/>