TEAM B6

Virginia Mason Franciscan Health™

DISCHARGE BARRIER QUANTIFICATION

SPOORTHY THATIPELLY

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CLIENT : Virginia Mason Franciscan Health

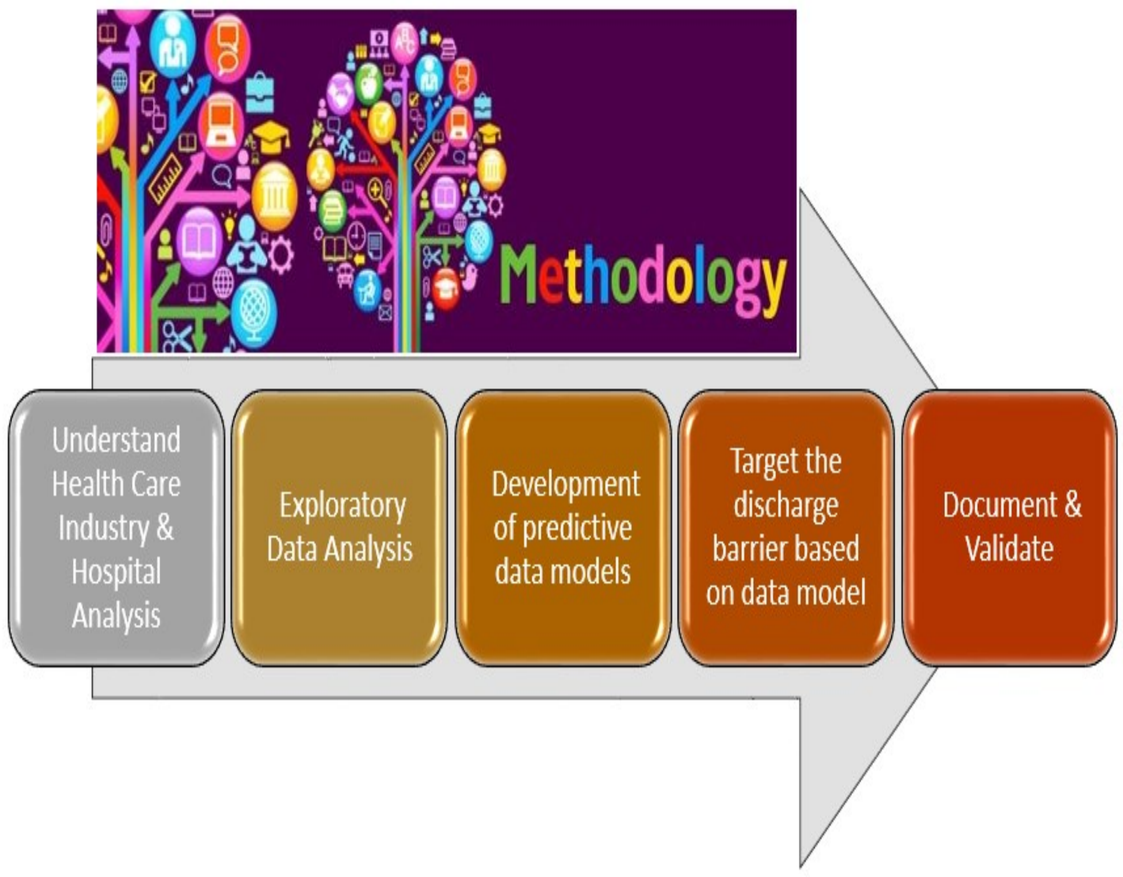
Virginia Mason Franciscan is leading Healthcare in Puget Sound Area- "A Mission to Heal, a Promise to Care "

SCOPE : Discharge Barrier Quantification

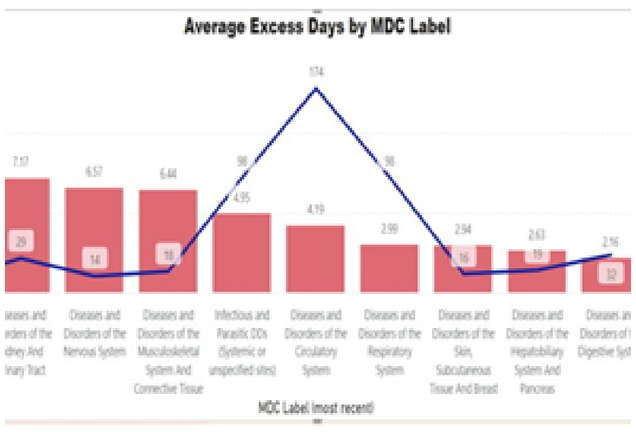
To implement a model to quantify the discharge barrier categories, to identify the length of stay & certificate the need for more beds

DATA :

min fetch	max fetch	Most rece	GMLOS	LOS	Excess da	gender	classCode	dob	admitDate	age	Discharge	DRG Label
10/3/20 0:00	10/13/20 0:00	10/7/20 11:55	5	10	5	M	IP	4/13/1943	10/2/2020 11:55	63	Home independently	DEGENERATIVE NERVOUS SYSTEM DISORDERS W MCC
8/31/20 0:00	10/14/20 0:00	9/2/20 21:43	4	73	69	F	IP	5/21/1968	8/29/2020 21:43	53	Skilled Nursing Facility	INTRACRANIAL HEMORRHAGE OR CEREBRAL INFARCTION W MCC
9/15/20 0:00	10/15/20 0:00	9/16/20 2:00	2	3	1	F	IP	3/13/1968	9/14/2020 2:00	53	Adult Family Home	Pulmonary W MCC
8/25/20 0:00	8/31/20 0:00	8/25/20 19:52	2	5	3	M	IP	2/18/1955	8/23/2020 19:52	65	Home independently	MCC
9/28/20 0:00	9/1/20 0:00	9/30/20 17:54	4	11	7	M	IP	1/22/1931	8/24/2020 19:52	89	Home with family care	OTHER DISORDERS OF THE EYE W MCC



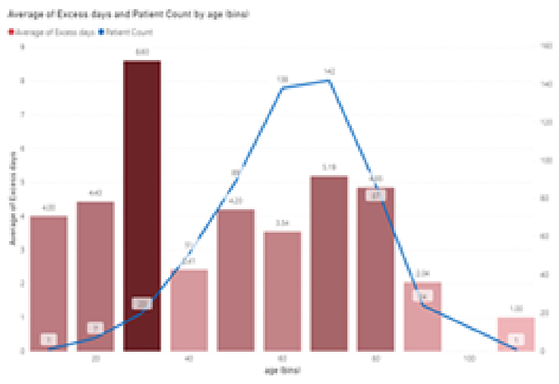
Descriptive Analysis



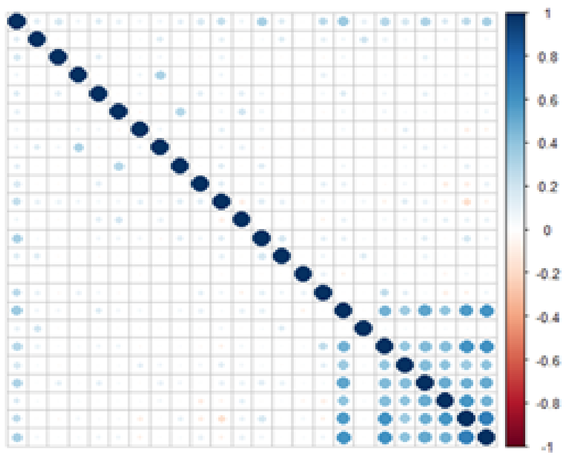
MDC/DRG Analysis

Quantified and analyzed the relationship between the Age, MDC/ DRG with Average of Excess days

Average of excess days patient Count by Age (converted into bins)



Diagnostic Analysis

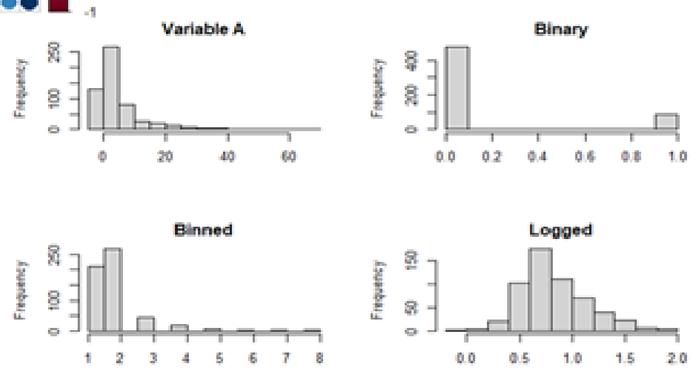


Correlation Heatmap

Find correlated features and determine how they relate to each other as well as the label.

Label Transformation

Explore the ideal distribution for the predictor variable, accounting for data limitations.



Predictive Analysis

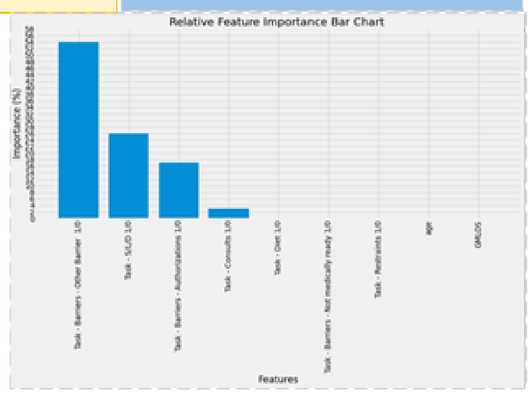
MODEL	PRECISION	RECALL	F1 SCORE	ACCURACY
Classification and Regression Tree	0.798	0.512	0.618	0.866
Two Class Boosted Decision Tree	0.791	0.646	0.711	0.774
Random Forest Classifier	0.412	0.293	0.352	0.822
Two Class Logistic Regression	0.629	0.5	0.557	0.657

Azure ML

Tried various classification models and Two-Class Boosted Decision Tree gave the best overall Accuracy, Precision, Recall and F1 score.

CART ANALYSIS_Python

Relative Feature Importance bar graph displaying which features make most impact to the least, as discharge barriers.



DESCRIPTIVE ANALYTICS

- We understood the relationship between Diagnosis Related Groups, Major Diagnostic Categories , Patient Demographics over Excess days

DIAGNOSTIC ANALYTICS

- No barrier categories are highly correlated to the predictor variable. The predictor variable must be in a suitable format for the modeling techniques.

PREDICTIVE ANALYTICS

- Implemented CART analysis and created a model using Azure ML Classification Two class Boosted Decision tree, identified top significant features that has the most impact on Excess days

PRESCRIPTIVE ANALYTICS

- Other – Barriers was the most common Top - feature importance. Analyzed the comments & other free text using Python & Rapid Minor by using Text mining Techniques.
- Created Dictionary in Python for future analysis and Automation techniques
- Anomaly detection can be implemented to identify the rare events or observations that differ from Normal Patterns of Patient data