Virginia Mason Franciscan Health™

Project: Optimization & Rationalization of Perioperative Services and Resources in a Network of Facilities
UW Tacoma MSBA Team 8

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Excel based Models Development

Model –1
Scheduled Minutes After Retrospective Adjustments

Model –2
Patient in Room Minutes After Retrospective Adjustments

Dashboard
Excel Models
Summary

Project Introduction

Virginia Mason Franciscan Health (VMFH) is a leading health system in Washington state. Formed by the integration of two outstanding health systems—CHI Franciscan and Virginia Mason—Virginia Mason Franciscan Health offers a wealth of convenient hospital, clinics ,and care locations in Western Washington.

The healthcare sector plays a crucial role in communities by providing medical services, care, and treatments to individuals in need. Perioperative services hold significant importance as they initiate both preoperative and postoperative care for people undergoing surgical procedures. VMFH provides a broad range of perioperative services to accommodate different surgical specializations. Orthopedic, cardiovascular, neurosurgery, and general surgery are some of the services VMFH offers. Seattle Hospital has the highest number of both low and high acuity surgical cases, while 2023 Q3 registers the maximum cases across all surgery centers . The findings of descriptive and diagnostic analysis have reaffirmed a high volume of outpatient low acuity cases in Seattle Center and need for them to shift those cases to Bellevue and Federal Way ASCs.

Data Management Plan / Technologies Used
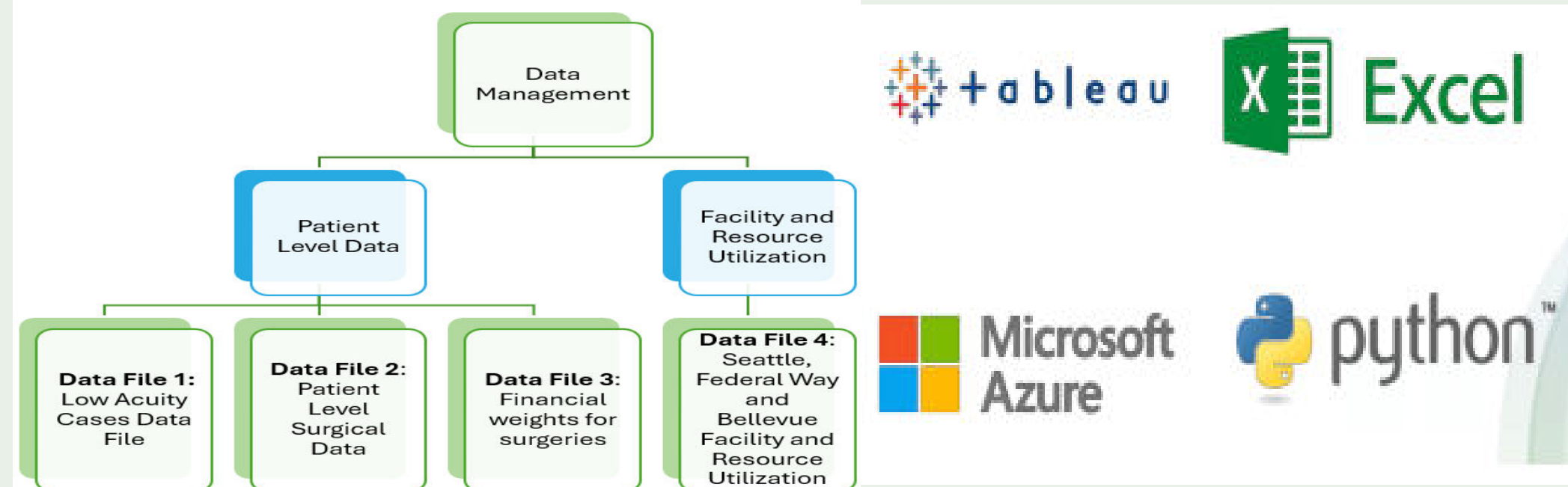
Descriptive and Diagnostic Analysis


Encounter Distribution Based on Acuity Level
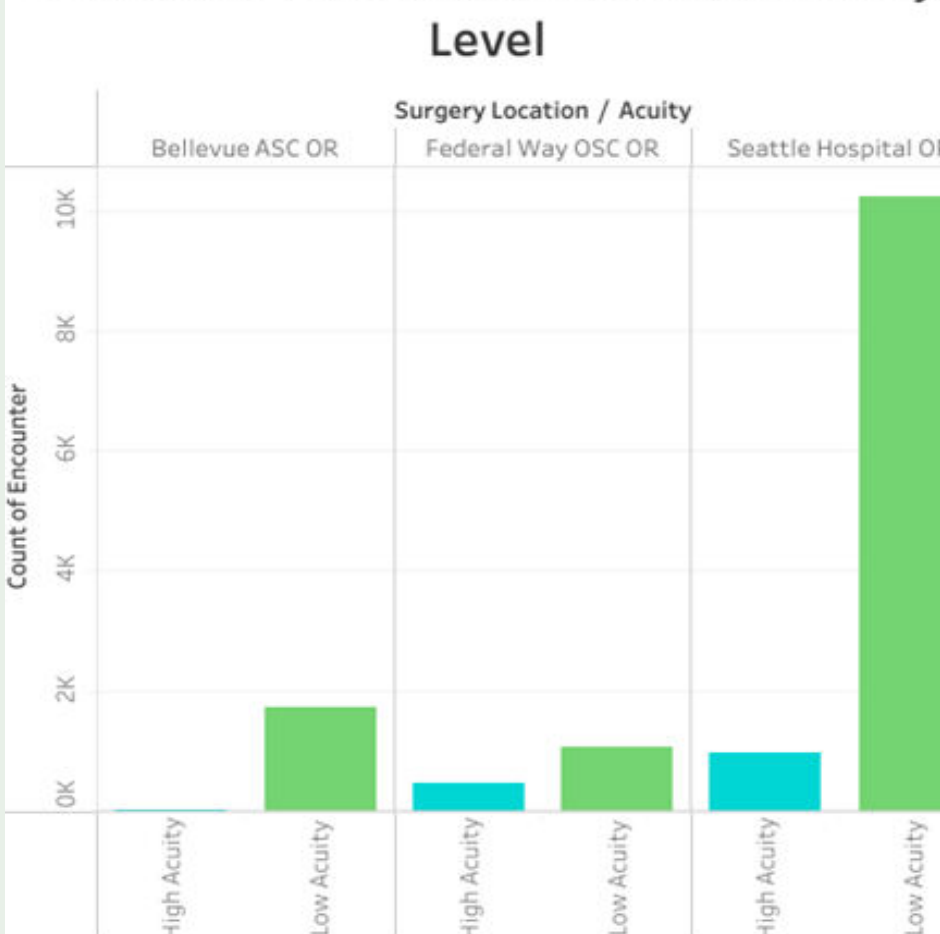
Financial weights

PayorGroup	Bellevue	Downtown	Federal Way
Commercial	0.6	2.0	2.0
Medicaid	0.2	0.8	0.8
Medicare	0.3	1.0	1.0
Other	0.3	1.0	1.0

Key Findings

- Our data highlights the problem we are solving i.e., the Seattle facility has maximum surgeries taking place and we have to move low acuity surgical cases from the Seattle facility to Bellevue or Federal Way facility.

- The Federal Way facility handles the least number of cases, but has more financial weight as compared to the Bellevue facility. This high-

Predictive Analysis: Prediction of Patient In Room Minutes
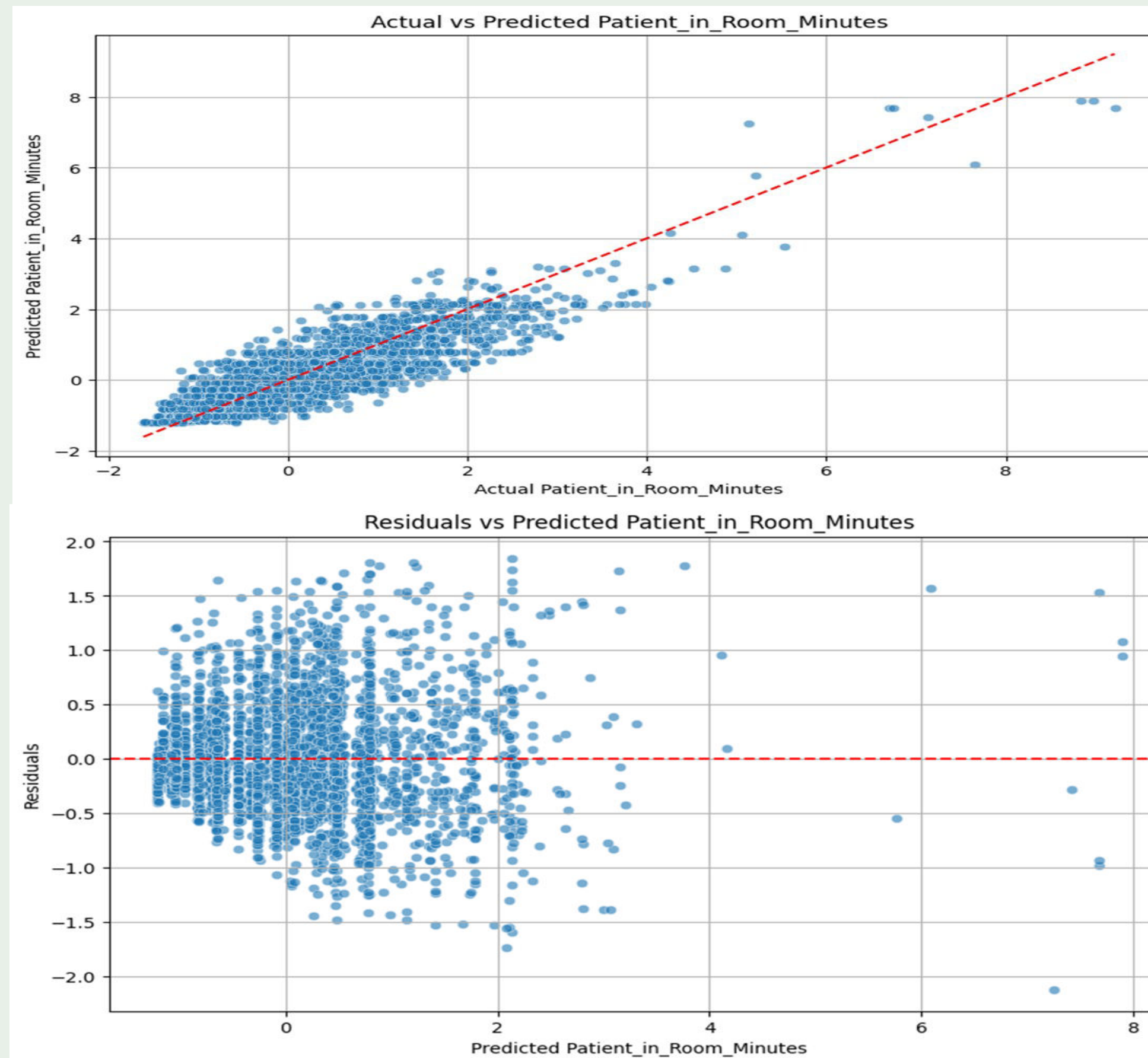
Boosted Decision Tree Regression Model

| Mean Absolute Error: 0.352910	Root Mean Squared Error: 0.476009	Coefficient of Determination (R^2): 0.781280

Accuracy and Performance : The relatively low MAE and RMSE values indicate that the model has good predictive accuracy, with small average errors in its predictions, The RMSE being slightly higher than the MAE is typical and indicates the presence of some larger errors, but not excessively so.

Fit Quality : The R^2 value of 0.781280 demonstrates that the model has a strong fit to the data, capturing a significant portion of the variability in "Patient in room minutes".
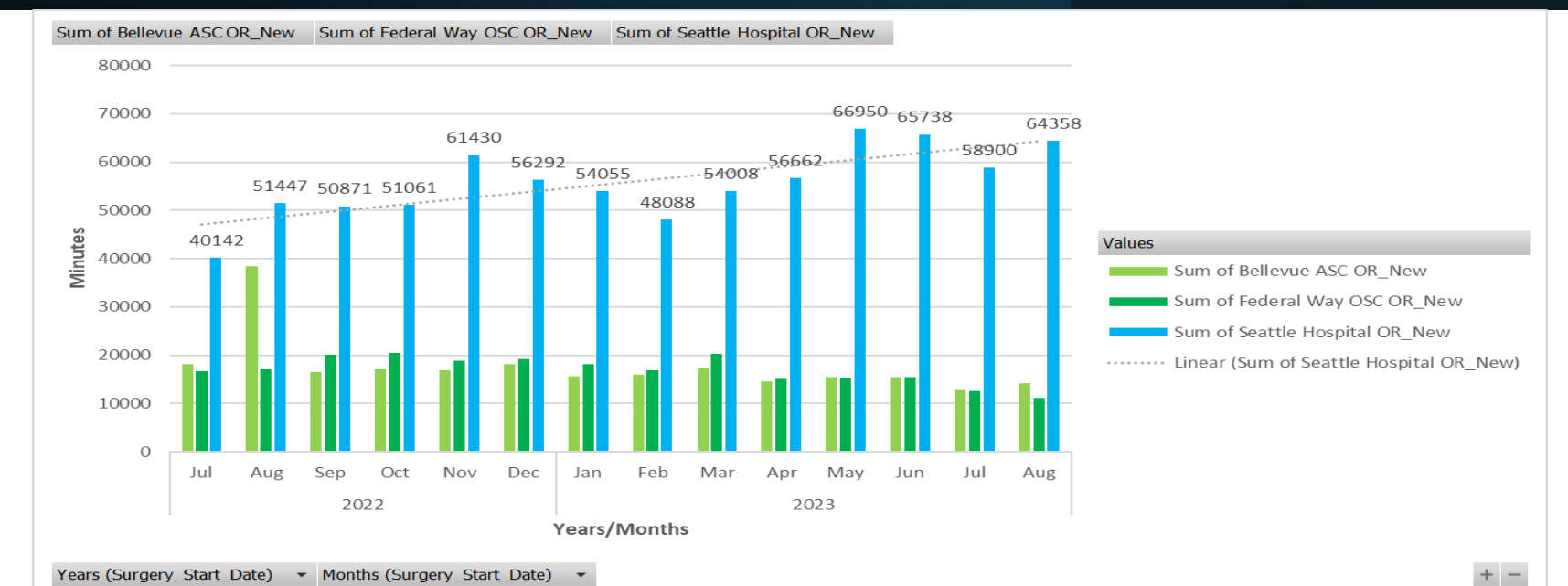
Model Quality : Overall, the boosted decision tree regression model performs well with a good balance of low error metrics (MAE and RMSE) and a high explanatory power (R^2).
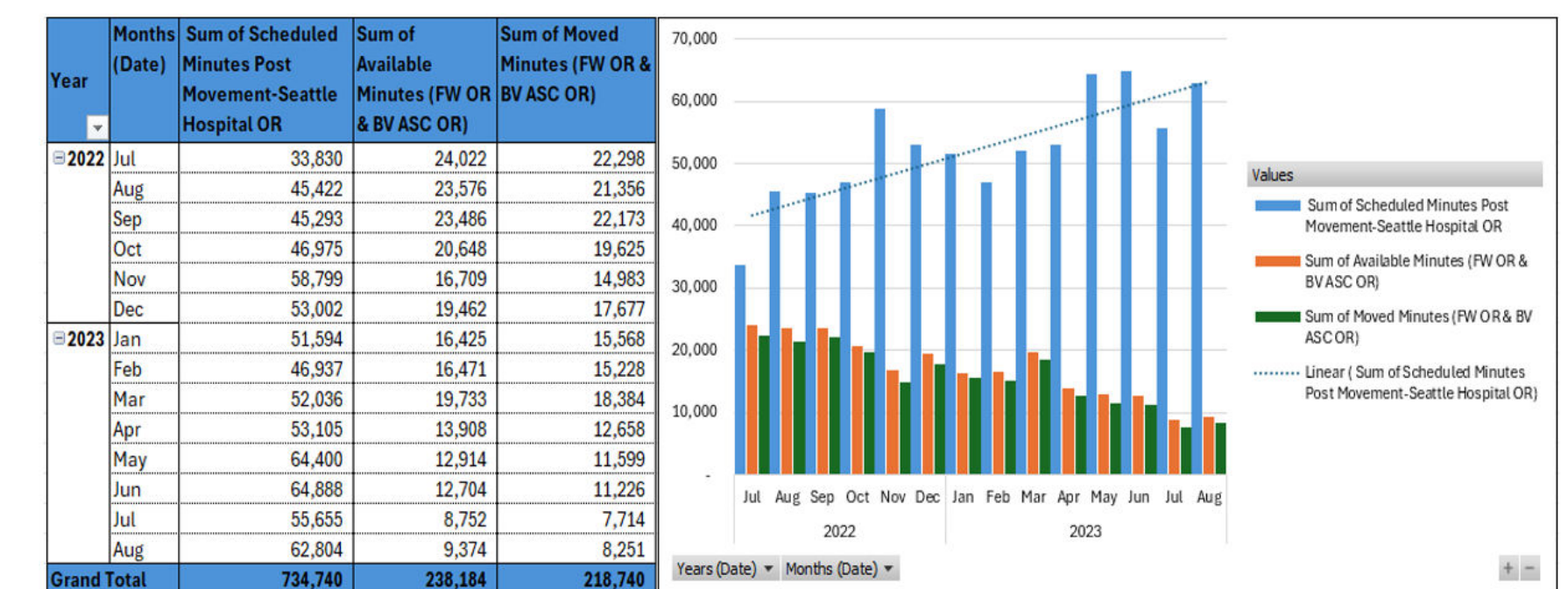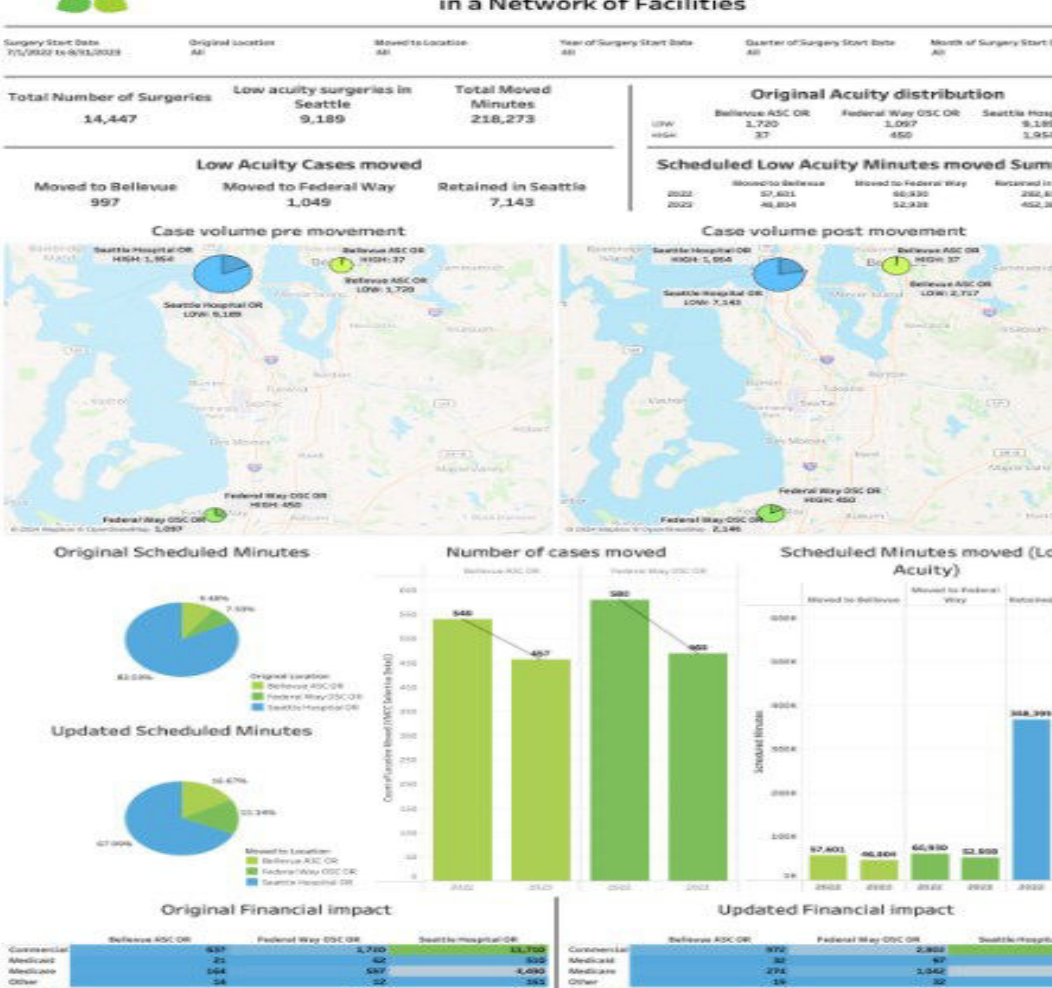
Conclusion

Project Analysis : Helped in understanding patient distribution and optimizing resources utilization ≈ 92%.

Future Work: Expand dataset, incorporate advanced ML techniques, and conduct longitudinal studies.

Impact: Potential to enhance patient care and operational efficiency at VMFH.