



HMP 669 GROUP PROJECT

FINAL REPORT

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EXECUTIVE SUMMARY

This report analyzes and presents key quantitative information to guide contract discussions between the MHS Executive Committee and Omega Hospital. Metrics regarding patient demographics, the current state of facility services, disposition data, and length of stay are discussed in detail. Intensity and utilization assessments of Cardiology and Orthopedic services at Omega are explained using distance traveled, death rates, percent of visits requiring an external review, and other appropriate key metrics. The profitability of these services at Omega is also defined through viability measures such as LOS outlier rates, payer mix variants, sources of key reimbursement, and possible avenues of service line profit maximization.

Based on this report, we recommend that the MHS Executive Committee keep Cardiology and carve-out Orthopedics. This will improve efficiency and better manage costs for Orthopedics; it may also lead to fragmentation of care and limit access to care for patients reliant on Orthopedic services at Omega Hospital.

ANALYSIS

1. Assessment of the Overall Patient Population and Current Facility Services

Currently, there are 13,588 patients at Omega Hospital, of which 16.1% of patients (2,422) are admitted to the Cardiology department, and 8.9% (1,261) are admitted to the Orthopedics department. Regarding the total number of patients, both Orthopedics and Cardiology are within the top 5 of the largest departments at Omega Hospital.

As for the patient demographic, our team assessed patient distribution by age, race, and gender of patients within the Cardiology and Orthopedics departments and their standing compared to all other available services at Omega Hospital. Patients from Cardiology have an average age of 63.5 with a median of 65, while patients from Orthopedics have an average age of 52.2 with a median of 53. Both departments have an older female cohort on average than their male counterparts. Compared to the average age of patients from all other services, patients from Cardiology and Orthopedics are relatively older. Regarding gender distribution, 41% of the patients in Cardiology are male, while orthopedic patients are evenly distributed among males and females. As for the composition of race and ethnic groups at Omega Hospital, most patients are white (72.6%), followed by Black (6.68%). Other racial groups, including Asian, American Indian, and Hispanic populations, only comprise 0.7% of the total number of patients, while 20% of the patient information about race and ethnicity is missing. Both the Cardiology and Orthopedics departments share this trend.

Our team also evaluated Omega Hospital's current facility services by assessing the average length of stay, disposition, and death rate. On average, Orthopedic and Cardiology patients stay in the hospital for 5-6 days, while the Substance Use department has the longest average length of stay at Omega Hospital, which is about 28 days. Most of the patients for Cardiology (84%) and Orthopedics (79%) went home after being discharged since most patients came for a routine check-up. About 10% of Cardiology and 16% of Orthopedic patients end up in care facilities.

The team also investigated top disease entities for Cardiology and Orthopedics to assess underlying reasons for patient visits (**Appendix I, Figure 1**). For Cardiology, the top 3 disease entities include percutaneous cardiovascular procedures, chest pain, and heart failure & shock. For Orthopedics, the top 3 disease entities include major joint & limb reattachment procedures of the lower extremity, back & neck procedures, and adult lower extremity & humerus procedures (except hip, foot, and femur).

Overall, Cardiology and Orthopedics are large departments at Omega Hospital in terms of the total number of patients compared to other services, and both primarily receive older patients.

Considering cardiac disease entities are typically more life-threatening, the Cardiology department at Omega Hospital has a relatively low death rate than expected.

II. Intensity/Utilization Indicators

To understand the utilization of Cardiology and Orthopedic services, our team studied a few metrics such as distance traveled, death rates, and percent of visits requiring an external review. The distance traveled is similar compared to a list of selected services with high patient volumes for the near-mile radius of the hospital (**Appendix II, Figure 2**). Comparing the distance traveled moving farther out, we can identify that Cardiology and Orthopedics rates were higher than other services.

It is also observed that 77 patients from the Cardiology department (2.9%), and 11 from the Orthopedics (0.8%) died after being discharged (**Appendix II, Figure 3**). The death rate is also assessed by death at different points (**Appendix II, Figure 4**) during their stay, including within 48 hours of admission, in operation, and postoperatively. The death rate is higher within 48 hours of admission than that of in-operation and post-operative procedures except for the urology department. Overall, death rates from Cardiology and Orthopedics are very low.

When studying the percentage of visits requiring an external review (**Appendix II, Figure 5**), Cardiology and Orthopedics have 0.36% and 0.47% of visits requiring an external review, respectively. These three metrics indicate that the reputation of providers of Cardiology and Orthopedics services is noteworthy that patients are traveling this far out to receive care. When investigating the percentage of encounters where service was teaching-related (**Appendix II, Figure 6**), 10% of Cardiology cases and 4% of Orthopedic cases were teaching-related. Not many teaching-related activities are being conducted across all service lines, including Cardiology and Orthopedics.

We explored the admission types for Cardiology and Orthopedics at Omega Hospital (**Appendix II, Figure 7**). Data shows that 86% of cardiology cases were admitted as emergent cases in the ER, and 14% were elective admissions. 38% of orthopedic cases were admitted as emergent, and 62% were elective admissions. One possible reason for this is that the nature of cardiovascular diseases and conditions requires more urgent or emergent interventions, such as heart attacks or other acute events. In contrast, orthopedic conditions may be more chronic and not require immediate attention, leading to a higher percentage of elective admissions. Based on this, we further investigated ER admissions for both service lines (**Appendix II, Figure 8**) 61% of cardiology ER admissions and 47% of orthopedic ER admissions were medical cases. This is due to the nature of cardiovascular diseases, as cardiac conditions generally require more immediate medical attention, such as medication or other non-invasive interventions, which could lead to more ER admissions for medical care. 39% of cardiology ER admissions and 53% of orthopedic ER admissions were procedural. This fits with the characteristics of orthopedic conditions. Orthopedic conditions generally are chronic conditions where procedures are typically scheduled in advance. Procedural admissions in ER likely indicate that these patients had an emergency (e.g., a car crash) that immediately needed an operative procedure.

We also examined data regarding ICU admissions for both cardiology and orthopedics. When comparing the percentage of ICU stays for cardiology and orthopedics with multiple service lines, (**Appendix II, Figure 9**), Cardiology had 26.8% ICU admissions, whereas orthopedics had the lowest of 2.42%. This is the result of multiple factors. First, cardiac diseases are more prevalent, with higher chances of complications such as cardiac arrest, arrhythmias, etc., that will require more intense care and follow-up. Second, cardiac diseases may require more complex treatments and invasive procedures like cardiac catheterization, which can increase the risk of complications needing ICU stays. We studied the length of stay as shown in **Figure 1**, and data indicates that 60% of orthopedic patients admitted to the ICU have a one-day stay. Cardiology has comparable results, with few patients staying in the ICU for 15-20 days.

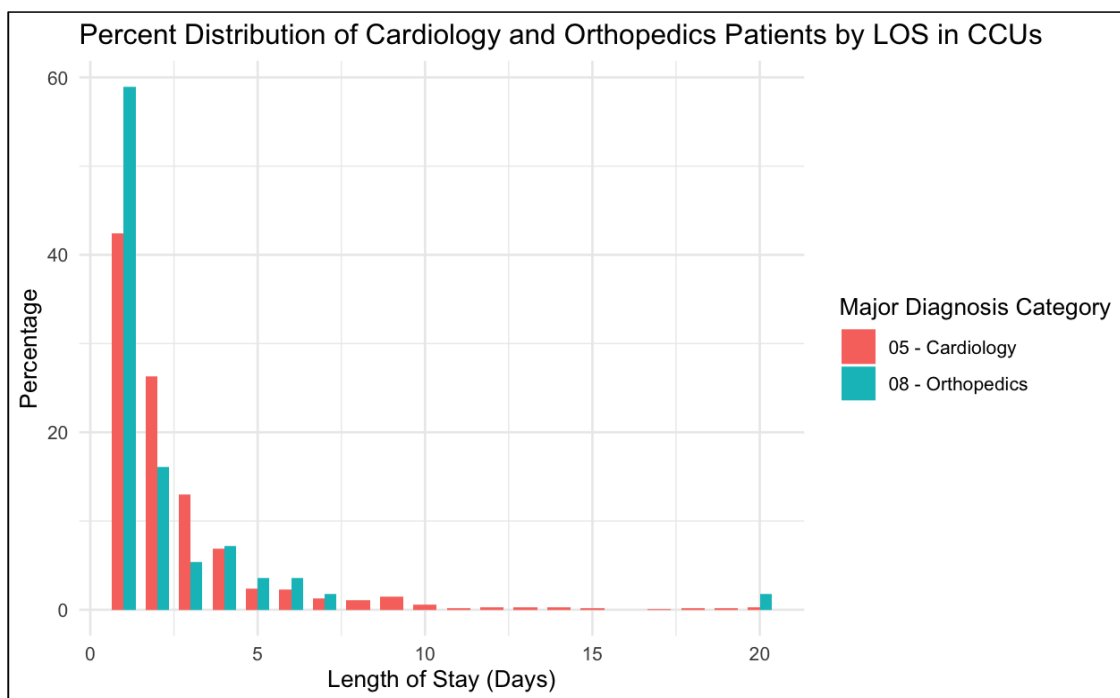


Figure 1: Percent distribution of patients by Length of Stay (LOS) in CCUs

We further examined the types of ICUs and the average length of stay in each type (*Appendix II, Figure 10*). Omega Hospital has three ICU types: SICU, CCU, and MICU. Cardiology has a much higher number of ICU admits across all three ICU unit types over Orthopedics. The average length of stay for both services in each unit is comparable despite cardiology having 780 more patients admitted to ICU. This data can indicate that Omega Hospital’s ICU has standardized treatment protocols that ensure patients receive adequate treatment, reducing the length of stay for both patient populations.

Following that, we looked at the top 10 major operations performed by cardiology and orthopedics requiring ICU stays (*Appendix II, Figure 11*). Data indicates that Omega Hospital provides a range of cardiology services and the fact that a substantial number of these operations require ICU stays suggests that the Cardiology department may be utilizing more resources when compared to orthopedics. Finally, we looked at the average number of operations undergone by cardiology and orthopedics patients (*Appendix II, Figure 12*). Cardiology patients, on average, undergo 1.5 more operations than Orthopedic patients. This could be due to cardiac cases being more complex, requiring multiple procedures, or comorbidities of cardiology patients may necessitate an additional operation.

III. Financial Viability

Omega's Cardiology and Orthopedic services are among the hospital's top 5 high-cost service lines. Given their older patient populations, these services align with national trends (Institute of Medicine 2008). A comparative analysis of the current state of profitability between Cardiology and Orthopedic (*Appendix III, Figure 13*) demonstrates that cardiologic procedures generate more profit than orthopedic procedures overall. Cardiology services currently present a profit of USD 2.14 million, whereas Orthopedics is experiencing a loss of USD 620,000. In addition, Cardiology services contributed to 18% of the overall profit, while Orthopedic services contributed to a 10% loss to Omega Hospital (*Appendix III, Figure 14*).

According to Modern Healthcare Insights, Orthopedics will continue to profit more in an ever-increasing move toward an outpatient setting rather than inpatient. Traditionally expensive inpatient procedures, such as hip replacements, will therefore be advised to move to outpatient centers; Insurers will push patients to surgeon-owned facilities where costs tend to be lower. Even at Omega Hospital,

86% of cardiac procedures were emergency procedures, while only 36% of orthopedic procedures were emergency procedures. Hence, entering joint ventures with surgeons will be the best strategy for Orthopedics even though they lose the facility fee associated with inpatient procedures. Comparatively, inpatient procedures and services from Cardiology (in particular, cardiovascular surgery and interventional cardiology) continue to be profitable for most hospitals. This overall trend continues to be illustrated in Cardiology and Orthopedic Services at Omega Hospital. Cardiology services continue to show high volume (*Appendix III, Figures 14, 15*) and profitability; Therefore, it is a considerably strategic service line at Omega.

The payer mix is an important metric to consider because self-paying patients and private insurance companies compensate hospitals at a higher rate than government programs like Medicare. Government programs may pay hospitals less than the actual cost of patient treatment, impacting hospital revenue, as seen in *Figure 2*. In this figure, the payer mix shows us that this facility primarily services Medicare and/or Medicaid beneficiaries and possibly serves as a safety-net hospital. Omega Hospital relies far more heavily on government reimbursement levels than hospitals with a lower percentage of Medicare and Medicaid patients. As is the general trend, hospitals like Omega, with greater numbers of Medicare and Medicaid beneficiaries, can struggle to draw patients with private insurance to balance the scales.

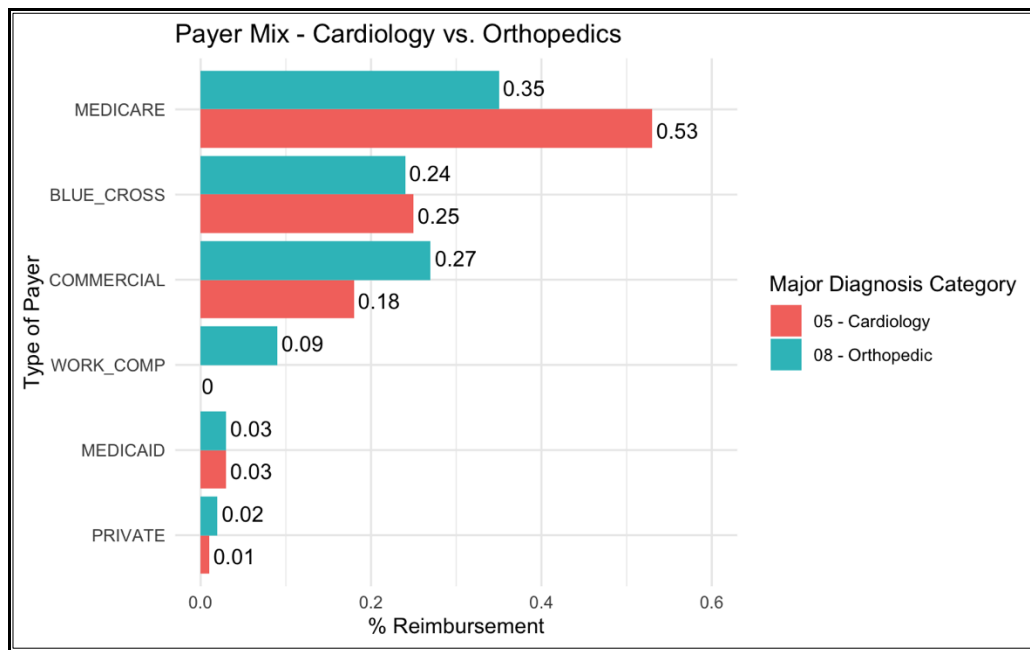


Figure 2: Bar Chart for Payer Mix

Cardiology's more significant revenue stream may come from the higher reimbursement rates for procedures such as coronary bypass with cardiac catheterization. Orthopedic procedures are likely to continue to experience less volume and a lower profitability rate. Additionally, orthopedic procedures yield high costs, often more than total payments (*Appendix III, Figures 16, 17*). A study shows that the average Medicare reimbursement for healthcare procedures for orthopedic trauma decreased by 30% from 2000 to 2020, where annual data showed a steady decline of 1.5 percent per year (News-Medical, 2020). It is also noted that foot and ankle procedures had the most significant decline in reimbursement, followed by hip fracture surgery and upper and lower extremity procedures. The procedures mentioned in the study are among the top five procedures with the highest cost in Orthopedics (*Appendix III, Figure 15*). Orthopedics' negative profitability stands out as a necessary carve-out within a service line facing high costs and historically lower Medicare reimbursement.

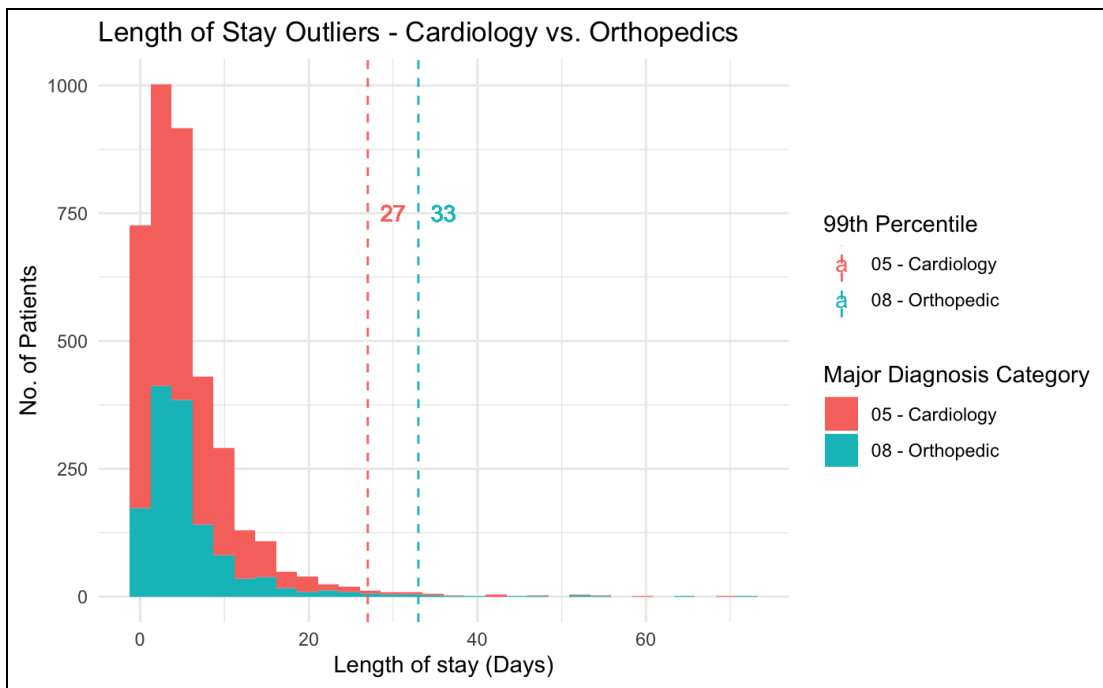


Figure 3: Length of Stay Outliers

Length of stay outlier rates refers to the percentage of patients who stay in the hospital for an unusually long time, typically exceeding the median or average length of stay for a related diagnosis or procedure. High outlier rates can indicate a need for better care coordination, early intervention, and more efficient use of hospital resources (*Hughes et al. 2022*). The 99% threshold for LOS in Cardiology was 27 days and 33 days for Orthopedics, yet the average length of stay for Cardiology and Orthopedics at Omega Hospital differed by only one day (*Appendix II, Figure 10*). The distribution for Orthopedics is skewed due to outliers that fall above the upper range of stay. In this case, the five days difference in outliers shows us that the Orthopedic service at Omega struggles to maintain lengths of stay that remain viable for attaining profit (*Figure 3*). The negative outliers of the length of stay from Orthopedics services effectively address the slight overall loss (*Appendix III, Figure 13*). Reasons for hospitalization could explain this. Orthopedic procedures can involve complex surgical interventions that often require specialized equipment, advanced imaging techniques, and experienced surgeons, leading to high costs (*Gholson et al. 2017*). Moreover, orthopedic patients have a higher risk of complications due to underlying health conditions or the nature of the injury. All these factors can contribute to a higher rate of outliers in orthopedic services, impacting reimbursement rates and requiring healthcare providers to carefully manage patient care to ensure that all patients receive high-quality treatment while controlling costs.

VALIDITY & SCOPE OF ANALYSIS

The scope and validity of this report would be significantly enhanced if it incorporated a comprehensive, robust view of the overall healthcare landscape surrounding Omega's hospital. Specifically, the inclusion of CMS data, quality improvement and testing metrics, implementation data, or a suggested variegated analysis to better understand the drivers found across quality and cost of care could either elevate or counter the recommendations set forth. Furthermore, additional data such as incident reports, readmission rates, and infection rates would provide valuable insights into the quality and safety of cardiology and orthopedics services.

APPENDICES

APPENDIX I – DEMOGRAPHICS

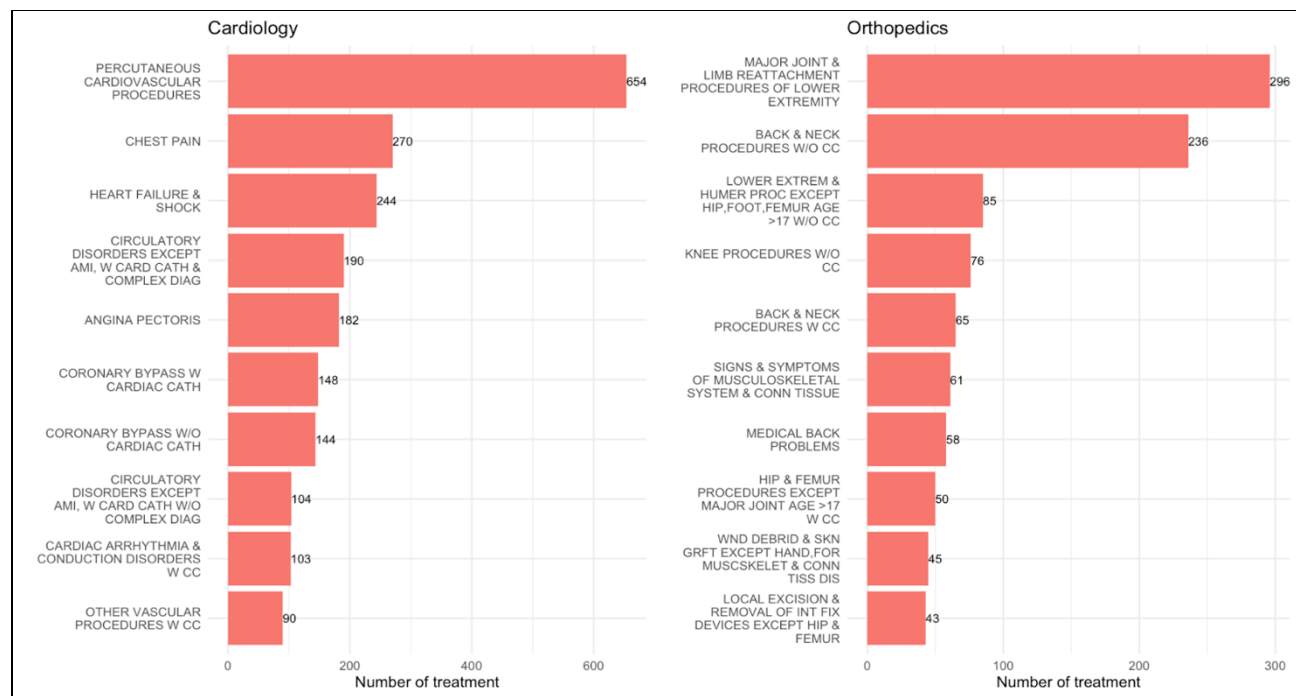


Figure 1: Top 10 disease entities in Cardiology and Orthopedics departments

APPENDIX II - INTENSITY/UTILIZATION INDICATORS

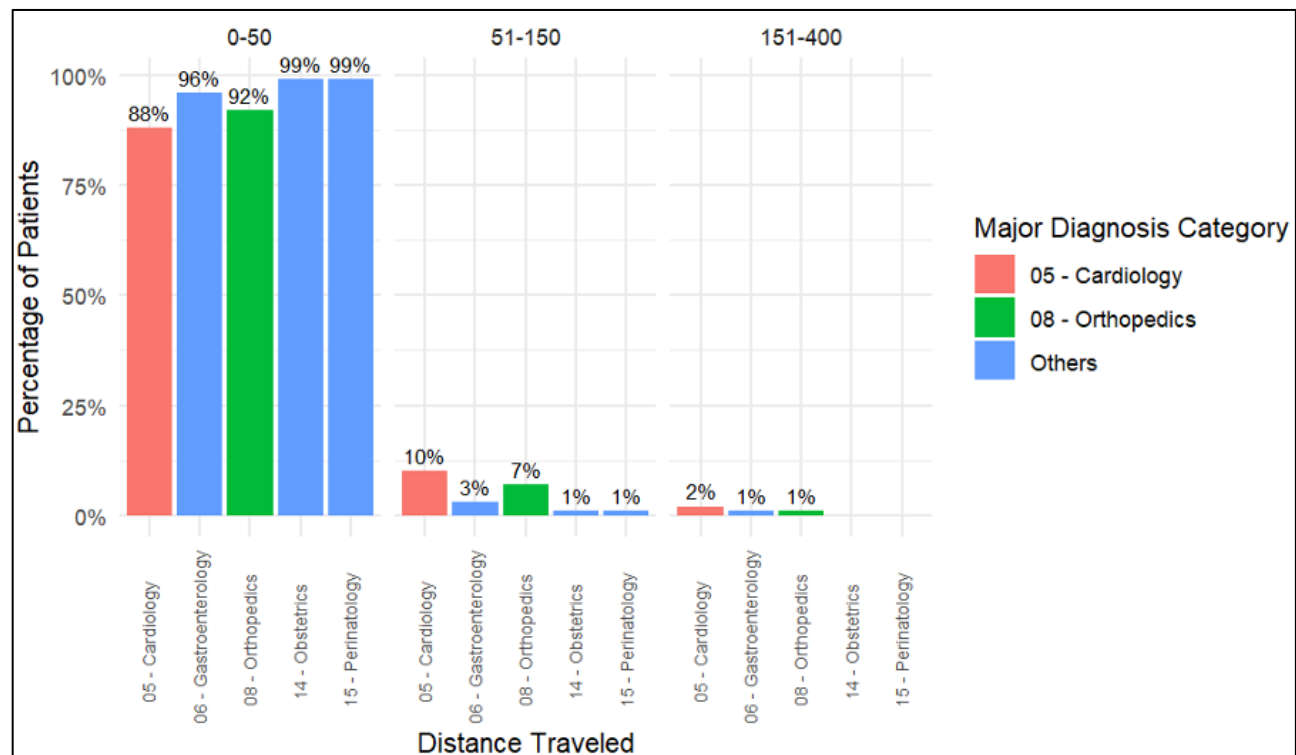


Figure 2: Distance traveled by patients for Cardiology & Orthopedic vs Other Services

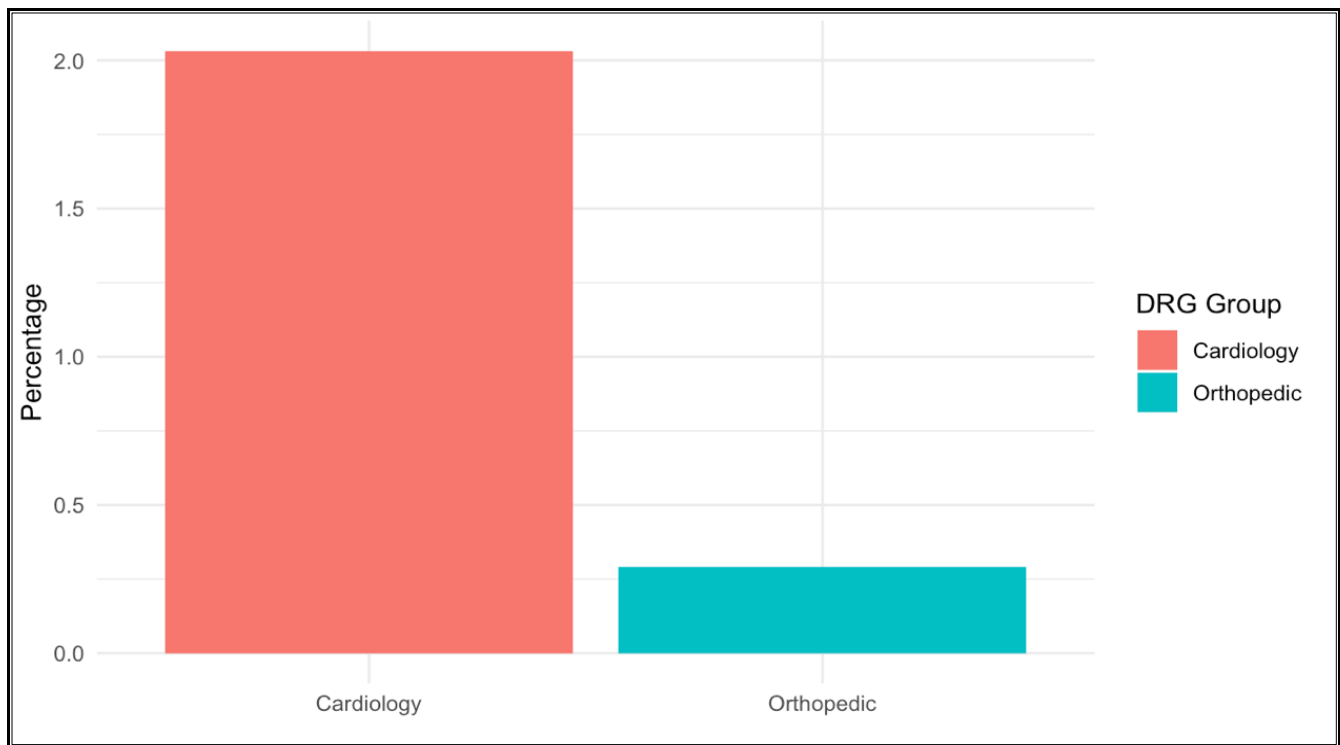


Figure 3: Death Rate (%) in Cardiology vs Orthopedic Patients

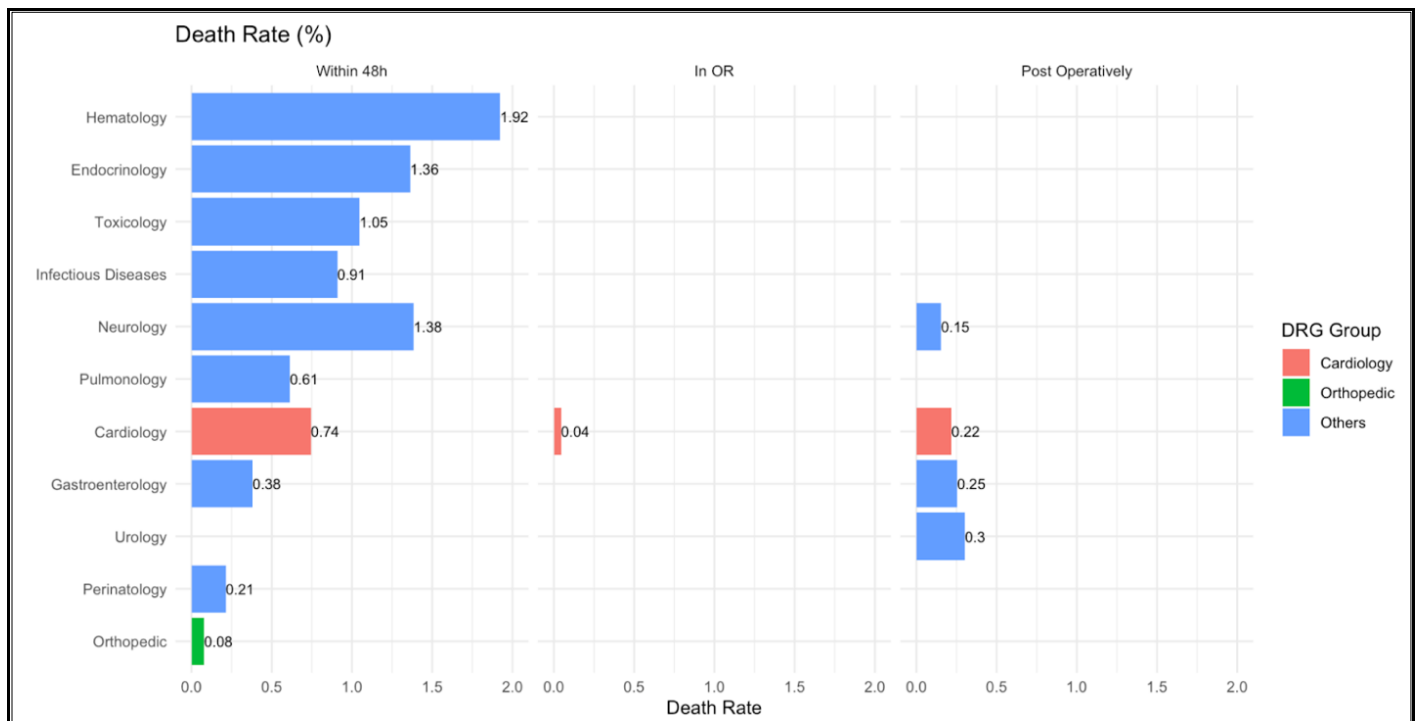


Figure 4: Comparison of death rate (%) by Diagnosis-related Group (DRG) by death at a different point during hospitalization.

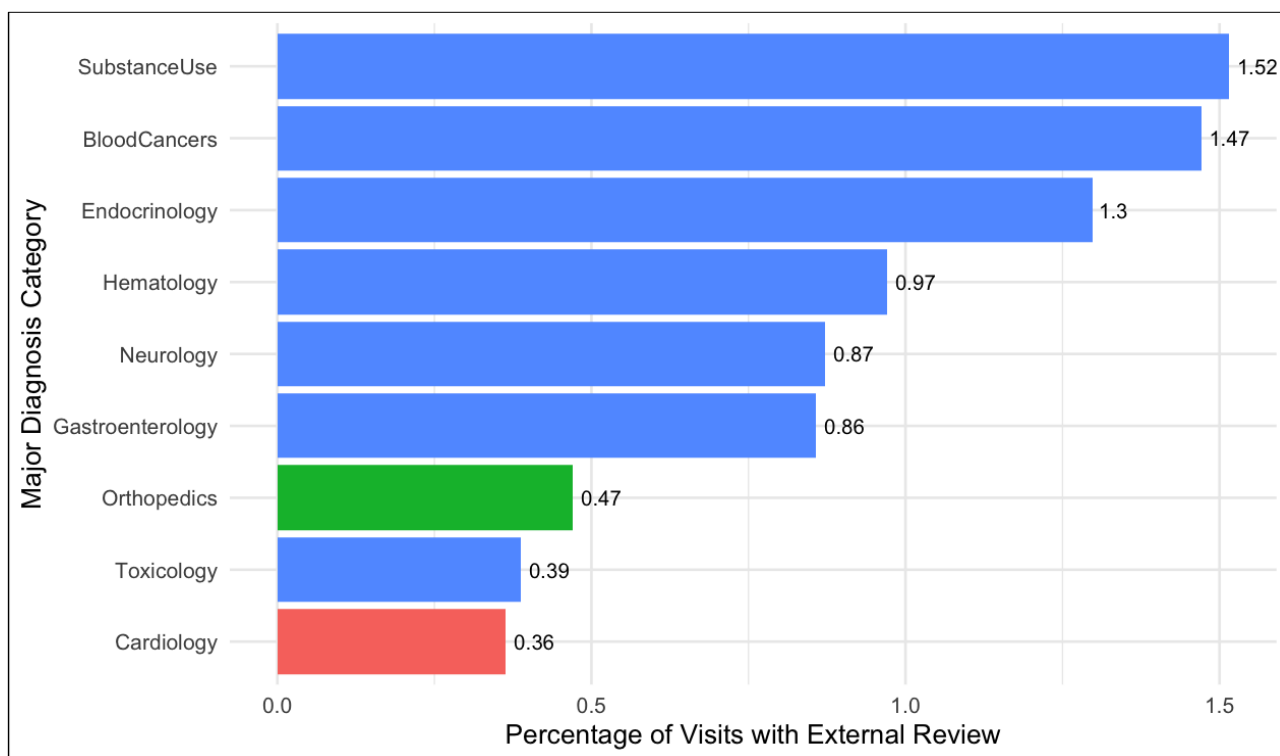


Figure 5: Percentage of visits requiring External Reviews by Diagnosis Group

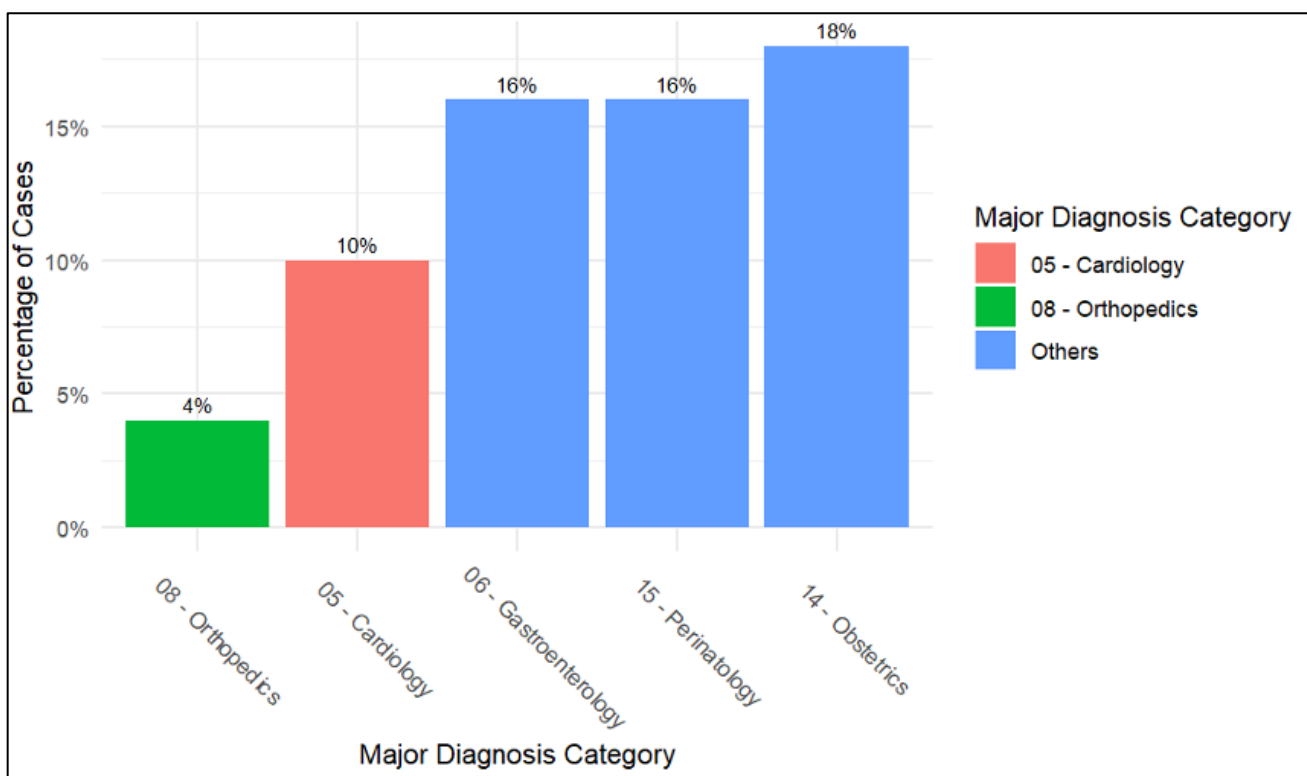


Figure 6: Teaching designation for Cardiology and Orthopedics vs Other Services

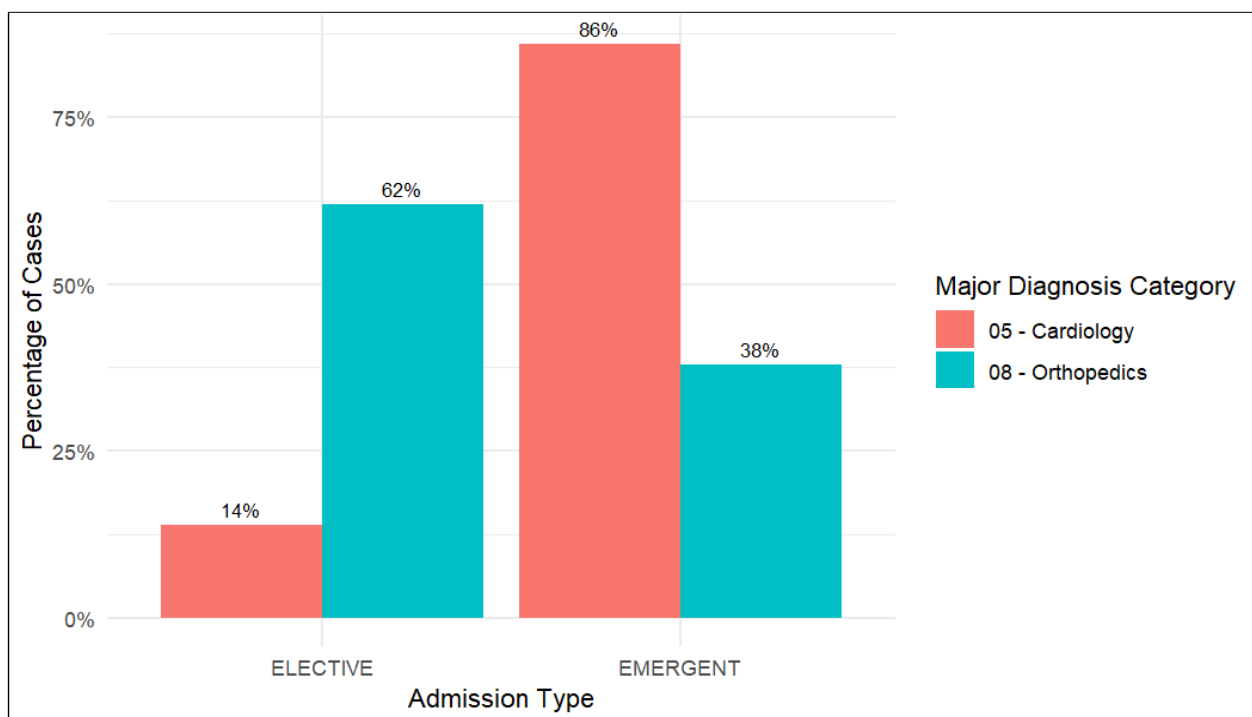


Figure 7: Admission Type of Cardiology and Orthopedics

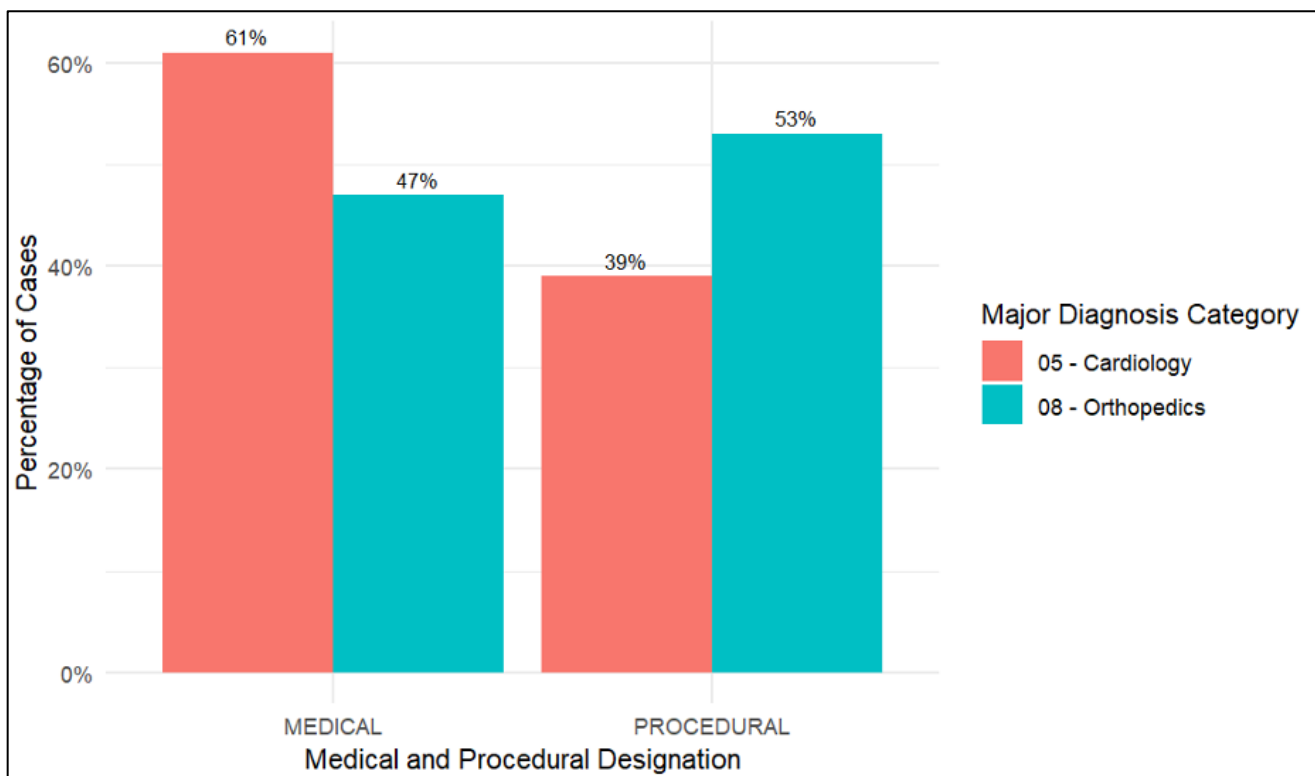


Figure 8: Medical and Procedural Cases in the ER for Cardiology and Orthopedic Services

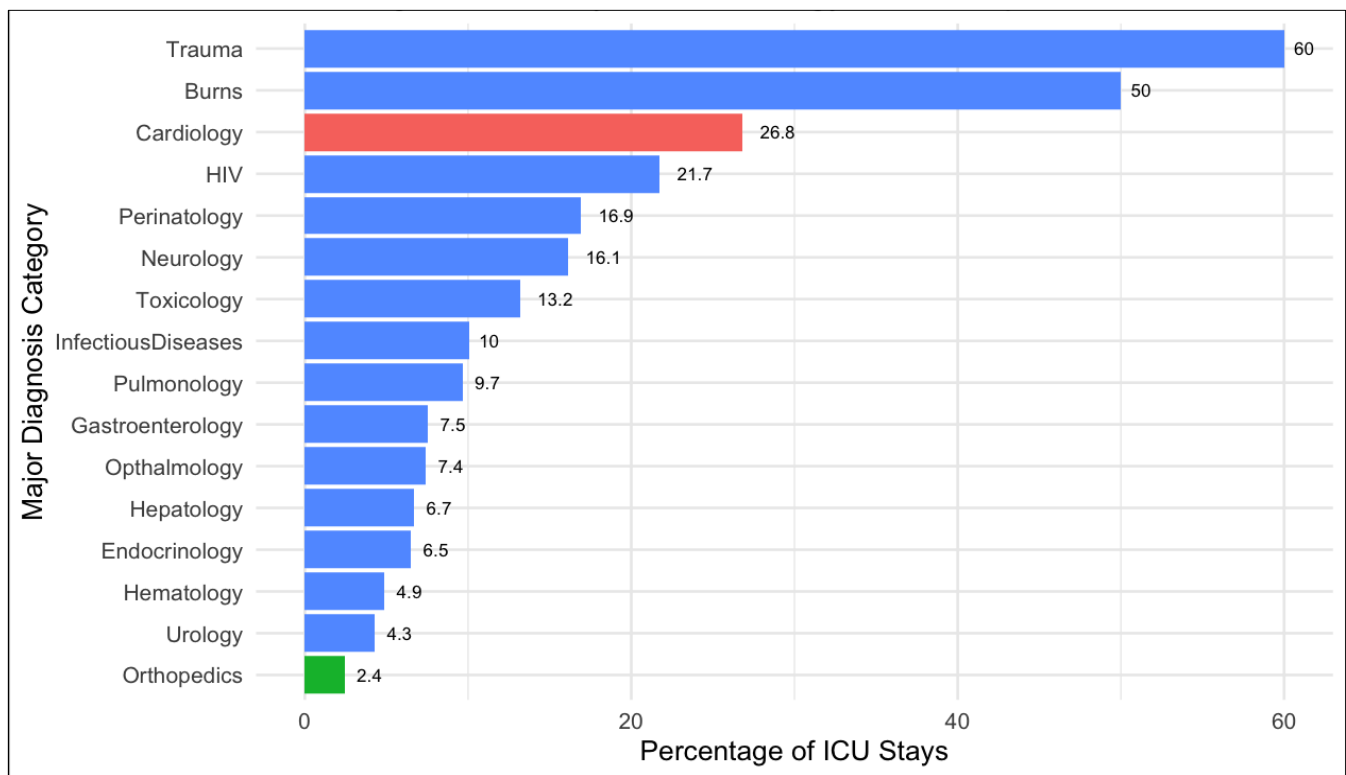


Figure 9: Percentage of ICU Stays in Cardiology and Orthopedics vs Other Services

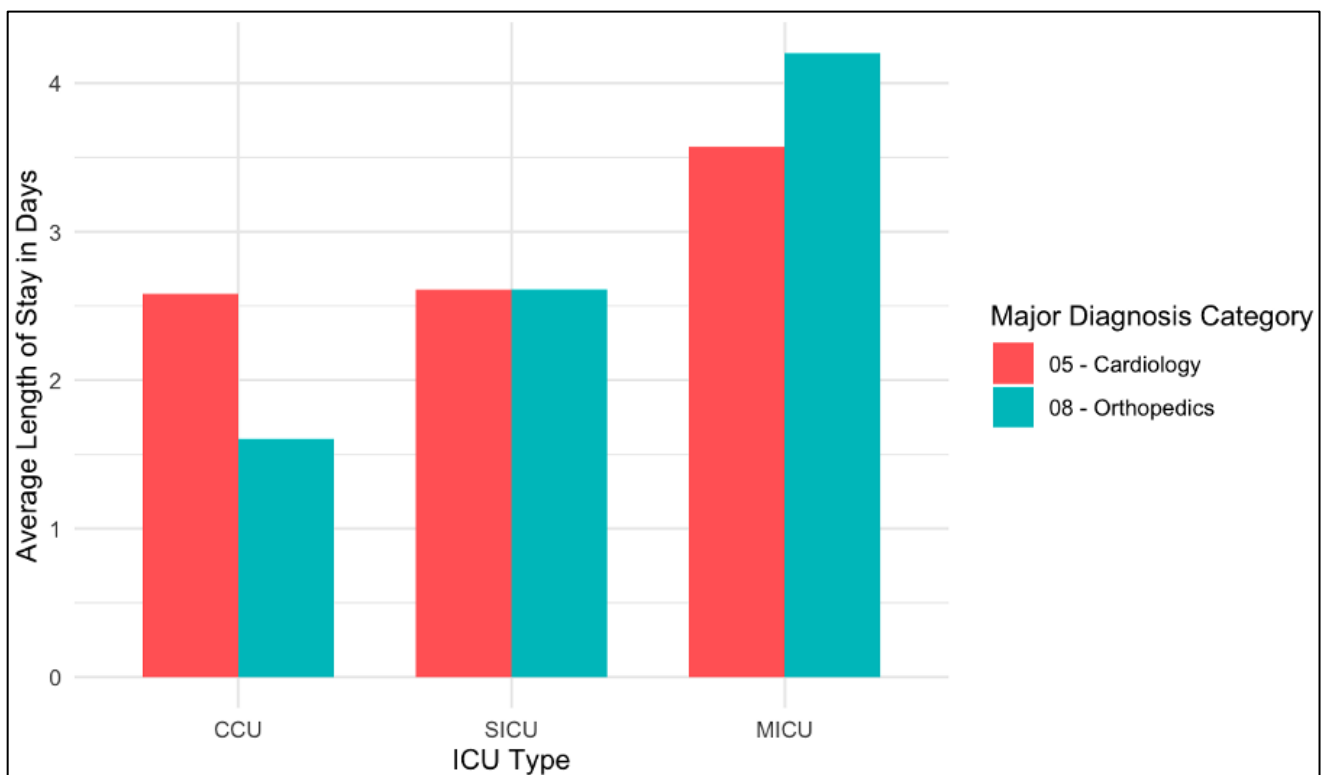


Figure 10: Average Length of Stay in each ICU Unit Type

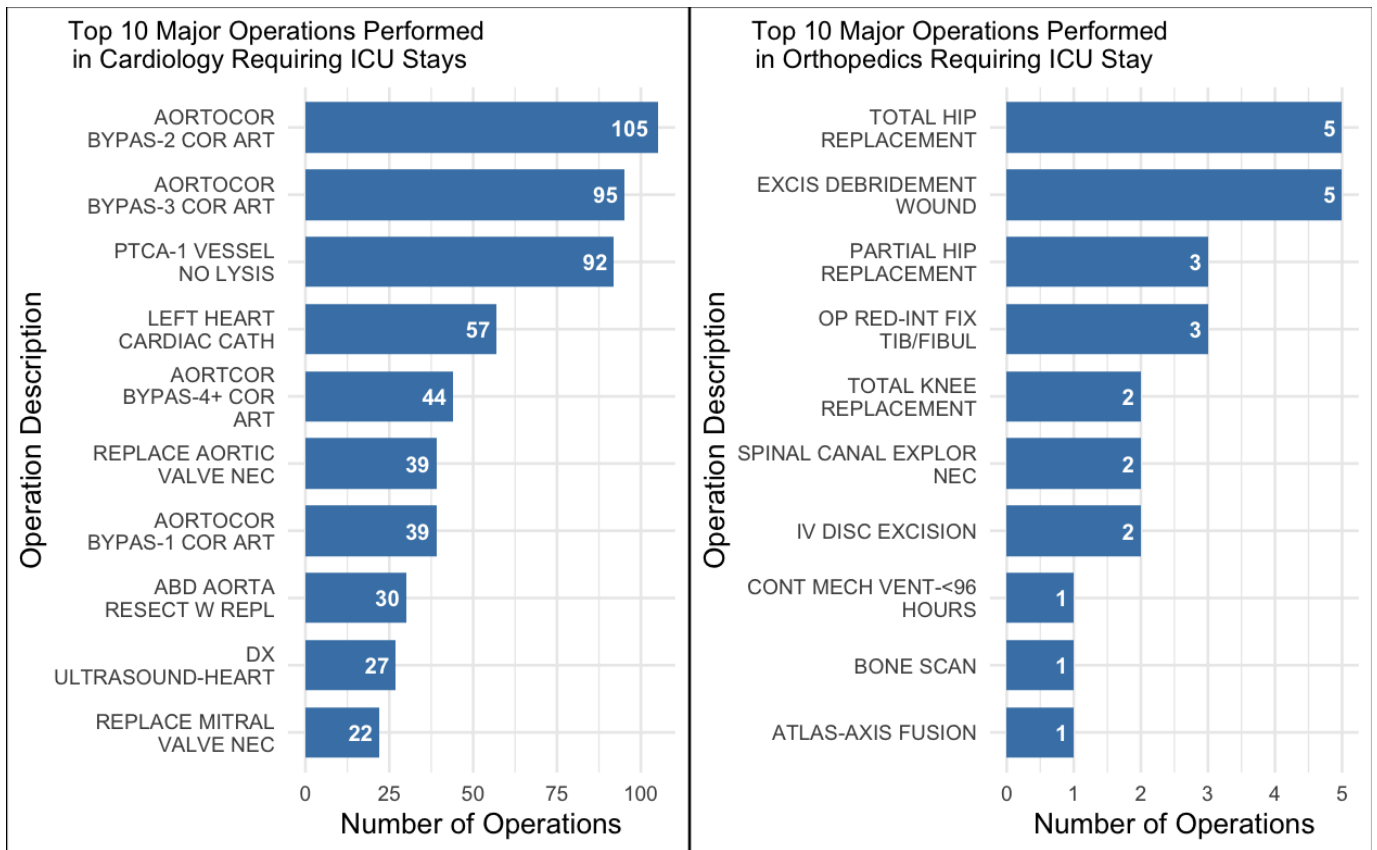


Figure 11: Top 10 Major Operations Requiring ICU Stays

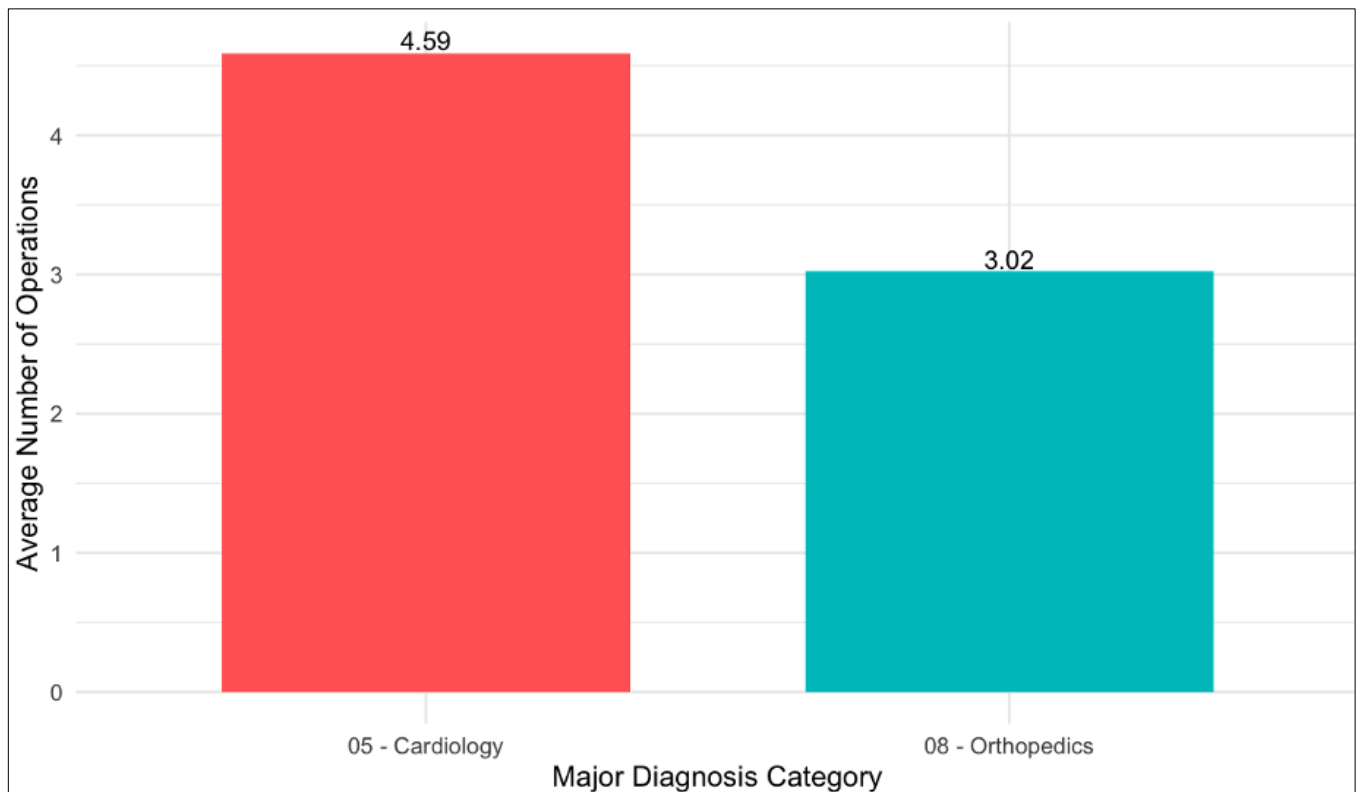


Figure 12: Average Number of Operations Performed in Cardiology and Orthopedic Groups

APPENDIX III - FINANCIAL VIABILITY

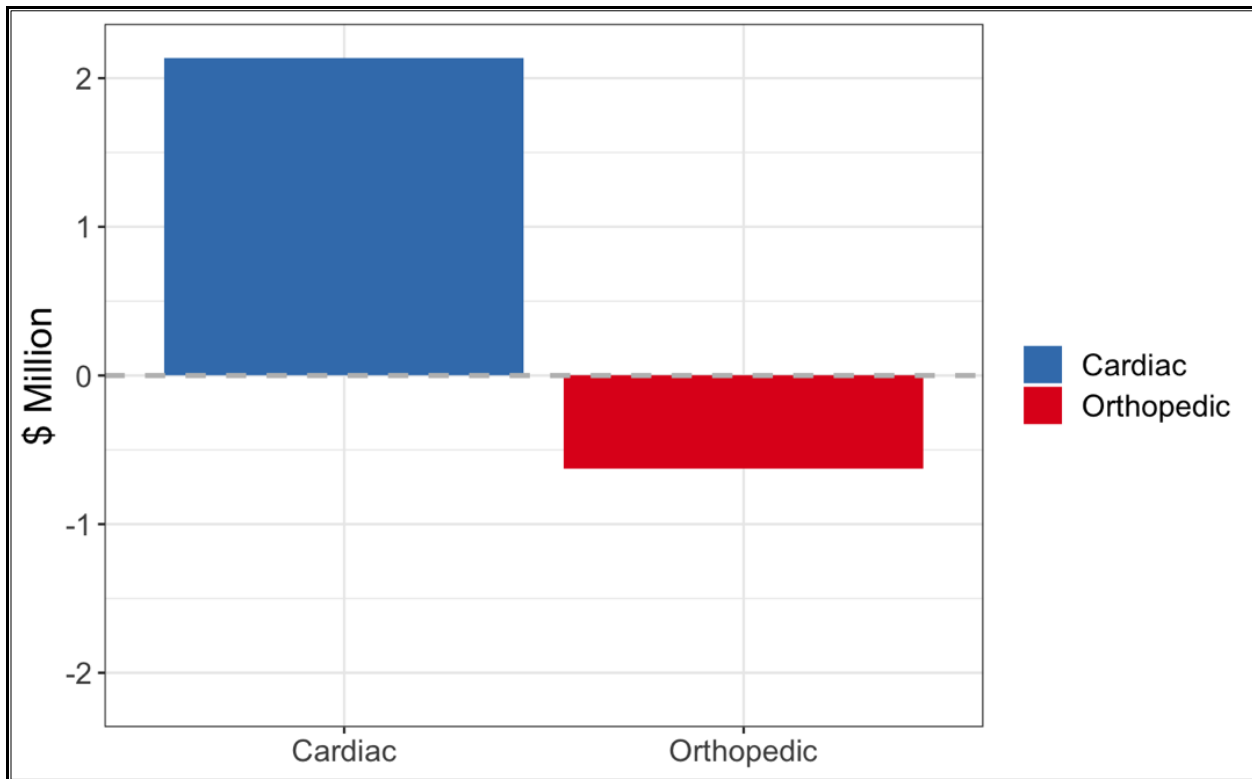


Figure 13: Profit and Loss Bar Chart for Cardiology and Orthopedics

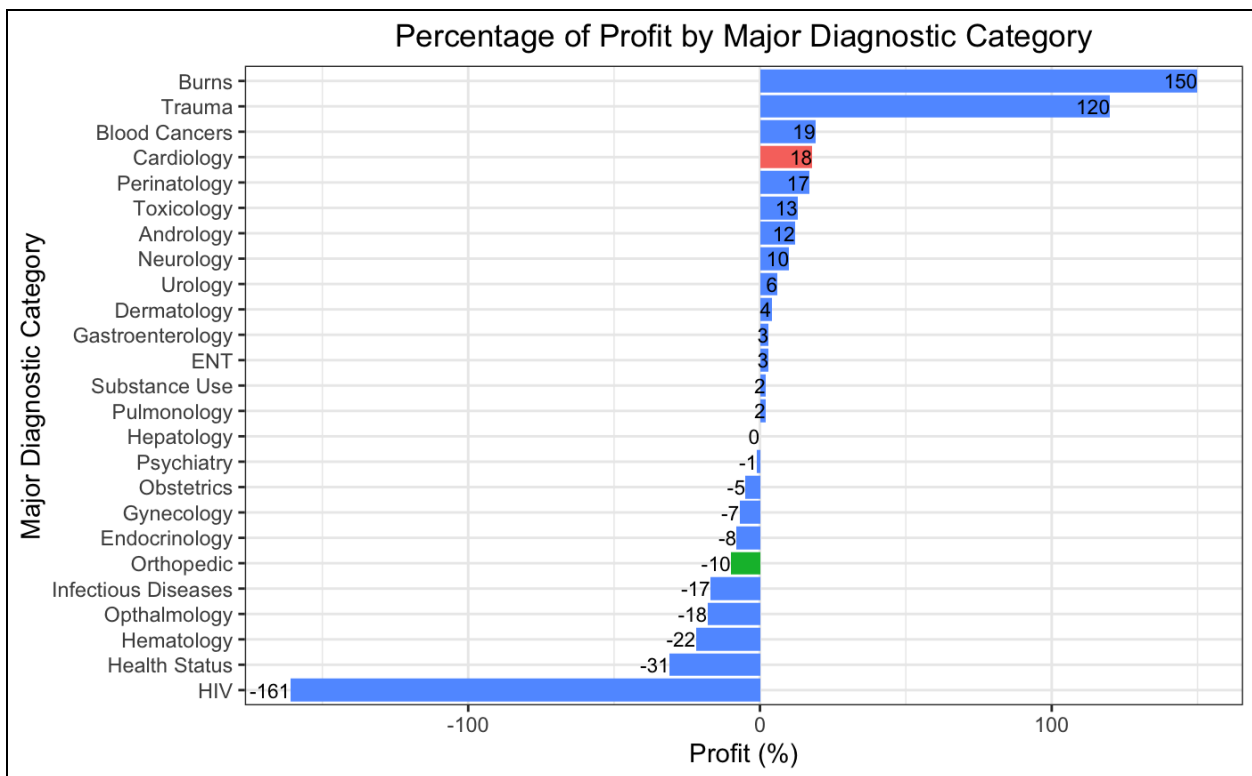


Figure 14: Percentage Profit by Major Diagnostic Group



Figure 15: Top 5 High-Cost Procedures for Cardiology and Orthopedics

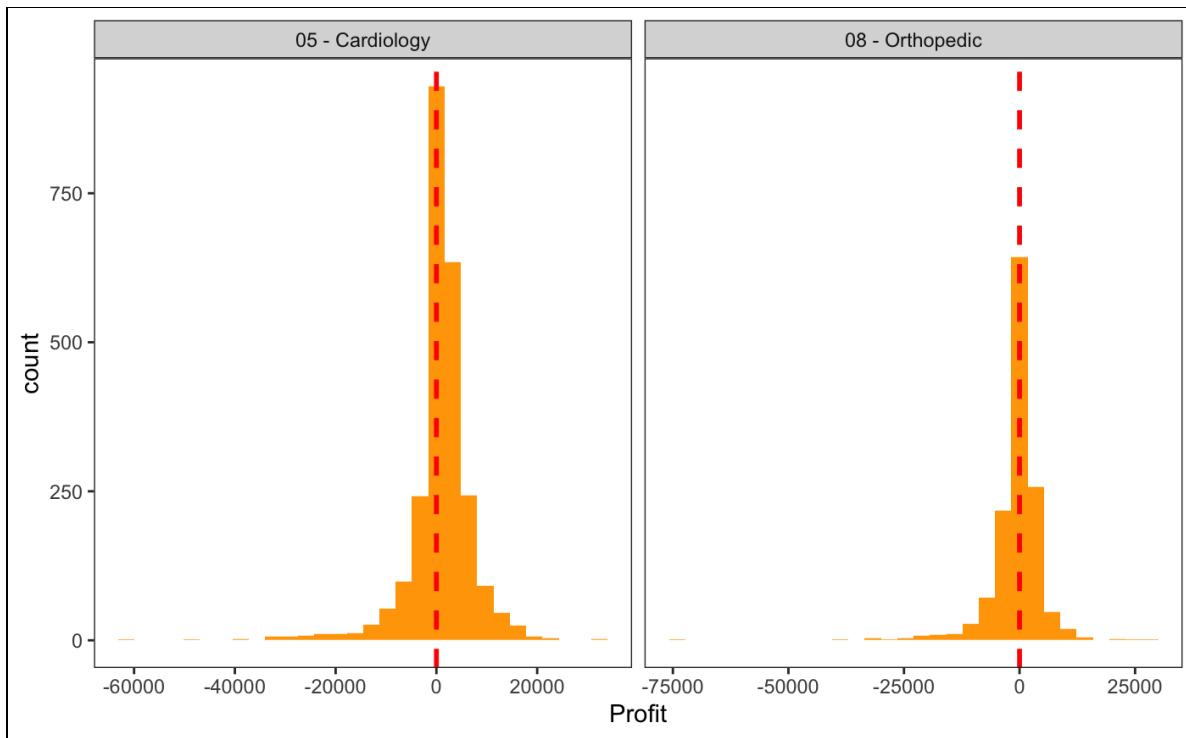


Figure 16: Profits by Number of Procedures for Cardiology and Orthopedics

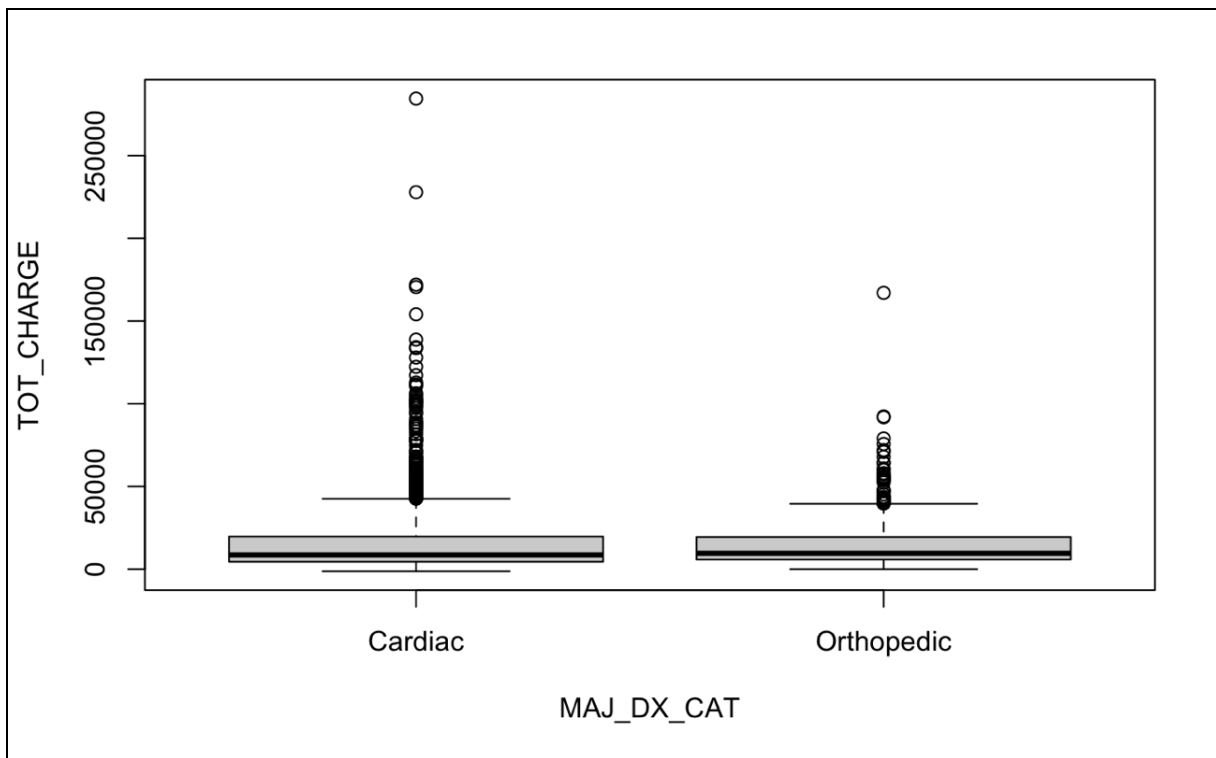


Figure 17: Total Charges of Cardiology and Orthopedics

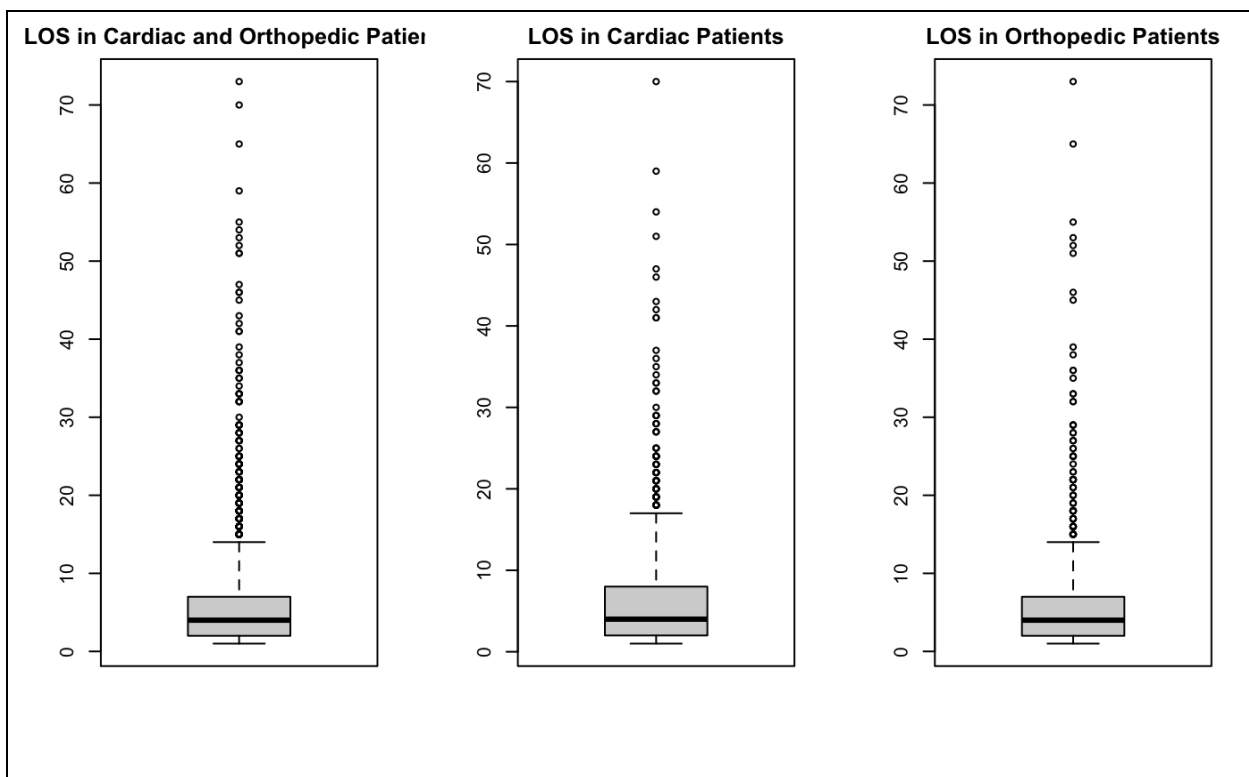


Figure 18: LOS Outlier Rates Box Plot

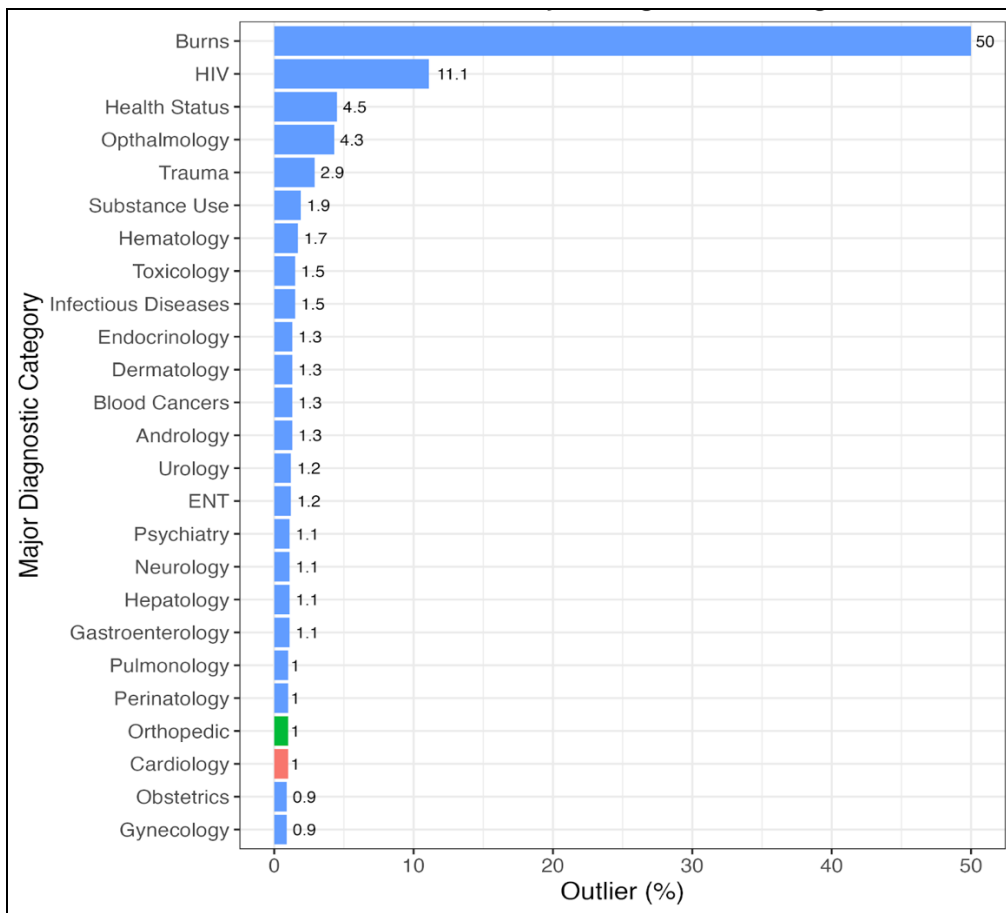


Figure 19: Outliers by Percent in all Major Diagnostic Categories

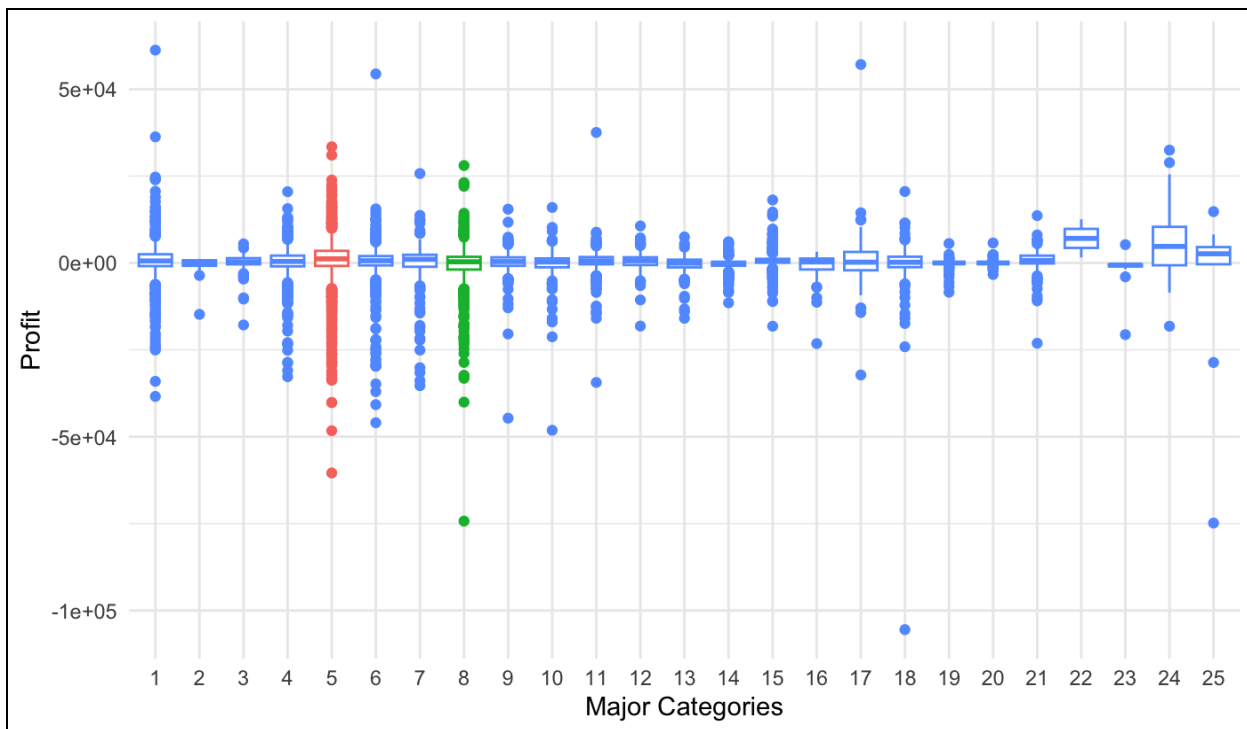


Figure 20: Profit Distribution in all Major Diagnostic Categories

<https://drive.google.com/drive/u/3/folders/OAOhn1xRNfqXIUk9PVA>

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