Evanston Hospital: Data-Driven CMS Rating Enhancement

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Introduction :

The Centers for Medicare & Medicaid Services (CMS), a federal agency based in the US, rates hospitals on a scale of 1-5, with the objective of making it easier for patients and consumers to compare the quality of services offered by various hospitals.
The ratings directly influence the consumer's choice of hospitals and may significantly impact hospital's revenues. Thus, it is extremely import ant for hospitals to identify the key factors that affect their ratings so th at they can work on improving them.

Evanston Hospital is a comprehensive acute-care facility in Illinois, US. The hospital offers a wide range of services and surgical specialities, in addition to having high-end lab capabilities. Despite spending a consid erable amount of resources on improving its services, the hospital's CMS rating has remained at 3 for the past 5 years, and this has led to a stea dy decline in revenue for the hospital. For hospitals like Evanston, these ratings directly influence the choice made by consumers who are looking for a healthcare provider and would, therefore, have a significant impact on the hospitals' revenues.

Problem Statement :

Evanston Hospital is a comprehensive acute-care facility in Illinois, US. The hospital offers a wide range of services and surgical specialities, in addition to having high-end lab capabilities. Despite spending a considerable amount of resources on improving its services, the hospital's CMS rating has remained at 3 for the past 5 years, and this has led to a steady decline in revenue for the hospital. For hospitals like Evanston, these ratings directly influence the choice made by consumers who are looking for a healthcare provider and would, therefore, have a significant impact on the hospitals' revenues. As a consulting company hired by Evanston, our task is to identify possible root causes for the hospital getting such an average rating and recommend measures to mitigate this problem.

Objective :

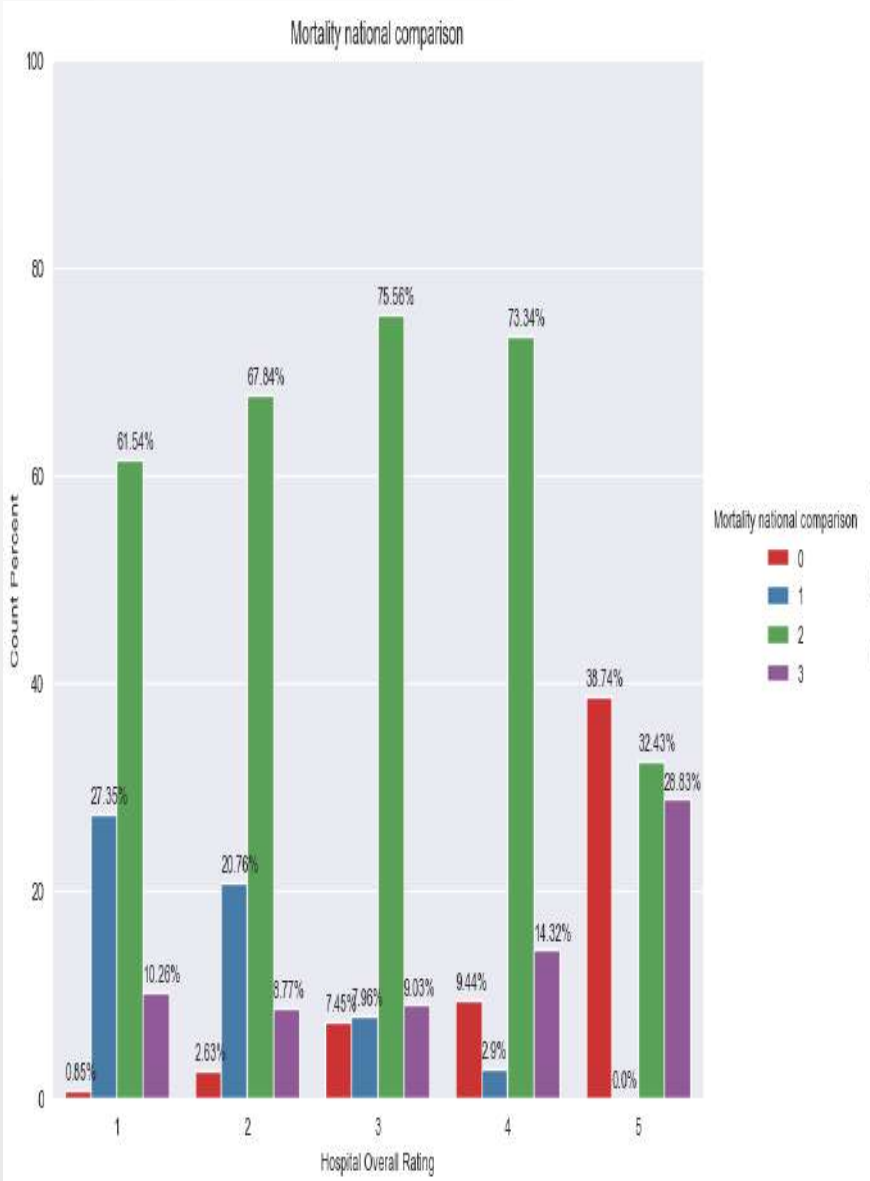
- To perform a root cause analysis to determine the reasons why Evanston Hospital's profits didn't improve using the '**issue tree frame work'.**
- Develop a predictive model for calculating hospital ratings.
- Identify and analyze factors significantly affecting Evanston Hospital's rating.

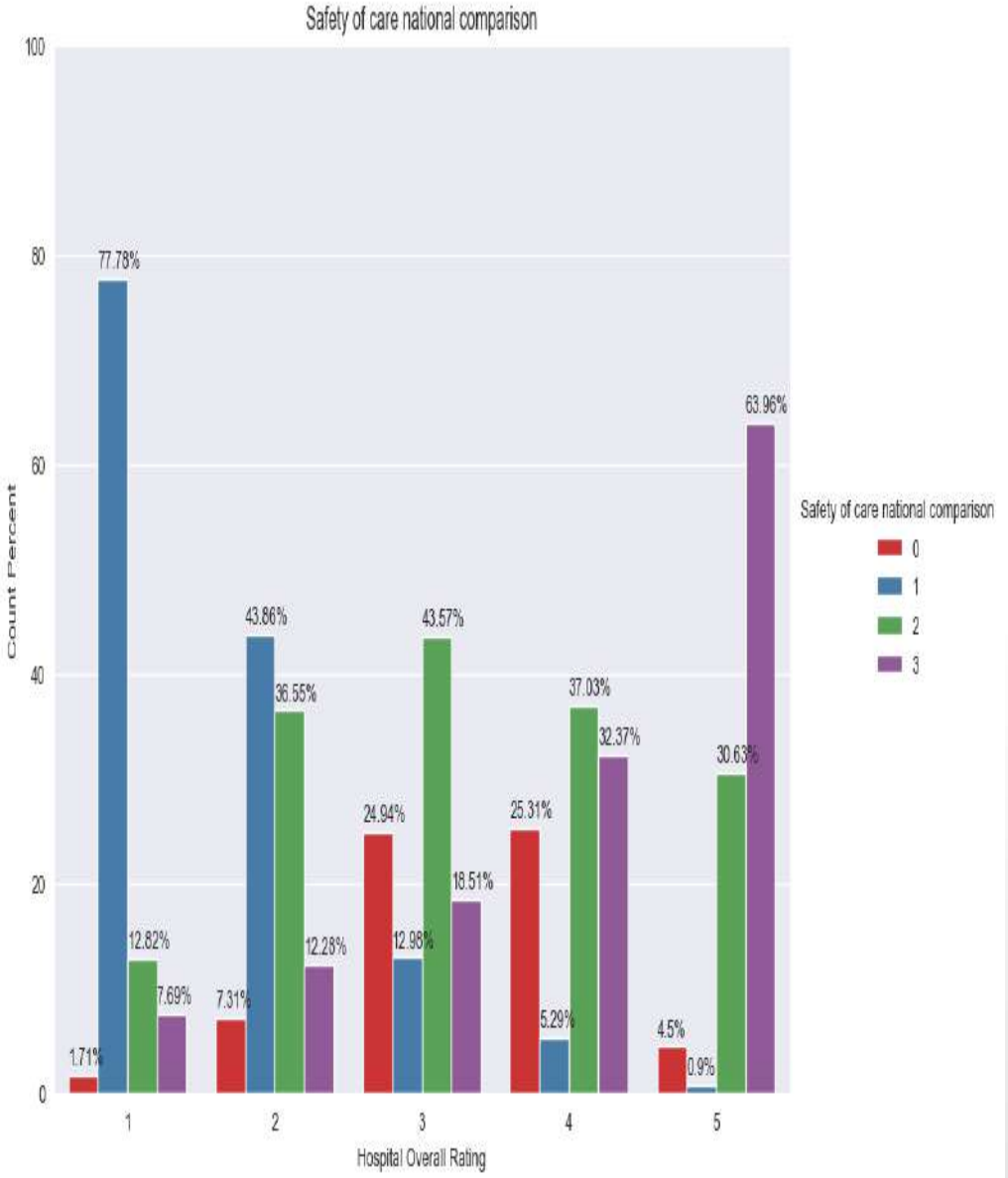
Key Insights :

"By conducting thorough analyses, we uncovered significant findings pertaining to hospital rating factors.“

- We delved into various aspects, including the Lack of data-driven decision-making processes hinders improvement efforts.
- Unfocused Investment Without Addressing Rating Criteria.
- We also examined Mortality, Safety, Readmission, and Patient Experience measures have a significant impact on a hospital's star rating
- Failure to Identify and Prioritize Critical Services.
- Absence of a Systematic Rating Improvement Plan.

Comparison of Overall Hospital Quality Star Rating and Measures Across Seven Exclusive Groups(Mortality ,Safety of Care, Readmissions. ,Patient Experience, Effectiveness of Care, Timeliness of Care, Efficiency ,Outpatient Imaging Use





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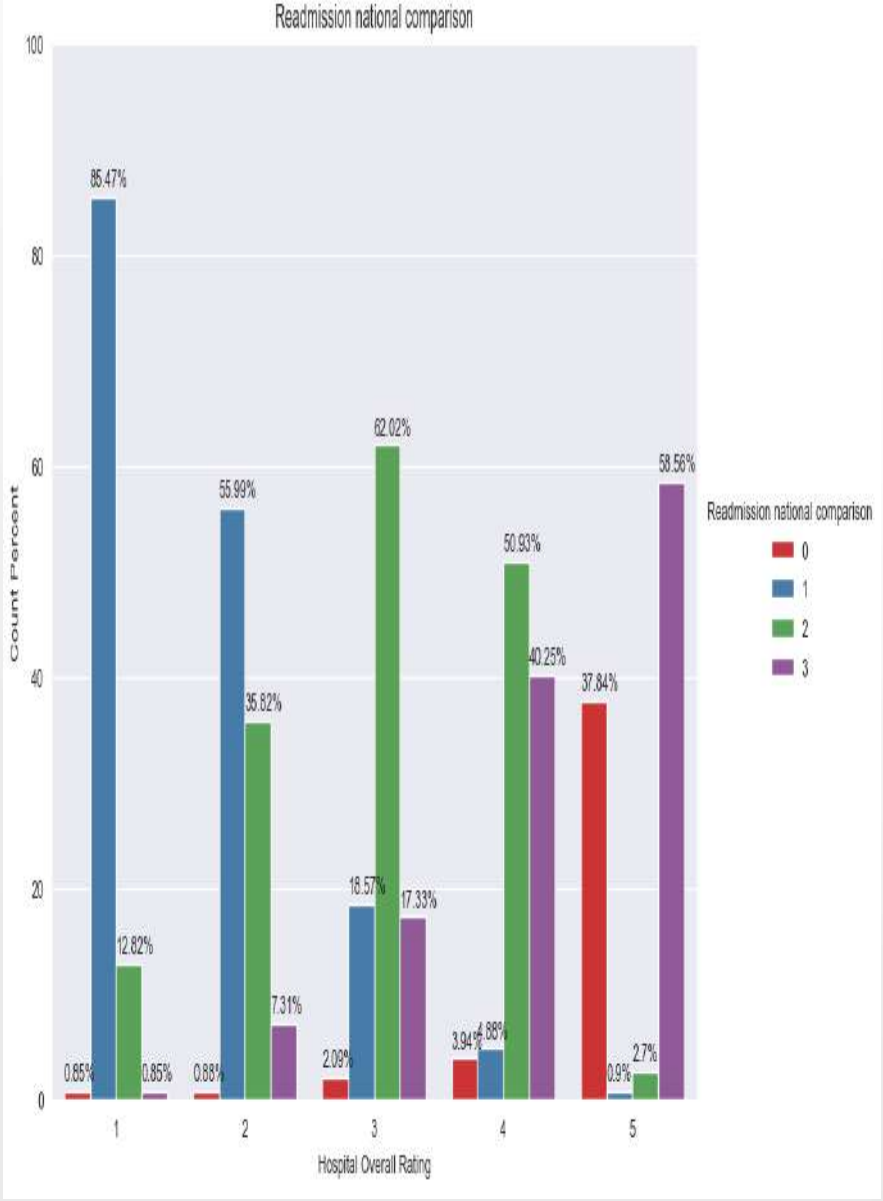

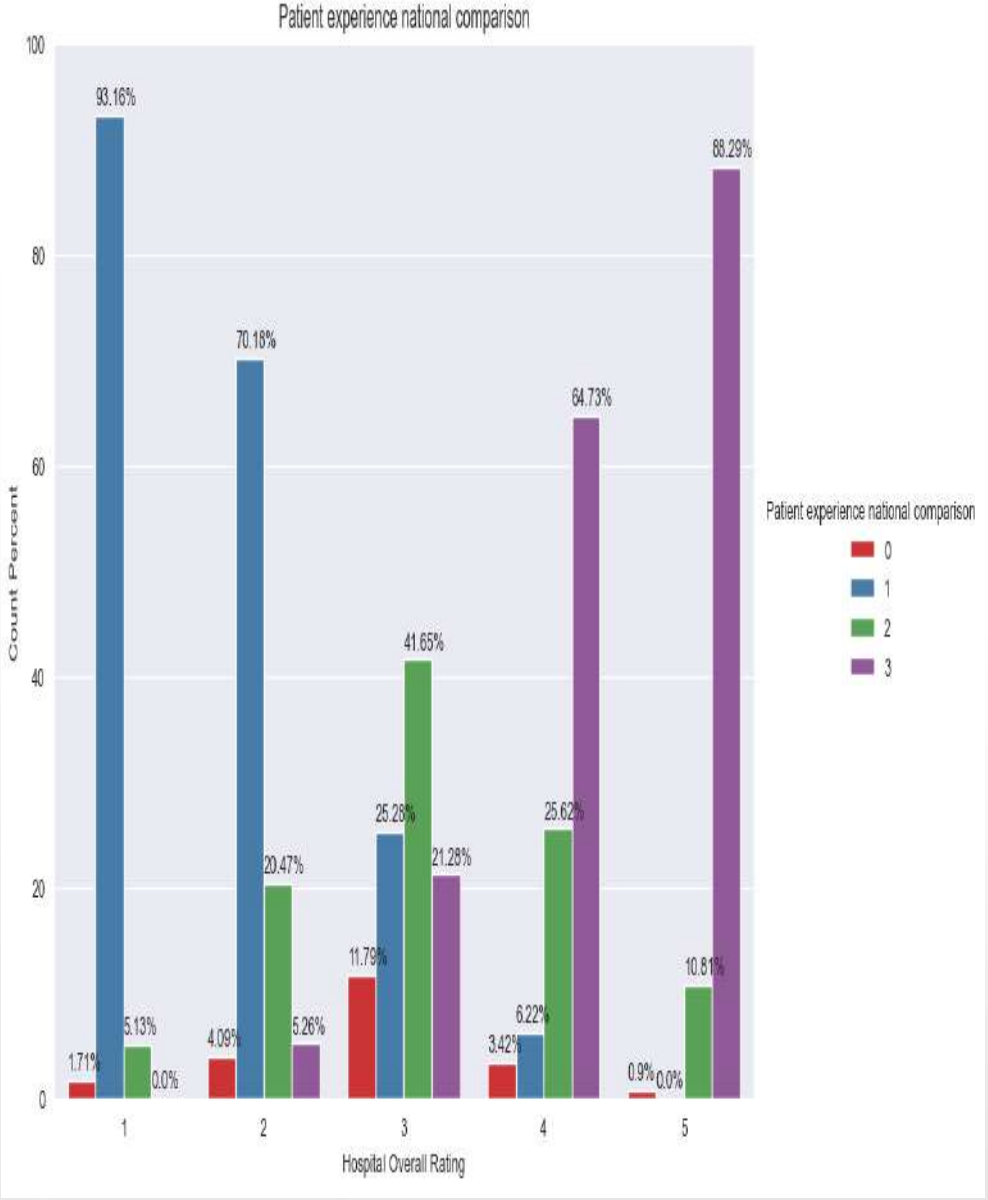

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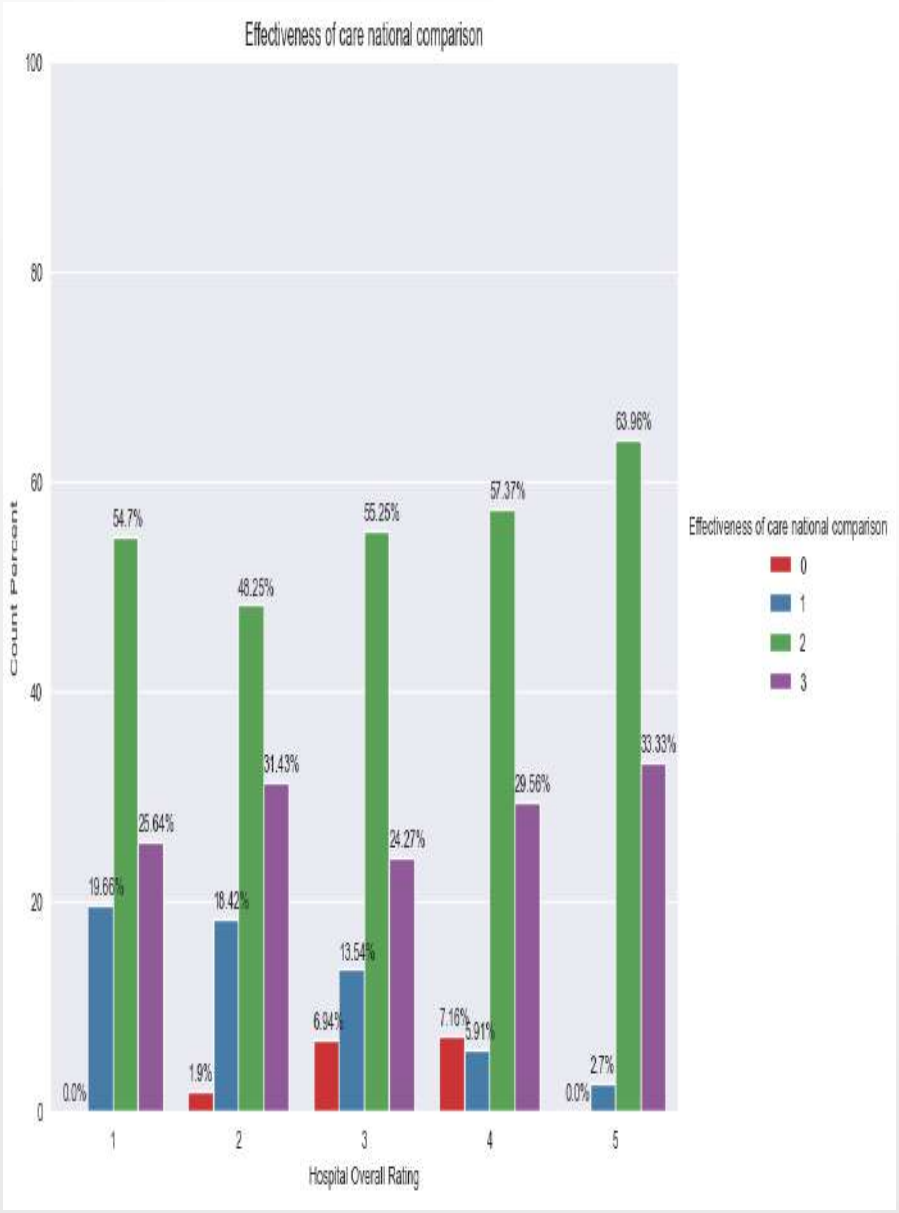

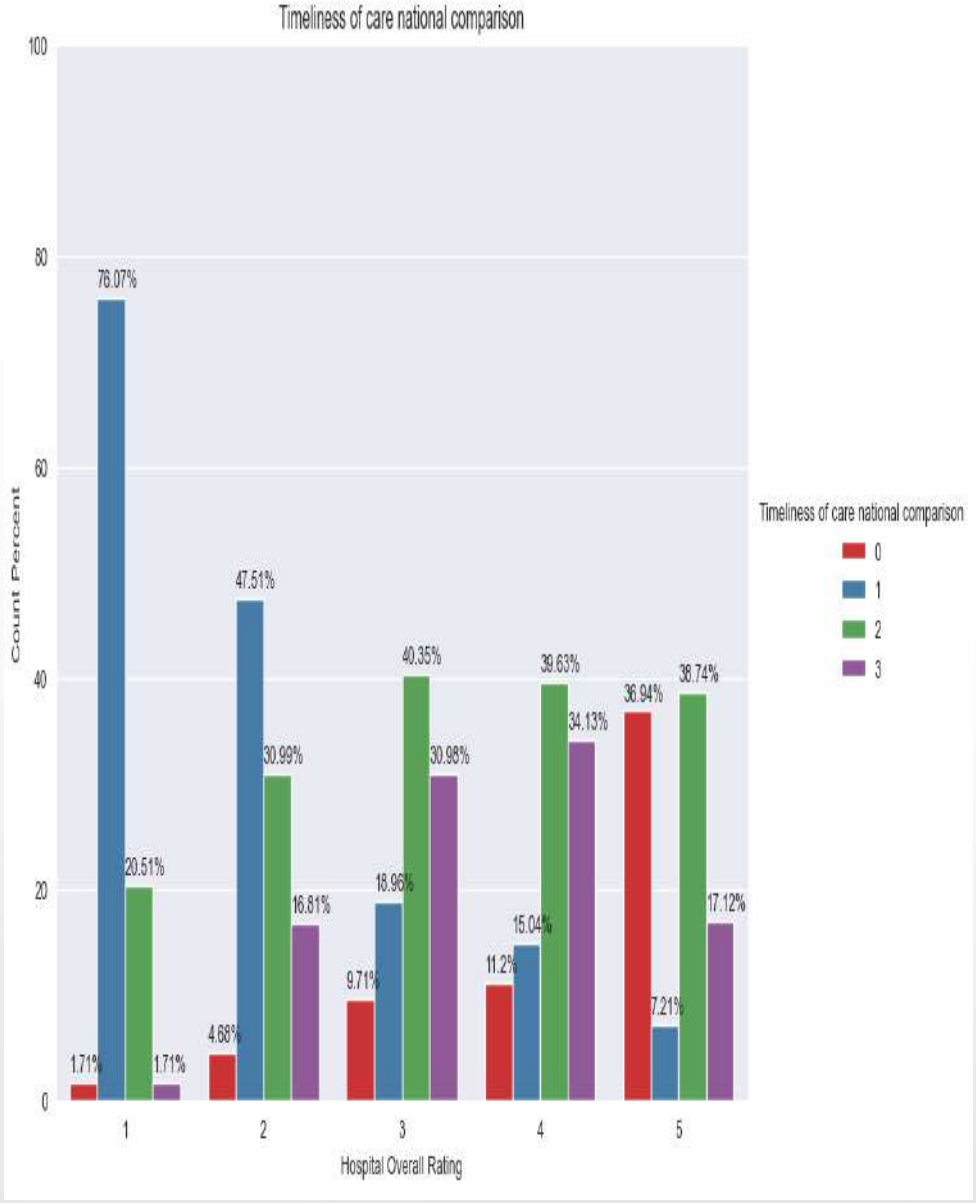

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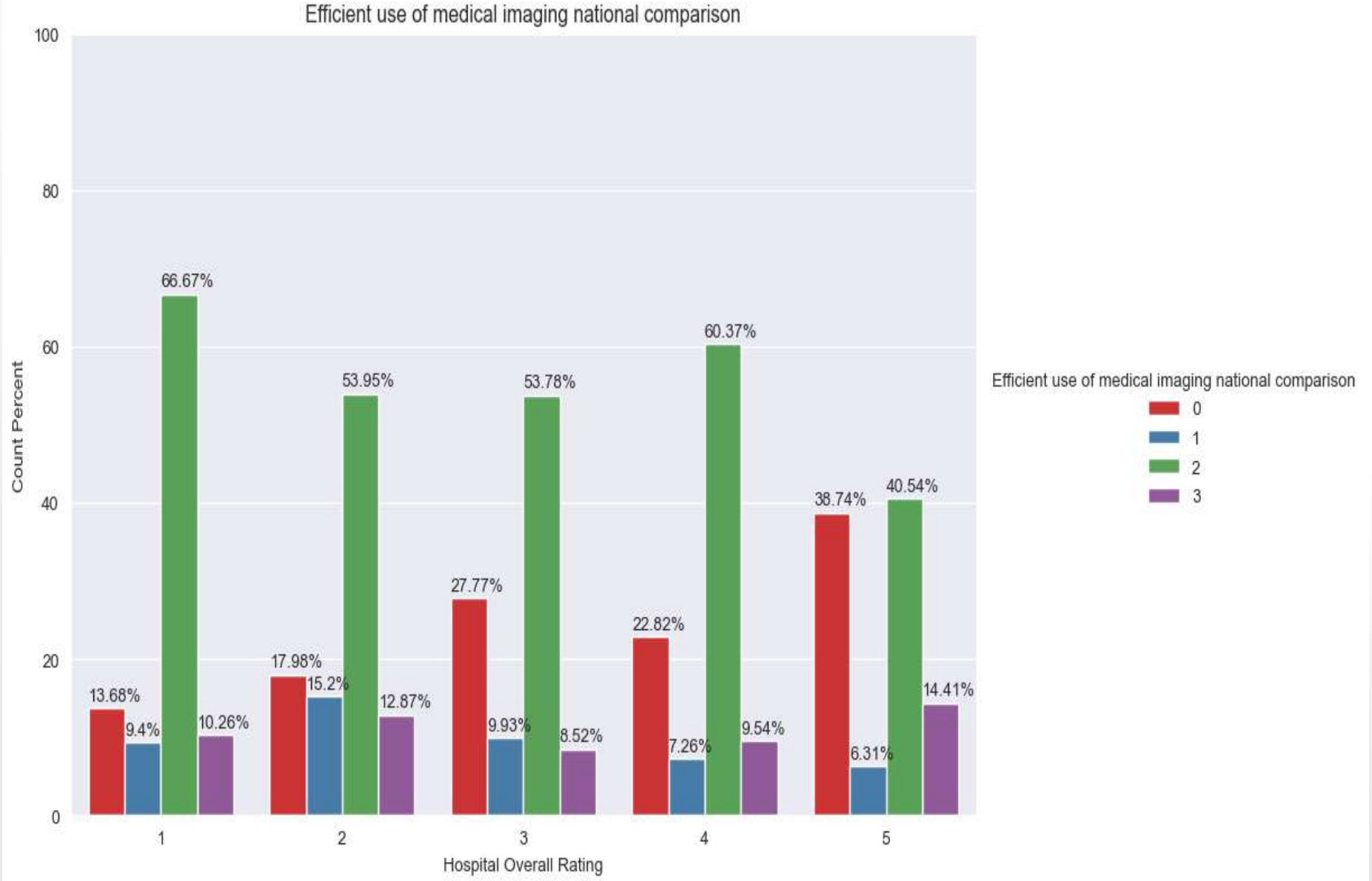


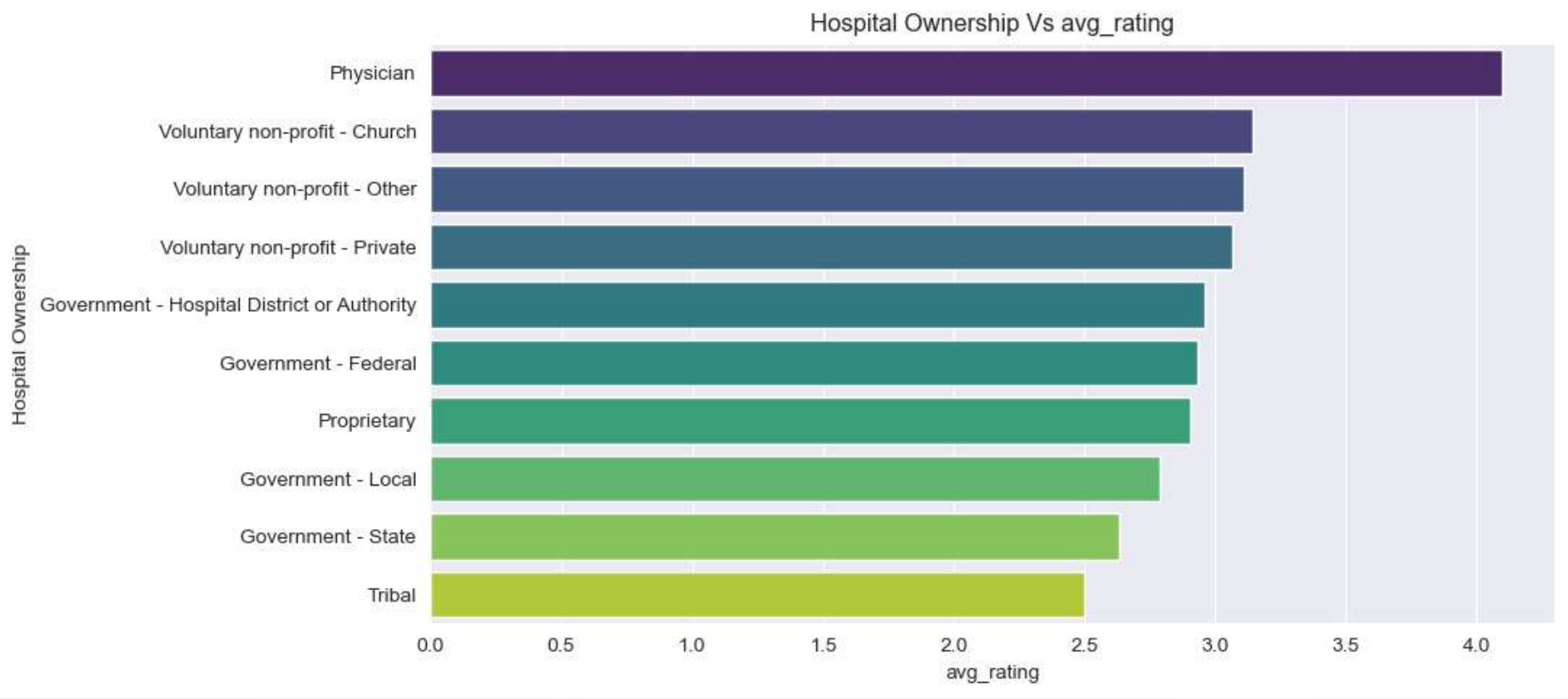
Comparison of Overall Hospital Quality Star Rating and Measures Across Seven Exclusive Groups(Mortality ,Safety of Care, Readmissions. ,Patient Experience, Effectiveness of Care, Timeliness of Care, Efficiency ,Outpatient Imaging Use)

Insights :

- **Mortality Measures:**5-star hospitals tend to have higher Mortality measure score.
- **Safety Measures:** There is a strong correlation between higher Safety scores and better star ratings.
- **Readmission Score:** There is significant impact of higher Readmission measures on star ratings.
- **Patient Experience:** Patient Experience scores play a crucial role in determining star ratings.
- **Effectiveness Measures, Timeliness Measures, and Efficient Use of Imaging Measures:** a substantial percentage of hospitals have scores similar to the National average. This aligns with the expectation that these measures contribute less to star ratings, as they are assigned a lower weightage of 4%.

Mortality, Safety, Readmission, and Patient Experience measures have a significant impact on a hospital's star rating, while Effectiveness Measures, Timeliness Measures, and Efficient Use of Imaging Measures appear to have less influence, in line with their lower assigned weightage.

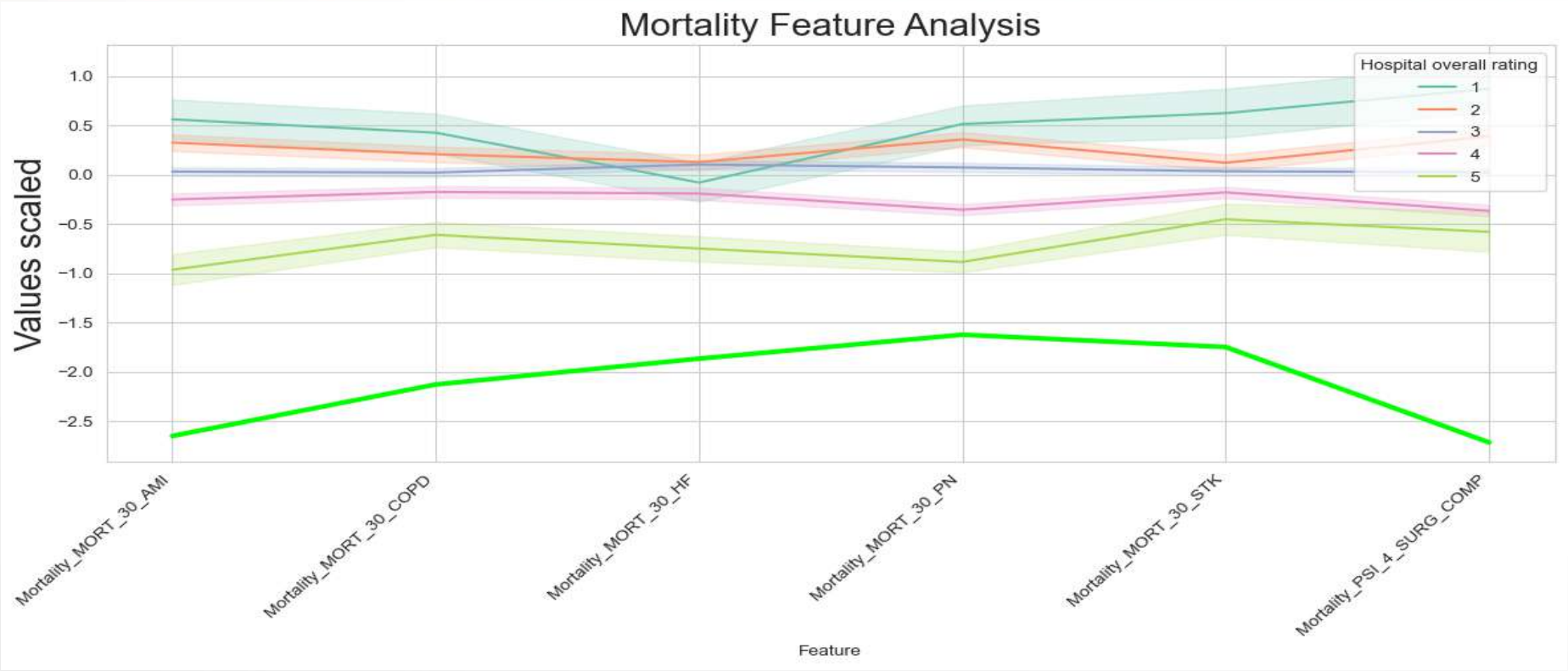
Hospital Ownership Vs Average Hospital Rating



Insights:

The average rating(for Acute Care Hospitals type) was found to be lower for hospitals under tribal and local government ownership, while higher ratings were consistently observed for hospitals owned by physicians and voluntary non-profit organizations, such as churches, private institutions etc.

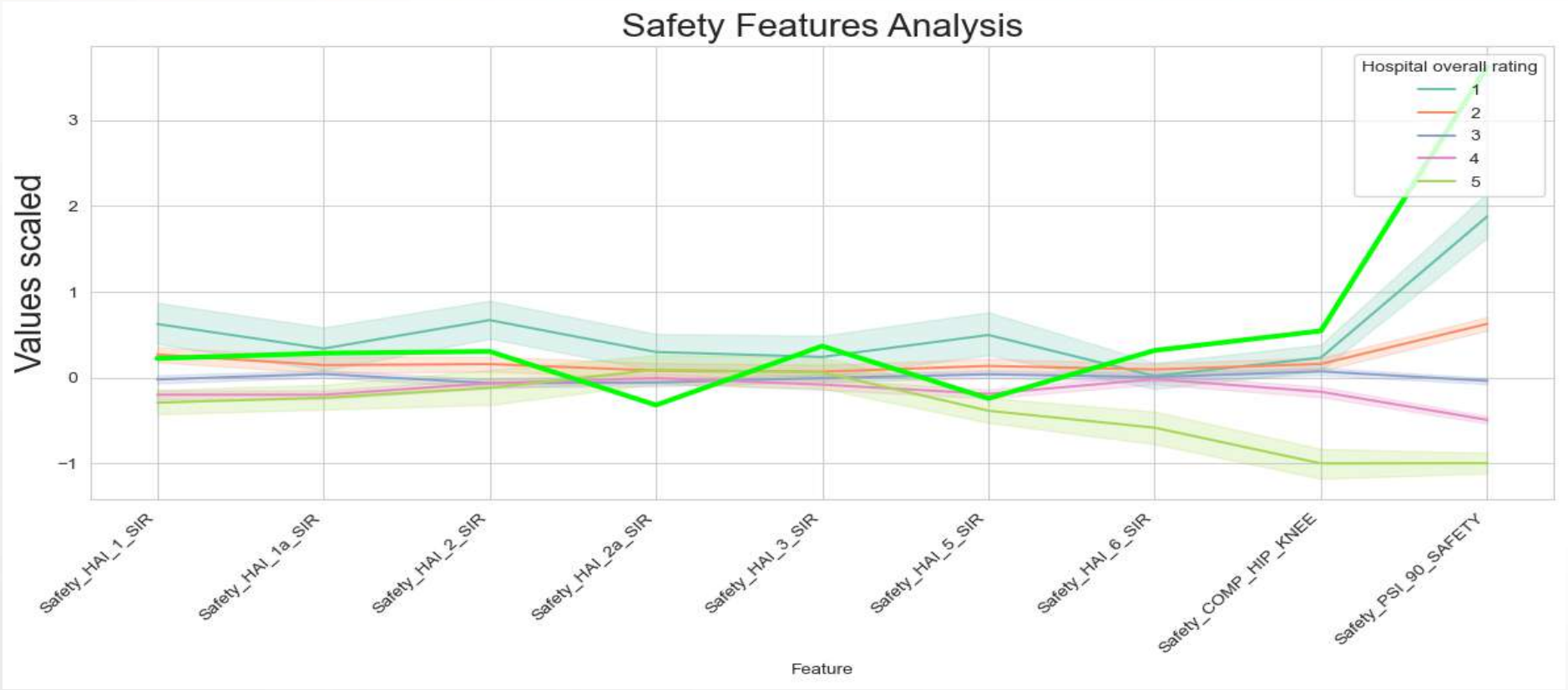
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

Evanston hospital demonstrates strong performance in terms of mortality rates , which contributes to its higher overall rating.

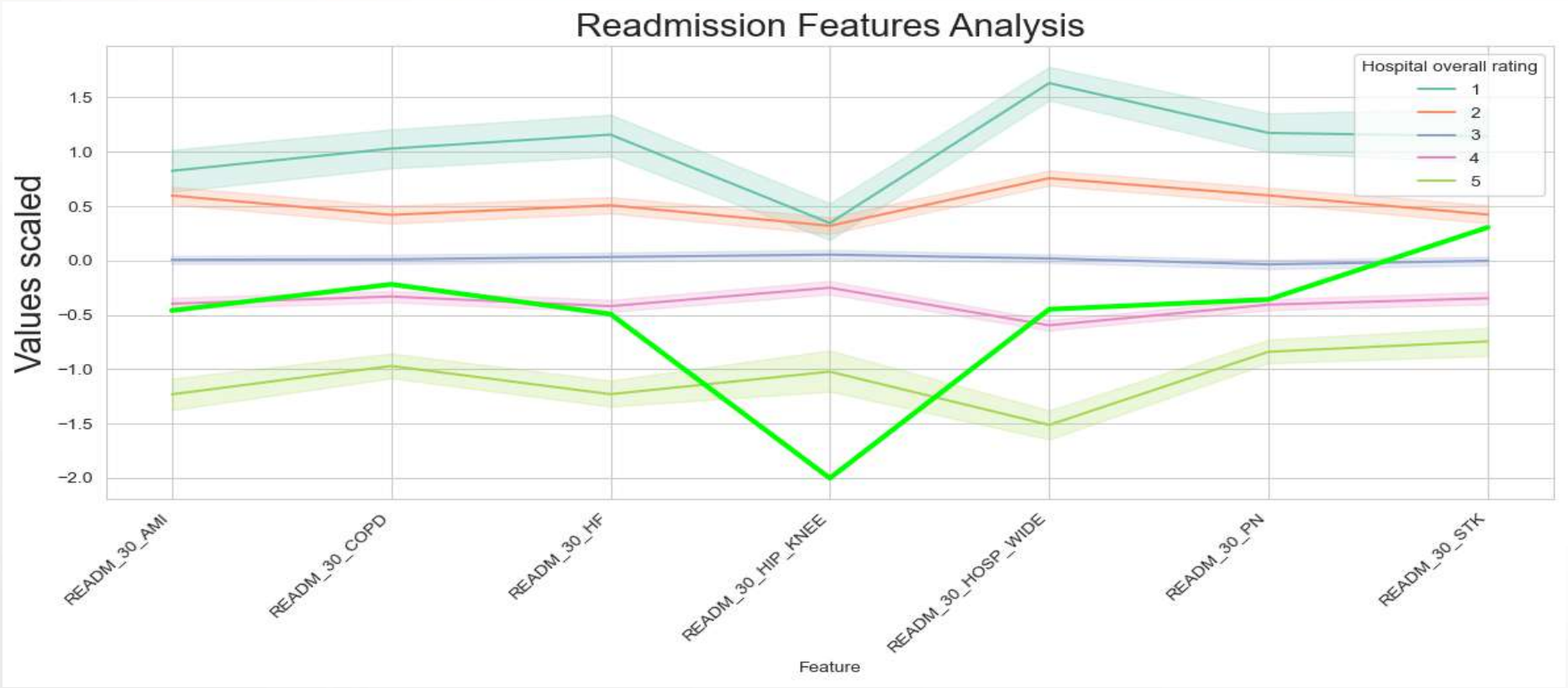
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

Safety performance at Evanston hospital varies and does not strongly correlate with its overall rating.

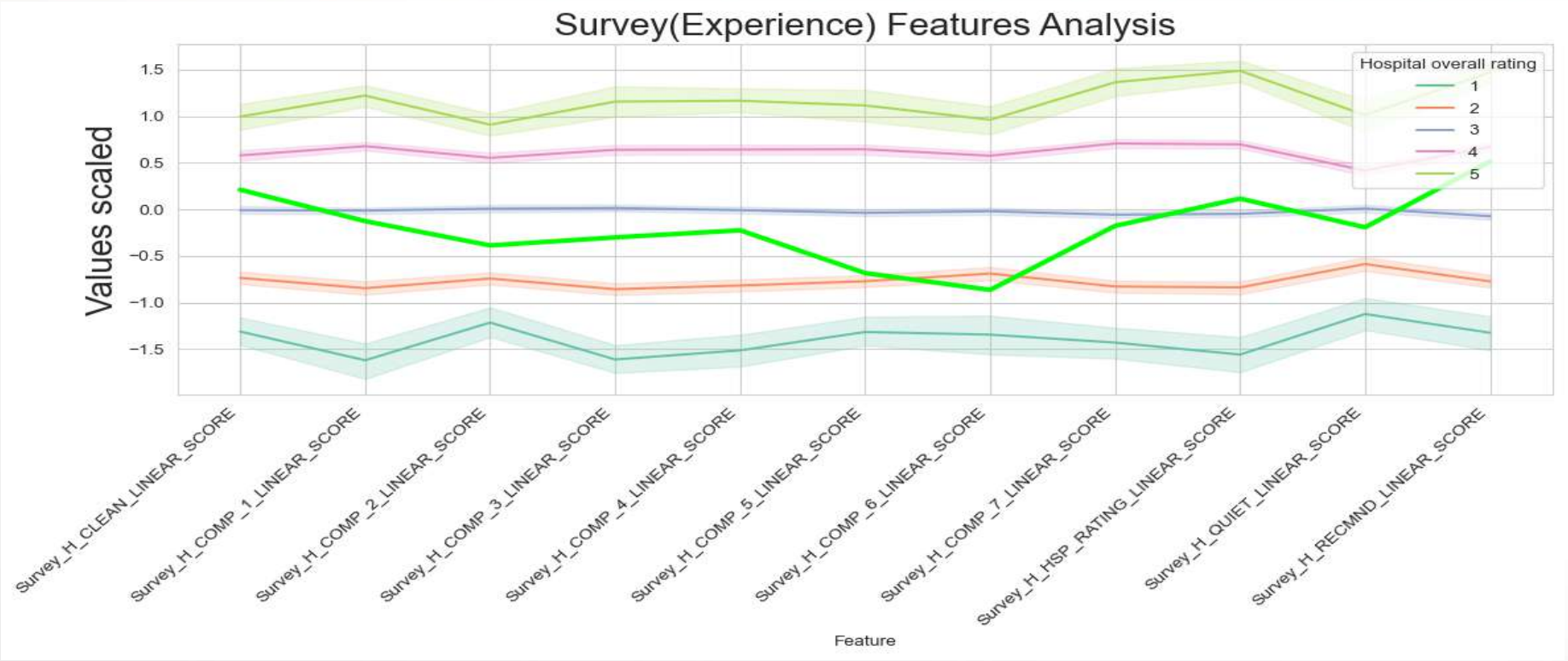
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

While Evanston hospital performs well in some areas, it may have challenges related to readmissions, which is reflected in the lower overall rating in this aspect.

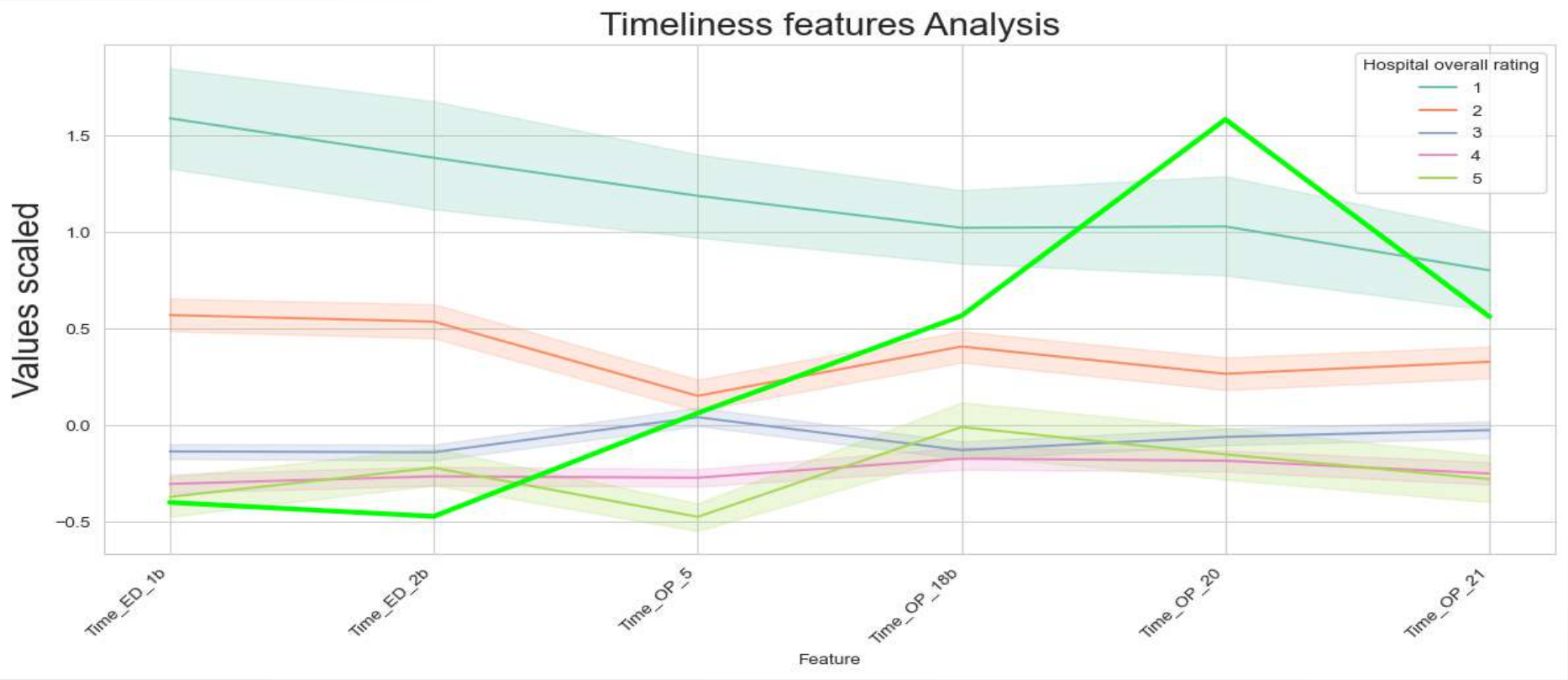
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

Patients' experiences at Evanston hospital, as reflected in surveys, are consistently rated highly, which contributes to its higher overall rating.

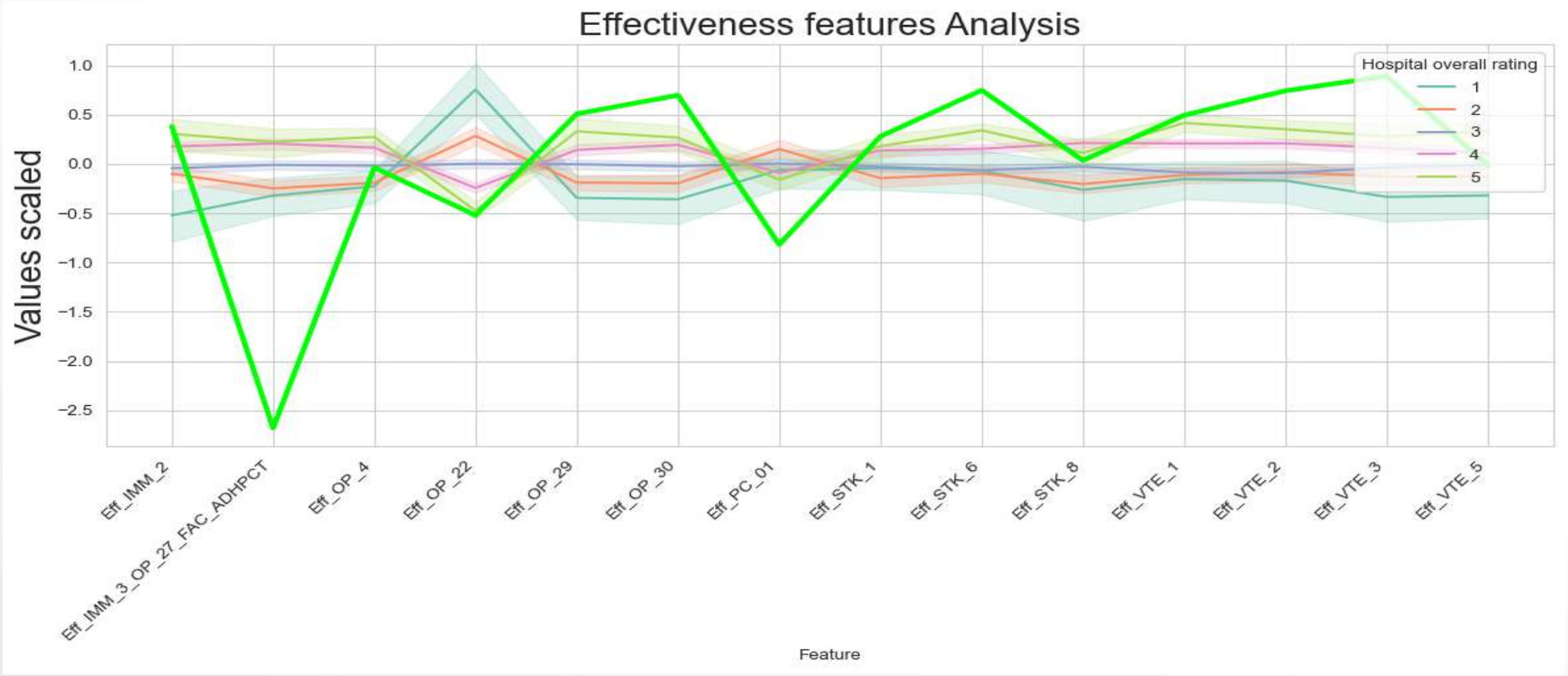
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

Evanston hospital's performance in terms of timeliness may vary and does not show a strong correlation with its overall rating.

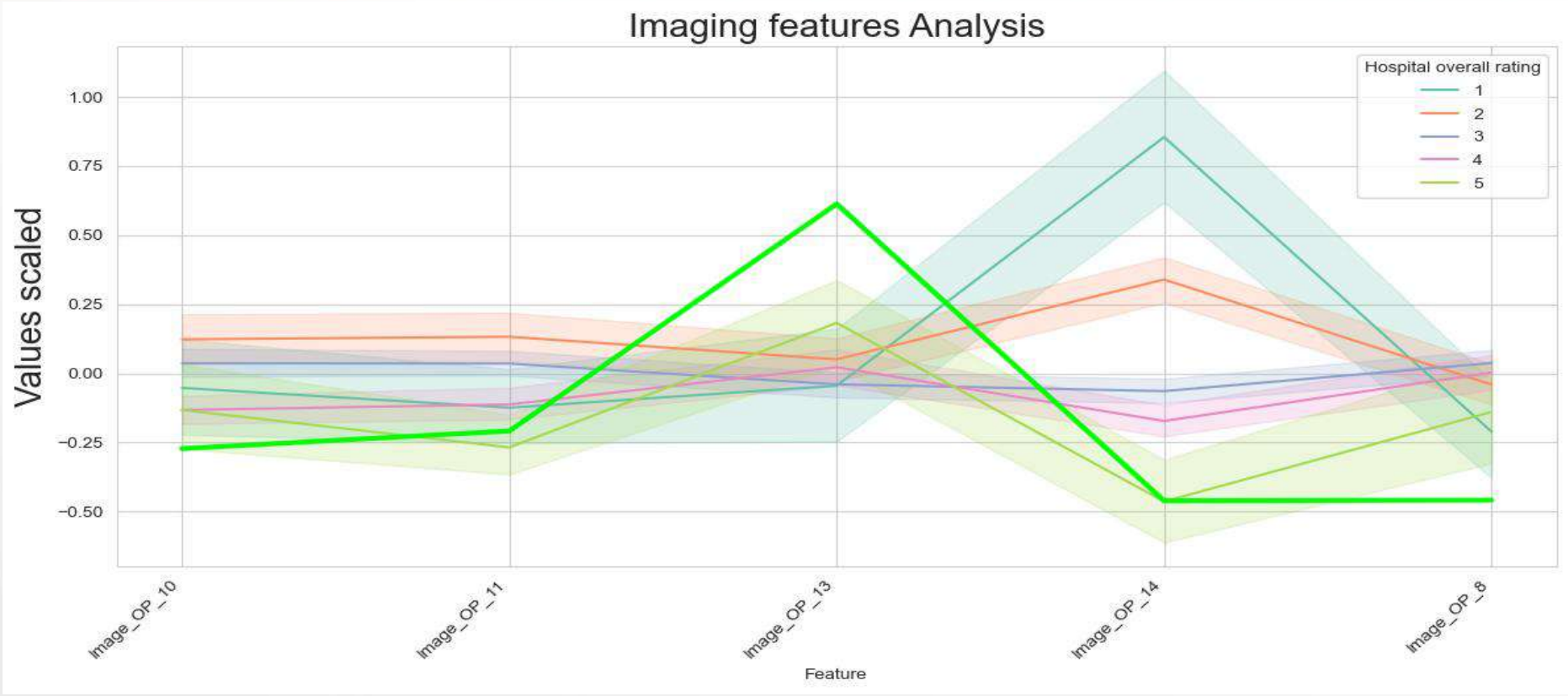
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

Evanston hospital appears to excel in terms of effectiveness, and this is reflect ed in its higher overall rating.

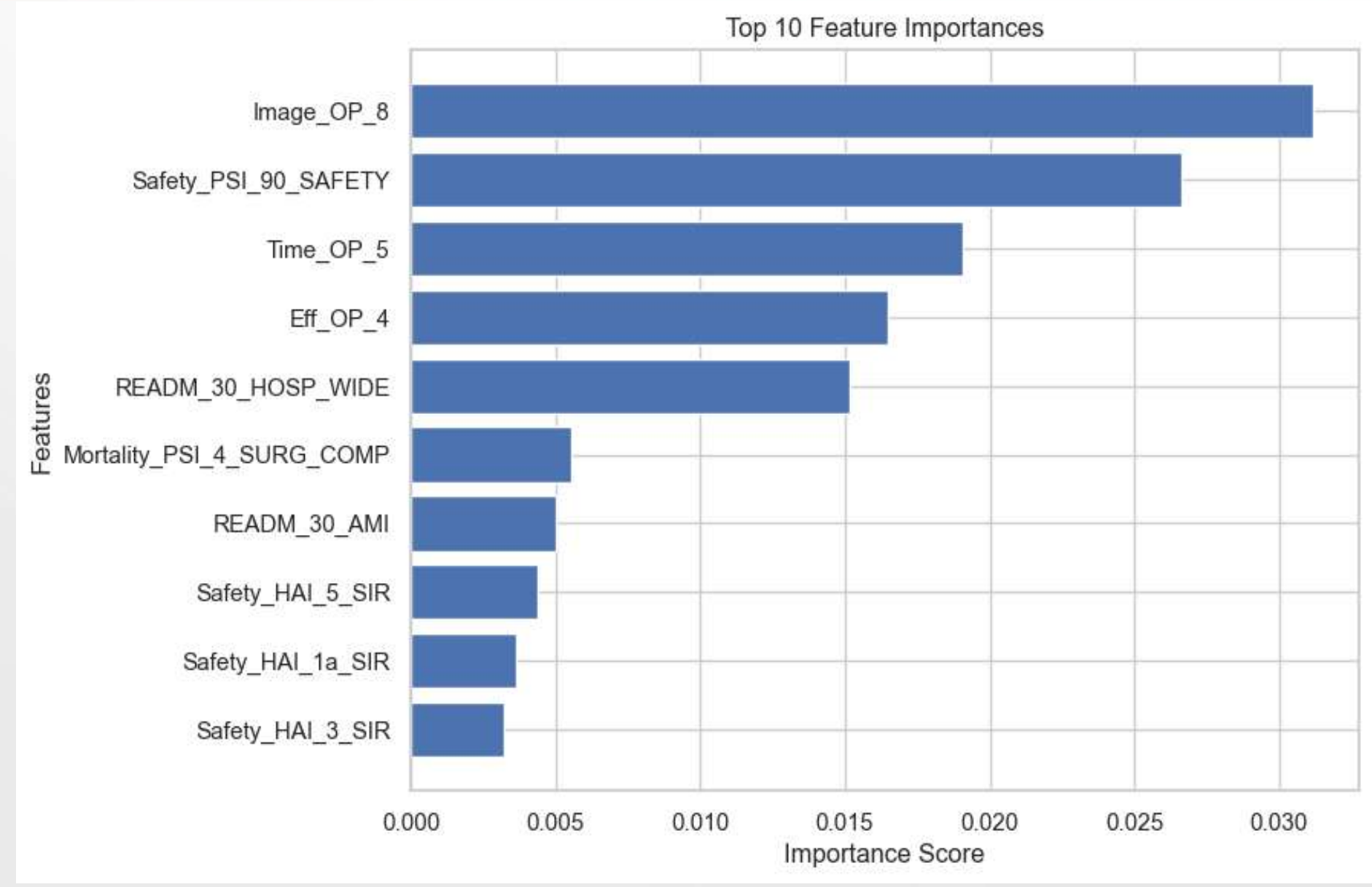
Comparison of ratings of Measures w.r.t Hospital Overall Rating and Evanston Hospital Rating



Insights:

Evanston hospital tends to perform well in imaging-related aspects compared to other aspects, and this aligns with its higher overall rating.

Top 10 Feature Importance:



Recommendations:

1. **Focused Investment:** Align investments with specific rating criteria.
2. **Cost Control:** Implement cost containment strategies.
3. **Resource Efficiency:** Optimize resource use and assess ROI.
4. **Data-Driven Decisions:** Foster a culture of data-driven decision-making.
5. **Efficient Use of Medical Imaging (Image_OP_8):**
   Implement protocols to ensure the judicious use of medical imaging, such as MRIs for low back pain, to reduce unnecessary tests and costs.
6. **Patient Safety (Safety_PSI_90_SAFETY):**
   Enhance safety practices and protocols to minimize serious complications and adverse events. Invest in staff training and quality assurance measures.
7. **Efficient Use of Time in Hospital Operations (Time_OP_5):**
   Streamline hospital operations to reduce the median time to ECG, improving patient care efficiency and experience.
8. **Efficient Delivery of Medical Services (Eff_OP_4):**
   Optimize processes to ensure the timely administration of aspirin upon patient arrival.
9. **Reducing Hospital-Wide Readmissions (READM_30_HOSP_WIDE):**
   Develop readmission reduction strategies, including better post-discharge care coordination and follow-up.

Recommendations:

10. **Surgical Quality and Safety (Mortality_PSI_4_SURG_COMP):** Invest in surgical quality improvement initiatives, surgeon training, and patient safety protocols .
11. **Reducing Readmission Rates for AMI Patients (READM_30_AMI):** Implement targeted interventions and follow-up care to reduce readmission rates AMI patients.
12. **Reducing MRSA Infections (Safety_HAI_5_SIR):** Strengthen infection control measures and protocols to lower the incidence MRSA infections.
13. **Reducing Central Line-Associated Bloodstream Infections (Safety_HAI_1a_SIR):**Focus on intensive care units (ICUs) to reduce Central line-associated blood stream infections (CLABSI), which significantly impact safety ratings.
14. **Reducing Surgical Site Infections (Safety_HAI_3_SIR):** Implement enhanced infection control practices specifically targeted at reducing surgical site infections following colon surgery.

Appendix :

Data sources:

The Overall Hospital Quality Star Rating is calculated using 64 existing quality measures across seven different measure groups.

- The Different measures used are referred to in the document- https://media.wbur.org/wp/2016/07/Hospital_Quality_Star_Ratings.pdf
- For developing the model, the data can be downloaded from the hospital compare website.

Data Methodology:

The analysis is divided into four parts:

- Data Understanding – Groups and Measures.
- Performed a root cause analysis to determine the reasons why Evanston Hospital's profits didn't improve using the 'issue tree framework' and prioritise the hypotheses that got at the end of the branch. This helped us in identifying the underlying causes that need to be prioritized.
- Predictive modelling of star ratings
- Provider analysis: Recommending ways for Evanston Hospital to improve their rating.

Assumptions:

- Reliable data is available for analysis.
- The data sample reflects the broader patient population.
- Hospital operations remain consistent during the analysis period.

THANK YOU