SAFETY & QUALITY REVIEW OF A LARGE TELERADIOLOGY PROVIDER

LEAR MEDICAL LIMITED

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Introduction

The evolution of teleradiology has revolutionized the accessibility and efficiency of diagnostic imaging services. However, ensuring high safety and quality standards remains critical to delivering accurate and timely patient care. This case study presents the findings of a comprehensive review conducted by Lear Medical on a leading teleradiology provider. The assessment evaluated Safety, Productivity, Efficiency, and Quality (SPEQ), identifying key strengths and areas for improvement.

Background

Lear Medical collaborated with the Teleradiology Provider to conduct an independent, third-party review of its radiology services. The retrospective study examined 511 cases (490 unique cases after duplicate removal) across 8 sites, covering the period from April 13, 2023, to September 5, 2023. The analysis included contributions from 44 radiologists, with anonymized data ensuring an unbiased evaluation.

Methodology

Lear Medical employed a structured review methodology based on SPEQ metrics:

- **Safety:** Identification of discrepancies and adherence to best practices.
- **Productivity:** Radiologist workload distribution and output.
- **Efficiency:** Workflow optimization and turnaround times.
- **Quality:** Consistency and accuracy of radiology reports.

Data sources included DICOM and HL7 messages. Further information was garnered by reviewing the Radiologists' working patterns and the Department policy manual. An interview with the main stakeholders from the Teleradiology provider was performed to understand the expectations of the Teleradiology provider and to help develop a clearer picture of the pain points and the overall value chain of the units. Discrepancies were categorized based on severity:

CAT 1	A significant discrepancy that will undoubtedly affect patient care
CAT 2	A moderate discrepancy that could affect patient care
CAT 3	A minor discrepancy or incidental finding that may not affect patient care
CAT 4	Grammatical error or minor discrepancy
CAT 5	No discrepancy

Safety (Score: 85%)

- 7.8% of reports contained serious discrepancies (CAT 1-3).
- CAT 1 discrepancies were identified, with 5 occurring in neuroimaging.
- The majority of CAT 1 errors occurred between 6:00 PM - 10:00 PM, suggesting an increased risk during after-hours reporting.
- The strongest contributors to discrepancies included failure to provide differential diagnoses, inadequate report conclusions, and missing follow-up recommendations.
- Site-based performance varied significantly, with certain locations demonstrating higher safety risks

Productivity (Score: 80%)

- 54% of cases were reported between 8:00 AM - 4:00 PM.
- Radiologist workload distribution appeared uneven, with some reporting significantly more cases than others.
- Limited data on patient waiting times and resource utilization restricted a full productivity analysis.

Efficiency (Score: 90%)

- 48% of studies were reported between 8:00 AM - 2:00 PM, with a notable increase in discrepancies during late evening hours.
- Turnaround time (TAT) data was unavailable, limiting comprehensive assessment.

Quality (Score: 82%)

- Radiologist performance varied widely, with some achieving over 90% quality scores, while others scored below 80%.
- 99.8% of images were of diagnostic quality, but 2.4% of reports lacked appropriate differential diagnoses.
- 3.5% of reports had inadequate conclusions, many correlating with serious discrepancies
- Neuroimaging accounted for the majority of discrepancies, highlighting the need for additional training in this area.

- Peak Workload and Discrepancies: The highest error rates occurred during after-hours reporting (6:00 PM - 10:00 PM), suggesting increased fatigue or reduced oversight.
- Training Gaps in Neuroimaging: Neuroimaging accounted for a disproportionate number of serious discrepancies, warranting focused educational interventions.
- Quality Assurance Measures Need Strengthening: Errors related to missing differential diagnoses and inappropriate conclusions indicate a need for stricter quality control protocols.
- Site-Based Performance Variation: Some sites demonstrated significantly lower safety and quality scores, suggesting inconsistency in reporting standards across locations.

Recommendations

1. Strengthen After-Hours Quality Control: Implement additional oversight or staggered shift rotations to minimize errors during evening reporting.
2. Enhance Training in Neuroimaging: Conduct focused training sessions to improve diagnostic accuracy in high-risk modalities.
3. Implement Standardized Quality Assurance Protocols: Introduce automated quality checks or peer review processes to identify and mitigate discrepancies before final reporting.
4. Balance Workload Distribution: Optimize radiologist shift schedules to reduce stress and improve report accuracy.
5. Improve Communication of Critical Findings: Ensure that all critical results are documented and directly relayed to referring physicians, reducing the risk of miscommunication.

Conclusion

The Teleradiology Provider achieved a commendable overall score of 89% (4.0 stars) in the SQEP evaluation, demonstrating strong safety and quality performance. However, the review highlighted critical areas requiring targeted improvement, particularly in after-hours reporting, neuroimaging accuracy, and quality assurance measures.

By implementing the recommended strategies, the Teleradiology Provider can enhance diagnostic reliability, optimize operational efficiency, and improve patient outcomes. This case study underscores the importance of continuous monitoring, structured training, and standardized quality control in maintaining excellence in teleradiology services.

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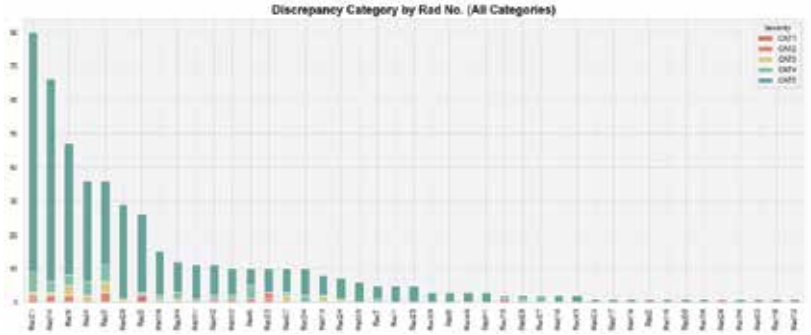
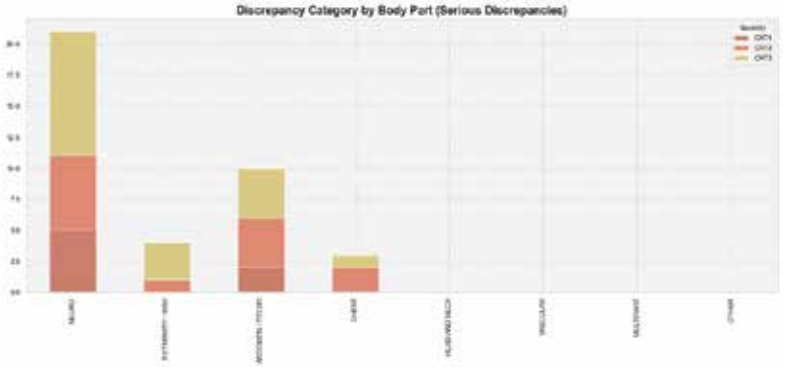
Appendices

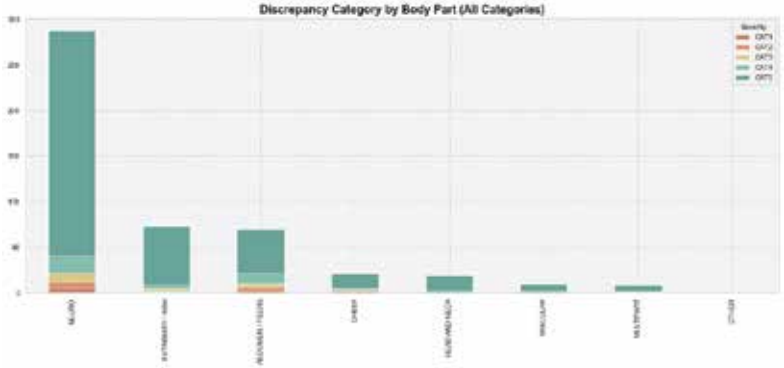
Appendix A: Supplemental Data Review Results)

Overall Radiologist Results

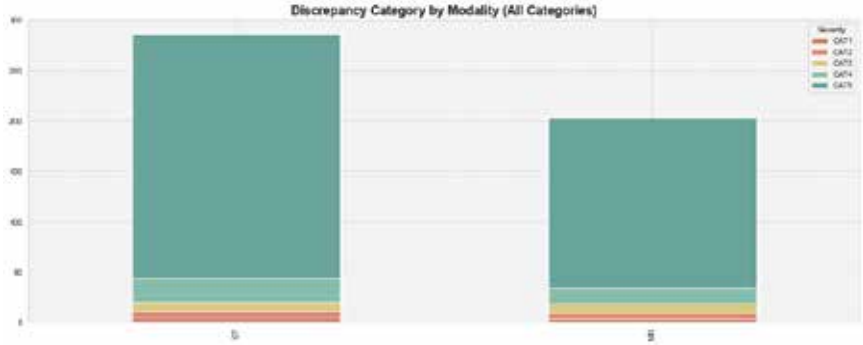


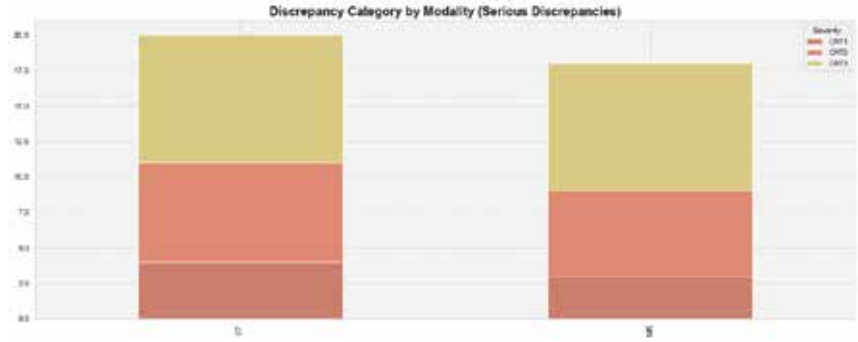
Body Part Results



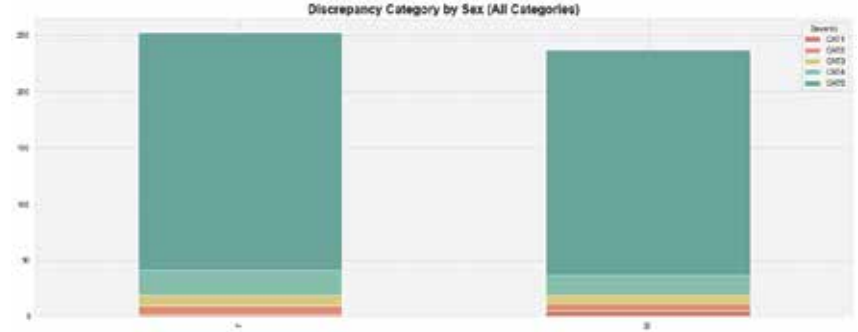


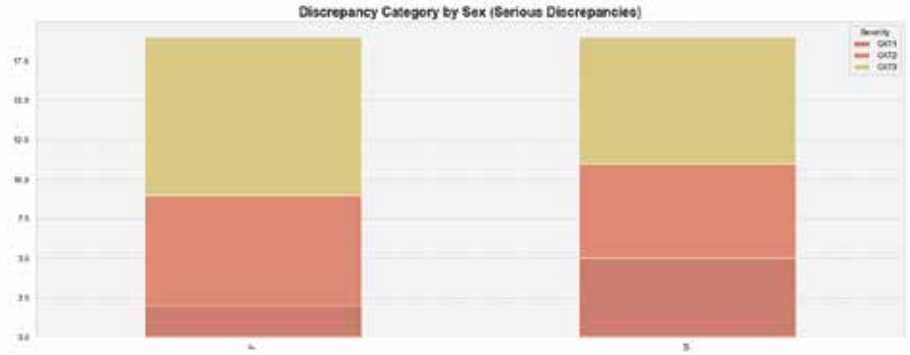
Modality Results (CT)



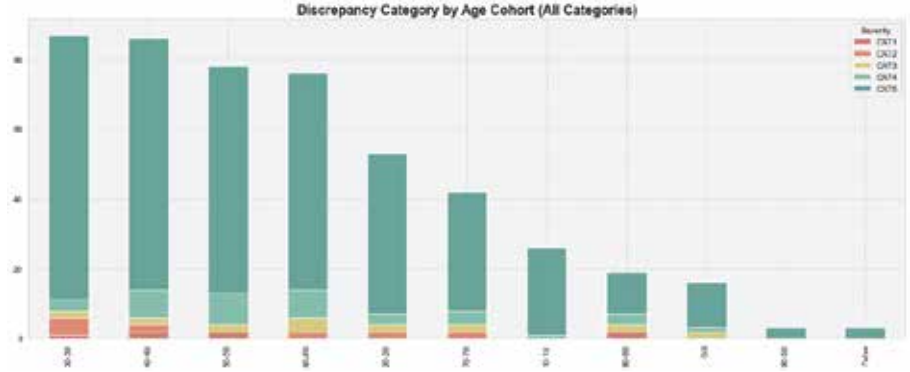


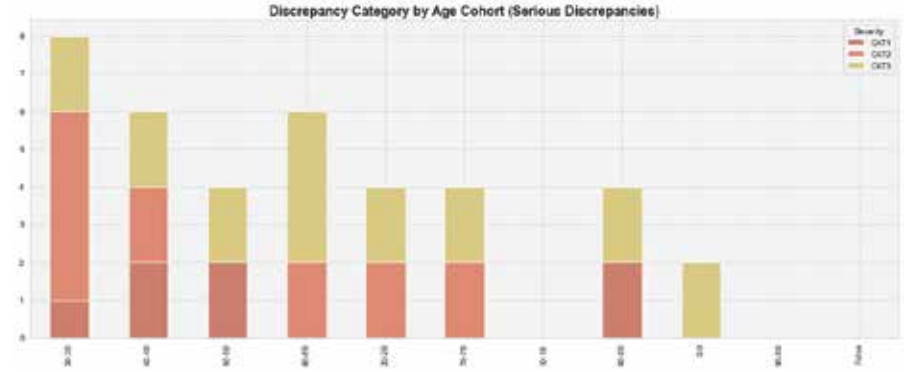
Patient Gender



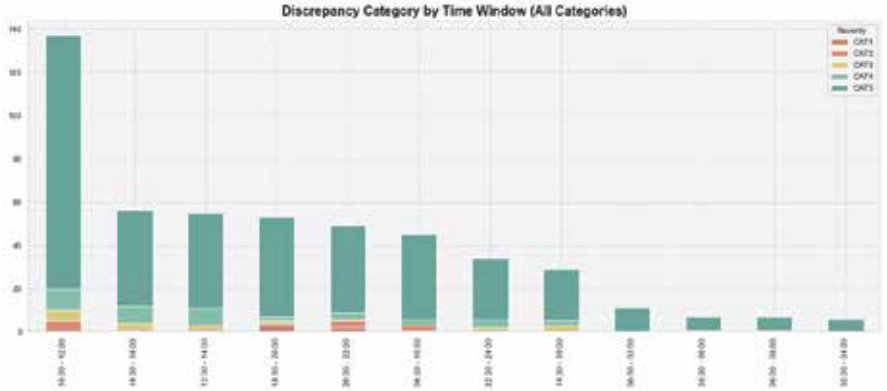


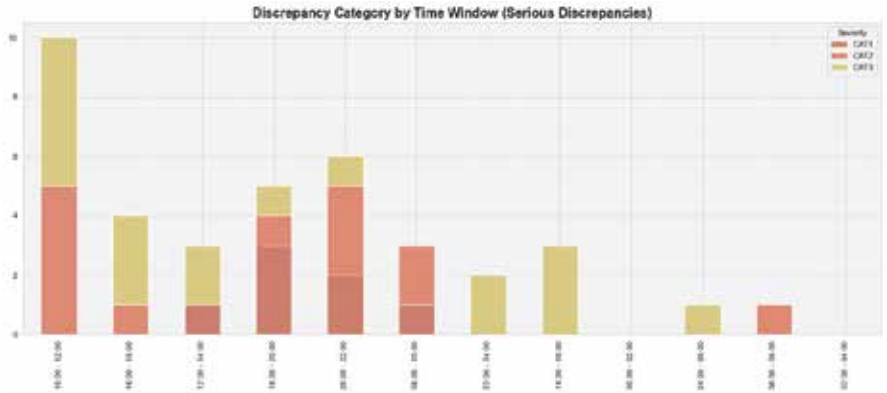
Age





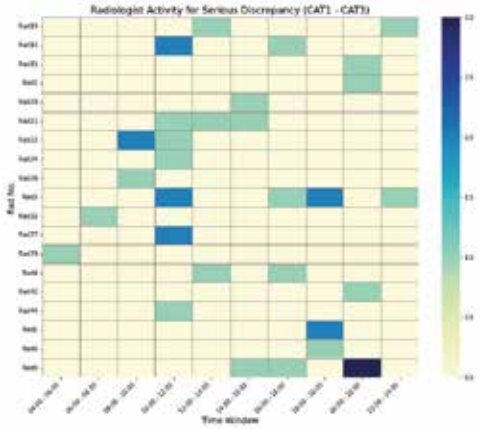
Time Window

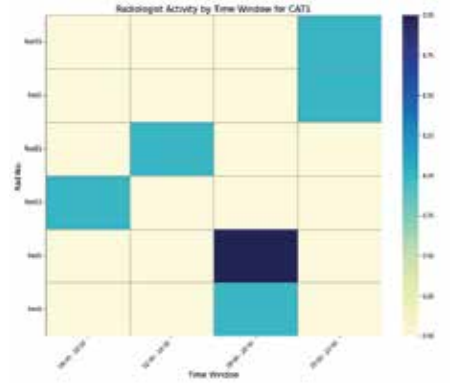


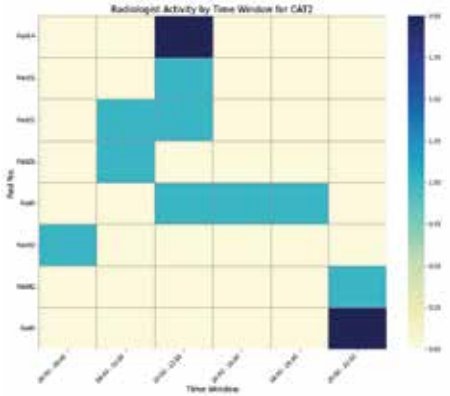


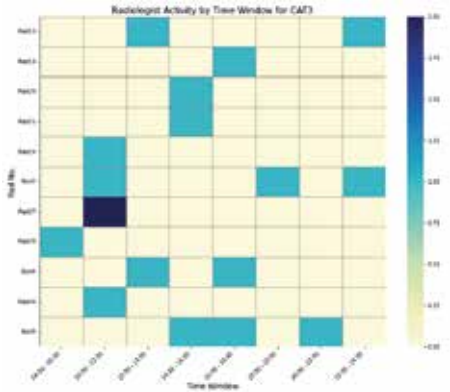
Patient Gender

The following heatmaps are a visualization of local reporting time corresponding with Category discrepancy (CAT 1 – CAT 3)









Appendix B:
Correlation of contributing factors to Serious Discrepancies

We can establish a correlation with factors graded by Lear Medical's reviewers with Serious Discrepancies (CAT 1, CAT 2, CAT 3).
Cramer's V is a statistical measure that quantifies the association between two categorical variables.

The variables that we are comparing are the factor as evaluated by Lear Medical and the outcome for the review

Cramer's V values range from 0 to 1

- 0.0 to 0.1 : Indicates a very weak association.
- 0.1 to 0.2 : Represents a weak association.
- 0.2 to 0.4 : Suggests a moderate association.
- 0.4 to 0.6 : Indicates a relatively strong association.
- 0.6 to 0.8 : Represents a strong association.
- 0.8 to 1.0 : Indicates a very strong association.

P-values (Represents statistical significance):

- A p-value close to 0 (typically < 0.05) indicates a statistically significant association.
- A larger p-value suggests a lack of statistical significance.

Factors that are strongly related to serious discrepancies and are statistically significant are:

Factor	Cramer's V	p-value
Appropriate differential diagnosis has not been included in the report	0.5705	0.0017
The conclusion of the report is inadequate	0.5982	0.0006
Recommendations for further clinical management have not been made	0.6828	0.0002

Appendix C:
Final Dashboard View