

Dashboard for Big Data Analysis of Detection and Communication of Critical Findings

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Background/Problem Being Solved

Timeliness in identifying and reporting critical findings is imperative in Radiology. Not only is monitoring communication of critical findings mandated by regulatory commissions and adherence to a professionalism metric but delays in the process can significantly impact patient care. Historically, information regarding communication of findings with clinicians has been buried in an unstructured format within the Radiology report body, which limits large-scale retrospective analysis of timeliness in reporting critical findings to assess for factors that may cause process delays.

Interventions

Our department requires use of a critical findings macro that includes time the finding was identified and reported and a searchable flag. Utilizing the HL7 data integration platform (Analytical Informatics, LLC), we developed scripts to extract flagged reports and used natural language and semi-structured text processing to mine documentation regarding identification and communication of critical findings to clinicians in conjunction with stored meta-data. Parsed information is standardized in a SQL database with a web-based front-end user-interface for data analysis and compliance tracking. We analyzed the time from end of imaging (End Exam) to first identification of the finding (Detection) and subsequently communication of the critical finding (Communication), and we identify general patterns that may cause delays.

Outcome

The initial application was used to provide individualized documentation compliance statistics in a user-friendly dashboard. The system was modified to handle the variety of methods and formats that were used to document communication times. Subsequent analysis of collected data revealed that assessment of time from End Exam to Detection may be a more objectively and clinically meaningful quality metric to assess for workflow delays than the commonly reported time interval between Detection and Communication, which is often estimated by the Radiologist. Preliminary analysis highlights factors such as shift changes, time of day, and academic year changes that contribute to delays in detecting critical findings.

Conclusion

We developed a user-friendly dashboard and method of collecting and analyzing data related to detection and communication of critical findings, and we determined that the time interval between End Exam and Detection is an important benchmark. Factors such as shift changes contribute to delays in identifying and therefore communicating critical findings.

Statement of Impact

Big data mining as well as natural language and semi-structured text processing were used to meaningfully analyze detection and communication of critical radiology findings to identify factors that cause delays in important clinical information delivery.

Keywords

big data, quality improvement, critical findings, workflow