LL-QSE-MO3A • Enhancing Turn-around-Time (TAT) on Stroke Protocol Head CT Reports via Continuous Quality Improvement (CQI) Methodology in a Busy Teleradiology Practice

Stephen B Eigles MD, MS (Presenter) *; Sridhar G Panughpath MD *; Arjun Kalyanpur MD *

PURPOSE
In recent years, there has been increasing recognition of the importance of rapid triage and treatment of non-hemorrhagic stroke, with thrombolysis predicated on first excluding intracranial hemorrhage. To this end, beginning in 2006, our teleradiology company began to prioritize reports for non-contrast head CTs obtained to rule out stroke (Stroke Protocol). We internally set a goal of 15 minute TAT, a requirement subsequently adopted by one client hospital in 2009, and later by all of our clients. After almost four years of monitoring Stroke Protocol TAT, as of late 2009, our internal efforts to reduce TAT had been relatively ineffective. We then began a long-term systematic CQI initiative, which we continue to the present time. This project has resulted in a dramatic sustained decrease in the number of delayed cases, achieving our internal goal and client requirements.

METHODS
We first selected our metric and in stages more accurately defined it. We replaced the measurement of average TAT in favor of percentage of cases.

RESULTS
Over a period of several years, by performing the CQI process on a monthly basis, we gradually reduced the number of delayed cases, to the extent that in the last 6 months, despite increasing case volumes, we have had no more than 1 delayed case each month. In 2006, we labeled only 54 cases as Stroke Protocol, and yet only 57% had TAT 99% TAT

CONCLUSION
CQI has been a highly effective method of treating the complex problem of report delays, allowing us to achieve our TAT goals through incremental workflow changes.

LL-QSE-MO1A • Implementation of Standardized Reports within a Pediatric Health Care System with Locations across Multiple States

Carolina V Guimaraes MD (Presenter) ; Robert M DeFlorio MD ; Lauren W Averill MD ; Kathlene E Walters ; Ramona A Beasley ; Lane F Donnelly MD *

PURPOSE
A pediatric health care system that formally independently operated multiple locations covering multiple states recently created an integrated radiology service with radiologists reading from multiple locations on common work lists. There were significant differences in reporting structure both between sites as well as between individual radiologists. To optimize effective communication with referring care-givers, standard reports were created, vetted by faculty radiologists, and implemented. The purpose of this Quality Story Board is to describe the process utilized and study the radiologist compliance with use of the standard reports.

METHODS
A Standards Report Work Group (SRWG) was established with representatives from each of the hospital locations and IT support. The group worked with divisional content experts to create standard reports in each of the pediatric imaging areas (neuro, chest/abdomen, musculoskeletal, fluoroscopy, interventional, NUCS, ultrasound). Standard headers were created which were common to all reports. Standard reports were created
for the most common examinations and indications. Language was defined for normal examinations and for common abnormal examinations (example - viral illness on chest radiography). Standard reports utilized features of our dictation system, such as pick-lists. Drafted standard reports were sent in batches to all radiology faculty for a period of vetting. Suggestions and requests for change were then sent to the SRWG and the standard reports finalized. After implementation, random audits of 200 reports, including reports from all locations and all types of examinations for which standard reports were created, were performed. The audited reports were considered compliant if they met the following criteria: use of the standard headers and use of standard language for normals and defined common abnormals. Additional comments added to reports that addressed a specific clinical question such as “No rib fracture” being added to “Normal chest radiograph” in the impression of a chest radiograph ordered to exclude rib fracture were considered compliant. A goal of > 90% compliance was established and included as a metric in the physician incentive plan.

RESULTS
Over 150 Standard reports were created, vetted, agreed upon by faculty, and implemented. The initial audit showed compliance with the standard reports of 97.5%, exceeding the goal of 90%. Time to create and vet reports was approximately 6 months. The audit was performed during the second month of utilization. Subjective opinion voiced from radiologists was positive. Work was perceived as more efficient with the use of the standard reports. Ongoing such audits will be performed annually. Compliance with use of standard reports is one of our annual dashboard goals for our department.

CONCLUSION
The process utilized resulted in the successful implementation of a large number of standard reports relatively quickly across a geographically dispersed system. High acceptance and compliance in use by radiologists was achieved. We believe that standard reporting language is important to enhance effective communication with referring care-givers and particularly so for our system as radiologists from multiple geographic sites are collectively providing service.

LL-QSE-MO4A • An Innovative Preliminary Read Communication Tool to Reduce Door-to-CT-Read and Door-to-Needle Time in Patients with Acute Ischemic Stroke
Sarah F Ifthikharuddin MD; Jonathan D Broder MD; Katia Kaplan-List MD (Presenter); Cheryl Wood RN; Jenny Lana RT

PURPOSE
The purpose of our study was to evaluate a novel communication tool in order to ensure rapid and accurate communication of critical results to the ordering provider and to reduce door to head CT interpretation and intravenous rt-PA time in patients with a suspected ischemic stroke.

METHODS
In collaboration with the neurology, neurosurgery and emergency departments at our institution, and in accordance with the American Stroke Association/ AHA's stroke management guidelines, we composed a resident preliminary report form. This form incorporates the most common radiographic contraindications for thrombolytic therapy, in order to focus the attention of the resident on identification of these contraindications during the CT scan check immediately upon completion of the study and before the patient leaves the CT scan suite. The key findings are communicated to the stroke team at the time of the study, the form is handed over or faxed to the ordering provider, and a copy is also scanned into the Radiology Information System (RIS) as a part of the permanent medical record. The purpose of this form was to provide a tool for focused assessment of the head CT examinations and to answer the clinical question that would allow the clinician to administer or withhold TPA, therefore reducing door-to-needle time and improving patient outcomes. A total of 609 patients with a suspected stroke seen in our emergency department between February 2010 and January 2013 were analyzed. A two sample t-test was used to analyze the median and mean door-to-CT-read time and door-to-needle time (DNT) 18 months before and 18 months after the implementation of the form (February 2010-July 2011 and August 2011-January 2013). The number of CT scans interpreted within 45 minutes of arrival 17 months before and 17 months after the implementation of the form was also analyzed using a two-sample t-test.
All statistical analysis was performed using SAS v.9.0 (SAS Institute, Cary, North Carolina) and all significance testing was done at the 5% level.

RESULTS
There was a significant decrease in both mean and median door-to-CT-read times (p=0.0001 and p=0.0005 respectively) and mean and median door-to-needle times (DNT) (p=0.01 and p=0.0057 respectively) within the 18 months after the implementation of the form.
There has also been a significant increase in the number of head CT studies interpreted within 45 minutes of arrival with the 17 months after the implementation of the form (p=0.0001).

CONCLUSION
Earlier administration of intravenous rt-PA after the onset of stroke symptoms is associated with greater functional recovery. Rapid analysis of a non-enhanced head CT in a patient with suspected stroke and immediate communication of the results to the stroke team reduces the door-to-CT-read times, door-to-needle times, improves the accuracy of documentation, increases compliance with the AHA/ASA guidelines, and therefore improves patient outcomes.

LL-QSE1045-MOA • Successful Departmental Effort in Reduction of Dose Area Product (DAP) during Pediatric Upper Gastrointestinal (UGI) and Genitourinary (VCUG) Cases

Grace W Guo MD (Presenter) ; Heidi Kecskemethy ; Leslie E Grissom MD

PURPOSE
Implement a department-wide initiative to decrease radiation exposure as measured by Dose Area Product (DAP) in the two most common fluoroscopy imaging modalities, UGI abd VCUG.

METHODS
A one-year program consisting of awareness orientation, review of techniques for decreasing dose, incentive, and continuous monitoring with quarterly reporting of data was implemented. The DAP on all fluoroscopy cases were recorded in the electronic medical record (EMR). Quarterly reports on all fluoroscopy cases listed details including the procedure, radiologist, patient age, and DAP level. Data were analyzed quarterly for 4 successive quarters (one year). Average DAP for quarter four of the prior year was used as baseline. Patients post lap band placement were removed from evaluation of the DAP of UGI studies. Mean DAP level was calculated for the group, by age groups: 0-3 years, 4-10 years and 11-18 years for the group, and by Radiologist. Aggregate percent change compared to baseline and coefficient of variation was calculated quarterly. Group results were shared with the group and individual results were shared with each Radiologist.

RESULTS
A total of 1690 cases for 10 Radiologists were reviewed (893 UGI; 797 VCUG).
Total reduction: The 0-18 year group mean DAP (UGI and VCUG combined) for the department was reduced from 73.8 to 42.8 (66.4%), with decreased variation noted over the year. DAP by age was lowest for the youngest children and highest for the oldest children for both imaging modalities. Reduction by modality: For UGI cases, there was a 77% decrease in DAP with a 40.1% decrease in variation over the year. Decreases were recognized every quarter. Mean VCUG DAP decreased 59% over the year with 32.2% less variation. Greatest reductions occurred in the youngest ages for both UGI and VCUG.

CONCLUSION
A one-year program featuring increased awareness, implementation of dose reduction techniques, group and individual accountability by quarterly group/individual monitoring was effective at reducing DAP levels in both UGI and VCUG studies. This can serve as a model for measuring and to encourage dose reduction for other studies within a Radiology Department.

LL-QSE1051-MOA • A Five-year Study on Critical Results Compliance to the Joint Commission National Patient Safety Goal 02.03.01 (Report Critical Results of Tests and Diagnostic Procedures on a Timely Basis)
Stacy R Schultz BA (Presenter) ; Robert E Watson MD, PhD ; Sherrie L Prescott RN ; Gina K Hesley MD * ; Karl N Krecke MD

PURPOSE
To describe efforts over the past five years to improve Critical Result (CR) documentation and communication in a large radiology department and comply with The Joint Commission (TJC) National Patient Safety Goal (NPSG) 02.03.01.

METHODS
Each year of the 5-year study one CR from the Critical Results Communication Policy of listed results was selected for measurement by the Radiology Safety and Accreditation Committee with approval by the Clinical Practice Committee. Monthly, the quality improvement analyst would receive a list of the exams performed the previous month that included reference to the selected CR (e.g., Acute Pulmonary Embolism (PE) - CT Chest w/PE Protocol, Acute Deep Vein Thrombosis (DVT) – Extremity Veins Complete) along with specific report keywords (e.g., acute, positive). The analyst would review each of the cases looking for evidence of a CR. If a CR was identified, the analyst would then verify that: 1) the radiologist communicated the result to the ordering provider within 60 minutes from the time of the interpretation; 2) documentation of the name of the licensed care provider to whom the result was communicated; and 3) documentation of the time of communication. The positive exam information (date, patient account number, time of interpretation, time of report finalization, time of communication, name of radiologist and resident) was transferred to an Excel spreadsheet. This information was then charted for compliance to timeliness (within 60 minutes) and overall compliance (within 60 minutes, documentation of name, and time) and posted to the departmental dashboard.

Three key quality and process improvement efforts undertaken during this 5-year period included: 1) a dedicated Institute for Healthcare Improvement (IHI) Quality Initiative focused on the barriers to effective communication of CR; 2) direct feedback to those radiologists who were noncompliant; and 3) efforts by ultrasound staff to fast-track patients positive for acute DVT to the Thrombophilia Clinic or immediate transfer to the Emergency Department for those patient seen late in the day/after hours. Additional multifaceted efforts included email and newsletter communication with regard to policy and procedure along with presentations at division meetings and resident lectures.

RESULTS
Initial baseline data gathered in the 3rd and 4th quarter of 2007 for Acute PE showed a mean overall compliance of 57% with the 3 elements of the CR communication policy. A formal quality improvement project dedicated to improving CR communication was performed in 2008, including additional CR policy information directed to the staff. This led to a statistically significant improvement (78%) with overall compliance to the policy. There was further increase in 2009 to 81% overall compliance. In 2010, it was decided to measure reporting compliance for a different critical finding, DVT, and this showed an even greater overall compliance of 90%. In 2011, the CR chosen for measurement was acute aortic dissection. As the number of positive cases was very low, (1-2 per month), 1 missed opportunity in reporting compliance had the potential to drastically affect compliance data. Reflecting this, the compliance to the time metric was 100% for 2011, while documentation of the time of communication and the name of the licensed care provider demonstrated 88% and 94%, respectively. In 2012, Acute PE was again the CR chosen for measurement, with 94% rate of overall compliance. Thus, the data demonstrated steady improvement in overall compliance when reporting the Critical Finding of Acute PE: 57% (2007); 78% (2008); 81% (2009); 94% (2012). Of note, there were no communication-related events categorized as sentinel during this 5-year period.

CONCLUSION
A multifaceted approach to improving compliance with TJN NPSG on CR requirements yielded positive, steadily improving results over the 5-year course of the study. Over time, data revealed high compliance to timeliness of communication with opportunities for improvement related to documentation. Barriers to more robust data are due to our inability to easily retrieve positive results for all the critical findings listed in our policy which leaves us focusing our attention on those high volume exams with the greatest potential for positive findings.

Key features that improved overall radiologist compliance included numerous educational opportunities including a dedicated quality initiative, direct performance feedback, along with written and verbal
communication of policy and procedure. Improved compliance, while difficult to quantitate, seemed to be tied to radiologists understanding that these reporting requirements serve not only to help assure timely care for their patients, but also to effectively document that they had properly notified the appropriate caregivers and were therefore in a stronger medicolegal position.

LL-QSE-MO2A • Reduction of Radiographers' Error Rate in Radiological Information System (RIS)

Mei Chyi Kok BSc ; Siok Mei Ng (Presenter) ; Meng Yau Low BSc ; Kok Yew Lee BSc

PURPOSE
Patient is billed upon registration of procedure. Each registered procedure in RIS has to be started and completed before radiological reports could be generated timely by Radiologists. However, radiographers have left uncompleted procedures in RIS daily which resulted in operational issues. Uncompleted procedures could cause delay in Reporting Turnaround Time, thus would have impact on patient safety issues. Administrative staff would also have to spend a reasonable amount of effort to trace the reporting radiologist to complete reports. For unperformed procedures, which were not cancelled promptly, this would result in wrong billing issues. Such incidences would often result in patient dissatisfaction as well as rework to generate ebarfs (bill correction) in cases where amendments could not be administered due to discharged cases. Therefore, the purpose of this project is to reduce two types of false acceptance errors by 50%.

METHODS
RIS errors monitoring was conducted since June 2011 with a list of RIS errors extracted on daily basis. The numbers of RIS errors were recorded with details to segregate into various sections and category. A problem analysis was conducted using Why and Therefore method to analyse the causes contributed to high RIS Error rates. This tool has helped the team to brainstorm the possible intervention to attain our goal. From the analysis, the following root causes were identified,

• New radiographers are not familiar with the system workflow • Radiographers have missed out the RIS procedures due to carelessness, heavy workload and having the impression that the procedures should be completed by fellow colleagues as there could be more than one radiographer working in one procedure room.
• Radiographers might not be aware of outstanding cases left as there was no clear visible list for reference.

The following solutions were implemented to reduce error rate:

• New radiographers would have their learning curve to be familiarized with the system workflow after training was provided. • RIS Software upgrade was scheduled in December 2011. New RIS function allows segregation of work lists by sections and configuration enables pending cases to be displayed clearly. Section in Charges were instructed to ensure that the daily work list was cleared at the end of the day to reduce error rate • A daily pending list was generated by Administrative staff in the morning before 930am to monitor carelessness. RIS PACS Administrators would intervene based on the pending list to verify with the respective radiographers by sending personal reminders to educate individual of the correct workflow. • In addition, RIS error was set as one of key performance indicators to the radiographers’ work. The statistics was published and reviewed in Monthly Radiographers’ Meeting since February 2012 when there was no sign of improvement after new RIS was implemented in December 2011.

RESULTS
Daily RIS error records were extracted and compiled as Monthly data for analysis. An average of 149 RIS errors was noted from June 2011 to November 2011 before the New RIS application was upgraded in December 2011. Limited improvement was observed due to constraints in system applications. After RIS upgrade in December 2011, RIS error monitoring was resumed in January 2012. No significant improvement of error rate was observed after implementation of work list and personal monitoring workflow daily. Therefore, intervention switched from Section-In-Charges to PACS Administrators in hope of better educate radiographers could adhere to the system workflow. A slight improvement of 10% was observed in February 2012. In order to further reduce the error rate, sections’ error statistics were routinely shown in the Monthly Radiographers’ Meeting to serve as a reminder. A gradual improvement was observed from February 2012 onwards with a significant decrease in the number of RIS errors recorded after the third intervention. 70% reduction rate was achieved by September 2012. Through such daily monitoring, billing amendments could be performed in time before account was closed.
Thus helps to reduce the number of reworks required to correct the incorrect billing too.

CONCLUSION
The RIS Error rate was reduced by 70% instead of 50% since August 2012. However, there was a slight increase in November 2012 due to new radiographers on board. Continuous monitoring and education of the RIS errors are required to sustain the low error rate as well as setting new targets to challenge the team to attain better results. The same intervention could be extended to Administrative staff and Radiologists with related RIS compliance issues.