Quality Improvement to Optimize Pediatric MRI Efficiency in Hospitalized Patients: Improving the Ordering Process and Reducing Time to MRI Completion

Andrew Stack MD FAAP, John Adent MD, Eric Shaw PhD
Dwaine and Cynthia Willett Children's Hospital of Savannah, Department of Pediatrics
Mercer University School of Medicine, Savannah Campus

Background

- MRI is a commonly utilized imaging modality, especially in hospitalized patients
- The lack of timely radiology services may have a significant impact on a patient's length of stay (LOS) due to delays in diagnosis and implementing treatment
  - This has negative effects on hospital revenue and patient and provider satisfaction
- At the Children's Hospital of Savannah (CHoS), we have experienced an increased volume of inpatient MRI scans ordered

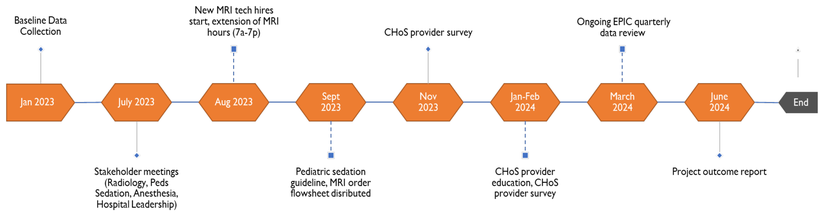
Objective

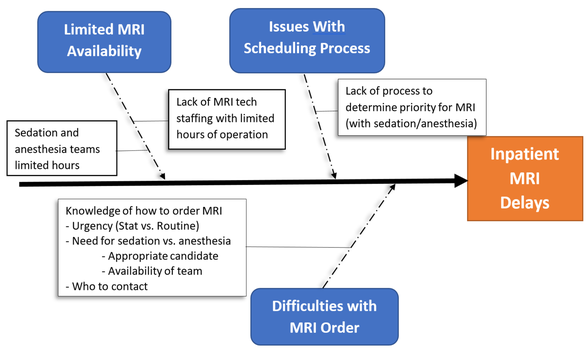
To optimize the MRI ordering process and improve the timeliness of completion of MRI scans by 20% (from time of order entry to study completion) on hospitalized pediatric patients

Methods

Quality improvement project over 12 months with multiple PDSA cycles utilizing EPIC data query, retrospective chart review, stakeholder meetings, and hospital provider surveys

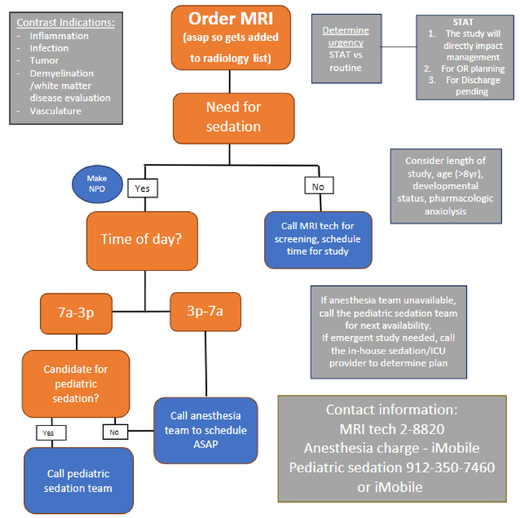
- All CHoS patients who had an inpatient MRI scan during the project duration (January 1, 2023-December 31, 2023) were included
- Interventions included provider education, creation of an MRI order pathway, and extension of MRI table time availability in the CHoS



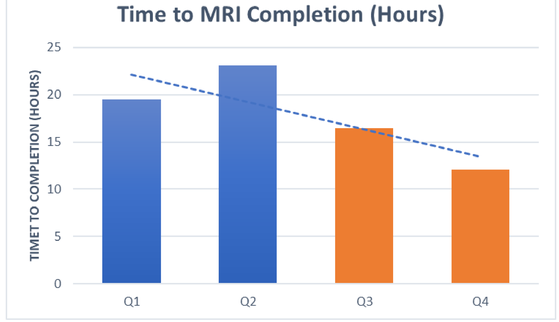


This research was supported (in whole or in part) by HCA Healthcare and/or an HCA Healthcare affiliated entity. The views expressed in this publication represent those of the author(s) and do not necessarily represent the official views of HCA Healthcare or any of its affiliated entities.

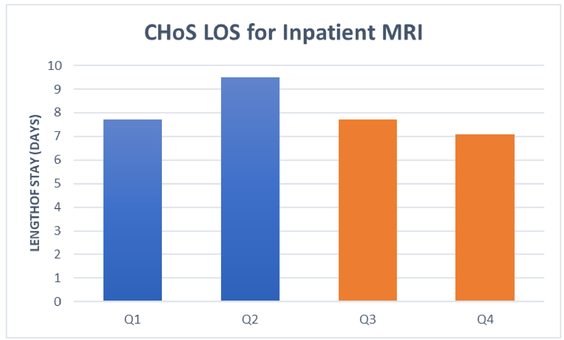
MRI Order Pathway



Results

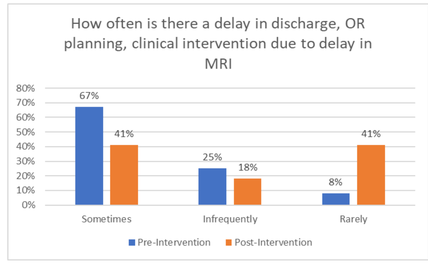


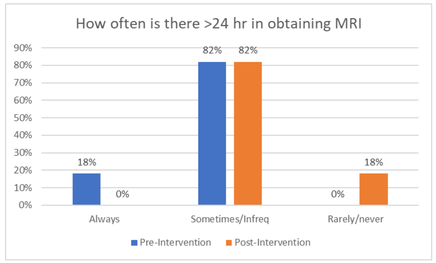
Pre-Intervention	Post-Intervention	P value
19.4 hours	13.56 hours	0.016

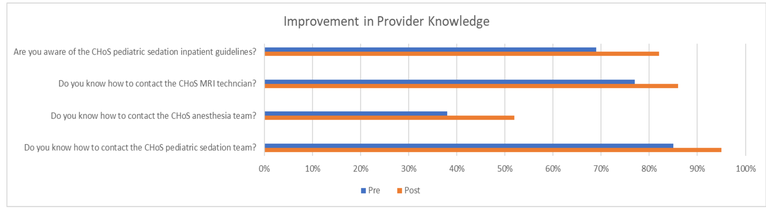


Pre-Intervention	Post-Intervention	P value
8.64 days	7.49 days	0.417

Results







Discussion

- For the primary outcome, there was a statistically significant decrease in average time to study completion of MRI scans (pre-intervention: 19.4 hours vs post-intervention: 13.56 hours, p=0.016) during the 6-month intervention phase.
- Also, while not statistically significant, there was a trend towards shorter mean hospital LOS (pre-intervention: 8.64 days vs post-intervention: 7.49 days, p=0.417).
- From survey data, there was an increase in the provider's knowledge of the MRI ordering process (who to contact and how to contact them). There was also reported improvement in timeliness of MRI completion and a perceived decrease in delay of hospital discharge, OR planning, and implementation of clinical intervention.

Conclusion

This project successfully improved time to MRI completion in hospitalized pediatric patients (decreased 30.1%) and improved provider knowledge and perception of the MRI ordering process. A decreased LOS for hospitalized patients requiring MRI scans was observed during the project duration suggesting potential benefits to hospital workflow.

References

- Hurlen P, Ostbye T, Borthne AS, Gulbrandsen P. Does improved access to diagnostic imaging result in reduced hospital length of stay? A retrospective study. *BMC Health Serv Res* 2010;10:262.
- Wertheimer B, Jacobs REA, Iturrate E, Bailey M, Hochman K. Discharge before noon: Effect on throughput and sustainability. *J Hosp Med* 2015;10(10):664-669.
- Tokur S, Lederle K, Terris DD, et al. Process analysis to reduce MRI access time at a German University Hospital. *Int J Qual Health Care* 2012;24(1):95-99.