IMPLEMENTING ELECTRONIC HEALTH RECORD-BASED WORKFLOW SOLUTIONS TO IMPROVE EMERGENCY CT EXAM TURNAROUND TIME AT A COUNTY SAFETY NET HOSPITAL

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OVERVIEW

Five major electronic medical record (EMR)-based workflow solutions were implemented to improve emergency CT exam turnaround time.

- First, **exam order pick lists** were created (e.g., trauma, stroke, etc.) to guide clinicians on appropriate exam selection.
- Second, we operationalized **kidney function and pregnancy screening policies** into the EMR exam order.
- Third, **order-protocol guidance sheets** were produced to enable radiology technologists to protocol uncomplicated exams.
- Fourth, a **"CT Technologist Details" EMR tab** was generated to display necessary information required before a patient is transported (e.g., intravenous access, screening tests, etc.).
- Fifth, **EMR-based banners** were used to communicate availability of patient transporters with emergency department staff.

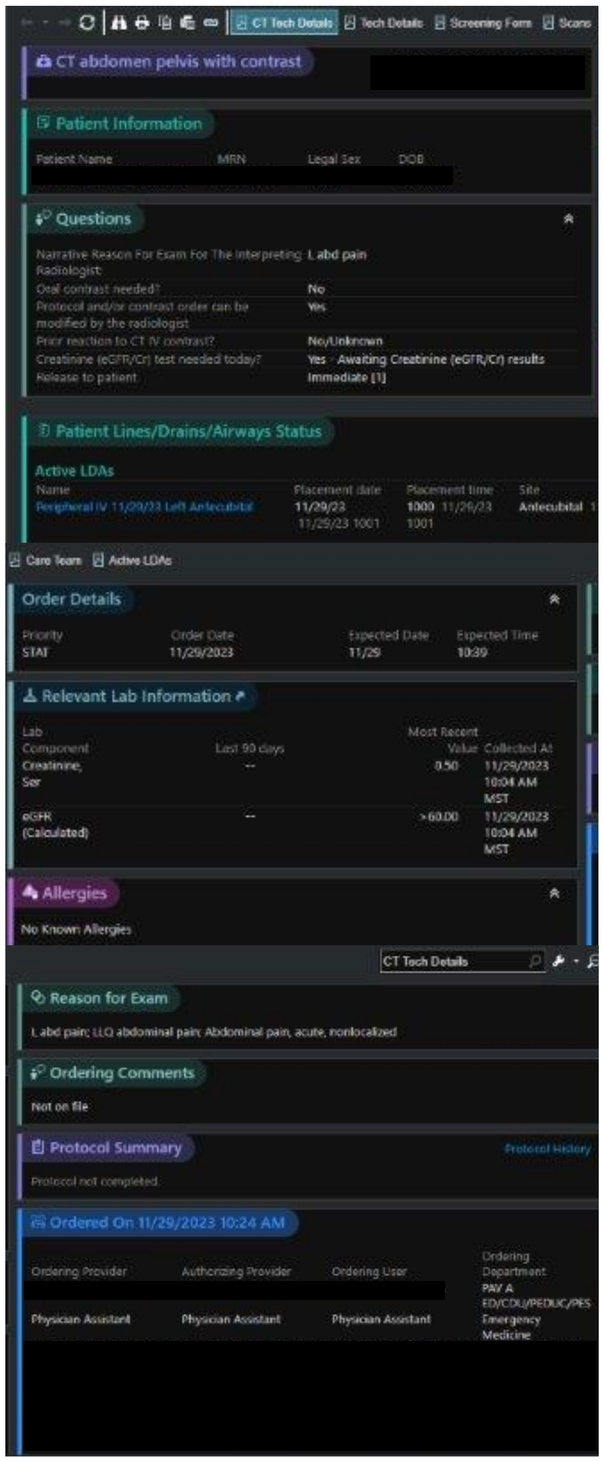
METHODS

Study setting: Large 525-bed, community-based, academic hospital

Study period: first quarter of 2021 to second quarter of 2023

- **Metrics measured:**
  - Median exam order to patient arrival time (Ord to Arr)
  - Patient arrival to exam beginning time (Arr to Beg)
  - Exam order to exam beginning time (Ord to Beg)
  - Exam order to final report time (Ord to Final)
- Q2 of 2021 compared to Q2 of 2023
- The total number of CT exams performed during each quarter was measured.
- Screenshots of EMR-based workflow solutions were produced.

RESULTS



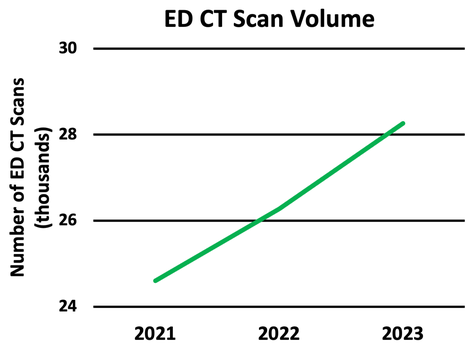


Figure 1. CT Scan volume increased from 24,597 in 2021 to 26,273 in 2022 and 28,264 in 2023.

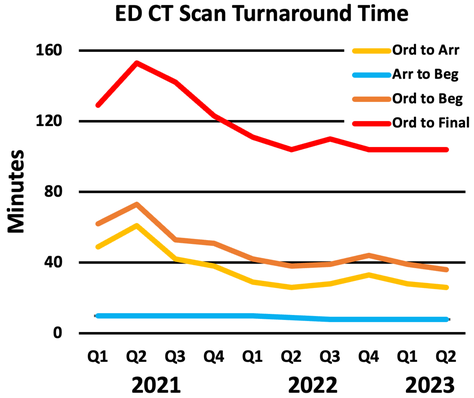


Figure 2. 35-minute (57%) reduction in Ord to Arr time from 61 minutes in Q2 of 2021 to 26 minutes in Q2 of 2023. **37-minute (51%) reduction in Ord to Beg time** from 73 minutes in Q2 of 2021 to 36 minutes in Q2 of 2023. 2-minute (20%) reduction in Arr to Beg time due to smaller margin for improvement. **49-minute (32%) reduction in total Ord to Final time** from 153 minutes in Q2 of 2021 to 104 minutes in Q2 of 2023. Order to Final time includes radiologist reading time and not directly affect by EMR-based interventions.

DISCUSSION

- Exam order pick lists guide clinicians in selecting the most appropriate exam, **minimizing incorrect or unnecessary imaging studies.**
- Operationalizing screening policies, **kidney function and pregnancy screenings**, ensures prompt assessment of patient eligibility criteria.
- Protocol guidance sheets provide technologists with **standardized protocols** for common exams, ensuring consistency, accuracy, and optimizing image quality.
- "CT Technologist Details" EMR tab grants quick access to patient information, including intravenous access, **facilitating effective preparation and reducing pre-scan delays.**
- EMR-based banners facilitate communication regarding patient transporters availability thus **expediting patient transfer** to the CT exam room.

CONCLUSIONS

- Despite a rising number of exams, EMR-based workflow solutions significantly improved CT exam turnaround time with a **reduction in the Ord to Beg time of 37 minutes (51%).**
- **Future directions:** calculating extra revenue generated from time savings.

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