EMR Tracking Reduces Pediatric ED Consult Times

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Abstract

Introduction: Prolonged emergency department (ED) consults are associated with delays in patient care and ED throughput. Our goal was to decrease average pediatric ED consult completion times from 160 minutes to 120 minutes in 16 months.

Materials and Methods: Two plan-do-study-act (PDSA) cycles were implemented. First, ED providers were educated monthly on electronic medical record (EMR) consult tracking. Second, the EMR process was enhanced so that consult tracking was displayed on the ED providers' EMR home screen.

Results: Average consult completion times decreased from 160 minutes to 135 minutes (p <0.001). Pareto analysis identified four consulting services that accounted for 50% of consults greater than 120 minutes.

Discussion: ED provider education and EMR consult tracking significantly decreased average ED consult completion times. Consult tracking also identifies individual services for high-value targeted interventions.

Keywords: Consults; Electronic Medical Record; Emergency Department; Pediatric

Abbreviations:

ED : Emergency Department
EMR : Electronic medical record
ENT : Ear, nose, and throat
LOS : Length of stay
GI : Gastroenterology
GPS : General pediatric surgery
LCL : Lower control limit
NSGY : Neurosurgery
PDSA : Plan-do-study-act
QI : Quality improvement
SW : Social work
UCL : Upper control limit

Introduction

Emergency department (ED) patient care frequently requires consultation of medical and/or surgical services. [1] Prolonged consults increase ED length of stay (LOS) and worsen ED crowding, [1-4] which both correlate with adverse clinical outcomes and rising numbers of patients who leave without being seen (LWBS). [5,6] ED consult times are also subject to government regulations. The Emergency Medical Treatment and Active Labor Act (EMTALA) states on-call consultants must “appear within a reasonable period of time.”[7] The Centers for Medicare and Medicaid Services (CMS) provide a more precise timeframe, requiring that on-call consultants acknowledge ED requests within thirty minutes. [8]

Given the detrimental effect on patient care and regulatory scrutiny, evidence-based methods to decrease ED consult times are needed. Studies in two general/adult EDs reported improved consult times after implementation of institutional guidelines prescribing maximum allowable consult times. [9,10] Other studies significantly improved ED LOS using computerized tracking systems and/or real-time alerts for prolonged consults. [11-13] An academic center utilized ED resident education on appropriate consult response times to improve patient throughput. [14] To date, no published studies have been undertaken in an exclusively pediatric ED setting. Our institution’s pediatric ED combined the aforementioned published methods into a comprehensive quality improvement (QI) initiative designed to reduce consult completion times.

Materials and Methods

Our institution is a tertiary/quaternary care academic children’s hospital with Level I trauma and state pediatric specialty center designations. The pediatric ED sees approximately 36,000 annual visits. The average ED LOS for admitted patients is over five hours and for discharged patients approximately three hours. Consult completion time was defined as the interval from when the consulting service was first paged to when the ED treatment team received a definitive plan of care (e.g., admission, operation, clinic follow-up, etc.). The initial page is automatically tracked by the electronic medical record (EMR), as pages are sent via EMR orders. The consult completion time was marked by ED providers as a timestamp within the EMR.

A QI team was assembled combining expertise in pediatric emergency medicine, graduate medical trainees, medical informatics, nursing, and administration. The initiative was approved by the Department of Pediatrics Office of Quality and Safety, and was exempted from institutional review board approval. Prior to the QI initiative's implementation, a four-month baseline (Phase 0) established an average consult completion time of 160 minutes (compared with previously published times ranging from 55 to 160 minutes. [3,9,13] Also prior to implementation, stakeholders from the Departments of Surgery and Pediatrics discussed an informal guideline of a maximum 120 minutes for consult completion. Therefore, our initiative sought to decrease average consult completion times from 160 minutes to 120 minutes.

Two plan-do-study-act (PDSA) cycles were conducted (Phase 1 and 2). In Phase 1 (initiative’s start), consult tracking education began for ED physicians (residents, fellows, attending’s). This educational phase lasted 16 months and consisted of monthly electronic reminders on EMR consult tracking (via email) and an online presentation on the consult QI initiative. Visual reminders were also posted in the ED. Prior to the initiative’s first month; two in-person education sessions were conducted for ED physicians. After the initiative’s launch, one study investigator (J.N.F.) performed ‘walk-abounds’ in the pediatric ED to answer questions. Feedback from ED physicians during Phase 1 was that the EMR consult tracking process was too complex. Therefore, in Phase 2, (initiative’s fourth month), the EMR consult tracking process was simplified and a special icon was made visible on the ED providers’ EMR home screen. That tracking process change was incorporated into the ongoing education that started in Phase 1. Data on consult completion times, consulting service, time of day, and day of week was collected in monthly intervals for 16 months. Statistical analysis was performed using Minitab© v17 (State College, PA).

Results

An average of 994 consults was called in the pediatric ED each month. The average pediatric ED consult time decreased from 160 minutes to 135 minutes (Figure 1) (p <0.001 Wilcoxon-Mann-Whitney test). Both Phase 1 and 2 PDSA cycles showed special cause variation, also indicating a significant decrease from pre-initiative consult times. Phase 1 contained a “freak,” one data point more than 3 standard deviations below the Phase 0 average (p=0.001).

Phase 2 contained a “shift,” 10 consecutive data points below the Phase 0 average (p<0.001). Analysis using the Pareto (80/20) rule demonstrated four consulting services (Social work, General Pediatric Surgery, Orthopedics, and Neurology) accounted for 50% of consults longer than 120 minutes (Figure 2).

Points in red indicate special cause variation. UCL = upper control limit. LCL = lower control limit. X bar = Pre-Implementation/baseline average monthly consult times.

Figure 2. Pareto Chart (80/20 analysis) of Consulting Services Accounting for Consult Times Greater than 120 Minutes

Legend: Count = Number of Consults; Percent = Percent of Consults Greater than 120 Minutes; Cum % = Cumulative Percentage of Consults Greater than 120 Minutes

SW = social work; GPS = general pediatric surgery; NSGY = neurosurgery; GI = gastroenterology; ENT = ear, nose, and throat

Discussion

This QI initiative significantly decreased pediatric ED consult completion times using EMR consult tracking. The decrease from an average 160 minutes to 135 minutes is similar to results reported by Horng, et al for surgical consults in an academic center. [13] Other academic centers report decreases from a mean 120 to 100 minutes (by codifying institutional guidelines), [9] and from a mean 321 to 229 (through a resident physician educational initiative). [14] A systematic review details two other studies which both sought to improve consult response times through new protocols or guidelines. [1] To the study investigator’s knowledge, this is the first report utilizing a combination of EMR technology and provider education to decrease consult times in an exclusively pediatric ED setting.

This study utilized Pareto analysis to identify four services responsible for 50% of consults longer than 120 minutes (social work, general pediatric surgery, orthopedics, and neurology). Notably, two of the four are surgical services whose consultation likely implies the need for a procedure/operation. A cross-sectional survey of EDs in California similarly revealed problems with timely responses by surgical services. [15] Engaging and providing direct feedback such consulting services has been shown to reduce consult times and ED LOS. [13] Therefore, the study investigators are currently working with the adult ED and the Department of Orthopedics to determine if additional orthopedic resources or other process improvements related to procedures are required for timely consult completion.

This QI initiative has limitations that bear mention. Consult completion times are tracked by ED providers, who must manually mark the consult as completed in the EMR. Not all ED consults were tracked during the pre- and post-implementation phases (average 56% tracked). However, the percentage of consults tracked showed significant improvement over the length of the initiative (Figure 3). Additionally, individual ED providers may have different definitions of what constitutes a definitive plan of care. The QI team attempted to address any questions or ambiguity through both the electronic education and in-person question and answer sessions.

Figure 3. Percentage of Consults Tracked in the EMR by Month.

This initiative demonstrates that enhanced ED provider awareness of consult times through education and EMR tracking is associated with reduced average consult completion times. Both education and EMR tracking are sustainable changes that may be adapted for use at institutions with different characteristics (academic-affiliated, pediatric, patient volume, etc.). Future efforts at our institution will track ED LOS for patients with consults to link this initiative’s results to standard ED throughput measures.

Conclusion

This QI initiative combining education and EMR tracking significantly reduced consult completion times. Both education and EMR tracking are sustainable changes generalizable to any...
ED using an EMR. For EDs seeking to further reduce consult times, the Pareto method identifies high-yield consulting services for targeted feedback and intervention.

**Competing Interests**

The authors have no competing interests to declare.

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**References**


