

ED RAPID: A Novel Children's Hospital Direct Admission Process Utilizing the Emergency Department

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Abstract

Introduction: Direct hospital admission of children without evaluation in the emergency department (ED) is common, but few guidelines exist to maximize safety by assessing patient stability. This report describes a novel approach to support patient safety. **Methods:** An interdisciplinary children's hospital team developed a brief ED-based evaluation process called the ED Rapid Assessment of Patients Intended for Inpatient Disposition (ED RAPID). It entails a brief evaluation of vital signs and clinical stability by the ED attending physician and nurse. Children deemed stable are admitted to inpatient wards, whereas those requiring immediate intervention undergo full ED evaluation and disposition. We assessed outcomes for all children evaluated through this process from March 2013 through February 2015. **Results:** During the study period, we identified 715 patients undergoing ED RAPID evaluation. Of these, we directly admitted 691 (96.4%) to the hospital ward after ED RAPID evaluation; median ED treatment time was 4.0 minutes. We transitioned 24 (3.4%) to full ED evaluation, 14 (2.0%) because a ward bed was unavailable, and 10 (1.4%) for clinical reasons identified in the evaluation. We admitted four of the 10 stopped (40% of stops, 0.6% of total) to an intensive care unit, and 6 (60% of stops, 0.8% of total) to the hospital ward after ED care. Eight children (1.1%) admitted to the hospital ward after ED RAPID evaluation required a transfer to an intensive care unit within 12 hours. **Conclusion:** The ED RAPID evaluation process for children directly admitted to the hospital was feasible and effective in this setting. (*Pediatr Qual Saf* 2020;2:e268; doi: 10.1097/pq9.000000000000268; Published online March 10, 2020.)

INTRODUCTION

Emergency department (ED) evaluation and treatment before hospital admission expedites patient care, improves patient safety,

facilitates appropriate patient disposition within the hospital, and, in some cases, decreases hospital admission rates.¹⁻³ However, hospitals must balance the use of the ED as a portal of entry with concerns about increasing ED volumes, wait times, overcrowding, discontinuity of patient care, increased handoffs, and cost.^{4,5} Such concerns have led to national efforts to reduce unnecessary ED utilization.⁶

Direct admission to an inpatient hospital ward without ED visit is a frequently employed alternative strategy.^{3,7} National studies have found that direct admissions account for 25% of all unscheduled pediatric hospital admissions; 95% of the US hospitals accept patients for direct admission, though only one-third have a policy in place governing this process.^{7,8}

Direct hospital admission without ED evaluation has potential benefits, including improvements in continuity of care, efficiency, referring physician satisfaction, and patient and family experience as well as reduced ED overcrowding and healthcare costs.^{3,4,7,8} However, direct admission also has risks, including inaccurate determination of the need for hospital admission and potential delay in the evaluation and treatment of unstable or critically ill patients through a placement to an inappropriate level of inpatient care.^{4,7,8} Three pediatric studies have evaluated the safety of direct hospital admission by

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examining rates of transfer to the intensive care unit (ICU) within 12 hours of admission.⁹⁻¹¹ Two studies found no difference in the rate of these transfers, whereas a third reported an increase among patients admitted without ED evaluation.⁹⁻¹¹ Although this study lacked supporting outcome data, it highlighted the fact that ED evaluation and intervention may be beneficial for select patients.¹¹ In a study of a large national sample of patients hospitalized with sepsis, patients admitted through the ED had lower early and overall inpatient mortality than those admitted directly.¹

The safety of direct admission processes depends on appropriate triage by the accepting hospital physician.¹¹ Some hospitals require the evaluation of all patients in the ED before admission to minimize risk to patients. Other direct admission processes circumvent the ED, accepting a potential risk of unstable patients arriving directly to the inpatient ward.

There is little literature to guide the selection of patients who are appropriate for direct admission or to inform hospitals on methods of minimizing clinical risk from the process. Before the implementation of the process described here, our hospital allowed direct admission to the hospital ward at the discretion of the accepting provider, without specific tracking of patient outcomes. In response to a sentinel event in which a deteriorating patient presented directly to the pediatric inpatient ward and suffered a serious adverse outcome, an interdisciplinary hospital team developed a novel ED evaluation process for children accepted for direct admission to the hospital. This report describes the process and assesses its feasibility and discrete patient outcomes as proof of concept.

METHODS

This study was a retrospective evaluation of a novel process implemented to minimize clinical risks and optimize process efficiency for directly admitted patients. The process is known locally as the ED Rapid Assessment of Patients Intended for Inpatient Disposition (ED RAPID). It consists of a brief ED assessment of direct admission patients to determine if they are stable for admission to the inpatient ward. In response to the sentinel event noted above and further anecdotal reports of problematic outcomes among patients directly admitted to the ward, a group of ED physicians and hospitalists decided to develop a new process. As process discussions proceeded, the group obtained input and assistance from key stakeholders, including nursing leadership, medical subspecialty physicians, senior administrators, the electronic health record (EHR) team, and the team of registered nurses who coordinate bed assignments for the medical center, known as patient placement managers (PPMs).

Setting

We implemented this process at a quaternary-care university children's hospital with approximately 3,800

hospital admissions per year, excluding newborn and behavioral patients. The hospital admits patients from newborn through 24 years of age to a general pediatric hospitalist service or a full range of medical and surgical subspecialties. At the time of this process implementation, pediatric resident physicians were on duty in-house around the clock; attending hospitalists were present approximately 10 hours a day, providing support by phone overnight. The ED provides care annually to 15,000 children and young adults, with a 20% hospital admission rate. It is staffed around the clock by board-certified pediatric emergency medicine physicians, with second-attending pediatrician coverage approximately 8 hours per day, and pediatric residents present 18 hours per day. This study was reviewed and approved by the University's Human Subjects Institutional Review Board before data collection.

Process

When a referring provider contacts the hospital's call center regarding a potential admission, call center staff coordinate a call with the PPM, the admitting hospitalist or relevant subspecialist, and the ED physician. This group discusses the safest disposition for the patient and whether the patient is an appropriate candidate for direct admission with ED RAPID evaluation. Occasionally, referring providers contact the ED or the accepting provider directly. In these cases, the physician who took the call or the PPM notifies stakeholders who did not participate in the initial call separately; direct admission cannot proceed without the approval of the admitting physician and the ED physician.

Once the team agrees that a patient is likely stable for direct admission with ED RAPID evaluation, a hospital ward bed is assigned, and the PPM creates a patient encounter in the EHR. Patient caregivers or Emergency Medical Services (EMS) transport teams are directed to present to the ED. On arrival, they are evaluated in the triage area (if arriving via private transport) or ED hallway (if EMS transport) by an ED attending physician and an ED nurse. The evaluation includes vital signs and a brief evaluation by the physician and the nurse to assess clinical stability and the potential need for urgent intervention. If the patient is stable, the ED nurse and physician document the ED RAPID evaluation encounter in the EHR using very brief standardized documentation templates (Fig. 1). Then, the patient is escorted directly to the inpatient hospital ward. If the patient is found to have signs of respiratory, cardiovascular, or neurologic instability necessitating resuscitation or other urgent intervention,¹² the ED RAPID process is stopped, and the patient becomes a standard ED patient. The entire process of ED RAPID evaluation and documentation was designed to take the ED physician and the nurse less than 5 minutes. Figure 2 outlines the process. The department did not require additional staffing to support the process, and patients were not billed separately for the ED RAPID evaluation.

Subjects

ED RAPID process inclusion criteria

All patients referred from outside hospitals or clinics for direct admission and all patients being referred by the hospital’s providers for unplanned admission directly from home undergo ED RAPID evaluation before direct hospital admission. It is optional for children being admitted by hospital providers after evaluation in an on-site clinic.

ED RAPID process exclusion criteria

Children being admitted directly to an ICU and those transferring from an on-site clinic visit do not undergo ED RAPID evaluation as they are not considered to require assessment of clinical stability. Children deemed likely by referring or accepting physicians to require immediate interventions on arrival, which can be accomplished more quickly in the ED than on the ward in our system, including IV placement, laboratory studies, and medication administration, are not eligible for ED RAPID evaluation and receive full ED evaluations. Scheduled elective admissions, such as admission for routine chemotherapy, are excluded from the process unless requested by the referring provider. Due to trauma service requirements, all children referred for injuries receive full ED evaluations. Specialties lacking in-house coverage at the time of planned arrival are not

eligible to directly admit patients through this process, as all children admitted through the ED RAPID evaluation process must have access to prompt provider evaluation.

Outcome Measures

The primary outcome measure for this assessment of the ED RAPID evaluation process was the feasibility of performing ED RAPID evaluations for all eligible patients designated for unscheduled direct hospital admission, resulting in *Process Success* or *Process Failure*. Secondary measures assessed process outcomes, including children stopped by staff for full ED evaluation based on findings from the ED RAPID evaluation and those who required admission to an ICU from the ED or within 12 hours of admission to the hospital ward. These outcomes are defined below. We utilized 12 hours from admission to ICU transfer due to the use of this metric in prior studies to indicate early decompensation and its use locally as a standard to trigger case review for evidence of inappropriate inpatient disposition. We also reviewed patient records for death in the first 48 hours of hospitalization as a balancing measure of potentially attributable risk and calculated mean time spent on the process based on EHR timestamps as a measure of resource utilization.

Items in [brackets] are automatically entered by the EHR
 *** indicates a prompt to enter free text.

Nurse template:

Emergency Department

[Vital signs]

[Patient name] presents to the University of Minnesota Children's Hospital ward as a direct admission through the Emergency Department. Refer to vital signs flow sheet. Based upon a brief MD clinical assessment, [patient name] is stable and will be admitted to the inpatient floor.

[Nurse name], RN

[Date, time]

Physician template:

Emergency Department

[Vital signs]

[Patient name] is a [age] *** who presents with *** for direct admission to the University of Minnesota Children's Hospital ward. At this time, based upon a brief clinical assessment, [patient name] is stable and will be admitted to the inpatient floor.

[Physician name], MD/DO

[Date, time]

Fig. 1. ED RAPID documentation templates. ED RAPID, emergency department Rapid Assessment of Patients Intended for Inpatient Disposition; EHR, electronic health record.

Definitions

Process Success

The process was completed as planned, including prompt transfer to the hospital ward after ED RAPID evaluation for patients deemed stable.

Process Failure

A patient found to require a full ED evaluation rather than the planned direct admission because the hospital ward bed was not yet available when the patient arrived.

ED Stop

A patient identified during the ED RAPID evaluation as clinically requiring full ED evaluation and treatment.

ED Save

An ED stop patient who required admission to an ICU after a full ED evaluation.

ICU Bounce

A patient who was transferred to an ICU within 12 hours after being cleared for admission to the hospital ward via ED RAPID evaluation.

Data Procurement

The patient placement team created a prospective log to identify all patients who underwent ED RAPID evaluation from March 1, 2013, through February 28, 2015, for assessment. To verify that the process was still working successfully, we conducted an EHR search of the standardized documentation template to identify patients cared for through the process from February 2017 through August 2019. Investigators retrospectively abstracted chart data into a spreadsheet (Microsoft Excel 2013; Microsoft, Redmond, Washington, D.C.). Variables collected included: date of birth, gender, referring location, acute presenting condition, disposition after ED RAPID evaluation (direct hospital ward admission or full ED evaluation), disposition after full ED evaluation (hospital ward, direct to ICU, or ward-to-ICU transfer within 12h), and mortality. Comparison data for patients directly admitted before the implementation of the ED RAPID evaluation process was not available, as no specific tracking procedures for these patients were in place at that time.

Data Analysis

Investigators calculated means, medians, standard error, confidence intervals (CIs), and interquartile ranges (IQRs) for continuous data, and percentages for nominal data. Analyses were performed using IBM SPSS Statistics for Windows 2013, version 22.0. (IBM Corp., Armonk, N.Y.).

RESULTS

During the 24-month study period, 725 patients underwent ED RAPID evaluation. Ten were excluded due

to incomplete data availability, leaving 715 subjects (98.6%) for analysis. ED RAPID patients represented 16.3% of ward patients admitted through the ED. Figure 3 shows the distribution by month and process maintenance during the reassessment period. Mean patient age was 7.7 years (95% CI: 7.2–8.2; range 3 d to 23.2 y); the median was 6.1 years. Fifty-three percent were female. Table 1 lists referring location types. The most common presenting complaint was respiratory illnesses (148, 20.7%), followed by gastrointestinal disorders (140, 19.6%), and nonrespiratory infections (109, 15.2%; presenting complaints are listed in **table 1**, **Supplemental Digital Content 1**, <http://links.lww.com/PQ9/A169>). Median ED length of stay for ED RAPID evaluation patients was 4.0 minutes (IQR 3.0–7.0 min); this does not include time spent on preparatory phone calls. No ED RAPID evaluation patients died within the first 48 hours of their hospital stay.

Process Success

Of the 715 children analyzed, 701 (98.0%) had their care provided through the process as planned. Fourteen (2.0%) were stopped in the ED because their designated ward bed was not yet available; these represent *Process failures*. No process failures resulted from ED staff being unavailable.

ED Stops

Of the 701 children completing the process, the ED RAPID evaluation identified 10 (1.4%) as clinically requiring full ED evaluation and treatment (*ED stops*, Table 2). ED stops were younger than the full patient population, with a median age of 18 months versus 6.1 years. They also differed in that 60% had a respiratory condition compared with 21% of the study population. The majority of them were transferred patients from outside EDs.

ED Saves

The treatment team admitted four (40% of stops, 0.6% of total) of the ED stops to the ICU after ED evaluation and treatment; these were considered *ED saves* (Table 2). Three of the 4 (75%) were infants, and 3 (75%) had respiratory illnesses.

ICU Bounces

Eight patients (1.1% of total) required transfer to an ICU within 12 hours of their admission to the hospital via the ED RAPID evaluation process; 0.65% of patients admitted after routine ED evaluation during the same period required such transfer. Table 3 outlines these *ICU Bounces*. Their mean age was 3.0 years (95% CI: 4.3 mo–5.7 y). Six of these 8 patients (75%) had a presenting condition classified as respiratory; 3 of these were transferred more than 6 hours after admission to the ward. None died within the first 48 hours of hospitalization.

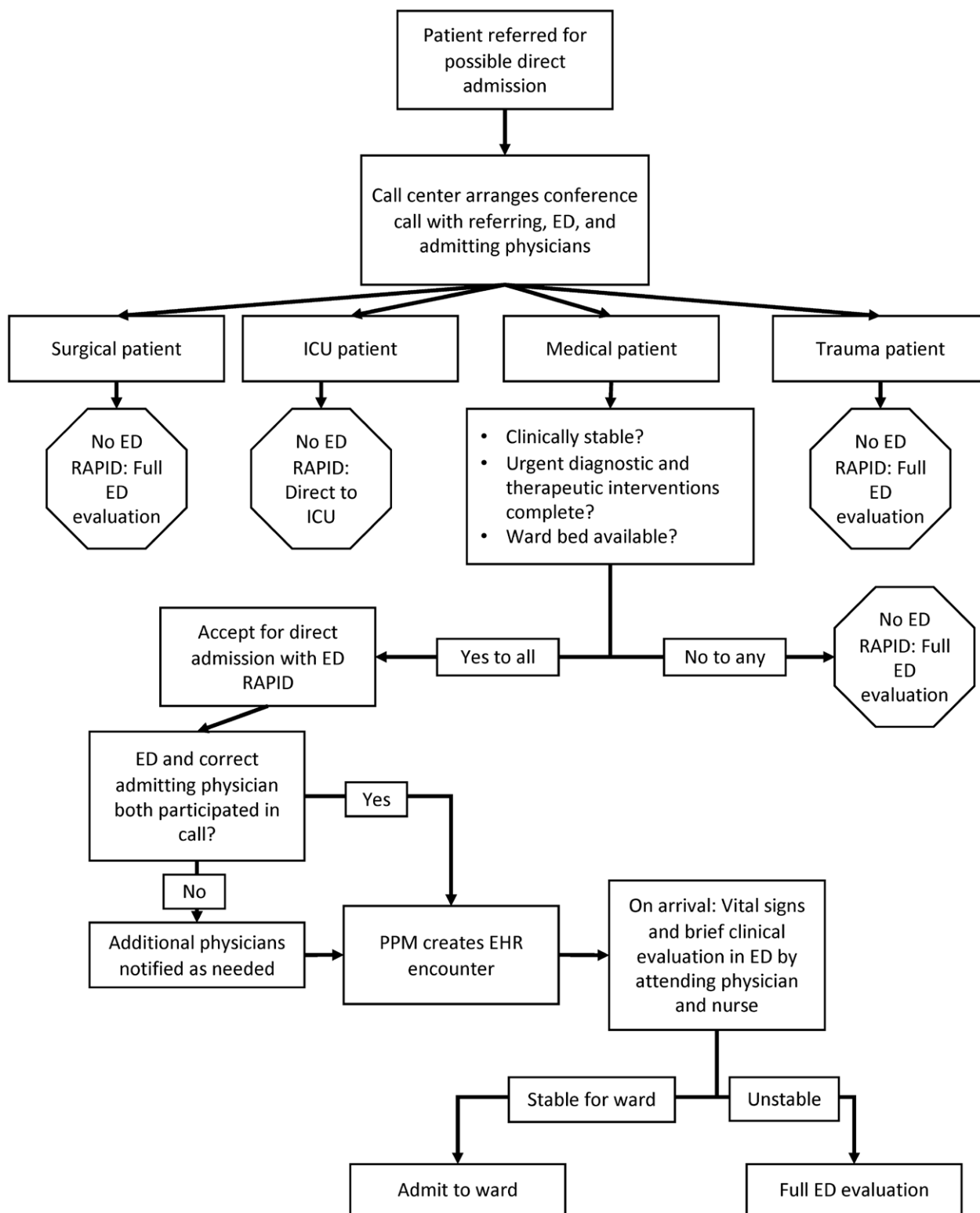


Fig. 2. ED RAPID process. ED RAPID, emergency department Rapid Assessment of Patients Intended for Inpatient Disposition; EHR, electronic health record; PPM, patient placement manager; ICU, intensive care unit.

DISCUSSION

This study is one of the first to describe a specific approach to supporting patient safety at the time of direct hospital admission. Although as many as one in 4 unscheduled

pediatric hospitalizations each year occur through a direct admission process, most hospitals lack policies governing the process, and the current literature provides limited direction in identifying appropriate patients for this

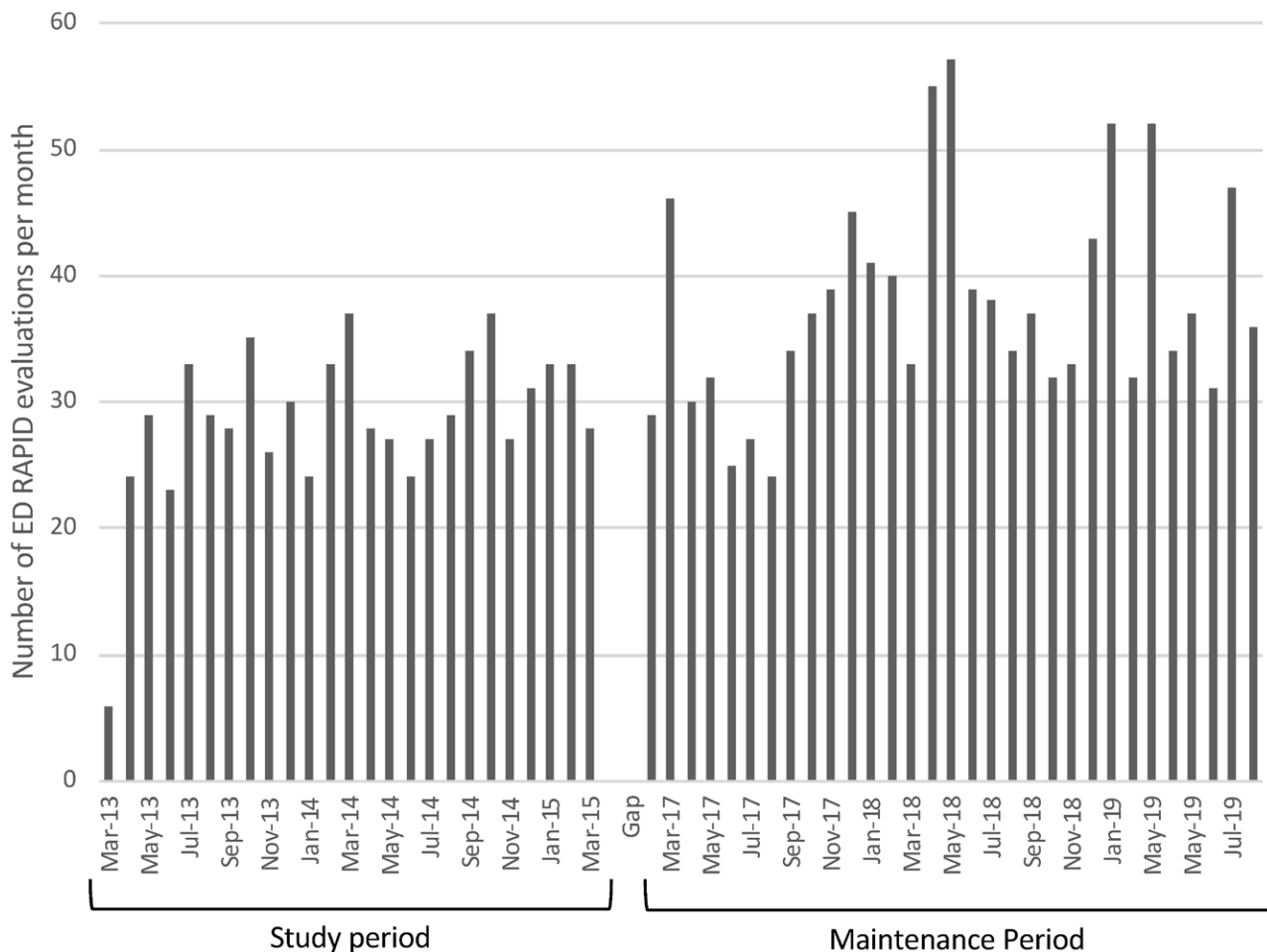


Fig. 3. ED RAPID utilization by month. ED RAPID, emergency department Rapid Assessment of Patients Intended for Inpatient Disposition.

Table 1. Frequency of Referral Sites for ED RAPID Evaluation Patients

Referral Site	Number (%)
Referring hospital—ED	311 (43.5%)
Home	196 (27.4%)
Referring hospital—inpatient	143 (20.0%)
Referring clinic	36 (5.0%)
University system clinic	29 (4.1%)
Total	715 (100.0%)

ED, emergency department; RAPID, Rapid Assessment of Patients Intended for Inpatient Disposition.

process and supporting their safe disposition.^{4,7,8,13} There are anecdotal reports of some children’s hospitals using a similar formal, but brief ED evaluation or an informal “eyeball” evaluation to establish patient stability for ward admissions. However, to the authors’ knowledge, there are no published reports of a process for assessing patient clinical stability at the time of direct admission. This effort sought to implement and assess a new direct admission process, leveraging the benefits of direct admission while mitigating the potential safety risks of admission without full ED evaluation.

The ED RAPID evaluation process was designed to include all patients for whom unscheduled direct admission is arranged rather than only those with specific conditions, as in previous reports.^{1,10} The feasibility of ED RAPID evaluation in this setting is demonstrated by the low Process Failure rate of 2%. An in-depth review revealed that process failures occurred because of bed unavailability during times of high inpatient census or because communication of the direct admission plan was incomplete, but never because of ED physician or nurse unavailability. To address these process failures, leaders have emphasized the need for accepting physicians to secure an inpatient bed before patient transport, and in some cases, when safe and feasible, to consider requesting a delay of transfer to await bed availability. The 4-minute total time required for the process further supports its feasibility. This time measurement does not include time spent on phone calls, but the phone conversations required to accept an ED RAPID evaluation patient are similar to those required to accept any transfer patient.

The low ED Stop rate (1.4%) supports the ability of referring and accepting providers to identify patients for whom direct admission is appropriate. In 60% of cases,

Table 2. Children Who Received Full ED Evaluation and Treatment: ED Stops and ED Saves

Outcome	Condition	Age	Intervention	Disposition
ED Stop				
1	Infection Septic shock	12 y	Bolus normal saline and IV antibiotics	Hospital ward
Respiratory				
2	Respiratory failure	3 y	Increased oxygen	Hospital ward
3	Bronchiolitis	1 mo	High-flow oxygen	Hospital ward
4	Pneumonia (complex medical)	12 y	IV antibiotics	Hospital ward
Gastrointestinal				
5	Gastroenteritis, dehydration	15 mo	Bolus normal saline	Hospital ward
6	Gastroenteritis, dehydration, hypoglycemia	2 y	Bolus normal saline and IV dextrose	Hospital ward
ED Stop + Save				
Infection				
1	Meningitis	7 wk	Bolus normal saline	ICU
Respiratory				
2	Bronchiolitis	5 mo	High-flow oxygen	ICU
3	Bronchiolitis	7 mo	High-flow oxygen	ICU
4	Aspiration pneumonia (complex medical)	10 y	Aerosolized beta-agonist	ICU

ED, emergency department; ICU, intensive care unit.

Table 3. ICU Bounces—Children Who Were Transferred to the ICU Within 12 Hours After Successful ED RAPID and Direct Admission to the Hospital Ward

Condition	Age	Intervention Necessitating ICU Transfer	Time of Transfer (Hours After Admission)
Respiratory			
Bronchiolitis	1 mo	Increased oxygen/high flow	5.1
Bronchiolitis	7 mo	Increased oxygen/high flow	2.5
Bronchiolitis and pneumonia (complex medical)	7 mo	Increased oxygen/high-flow, later intubated	10.2
Bronchiolitis and pneumonia (complex medical)	8 mo	Increased oxygen/high flow	2.0
Bronchiolitis	16 mo	Increased oxygen/high flow	9.0
Croup	3 y	Aerosolized epinephrine	10.5
Neurological			
Altered mental status (complex medical)	6 y	ICU monitoring	8.2
Stroke (complex medical)	12 y	ICU monitoring	4.1

ED, emergency department; ICU, intensive care unit; RAPID, Rapid Assessment of Patients Intended for Inpatient Disposition.

ED stops were able to be admitted to the hospital ward after stabilization in the ED. As ED stops were younger and more likely to have respiratory conditions, ED and hospitalist leadership have advised accepting physicians to consider recommending full ED evaluation for younger infants and patients with significant respiratory illnesses.

The 40% of ED stops admitted to an ICU after ED interventions represent ED saves. Although this was a small proportion of the patient population (0.6%), these patients were the primary impetus behind the development of the ED RAPID process, as erroneous admission of an ICU-level patient to a general ward is a high-risk source of preventable harm.

The majority (98.9%) of patients directly admitted after ED RAPID evaluation remained on the hospital ward without complication. Only 8 patients (1.1% of total) directly admitted after ED RAPID evaluation required a transfer to the ICU within 12 hours of admission; this number would have been 50% higher if the 4 ED saves had been admitted directly to the hospital ward then transferred. This ICU bounce rate is slightly higher than our institution's 0.65% bounce rate for routine ED patients, but is similar to one published report comparing direct admissions and ED hospitalizations.⁹ Another report of a pediatric direct admission process

discussed the need to follow ICU bounce rates as a quality measure but did not report outcomes.¹¹ As with ED stops, ICU bounces were younger and more likely to have respiratory conditions. Particularly, in the 50% of ICU bounce cases where a transfer occurred more than 6 hours after admission, these transfers may represent the unpredictable and unavoidable progression of the disease. However, this observation provides support for caution in the use of direct admission for these patients.

This hospital's experience with this process leads us to believe it could be generalizable to many hospital settings, but there are a few considerations. First, it relies on the judgment and cooperation of the referring, accepting, and ED providers, so its applicability to other settings would depend on local referral patterns, assessment skills, and relationships. The same is true, however, for any currently existing systems for accepting and placing referred patients. Second, the implementation of the process required an upfront expenditure of time and ongoing commitment among stakeholders. These stakeholders include EMS providers, who accepted a brief delay in their transfer process, ED staff, who accepted brief additional tasks and the need to balance performance of the ED RAPID evaluation with other patient care needs, and inpatient staff, who accepted a new step in the process of admitting their patients. In this

setting, there was sufficient motivation for this in the dual goals of ensuring the safety of directly admitted patients and avoiding the inconvenience to patients and staff of unnecessary full ED evaluations. Third, process implementation required information technology resources to overcome initial barriers, including the development of new processes to allow ED staff to document for a new class of patients and the creation of an EHR entry before arrival for patients new to the system.

Limitations

The authors' hospital implemented this process following a sentinel event. Given the perceived urgency, it was not rolled out through a formal quality improvement process with baseline data collection before implementation and coordinated Plan-Do-Study-Act cycles. The retrospective analysis presented here to describe the process and demonstrate feasibility has the limitations inherent to all retrospective reviews. Although the patient log used to identify study patients was maintained prospectively, we may have failed to capture some patients who received ED RAPID evaluation, and there was no means to identify patients designated for ED RAPID evaluation who inadvertently bypassed the process by presenting directly to the hospital ward. There are anecdotal reports of this occurring, but no patients are known to have bypassed the process and then required transfer to the ICU.

Furthermore, although it may have been useful to compare ED RAPID evaluation patients to patients pre-emptively diverted from the process by accepting staff, there was no mechanism to identify such patients, and we do not describe them here. Likewise, as we did not prospectively track the phone calls involved in arranging the direct admissions, we are unable to comment on the frequency with which the process required multiple phone calls or the time spent in phone coordination. Also, the ED RAPID evaluation process was not intended to identify direct admission patients that may have been safely discharged home after ED evaluation and care. Thus, we may have admitted some patients via the process that could have been treated and discharged from the ED. However, the ED RAPID evaluation process does not increase this likelihood when compared with standard direct admission. We do not currently have data regarding the effects of this process on patient-centered outcomes such as patient satisfaction, admission throughput, and the frequency of brief admissions that additional ED-based management may have averted; quality improvement targeting these outcomes would be a useful area for further research. Although the ED RAPID evaluation process includes formal evaluation of vital signs, it ultimately relies on a brief clinical assessment by ED attending physicians and nurses rather than standardized, objective measures. There is variation between providers inherent to this process; future improvement efforts could target this variability.

We found that infants and patients with respiratory difficulties were the most likely to require ICU admission rather than direct ward admission through this process; institutions considering implementing a similar process may wish to take this into account. Finally, this process was studied in a lower volume (15,000 annual visits) high complexity-acuity (20% admission rate) university children's hospital ED. Although the implementation of this process in hospitals with larger ED volumes is untested, if resources allow, such hospitals may wish to consider this as a process with the potential to decrease ED volumes.

CONCLUSIONS

We created the ED RAPID evaluation process to support the safe disposition of patients eligible for a direct hospital admission. When performed by pediatric ED attending physicians and nurses, the ED RAPID evaluation is feasible and effective, identifying a small but high-risk group of patients who required ED stabilization or diversion to the ICU; these patients were more likely to be infants and to have respiratory illnesses. Implementation of a similar pediatric direct admission process at other institutions may depend upon hospital staffing, referral patterns, resources, and patient populations, but this experience shows that it is possible in the right setting. The ED RAPID evaluation process simultaneously supports both the cost-effective, patient-centered practice of direct hospital ward admission and patient safety.

DISCLOSURE

The authors have no financial interest to declare in relation to the content of this article.

REFERENCES

1. Powell ES, Khare RK, Courtney DM, et al. Lower mortality in sepsis patients admitted through the ED vs direct admission. *Am J Emerg Med.* 2012;30:432–439.
2. Li J, Monuteaux MC, Bachur RG. Interfacility transfers of non-critically ill children to academic pediatric emergency departments. *Pediatrics.* 2012;130:83–92.
3. Webber EC, Bauer BD, Marcum CK, et al. Before the flood: impact of coordination of care and direct admissions on emergency department volumes. *Pediatr Emerg Care.* 2018;34:208–211.
4. Leyenaar JK, Shieh MS, Lagu T, et al. Direct admission to hospitals among children in the United States. *JAMA Pediatr.* 2015;169:500–502.
5. Smith CJ, Britigan DH, Lyden E, et al. Interunit handoffs from emergency department to inpatient care: a cross-sectional survey of physicians at a university medical center. *J Hosp Med.* 2015;10:711–717.
6. Mann C. *Targeting Medicaid Super-Utilizers to Decrease Costs and Improve Quality.* Baltimore, Maryland: Center for Medicaid and CHIP Services; 2013.
7. Leyenaar JK, Lagu T, Lindenauer PK. Direct admission to the hospital: an alternative approach to hospitalization. *J Hosp Med.* 2016;11:303–305.
8. Leyenaar JK, Shieh MS, Lagu T, et al. Variation and outcomes associated with direct hospital admission among

- children with pneumonia in the United States. *JAMA Pediatr.* 2014;168:829–836.
9. Leyenaar JK, O'Brien ER, Malkani N, et al. Direct admission to hospital: a mixed methods survey of pediatric practices, benefits, and challenges. *Acad Pediatr.* 2016;16:175–182.
 10. Reese J, Deakyn SJ, Blanchard A, et al. Rate of preventable early unplanned intensive care unit transfer for direct admissions and emergency department admissions. *Hosp Pediatr.* 2015;5:27–34.
 11. Van Blarcom JR, Srivastava R, Colling D, et al. The development and implementation of a direct admission system at a tertiary care hospital. *Hosp Pediatr.* 2014;4:69–77.
 12. Chameides L, Samson R, Schexnayder S. *Pediatric Advanced Life Support Provider Manual*. Dallas, Texas: American Heart Association; 2011.
 13. Homer CJ. Health disparities and the primary care medical home: could it be that simple? *Acad Pediatr.* 2009;9:203–205.