

Triage of the Pediatric Patient in the Emergency Department: Are We All in Agreement?

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ABSTRACT. *Objective.* To compare triage categorization as a measure of perceived patient acuity on presentation to the emergency department by pediatric emergency medicine (PEM) attending physicians, nurses, and pediatric residents with their general emergency medicine (GEM) counterparts.

Methods. A questionnaire that contained 12 pediatric triage scenarios was sent to all PEM attending physicians, triage-trained nurses, and pediatric residents and their GEM counterparts at a large urban hospital with separate pediatric and general emergency departments. Participants were asked to use a 3-tier triage system (emergent, urgent, nonurgent) to assign a triage level for each patient scenario.

Results. The response rate was 99%. The κ level of agreement was highest (.39) among the PEM physicians. Significantly more GEM attending physicians triaged the following scenarios at a higher acuity level as compared with PEM attending physicians with a trend toward emergent triage: simple febrile seizure, 50% (95% confidence interval [CI]: 30%–70%) versus 7.7% (95% CI: 1%–34%); 18-month-old with fever and bumps on lips, 21% (95% CI: 9%–43%) versus 0% (95% CI: 0%–23%); and 15-month-old well-appearing child with high fever, 50% (95% CI: 30%–70%) versus 7.7% (95% CI: 1%–34%). Significant differences were found between GEM and PEM triage-trained nurses only in the 15-month-old high fever scenario and between GEM and pediatric residents in the 15-month-old high fever scenario, the 18-month-old with fever and bumps on lips scenario, and a fever/limp scenario.

Conclusions. The level of agreement of triage assignment within each group was only fair. GEM participants and PEM participants agreed on most scenarios. However, GEM participants were more likely to triage children with certain febrile illnesses at higher acuity levels as compared with their PEM counterparts. *Pediatrics* 2004;114:356–360; *emergency, triage, fever, child.*

ABBREVIATIONS. ED, emergency department; PEM, pediatric emergency medicine; GEM, general emergency medicine; CI, confidence interval.

Because the priority of care often is based on triage categorization, consistent and appropriate triage decision making has important implications for health care delivery in emergency departments (EDs). Knowledge and experience with both common and life-threatening illness are essential for accurate patient assessment.

Both nurses and physicians use triage categorizations in patient treatment as an indicator of initial acuity of illness. For maintaining an efficient flow of patients through an ED, without compromising patient care, waiting time at each stage of the evaluation should take into account patient acuity. This is especially important for pediatric patients because their pattern of illness and presenting symptoms often varies with age. However, most children who require emergency care are brought to community hospital EDs because of their availability, rather than to separate EDs designed and staffed specifically for children.¹ Triage of children who are seen in general hospital EDs may or may not be performed by general emergency medicine staff who are experienced in treating childhood emergencies.

The training and experience of general emergency medicine staff and pediatric emergency medicine staff are different. Furthermore, differences in practice patterns between general emergency medicine staff and pediatric emergency medicine staff have been shown in several areas, including time to termination of resuscitation efforts,² sedation use,³ treatment of the febrile child,^{4,5} and management of febrile seizures.⁶ These studies focused primarily on management and did not specifically address the practitioner's perception of the severity of the child's illness on the basis of the presenting complaint. Our study was designed to compare triage categorization, as a measure of perceived patient acuity on presentation to the ED, by pediatric emergency medicine (PEM) attending physicians, PEM nurses, and pediatric residents with their general emergency medicine (GEM) counterparts. We surveyed these people to determine whether a difference existed in the way PEM and GEM staff triage varied pediatric patients.

METHODS

In our institution, physicians do not triage patients but are aware of the triage categorization and may reprioritize patient care at any stage of evaluation. The time to initial physician contact is based primarily on triage categorization and the time of presentation.

Twelve triage scenarios were devised by the study investigators to represent common complaints of pediatric patients who

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present to an ED (Table 1). Printed scenarios and the definition of the hospital's 3-tier triage system (Table 2) were given to all PEM attending physicians, PEM triage-trained nurses, pediatric residents, GEM attending physicians, GEM triage-trained nurses, and GEM residents at a large urban hospital with separate general and pediatric emergency services.

We used the 3-tier triage scale not only because this is the scale that we currently use in our institution and therefore what the physicians tested are familiar using but also to detect greater differences in triage categorizations. A 5-tier triage categorization scale might allow a more specific patient acuity level but would perhaps be less likely to highlight differences among raters triaging a group of patients. At the time of survey completion, the annual ED census was 74 000 adults and 42 000 children. The majority of the PEM attending physicians surveyed are board certified (10 of 13) in PEM. The nurses at our institution undergo a triage training class that includes a 6-hour class and requires them to triage 100 patients under the supervision of our nurse educator.

For each printed scenario, the following information was provided to the participant: chief complaint, a brief history of the patient's current illness, vital signs, and general appearance. The 12 cases chosen were not validated but were found to represent typical cases of the most frequent complaints for each category of triage. Most patients who are seen in our ED have urgent or nonurgent complaints, with fever being the most common complaint. Participants were asked to assign a triage level of emergent, urgent, or nonurgent for each scenario as well as a brief explanation as to their triage assignment. The forms were completed anonymously.

Categorical variables were analyzed with χ^2 and Fisher exact tests when appropriate. Ninety-five percent confidence intervals (CIs) were calculated using standard methods. The rate of agreement within each group was calculated using κ statistics. The following guidelines for interpretation of κ statistics were used: $<.20$, poor; between $.21$ and $.40$, fair; and $>.41$, moderate to substantial. Similar groups were compared with each other (eg, attendings with attendings, nurses with nurses, residents with residents). Although there was no triage gold standard for each scenario, we compared responses of all groups with those of the

TABLE 2. Triage Categorizations

Emergent	Patients with life-, limb-, or sight-threatening illness that, if not treated immediately, may result in permanent functional loss or mortality
Urgent	Patients with significant medical problems that, if not treated within 1–2 hours, have the potential for significant medical morbidity, pain, or psychological trauma
Nonurgent	Patients whose condition is stable but will require care within the next 4–6 hours, with no risk of mortality or permanent functional loss

PEM attending physicians. $P \leq .05$ was considered significant. The hospital's Institutional Review Board approved this study.

RESULTS

The response rate was 99% (PEM attending physicians: 13 of 13; GEM attending physicians: 20 of 20; PEM nurses: 17 of 17; GEM nurses: 38 of 38; pediatric residents: 60 of 62; GEM residents: 28 of 28). The average number of years of experience of the different groups were as follows: PEM physicians: 10.6 years; GEM physicians: 11.4 years; PEM nurses: 12.7 years; GEM nurses: 11.8 years; pediatric residents: 1.5 years; and GEM residents: 2.9 years.

The overall κ level of agreement in assigning a triage level to the case scenarios was .39 for the PEM physicians, .33 for the GEM physicians, .29 for the PEM nurses, .26 for the GEM nurses, .26 for the pediatric residents, and .27 for the GEM residents. There were no significant differences in triage categorization between PEM participants and their GEM

TABLE 1. Summary of Patient Scenarios

Chief Complaint	Brief History	Vital Signs (T, HR, R, BP)	Physical Appearance
Fever	7-wk-old boy with fever for 1 d	38.6°C, 140, 36, 90/60	Well appearing
Head trauma	3-y-old boy after fall off bed, no loss of consciousness or emesis	37°C, 100, 24, 95/65	Comfortable, looking around, small bump on forehead
Barking cough	18-mo-old girl with cough and runny nose for 1 d	38.3°C, 130, 40, 88/50, SaO ₂ 96%	Stridulous, retracting and agitated
Wheezing	7-y-old girl with known asthma	37.1°C, 110, 26, 105/68, SaO ₂ 95%	Comfortable, mild retractions, slight expiratory wheeze
Seizure	11-mo-old boy after generalized tonic-clonic seizure for 5 min at home	39.1°C, 120, 26, 90/60	Well appearing
Abdominal pain	12-y-old boy with mild intermittent abdominal pain for 1 d, emesis \times 3 today	37.8°C, 100, 18, 90/65	Comfortable, able to walk
Fever	4-y-old boy complaining of earache, cough, and fever for 2 d	38.5°C, 130, 30, 96/65	Well appearing and playful
Not drinking	2-y-old girl with 3 d history of vomiting and diarrhea and decreased oral intake	38.0°C, 150, 24, 88/50	Alert and active with slightly dry lips and normal capillary refill time
Fever and decreased oral intake	18-mo-old boy with 2 d history of fever, drooling, and "bumps" on lips	38.5°C, 140, 30, 90/60	A drooling, well-appearing boy with vesicles on tongue
Chest pain	12-y-old boy complaining of chest pain for 1 d	37°C, 100, 22, 110/70, SaO ₂ = 98%	Comfortable, chest clear and equal breath sounds, heart regular, no murmur
Not walking	2-y-old girl who won't walk for 1 d	39.7°C, 130, 26, 95/65	Crying but consolable; unable to bear weight
Fever	15-mo-old with fever for 1 d	41.1°C, 160, 44, 90/60	Crying but easily consolable, well hydrated

T indicates temperature; HR, heart rate (beats/minute); R, respirations (per minute); BP, blood pressure (mmHg)

counterparts for 8 scenarios: asthma, head trauma, croup, abdominal pain, otitis, dehydration, chest pain, and fever in a 7-week-old. For the scenario of a 15-month-old who had high fever for 1 day and was crying but consolable and well hydrated with an otherwise nonfocal physical examination, GEM attending physicians, GEM residents, and GEM nurses were more likely to assign a higher acuity triage category as compared with their PEM counterparts (Table 3). When asked for reasons for the triage level assignment for this scenario, 11.6% of the GEM participants listed that a fever >105°F was “very concerning” and that “the patient was at risk for seizure activity.” With regard to the 18-month-old who had fever, drooling, and bumps on lips and was otherwise well-appearing, significantly more GEM attending physicians and GEM residents triaged this child at a higher acuity level as compared with PEM attending physicians and pediatric residents (Table 4). Several of the GEM staff expressed that they were concerned that the child was drooling (13.3%) and gave the fear of a potential airway compromise (8.8%) and/or epiglottitis (2.2%) as an explanation for their emergent triage assignment, whereas the PEM staff noted this child as having stomatitis. No significant differences were found between the nurse groups for this scenario. The only significant difference found for the 11-month-old status post a simple febrile seizure who is now well appearing was between the attending physician groups (Table 5). For the 2 year-old with fever and limp scenario, the only significant difference was found between the resident groups, with pediatric residents more likely to categorize the triage level as emergent (45% [95% CI: 33%–58%] vs 39.3% [95% CI: 23%–57%]) and less as nonurgent (0% [95% CI: 0%–6%] vs 10.7% [95% CI: 4%–28%]).

The percentage of scenarios in which each group agreed with the PEM attending physicians were as follows: GEM attending physicians: 75% (95% CI: 53%–89%); GEM nurses: 75% (95% CI: 59%–86%); GEM residents: 91% (95% CI: 75%–97%); PEM nurses: 91% (95% CI: 69%–98%); and pediatric residents: 100% (95% CI: 94%–100%).

DISCUSSION

Appropriate triage requires not only the ability to recognize presenting signs and symptoms that need to be managed emergently but also the recognition of symptoms that are likely to represent a benign illness. It is clear that undertriaging (assigning an inappropriately low triage level) can lead to delays in patient care. However, overtriaging (assigning an inappropriately high triage level) can have a similar effect. Mixing nonurgent conditions with emergent conditions results in increased waiting time for the true emergencies. In addition, variations in triage practices can affect resource allocation, health care cost, and, ultimately, patient outcomes. For example, if a patient’s severity cannot be identified accurately by triage, then the option to divert a nonurgent patient to a less expensive venue cannot occur.⁷

Our data are consistent with the earlier findings demonstrating great variability among physicians

TABLE 3. Triage Categorization for the 15-Month-Old With Fever for 1 Day Scenario

	GEM Attending Physicians (n = 20; 95% CI)	PEM Attending Physicians (n = 13; 95% CI)	GEM Residents (n = 28; 95% CI)	PEDS Residents (n = 60; 95% CI)	GEM Nurses (n = 38; 95% CI)	PEM Nurses (n = 17; 95% CI)
Emergent	50% (30%–70%)	7.7% (1%–34%)	25% (13%–43%)	15% (8%–26%)	36.8% (24%–53%)	33.5% (16%–57%)
Urgent	50% (30%–70%)	61.5% (36%–83%)	67.8% (49%–82%)	45% (33%–58%)	57.9% (42%–72%)	26.6% (12%–51%)
Nonurgent	0% (0%–16%)	30.7% (13%–58%)	7.1% (2%–22%)	40% (29%–53%)	5.3% (1%–17%)	40% (21%–63%)
	P = 0.005		P = 0.006		P = 0.004	

P value = level of significance for each table

TABLE 4. Triage Categorization for the 18-Month-Old With Fever and Bumps on Lips Scenario

	GEM Attending Physicians (n = 20; 95% CI)	PEM Attending Physicians (n = 13; 95% CI)	GEM Residents (n = 28; 95% CI)	PEDS Residents (n = 60; 95% CI)
Emergent	21% (9%–43%)	0% (0%–23%)	36% (21%–54%)	5.1% (2%–14%)
Urgent	47.4% (27%–68%)	7.7% (1%–34%)	39% (23%–57%)	32.2% (22%–45%)
Nonurgent	31.6% (16%–54%)	92.3% (66%–99%)	25% (13%–43%)	62.7% (50%–74%)
	<i>P</i> = 0.002		<i>P</i> = 0.0001	

TABLE 5. Triage Categorization for the 11-Month-Old s/p Simple Febrile Seizure Scenario

	GEM Attending Physicians (n = 20; 95% CI)	PEM Attending Physicians (n = 13; 95% CI)
Emergent	50% (30%–70%)	7.7% (1%–34%)
Urgent	45% (26%–66%)	77% (50%–92%)
Nonurgent	5% (1%–24%)	15.3% (4%–42%)
	<i>P</i> = 0.03	

and nurses with regard to triage decisions.⁸ The development of triaging skills requires knowledge and experience of both common and life-threatening illness. Because the intensity of pediatric experience differs between GEM staff and PEM staff, we tried to determine whether differences existed in the way GEM staff and PEM staff triaged pediatric patients. In our study, GEM participants and PEM participants agreed on most scenarios, and there was a high level of agreement of each group with the physicians who have the most training in PEM, the PEM attending physicians. However, the scenarios in which PEM staff differed from GEM staff all involved triage of a febrile child. GEM participants were more likely to triage children with certain febrile illnesses as emergent compared with their PEM counterparts. This may be attributable to differences in their training, experience, and/or familiarity with certain common febrile illnesses in pediatrics. It is interesting that when compared with the PEM attending physicians, the GEM residents agreed on more scenarios (91%) than the GEM attending physicians (75%). This may be attributable to GEM residents' having more recent exposure to pediatric patients at the time of the questionnaire.

Differences in practice patterns between general emergency physicians and pediatric physicians in the management of certain febrile illnesses in children have been reported. In a survey of 1600 randomly selected pediatricians, family medicine practitioners, and emergency physicians, Wittler et al.⁴ found that although physicians generally agreed in their treatment of the young febrile infant, there was considerable variation in the treatment in the older infant and toddler, with the emergency medicine physicians being the most aggressive in their treatment. For example, when surveyed regarding a 16-month-old with a high fever and no clinically apparent source of infection, emergency physicians were more likely than pediatricians to obtain a blood culture and chest radiograph and initiate empiric antibiotic treatment. In a review of medical records from a children's hospital ED and a general ED, Isaacman et al⁵ found a number of differences between GEM

physicians and PEM physicians in their treatment of the young child with fever. Using existing practice guidelines as a gold standard, the investigators concluded that GEM physicians were more likely to order a chest radiograph, perform a lumbar puncture, and use parenteral antibiotics than their PEM physician counterparts. Furthermore, specific viral infections were diagnosed more frequently by PEM physicians than GEM physicians. The differences in the triage categorization of children with febrile illness between the GEM physicians and the PEM physicians in our study may explain some of the existing data. Perhaps the GEM physicians consider children with a febrile illness to be at higher acuity, thereby resulting in more aggressive management, or perhaps GEM physicians are accustomed to a higher level of acuity and therefore triage symptoms differently, resulting in more aggressive management.

Although we did not assess the potential outcome of each patient according to his or her level of triage assignment, our results demonstrate how triage may affect the way an ED operates. If certain febrile pediatric patients with common nonurgent illnesses are being overtriaged, then they may be placed in the same category as and thereby delay the care of patients with more emergent conditions. Therefore, the issue is not just the treatment and outcome of the child with the nonurgent complaint who is overtriaged but rather how that action affects the timeliness of care and outcome of children who present to the ED at the same time. For example, if a child with a benign febrile illness is triaged as emergent, then that may delay the care to a child who has possible meningitis and was triaged shortly thereafter. Furthermore, triage categorization may affect patient care not just during the initial presentation to the ED but also for additional evaluation by the physician. This is why we chose to include physicians' triage categorization in our study, because their judgment of patient acuity will affect the order in which patients are seen inside the ED.

Our study is also consistent with previous data⁹ showing variability among groups of similar practitioners. Interobserver agreement as judged by the κ statistic was only fair within each group surveyed.

There are a number of limitations to this study. First, the use of paper scenarios cannot truly substitute for actual triage practice. We tried to include all of the essential information generally obtained during a triage encounter. By providing this information, we were able to focus on triage categorization rather than on the clinical ability of the participant to assess properly whether the child was, for example, "well appearing" or "well hydrated." Nevertheless,

denying the participants their instinct or gestalt when actually triaging a patient may bias the results. We also used a limited number of scenarios, although we specifically chose scenarios of the more common illnesses that are seen in our pediatric ED. The variation in acuity of our scenarios is consistent with the fact that most patients who are seen in our ED have urgent or nonurgent complaints. In particular, the lack of high-acuity scenarios limits our ability to detect differences for emergent triage complaints.

We chose to use the 3-tier triage system currently in use at our institution because of its familiarity to the staff. It is true that some hospitals have adopted other triage systems, including a 5-tier triage system, that may have less variation in triage categorization.¹⁰ Nevertheless, the focus of our study was on the perception of patient acuity on the basis of the presenting symptoms. It was not our goal to assess the validity or effectiveness of the 3-tier triage system or to compare it with other systems. We sought only to use the triage categorization as a gross measure of perceived patient acuity on the basis of presenting symptoms.

Our study was not designed to investigate differences in the training experience of GEM staff. However, uncovering variability between GEM physicians and PEM physicians with regard to triaging a febrile child raises the question as to whether more GEM training in assessing febrile children is needed. Differences in management styles are common. Preconceptions, such as risk of disease prevalence and reliability of follow-up, may affect attitude toward assessment of a febrile child. Our intention was not to investigate whether there is a need for more GEM training in febrile pediatric patients. Furthermore, differences in patient assessment and treatment may not affect final outcome. Therefore, future studies are needed to assess whether these differences in management styles affect patient outcome.

In summary, the κ level of agreement within each group was only fair. GEM staff and PEM staff agreed

on the triage level for most scenarios. However, GEM participants were more likely to triage children with certain febrile illnesses at higher acuity levels as compared with their PEM equivalents. This may be attributable to differences in their training, experience, and/or familiarity with certain common febrile illnesses in pediatrics. Future studies are needed to validate these findings with actual triage practices and to determine whether differences in experiences or training are components to variation in triage categorization between GEM staff and PEM staff for certain febrile illness.

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