

# Dehydration Treatment Practices Among Pediatrics-Trained and Non-Pediatrics Trained Emergency Physicians

Jeranil Nunez, MD, Deborah R. Liu, MD, and Alan L. Nager, MD, MHA

**Objectives:** We sought to survey emergency physicians in the United States regarding the management of pediatric dehydration secondary to acute gastroenteritis. We hypothesized that responses from physicians with dedicated pediatric training (PT), that is, board certification in pediatrics or pediatric emergency medicine, would differ from responses of physicians with no dedicated pediatric training (non-PT).

**Methods:** An anonymous survey was mailed to randomly selected members of the American College of Emergency Physicians and sent electronically to enrollees of Brown University pediatric emergency medicine listserv. The survey consisted of 17 multiple-choice questions based on a clinical scenario depicting a 2-year-old with acute gastroenteritis and moderate dehydration. Questions asked related to treatment preferences, practice setting, and training information.

**Results:** One thousand sixty-nine surveys were received: 997 surveys were used for data analysis, including 269 PT physicians and 721 non-PT physicians. Seventy-nine percent of PT physicians correctly classified the scenario patient as moderately dehydrated versus 71% of non-PT physicians ( $P = 0.063$ ). Among those who correctly classified the patient, 121 PT physicians (58%) and 350 non-PT physicians (68%) would initially hydrate the patient with intravenous fluids. Pediatrics-trained physicians were more likely to initially choose oral or nasogastric hydration compared with non-PT physicians ( $P = 0.0127$ ). Pediatrics-trained physicians were less likely to perform laboratory testing compared with the non-PT group ( $n = 92, 45\%$ , vs  $n = 337, 66\%$ ;  $P < 0.0001$ ).

**Conclusions:** Contrary to established recommendations for the management of moderately dehydrated children, significantly more PT physicians, compared with non-PT physicians, follow established guidelines.

**Key Words:** pediatric dehydration, acute gastroenteritis, emergency physicians training

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Worldwide, acute gastroenteritis remains a commonly encountered illness. Although there have been many advances in the management of infants and children experiencing dehydration secondary to acute gastroenteritis, the condition is still a significant cause of morbidity and mortality. In developing countries, diarrhea is a common cause of pediatric mortality, accounting for approximately 21% of all deaths among children younger than 5 years.<sup>1</sup> In the United States, acute diarrhea accounts for more than 1.5 million outpatient visits, an average of 200,000 hospitalizations, and approximately 300 deaths per year in children younger than 5 years due to diarrhea and dehydration.<sup>2–5</sup> Subsequent costs to society are substantially high,

with more than \$2 billion per year spent in the United States alone on hospitalization and outpatient care for children with diarrhea.<sup>4–6</sup>

The American Academy of Pediatrics (AAP),<sup>7</sup> Centers for Disease Control and Prevention (CDC),<sup>2</sup> and the World Health Organization<sup>8</sup> have published practice guidelines for the treatment of dehydration secondary to acute gastroenteritis. These guidelines include recommendations on the use of oral rehydration therapy (ORT) for the treatment of mild to moderate dehydration and the use of intravenous (IV) therapy for severe dehydration, as well as statements on the utility of obtaining laboratory studies and the use of antiemetic agents. Despite these established practice guidelines, multiple surveys show that physicians do not always adhere to recommended management strategies.<sup>9–11</sup>

## Hypothesis

We sought to survey the current practice among emergency physicians in the United States regarding the identification and management of pediatric dehydration secondary to acute gastroenteritis. We hypothesized that responses from physicians with dedicated pediatric training (PT) would differ from responses of physicians with no dedicated training in pediatrics (non-PT).

## METHODS

### Participants and Procedure

To gather data from emergency medicine physicians in the United States, a national anonymous survey was mailed to emergency medicine physicians from a commercially available mailing list of the American College of Emergency Physicians (ACEP). Two thousand four surveys were mailed, 1 time only, to a computer-generated randomized list of ACEP members produced in 2009. An anonymous online survey of emergency medicine physicians who were subscribed to a pediatric emergency medicine (PEM) listserv<sup>12</sup> was also conducted via an online survey tool. The online survey link was e-mailed twice to members of the PEM listserv with a 1-month time interval between e-mails. This study was conducted over a 3-month period, from June to August 2009. Inclusion criteria included emergency medicine physicians who treat pediatric patients within the United States. Exclusion criteria included nonphysicians; international practitioners; physicians who do not see pediatric patients, who have not completed their training, or who are no longer practicing medicine; and physicians whose surveys were found to be incomplete. The Children's Hospital Los Angeles Committee on Clinical Investigations approved the study protocol.

### Survey Instrument

The survey instrument was nonvalidated and consisted of an anonymous, self-completed questionnaire with 17 items designed by the study authors, all of which were multiple choice formatted. The survey requested demographic information including specialty and board certification, the number of years

From the Division of Emergency and Transport Medicine, Department of Pediatrics, Children's Hospital Los Angeles, University of Southern California, and The Keck School of Medicine, Los Angeles, CA.

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Reprints: Jeranil Nunez, MD, Division of Emergency and Transport Medicine, Children's Hospital Los Angeles, 4650 Sunset Blvd,

Mailstop #113, Los Angeles, CA 90027 (e-mail: jnunez@chla.usc.edu).

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**TABLE 1.** Symptoms Associated With Dehydration

Symptoms	Minimal or No Dehydration (<3% Loss of Body Weight)	Mild to Moderate Dehydration (3%–9% Loss of Body Weight)	Severe Dehydration (>9% Loss of Body Weight)
Mental status	Well, alert	Normal, fatigued or restless, irritable	Apathetic, lethargic, unconscious
Thirst	Drinks normally, might refuse liquids	Thirsty, eager to drink	Drink poorly, unable to drink
Heart rate	Normal	Normal to increased	Tachycardia, with bradycardia in most severe cases
Quality of pulses	Normal	Normal to decreased	Weak, thready, or impalpable
Breathing	Normal	Normal, fast	Deep
Eyes	Normal	Slightly sunken	Deeply sunken
Tears	Present	Decreased	Absent
Mouth and tongue	Moist	Dry	Parched
Skin fold	Instant recoil	Recoil in <2 s	Recoil in >2 s
Capillary refill	Normal	Prolonged	Prolonged, minimal
Extremities	Warm	Cool	Cold, mottled, cyanotic
Urine output	Normal to decreased	Decreased	Minimal

Adapted from Duggan et al<sup>13</sup> and World Health Organization.<sup>8</sup>

since medical school graduation, whether the practitioner worked in a community versus academic emergency medicine setting, and the annual emergency department (ED) census of pediatric patients. Specific pediatric training was defined as board certification in either pediatrics or PEM. The remainder of the survey consisted of questions specifically related to a clinical case vignette. The clinical scenario depicted a healthy 2-year-old boy presenting to the ED with 5 days of nonbilious emesis and nonbloody diarrhea secondary to acute viral gastroenteritis. Vital signs and physical examination were as follows: afebrile; heart rate, 120 beats/min; respiratory rate, 20 breaths/min; blood pressure, 90/60 mm Hg. The boy appears irritable, with sunken eyes, minimal tears, dry mucous membranes, capillary refill of 3 seconds, cool extremities, and a normal abdominal examination. The specific signs and symptoms of the child in the case scenario provided were designed by the authors to reflect a child with moderate dehydration based on the established guidelines in Table 1.<sup>13</sup> Respondents were asked to classify the patient's level of dehydration (normal, mild, moderate, severe), the most important factor in determining the patient's hydration level, the reason for hydrating the patient in the ED, and the route for initial fluid administration (oral, nasogastric [NG], IV, intraosseous). Respondents also answered questions regarding laboratory testing, use of an antiemetic agent, and initial fluid management (type of fluid, amount, period for fluid administration).

**Date Entry and Analysis**

Questions from the mailed surveys in which the respondents reported multiple answers instead of only 1 as requested were eliminated from the data analysis a priori. The online respondents were limited to only 1 answer per question as specified by the authors and as designed by the online survey program. The online surveys that were not fully completed were excluded from data analysis. Data were entered into an Excel spreadsheet and analyzed using SPSS<sup>14</sup> software. Categorical data were analyzed using the  $\chi^2$  test, Fisher exact test, and odds ratio (OR). Case-based questions were analyzed via descriptive analysis. Primary analysis was done comparing responses from respondents who had specific pediatric training to those who did not have specific pediatric training. Secondary analysis was conducted comparing responses from physicians in community versus academic

settings, physicians working in general EDs (GEDs) versus pediatric EDs (PEDs), comparison of annual pediatric census, physicians' positions (ie, full-time, part-time, etc) within the ED, and number of years since medical school graduation.

**RESULTS**

Of 2004 surveys sent to random members of ACEP, 772 (38.5%) responded. Of 772 surveys received, 18 were excluded: 1 had no demographic information, 7 treated only adult patients, 6 were no longer practicing emergency medicine, 2 were retired, and 2 had incomplete surveys. Of the 297 surveys received online from the PEM listserv with approximately 2100 registered members, 54 (18%) were not completed and therefore excluded. A total of 997 completed surveys were included in the data analysis: 754 from general emergency medicine physicians and 243 from PEM physicians.

Of 997 physicians who responded, 269 physicians were board certified in either pediatrics or PEM, which comprised the PT group; the remaining 728 respondents were designated the non-PT group for study purposes (Table 2). Of all the respondents, 675 (69%) were full-time attending physicians, 726 (73%) practiced in a GED, and 270 (27%) worked in a PED. Four hundred ninety (49%) self-reported an annual pediatric census of less than 15,000 per year; 293 (30%) between 15,000 and 30,000 per year; and 121 (12%) reported more than 51,000 per year.

**TABLE 2.** Respondents Specialty and Board Certification

Board Certification	
Specialty	No. (%)
Emergency medicine	752 (76)
Pediatrics	238 (24)
PEM	203 (20)
Internal medicine	59 (6)
Family medicine	26 (3)
Other	22 (2)
No certification	2 (0.2)

**TABLE 3.** Respondents Demographic Data

Demographic Data	No Pediatric Training (n = 728)	Pediatric Training* (n = 269)	Total (n = 997)
Primary pediatric setting	n = 997		
Academic PED	10 (1%)	201 (20%)	211 (21%)
Community PED	14 (1%)	45 (5%)	59 (6%)
Academic GED	166 (17%)	3 (0.03%)	169 (17%)
Community GED	537 (54%)	20 (2%)	557 (56%)
Annual pediatric census, patients/y	n = 994		
<15,000	464 (47%)	26 (3%)	490 (49%)
15,000–30,000	224 (23%)	69 (7%)	293 (29%)
31,000–50,000	30 (3%)	60 (6%)	90 (9%)
51,000–70,000	4 (0.04%)	68 (7%)	72 (7%)
>71,000	3 (0.03%)	46 (5%)	49 (5%)
Current position	n = 976		
Part-time attending	87 (9%)	38 (4%)	125 (13%)
Full-time attending	476 (49%)	199 (20%)	675 (69%)
Director of ED	148 (15%)	28 (3%)	176 (18%)
Postgraduate years	n = 996		
<5	6 (0.06%)	14 (1%)	20 (2%)
5–15	260 (26%)	146 (15%)	406 (41%)
>15	461 (46%)	109 (11%)	570 (57%)

\*Pediatric training defined as board certification in either pediatrics or PEM.

Five hundred seventy (57%) of the respondents had been practicing medicine for more than 15 years, and 406 (41%) between 5 and 15 years, as shown on Table 3.

When asked about the single most important factor in determining the patient's initial level of hydration, PT physicians selected clinical appearance (n = 212, 80%), vital signs (n = 19, 7%), urine output (n = 14, 5%), and established dehydration tables (n = 11, 4%) most frequently. Non-PT physicians chose clinical appearance (n = 605, 85%), followed by urine output (n = 55, 8%), mental status (n = 30, 4%), and vital signs (n = 14, 2%). Pediatrics-trained physicians classified the patient's level of dehydration as normal to mild (n = 7, 2%), moderate (n = 208, 79%), or severe (n = 49, 19%). Non-PT physicians classified the patient's level of dehydration as normal to mild (n = 29, 4%), moderate (n = 516, 71%), or severe (n = 178, 25%). Although a greater percentage of PT physicians correctly classified the patient as moderately dehydrated, the difference was

not significant ( $P = 0.063$ ) (Table 4). Both PT and non-PT physicians chose similar reasons for hydrating the patient in the ED. The most frequently selected responses were level of dehydration (78% PT group, 81% non-PT group), significant ongoing losses (8% PT group, 8% non-PT group), and failure of a fluid challenge (7% PT group 5% non-PT group).

Of 724 physicians who classified the clinical scenario patient as moderately dehydrated, 471 (65%) preferred to initially rehydrate the patient with IV fluids, 247 (34%) with oral fluids, and 5 (0.7%) via NG hydration. One respondent's data was incomplete. One hundred twenty-one PT physicians (58%) would initially hydrate the patient with IV fluids compared with 350 non-PT physicians (68%). Of the remaining 252 physicians who chose oral or NG rehydration, a larger percentage were PT (42%) versus non-PT (32%). Although physicians in both groups were more likely to choose IV hydration in this scenario, PT physicians were significantly more likely to initially choose oral

**TABLE 4.** Classification of Level of Dehydration as Chosen by Physicians Based on the Vignette Described in the Study

Respondents	Chosen Level of Dehydration			Total, n	P
	Normal-Mild, n (%)	Moderate, n (%)	Severe, n (%)		
Non-PT	36 (4)	724 (73)	227 (23)	987	0.063
Versus					
PT	29 (4)	516 (71)	178 (25)	699	0.151
Versus					
Community ED	7 (2)	208 (79)	49 (19)	288	0.200
Versus					
Academic ED	25 (4)	436 (71)	151 (25)	612	0.200
Versus					
GED	11 (3)	288 (77)	76 (20)	375	0.200
Versus					
PED	27 (4)	518 (72)	176 (24)	721	0.200
Versus					
PED	9 (3)	206 (77)	51 (19)	266	

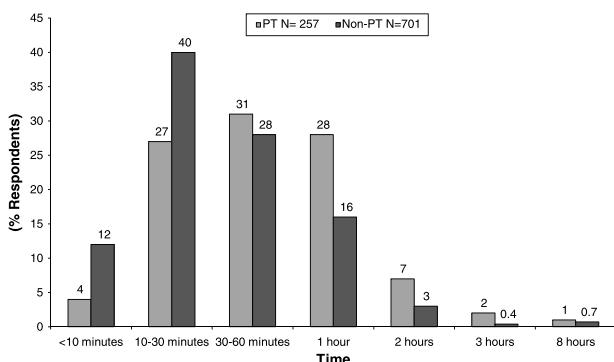
**TABLE 5.** Percentage of Physicians Who Chose to Administer an Antiemetic Agent in the Moderately Dehydrated Patient From the Vignette

Respondents	Use of Antiemetic Agent			P
	Yes, n (%)	No, n (%)	Total, n	
Non-PT physicians	575 (80)	148 (21)	723	0.004
Versus				
PT physicians	228 (86)	36 (14)	264	0.045
Community ED	504 (82)	109 (18)	613	
Versus				0.001
Academic ED	299 (80)	75 (20)	374	
GED	574 (79)	150 (21)	724	0.001
Versus				
PED	229 (87)	34 (13)	263	

or NG hydration compared with non-PT physicians ( $P = 0.0127$ ). Pediatrics-trained physicians were significantly less likely to obtain laboratory tests in this clinical scenario compared with the non-PT group (45% PT vs 66% non-PT;  $P < 0.0001$ ; OR, 0.42).

Of 227 physicians who classified the scenario patient as severely dehydrated, 202 (89%) preferred to initially rehydrate the patient with IV fluids, 21 (9%) with oral fluids, 2 (0.8%) via NG hydration, and 2 (0.8%) via intraosseous hydration. Forty-five PT physicians (92%) and 157 non-PT physicians (88%) would give IV fluids initially over oral or NG fluids ( $P = 0.527$ ). Both groups were likely to obtain laboratory tests (69% of PT group, 65% of non-PT group;  $P = 0.581$ ; OR, 1.2).

After the scenario patient failed an oral fluid challenge, physicians were questioned regarding use of an antiemetic agent. Physicians were more likely to administer an antiemetic agent if they practiced in a community versus academic setting ( $P = 0.045$ ), practiced in a PED versus GED ( $P = 0.001$ ), or were PT versus non-PT ( $P = 0.004$ ) as illustrated in Table 5. Ondansetron was the antiemetic agent of choice for 99% and 97% of PT and non-PT physicians, respectively. Ninety-six percent of PT physicians and 91% of non-PT physicians utilized hydration with 0.9% normal saline (NS) or lactated Ringer's solution. Ten (4%) of PT physicians compared with 61 (8.5%) of non-PT physicians chose other fluids such as fluids containing dextrose, 0.45% NS, or 0.225% NS. The majority of respondents in both the PT and non-PT groups would administer a 20-mL/kg bolus of IV fluids initially (n = 588, 83%, vs n = 184, 71%), respectively.



**FIGURE 1.** Time for IV fluid administration.

**TABLE 6.** Percentage of PT and Non-PT Physicians Who Chose to Perform Laboratory Tests in the Moderately Dehydrated Patient From the Vignette

Laboratory Study	PT	Non-PT	P	OR (95% CI)
	n = 265	n = 726		
Glucose	Yes, n (%)	Yes, n (%)	<0.001	0.63 (0.48–0.84)
Sodium	44	59	<0.001	0.56 (0.42–0.74)
Potassium	43	58	<0.001	0.54 (0.40–0.72)
Bicarbonate	45	60	<0.001	0.55 (0.41–0.73)
BUN/creatinine	40	58	<0.001	0.49 (0.36–0.65)
CBC	8	34	<0.001	0.17 (0.10–0.27)
Urine s.g.	14	29	<0.001	0.40 (0.27–0.59)

CBC indicates complete blood count; CI, confidence interval; urine s.g., urine specific gravity.

A larger percentage of PT physicians (n = 61, 24%) would initially administer a 40-mL/kg bolus of IV fluids compared with non-PT physician (n = 55, 8%). When asked to choose the amount of time over which they would administer the fluid bolus, most respondents selected time periods of 1 hour or less, as depicted in Figure 1.

Academic physicians, those working in a PED, and PT physicians were significantly less likely to obtain specific laboratory tests for the scenario patient. Community physicians, those working in a GED, and non-PT physicians were significantly more likely to perform laboratory studies, as shown in Tables 6 and 7.

**DISCUSSION**

Despite the existence of clinical guidelines published by the AAP, CDC, and World Health Organization on the management of pediatric patients with dehydration secondary to acute gastroenteritis, several studies published in the late 1990s and early 2000s demonstrated that both pediatricians<sup>9,15,16</sup> and emergency medicine physicians<sup>10,11</sup> had generally not incorporated

**TABLE 7.** OR for Physicians in the Following Groups Who Chose to Perform Laboratory Tests in the Moderately Dehydrated Patient From the Vignette

Laboratory Study	Academic ED vs Community ED	PED vs GED
	(n = 376, n = 616)	(n = 266, n = 726)
Glucose	OR (95% CI)	OR (95% CI)
Sodium	0.52 (0.40–0.68)	0.65 (0.49–0.86)
Potassium	0.48 (0.37–0.62)	0.59 (0.45–0.79)
Bicarbonate	0.48 (0.37–0.62)	0.58 (0.44–0.78)
BUN/creatinine	0.50 (0.38–0.65)	0.58 (0.44–0.77)
CBC	0.43 (0.33–0.55)	0.54 (0.41–0.72)
CBC	0.31 (0.22–0.43)	0.22 (0.15–0.34)
Urine s.g.	0.59 (0.43–0.81)	0.48 (0.33–0.70)

All P values are <0.003.

CBC indicates complete blood count; CI, confidence interval; urine s.g., urine specific gravity.

these recommendations into clinical practice. This survey study aimed to look at the most current practice among emergency physicians in the United States on the identification and management of pediatric dehydration secondary to acute gastroenteritis, with a focus on differences among physicians. Although there were some similarities in patient assessment and management between PT and non-PT emergency physicians, there were also several significant differences.

When asked about initial patient assessment, both groups were more likely to use clinical appearance as the most important factor in determining the patient's level of hydration. Pediatrics-trained physicians tended to use established dehydration tables and vital signs more often along with clinical appearance in their initial assessment of patients with dehydration. Although most respondents correctly identified the patient in the vignette as moderately dehydrated, a large number misclassified the patient as severely dehydrated or chose normal or mild dehydration. Although not statistically significant, more PT physicians correctly identified the patient as moderately dehydrated, and a larger percentage of non-PT physicians misclassified the patient as severely dehydrated. This suggests that there is still considerable variation among emergency physicians in their assessment and classification of pediatric patients with dehydration, possibly related to differences in training, exposure to pediatric patients, or other educational differences, such as, conferences, continuing medical education, and so on.

Of the respondents who classified the scenario patient as being moderately dehydrated, a large percentage of both PT and non-PT physicians preferred to initiate hydration with IV fluids rather than oral or NG fluids. This is contrary to established recommendations by the AAP and CDC, which recommends the use of ORT as first-line therapy in the management of pediatric patients with moderate dehydration from acute gastroenteritis.<sup>2,7</sup> Oral rehydration therapy has been shown to be as effective as IV rehydration for most children with mild to moderate dehydration and is more cost-effective.<sup>17-21</sup> Despite these recommendations, only 34% of all respondents chose to begin rehydration with oral fluids. Of the respondents who chose oral rehydration, a greater percentage were PT physicians versus non-PT physicians. This illustrates that ORT is still underutilized by emergency medicine physicians in an acute setting for the treatment of moderate dehydration. Proposed barriers to the use of ORT have been the belief that IV hydration is more effective, less time consuming, less labor intensive, and preferred by families and referring physicians,<sup>11</sup> as well as the misperception that ORT is contraindicated with vomiting.<sup>9,16</sup>

For the respondents who classified the patient as severely dehydrated, there were no statistically significant differences among all groups regarding mode of initial rehydration. The majority of physicians preferred to initially hydrate the patient with IV fluids, which is in accordance with both AAP and CDC recommendations. Interestingly, 9% of non-PT and 1% of PT physicians would initiate hydration with oral or NG fluids in this clinical scenario, in contrast to the AAP recommendations. Ozuah et al<sup>10</sup> noted a similar response rate from emergency medicine physicians in 2001, where 5% of physicians surveyed stated they would use ORT as the initial treatment for severe dehydration.

After the scenario patient "failed an oral fluid challenge," the majority of respondents chose to give an IV fluid bolus of NS or lactated Ringer's solution. Although most of the respondents chose to administer a 20-mL/kg bolus, a larger percentage of PT physicians compared with non-PT physicians would initially give a 40-mL/kg IV fluid bolus. More recently, the rapid administration of IV fluids to children with moderate dehydra-

tion from acute gastroenteritis has become an increasingly common practice by pediatric emergency physicians in the United States.<sup>11,22-24</sup> However, no standard method or consensus appears in the literature for "rapid IV hydration" for dehydrated children. Common practice involves the administration of an isotonic crystalloid solution without dextrose as an IV bolus followed by a continuous IV infusion of a dextrose-containing crystalloid solution if prolonged hydration is required. A small number of studies have looked at the effectiveness of early administration of IV dextrose to patients with dehydration from acute gastroenteritis<sup>25,26</sup>; however, there are no current recommendations for its routine use.

A number of studies have also looked at the utility of laboratory studies in the evaluation and management of pediatric patients with dehydration secondary to gastroenteritis. These studies have not shown a good correlation between specific laboratory values (electrolyte panels, bicarbonate, blood urea nitrogen [BUN], creatinine, glucose, urine specific gravity) and degree of dehydration.<sup>27-32</sup> Current AAP and CDC recommendations state that routine laboratory testing is unnecessary in pediatric patients with mild to moderate dehydration from gastroenteritis but is recommended in severe dehydration. Despite these recommendations, of the respondents who classified the scenario patient as moderately dehydrated, there were a large number of physicians who would obtain laboratory studies. For all laboratory studies, PT physicians were significantly less likely to procure laboratory tests compared with non-PT physicians.

The use of antiemetic drugs for children with nausea and vomiting associated with gastroenteritis was not evaluated in the 1996 AAP practice guidelines. However, by consensus opinion, the committee declared antiemetic drugs as "unnecessary."<sup>7</sup> Similarly, the 2003 CDC recommendations declared antiemetic drugs unnecessary, discouraging their use secondary to potential adverse events and unnecessary increased economic cost of illness. However, ondansetron, a serotonin antagonist, has been recognized as an effective drug in decreasing vomiting and limiting hospital admission.<sup>2</sup> In our study, the majority of physicians stated they would administer an antiemetic agent (ondansetron) for persistent vomiting. Several recent studies have similarly revealed that despite the discouraging nature of the guideline statements, physicians are commonly using antiemetic drugs in the management of children with gastroenteritis with promising outcomes and limited adverse reactions.<sup>33-38</sup>

This study illustrates that, despite existing recommendations on the management of moderately dehydrated pediatric patients from acute gastroenteritis, a large number of emergency physicians still do not incorporate these guidelines into clinical practice. Vague editorials in previous research have suggested that increased awareness of these guidelines via continuing medical educational programs for community pediatricians and medical staff, formal didactic sessions for physicians in training, and dissemination of physician and parental education materials would help decrease the discrepancy between established treatment guidelines and actual physician clinical practice. Although this study did not specifically look at the relationship between current physician treatment practices and awareness of established AAP or CDC recommendations, our assumption is that dedicated pediatric training should have afforded trainees such knowledge. The responses we received from current PT and non-PT emergency physicians illustrate that having dedicated pediatric training seems to increase the likelihood of adherence to these guidelines.

Recent national trends of increased ED overcrowding, limited staff resources, and increasing health care costs depict the need for increased adherence or reevaluation of the current

clinical practicality of these established guidelines. Additional research on the efficacy, safety, and cost-effectiveness of rapid IV hydration, as well as the use of early IV dextrose and antiemetic agents for dehydrated children, may be warranted. Although not studied specifically in the current study, future research may also include outcome analysis investigating educational collaboration between PT and non-PT emergency medicine physicians, perhaps via joint conferences, didactic sessions, and case-based discussions on current pediatric topics.

This study had several potential limitations. The study relied on self-reported data, which is a limitation of all self-completion surveys, and responses might not accurately reflect a practitioner's true clinical practice. The described vignette specified important clinical information, but clearly, physicians could not examine the patient or ask questions, thus possibly altering responses. In addition, we did not offer the opportunity for open-ended responses to questions and realize that there may be other potentially important considerations in management decisions. Furthermore, our survey was not validated in previous studies, which may have altered understanding and responses among test physicians. Although participants were randomly selected via several different national medical groups, these findings may not be representative of all emergency physicians. Lastly, we used existing guidelines as the "standard" for management purposes. It is conceivable that newer updated guidelines, if created, may align more closely with study physician responses.

Considerable variation exists among emergency physicians in their assessment and classification of pediatric patients with dehydration. Despite existing recommendations on the management of moderately dehydrated pediatric patients from acute gastroenteritis, a large number of emergency physicians do not incorporate these guidelines into clinical practice. Oral rehydration therapy is still underutilized by emergency medicine physicians in an acute setting for the treatment of moderate dehydration. Pediatrics-trained physicians tend to use ORT more frequently and obtain less laboratory tests than do non-PT physicians for pediatric patients with moderate dehydration. Having dedicated pediatric training seems to increase the likelihood of adherence to recommended guidelines that outline treatment approaches for pediatric patients with moderate dehydration secondary to acute gastroenteritis.

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