

# The Effect of Prior Interactions With a Primary Care Provider on Nonurgent Pediatric Emergency Department Use

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**Objective:** To determine the effect of parental reported difficulty getting care without long waits from a primary care provider (PCP) on nonurgent pediatric emergency department (ED) use.

**Design:** Case-control study.

**Setting:** Pediatric ED within an urban pediatric hospital.

**Participants:** Children, aged 6 months to 12 years, who presented with a chief complaint from a predetermined list of nonurgent (cases) or emergent complaints (controls).

**Main Outcome Measures:** Caregivers assessed interactions with a PCP during the previous 12 months by completion of a Consumer Assessment of Health Plans (CAHPS) survey. Baseline demographic variables were compared. Composite CAHPS scores assessing difficulty meeting medical needs, including getting care without long waits, were compared using median tests. Mul-

tivariate logistic regression was used to assess the effect of getting care without long waits on nonurgent ED use.

**Results:** Of 821 caregivers approached, 719 (87.6%) completed the survey, including 366 cases (50.9%) and 353 controls (49.1%). Those with emergent complaints were older, healthier, and more likely to be male; had higher caregiver education and income levels; and were more likely to have a PCP. Analysis of the CAHPS composite scores revealed increased difficulty meeting medical needs for those with nonurgent complaints, with the greatest difference noted for getting care without long waits (median score, 3.25 vs 3.67;  $P < .001$ ). In multivariate regression, increased ability to get care without long waits was associated with decreased odds of nonurgent ED use (odds ratio, 0.48; 95% confidence interval, 0.32-0.72).

**Conclusion:** Parental-reported previous difficulty getting care without long waits from a PCP is a risk factor for nonurgent ED use.

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**T**HERE WERE 108 MILLION VISITS to emergency departments (EDs) in the United States in 2001, an increase of 20% over the last 9 years.

Twenty-two million of these visits were by children younger than 15 years.<sup>1</sup> These high volumes have resulted in overcrowding, adverse events secondary to delays in care, and patients leaving the ED because of prolonged waiting times.<sup>2-4</sup> Many of these ED visits could have been managed in a primary care provider's (PCP's) office,<sup>5-7</sup> but we hypothesize that as a result of a breakdown in the family's primary care network, the child's unmet medical needs resulted in ED care.

One goal of the American Academy of Pediatrics is that all children develop a strong relationship with a PCP. Such a relationship creates a medical home by providing the child with a PCP and a place where the family knows the responsibility for coordinating and maintaining their child's health care is welcomed.<sup>8</sup> This second aspect of a medical home has not been

addressed in previous studies of ED use, in large part because it has been difficult to measure the experiences families have with their PCP.

The Consumer Assessment of Health Plans (CAHPS) survey provides a validated<sup>9</sup> tool to measure a family's experiences in receiving the care it needs. Through parental report, the survey assesses the levels of difficulty experienced during the past 12 months in receiving medical care, and receiving medical care without long waits for a child. Although family and demographic characteristics, including age,<sup>10,11</sup> race/ethnicity,<sup>12-14</sup> education level, and poor health status,<sup>12,15,16</sup> have all been associated with increased ED use, we sought to determine the association between difficulty fulfilling medical needs and nonurgent pediatric ED use.

We hypothesize that children presenting to the ED with nonurgent complaints would report decreased ability to meet medical needs from a PCP, especially when evaluating the ability to get care without long waits.

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## STUDY DESIGN

This project used a case-control design to evaluate nonurgent ED use. Children were selected on arrival in the ED on the basis of the outcomes of interest, with cases defined as those children who presented to the ED with a nonurgent chief complaint that could normally be cared for in a PCP's office. The control or comparison group consisted of those children who presented to the ED with complaints that would normally require emergency care. The exposure variable or risk factor of interest was the parental report of difficulty getting care without long waits during the past 12 months, as measured by the CAHPS survey.

The selection of our control group was based on the need to select a group of children who would use our ED for necessary care and for whom the visit was unrelated to parental assessment of the child's unmet medical needs. We believe that children with emergent complaints would seek care in the ED regardless of their assessment of primary care, therefore representing the range of CAHPS scores for our ED patients.

We derived diagnostic lists of nonurgent and emergent complaints from a combination of previously published guidelines<sup>17</sup> and our institutional guidelines for triage to urgent care developed by an expert panel of nurses, general pediatricians, and emergency medicine physicians. For the purpose of this study, these lists are somewhat restrictive, and numerous children did not fit into either category. For example, any child with a fever or history of chronic pulmonary disease, for which a nonurgent chief complaint could represent more severe disease, was excluded from either group in the study. Nonurgent complaints included pharyngitis without difficulty swallowing or breathing, runny nose, cough, nonbloody diarrhea, rash for longer than 2 days (eg, diaper rash, ringworm, or tinea capitis), mild ear pain, insect bite, chronic constipation, thrush, vomiting and diarrhea with normal urination, and nosebleeds of less than 10 minutes' duration. Emergent complaints included fracture with deformity, laceration requiring repair, new-onset seizure, motor vehicle crash with arrival in the ED by ambulance, altered mental status, head trauma with loss of consciousness or vomiting, anaphylaxis, foreign body aspiration, loss of vision, and cyanosis.

## STUDY PARTICIPANTS

The CAHPS survey was completed by the caregivers of children, aged 6 months to 12 years, who presented to the ED of a single children's hospital for care between 8 AM and midnight Monday through Thursday and between 8 AM and noon on Friday. Our ED policy is to treat all children who present for care, regardless of the chief complaint, so no child was turned away at triage. Enrollment occurred on eligible days from January 7 through December 27, 2002, to account for any seasonal variation in the ED population and PCP availability. There were 20 additional days scattered throughout the year on which enrollment was not possible secondary to staffing difficulties, leaving 200 days for possible enrollment. The group aged 6 months to 12 years was selected because of the need to assess a minimum of 6 months of previous provider contact, and the validation of the child CAHPS survey to 12 years of age.<sup>9</sup> The limited hours for enrollment stem from definitions of nonurgent problems as those conditions that would not result in further harm to the patient with a delay of 24 hours for care. We therefore excluded children presenting from Friday noon through Sunday, as they might have had increased difficulty accessing primary care in the next 24 hours. Weekday holidays were treated as Saturdays for the purpose of enrollment eligibility.

The number of eligible survey days was selected on the basis of a power calculation requiring 800 children be approached, with an 80% participation rate, yielding 640 completed surveys (320 for each group). Assuming an SD of 25% in the baseline score<sup>18</sup> and an  $\alpha$  of .05, this would provide 80% power to detect a minimum difference of 10% between the 2 subgroups, ie, presence (estimated to be 80% of each group) or absence of a PCP. In addition, this sample size would provide 86% power, assuming an  $\alpha$  of .05, to detect a difference of 6% or more between the 2 groups of children with nonurgent and emergent complaints.

## ENROLLMENT

A trained research assistant provided the caregivers for each eligible child the survey questions in the ED, with Spanish translation as required. All surveys were completed anonymously, recorded with an identification number only. The names of the child, caregiver, and PCP were not recorded. Assistance completing the survey was offered at the time of consent. Survey completion time was estimated at 15 minutes.

Families were identified when they arrived for triage on the basis of the age of the child and the list of inclusion complaints. The triage desk was selected as the initial point of identification in an effort to reduce the selection bias that could be introduced by differential willingness to wait for prolonged periods in families who perceive their child as having a less serious condition. The triage process was not affected by study participation, but a research assistant was notified after triage. In addition, the research assistants reviewed the ED charts of children already in rooms or put immediately into rooms in an effort to identify children not identified at triage and those rapidly triaged and requiring emergent care. The caregivers who consented to participate completed the survey during their stay in the ED and returned it to the research assistant before discharge. The protocol was approved by the institutional review board of the hospital.

## DATA ANALYSIS

Completed CAHPS surveys were scanned using Teleforms version 8.0 software (Cardiff Software, Inc, Vista, Calif) and exported into an SPSS database (release 11.5, 2002; SPSS Inc, Chicago, Ill). The 51-question CAHPS survey includes demographic information about the child and caregiver, an assessment of the child's overall health status (parental rating of child's health on a 1- to 5-point scale, with 1 indicating excellent health and 5, poor health), and information about the presence of a PCP. The PCP is defined as a single person whom the caregiver perceives as the child's personal health care provider. If no single PCP is identified, the survey responses are then based on the provider that the child sees most frequently. No information about insurance type or details of the provider site are asked as part of the CAHPS survey, and are therefore not part of the analysis.

Further questions are used to generate CAHPS composite scores assessing the family's difficulty getting needed care, getting care without long waits, communicating with their PCP, and getting help from the office staff. The questions making up these composite scores are described in the CAHPS survey and reporting kit<sup>19</sup>; those making up the composite score for getting care without long waits are also shown in **Table 1**. Questions for the composite score for getting needed care are scored on a 1- to 3-point Likert scale. All other composites are scored on a 1- to 4-point Likert scale. Composite scores are generated by averaging the scores of answered questions within each composite category. Higher scores for a given composite indicate less difficulty meeting medical needs as reported by the caregiver. In addition to the standard CAHPS questions, we added a single question requesting the caregiver's ZIP code as an estimate of socioeconomic status.

**Table 1. Questions Included in the Composite Score for Getting Care Without Long Waits\***

1. In the past 12 months, when you called during regular office hours, how often did you get the help or advice you needed for your child?
2. In the past 12 months, how often did your child get an appointment for regular or routine health care as soon as you wanted?
3. In the past 12 months, when your child needed care right away for an illness or injury, how often did your child get care as soon as you wanted?
4. In the past 12 months, how often did your child wait in the physician's office more than 15 minutes past the appointment time to see the person your child went to see?

\*Composite scores are derived from the Consumer Assessment of Health Plans survey. All questions are scored on a 1- to 4-point Likert scale, with 1 indicating never and 4, always.

**Table 2. Group Characteristics\***

Characteristic	Nonurgent Cases	Emergent Controls
Age, median, y	2.0	4.0
% Female	49.4	38.5
Household income, median, \$	32 980	42 189
Child health rated as excellent or very good, %†	56.2	86.8
% Non-Hispanic white	31.6	63.5
Caretaker completed schooling beyond high school/GED, %	48.9	70.6
Absence of a primary care provider, %	27.4	10.7

Abbreviation: GED, General Educational Development.

\*For each characteristic, the difference between nonurgent cases and emergent controls was significant at  $P < .001$ .

†Indicates 1 or 2 on a 6-point scale.

Comparisons of group characteristics were analyzed using Mann-Whitney tests. To account for the skewed distributions, composite scores between the 2 groups were compared using the 2-sample Kolmogorov-Smirnov test for differences in distribution and location (median). Logistic regression was performed to assess the effect of parental reported difficulty meeting medical needs on nonurgent use of the ED, after controlling for other factors that are present in the CAHPS that have been shown to affect ED use (age, race/ethnicity, health status, and parental education). All 4 composites were entered as independent main effects in the model. Variables included in the regression were the race and age of the child, socioeconomic status as determined by ZIP code, parental level of education, existence of a PCP, and child health status. Education level was entered into the final regression, with those who had at least 4 years of college constituting the referent group. The education variable was collapsed into 2 categories, because it had a dichotomous univariate relationship with ED use. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were calculated for each of the independent variables. Statistical significance of model terms was determined by means of the Wald test, with an a priori significance level of  $P < .05$  specified.

As a validation technique, because some of the data were missing for each covariate (24% of surveys had  $\geq 1$  missing variable), the logistic regression was then repeated, imputing missing values on the basis of the sex and race/ethnicity of the child. An a priori difference of 1 SE was set as a cutoff for reporting the imputed regression coefficients. As imputation did not al-

ter any ORs by our cutoff amount, the results of the survey data without imputation are reported.

## RESULTS

Of the 821 families who were approached, 719 (87.6%) consented to participate in the study and completed the survey. The 821 children constituted approximately 10% of those with any diagnosis who underwent evaluation in the ED on eligible study days. Those who completed the survey included 366 cases (50.9%) and 353 controls (49.1%). The number of refusals was similar between the 2 groups (13.3% of cases and 11.5% of controls). There was no difference between the 2 groups with respect to the season of the year at presentation. Those children with nonurgent complaints, however, were more likely to present between 8 AM and noon than those with emergent complaints (40.4% and 19.0%, respectively). Conversely, children with emergent conditions were more likely to present between 4 PM and midnight (48.3% for controls vs 24.1% for cases).

Univariate analysis of group characteristics yielded significant differences between groups. Those with emergent complaints were older, rated as healthier, and more likely to be male; had higher caregiver education and income levels; and were more likely to have a PCP (**Table 2**). The race/ethnicity composition for the children with emergent complaints (63.5% non-Hispanic white) was similar to that of Milwaukee County, Wisconsin (65% non-Hispanic white). Minorities were overrepresented among those children with nonurgent complaints (31.6% non-Hispanic white) compared with the overall Milwaukee County population and the total ED population (45.8% non-Hispanic white).

Analysis of CAHPS composite scores, with a higher score representing increased ability to obtain care, revealed significant differences in the ability to meet medical needs (**Table 3**). The largest difference was noted for those questions related to getting care without long waits; however, all composites revealed significantly more difficulty meeting medical needs for children who presented with nonurgent medical conditions. The distribution of the composite scores for getting care without long waits is shown in the **Figure**.

Regression analysis was performed to examine the effect of difficulty getting care without long waits on nonurgent ED use. The odds of presenting with a nonurgent complaint were significantly lower for those who reported less difficulty getting care without long waits (OR, 0.48; 95% CI, 0.32-0.72). None of the other composite scores remained significant in the model. Other factors associated with increased odds of presenting with a nonurgent complaint were younger age, female sex, minority race/ethnicity, poor health status, and decreased education (**Table 4**). The absence of a PCP was no longer significantly associated with nonurgent ED use in the regression model (OR, 1.78; 95% CI, 0.96-3.31). Although there was no significant change in the OR for absence of a PCP with imputed missing values, the variable became statistically significant (OR, 1.89; 95% CI, 1.10-3.29). No other significant differences were observed in the imputed analysis.

**Table 3. Comparison of CAHPS Survey Composite Scores\***

Composite Item	Nonurgent Cases	Emergent Controls
Getting care without long waits†		
Median score	3.25	3.67
Less than 0.75 of maximum, %	35.0	13.2
Greater than 0.90 of maximum, %	31.8	50.8
Physician communication‡		
Median score	3.63	4.00
Less than 0.75 of maximum, %	19.3	7.7
Greater than 0.90 of maximum, %	55.4	65.5
Office staff‡		
Median score	4.00	4.00
Less than 0.75 of maximum, %	16.7	5.3
Greater than 0.90 of maximum, %	52.3	69.6
Getting needed care‡		
Median score	3.00	3.00
Less than 0.75 of maximum, %	8.6	3.7
Greater than 0.90 of maximum, %	72.2	87.1

Abbreviation: CAHPS, Consumer Assessment of Health Plans.

\*For each composite item, the difference between nonurgent cases and emergent controls was significant at  $P < .001$ . Data were analyzed using the Kolmogorov-Smirnov test for distribution of data.

†Maximum score was 4.  
‡Maximum score was 3.

### COMMENT

The results of our study suggest that parental report of previous difficulty receiving medical care from a PCP is associated with nonurgent ED use. In particular, increased difficulty obtaining care from a PCP without long waits doubled the odds of presenting with a nonurgent complaint.

Our analyses of the demographic characteristics that are associated with ED use are consistent with previous studies. Those studies have also shown that younger age,<sup>10,11</sup> race/ethnicity other than non-Hispanic white,<sup>12-14</sup> poor health status<sup>12,15,16</sup> for the child, and less parental education are all associated with increased ED use. Male sex<sup>14,20</sup> has been shown to be associated with ED visits for trauma, which is consistent with their being overrepresented in our group with emergent complaints. Similar to other studies, the effect of income<sup>10</sup> was less predictive when the presence of a PCP was included in the model.

Comparison of the composite score for getting care without long waits between the 2 groups revealed a 13% higher median score for those with emergent complaints. This difference is of similar magnitude to the reported differences between adult and child ability to get care without long waits and larger than the differences for all other composites, as reported in a study analyzing the National CAHPS Benchmarking Database.<sup>18</sup>

Our study controlled for those demographic factors known to affect ED use and found that previous long waits for care from a PCP increased the odds of nonurgent ED use. By having the other composite scores in the model, we have also shown that the association between nonurgent ED use and ability to get care without long waits does not simply represent survey responses from a population with a propensity to score a PCP less favorably.

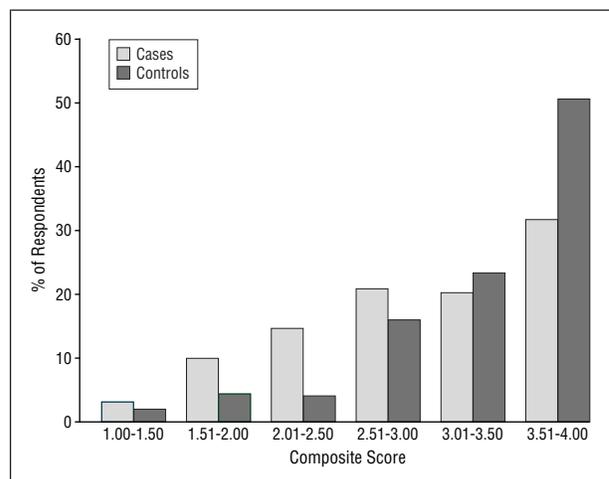
**Table 4. Logistic Regression Assessing Nonurgent ED Use**

Variable	OR (95% CI)
Composite item	
Care without long wait	0.48 (0.32-0.72)*
Office staff	1.22 (0.78-1.93)
Getting care	0.97 (0.47-2.01)
Physician communication	0.99 (0.61-1.62)
Age, increasing per year	0.83 (0.78-0.89)*
Female sex	1.59 (1.05-2.39)†
Race other than non-Hispanic white	1.63 (1.01-2.63)†
Improving health status	0.48 (0.38-0.62)*
Absence of a primary care provider	1.78 (0.96-3.31)
Family income per \$10 000	0.87 (0.74-1.04)
Caregiver education $\geq 4$ y of college	0.55 (0.34-0.91)†

Abbreviations: CI, confidence interval; ED, emergency department; OR, odds ratio.

\* $P < .001$ .

† $P < .05$ .



Comparison of composite scores for getting care without a long wait on the Consumer Assessment of Health Plans survey. A score of 4 indicates always able to get care without a long wait.

The lack of an association between the absence of a PCP and nonurgent ED use in this study suggests that previous interactions with a PCP may be more important in determining nonurgent ED use than the simple measurement of whether a provider exists. Specifically, parental reported difficulty getting care without long waits is a better predictor of nonurgent ED use than the absence of a PCP.

We made no attempt to classify visits as appropriate or inappropriate for this study. Our definition of nonurgent visits as those that would result in no further harm with a delay in care of 24 hours presupposes that subsequent care would be available sometime in the next 24 hours. If past perceived difficulty obtaining timely medical care has taught a family that care will not be available quickly, then an ED visit cannot be deemed inappropriate.

Some limitations to our study need to be addressed. First, as with all surveys, caregivers might not have answered all questions honestly. We do not believe this to be a problem in our study, as all answers were anonymous, and the names of the child/parent and provider were not recorded on the survey. In addition, those

who refused to complete the survey may somehow be different from those who consented to participate, therefore biasing the study results. With an almost 90% completion rate in both groups, however, we do not believe that this represents a large potential source of bias. The ZIP code information may also not be an accurate reflection of the individual's socioeconomic status. In addition, residual confounding is always a possibility; however, it is clear that there is an effect seen for getting care without long waits that is distinct from the other composites with regard to its association with nonurgent ED use.

Finally, the number of diagnoses included in the study was somewhat limited. This ensured the accuracy of classification into groups, but limited the generalizability to conditions not included in this analysis. The study population constituted only 10% of children seen on the eligible study days. We hypothesize that the "middle group" of children with urgent complaints would have CAHPS scores between those of the 2 groups in our study. These urgent complaints represent a heterogeneous set of complaints, some more amenable to primary care intervention than others, therefore resulting in intermediate CAHPS scores. An alternative design to study the relationship between unmet medical needs and ED use would be a prospective cohort. Although it is a more powerful design, such a study would be more difficult to perform owing to cost and bias arising from enrolling children currently being seen in a PCP's office, having successfully made an appointment. In this initial study evaluating the relationship between ED use and parental assessment of unmet medical needs, the case-control design was thought to be sufficiently informative to provide data for further study of this relationship.

In an effort to determine barriers to getting care without long waits, we are investigating how office characteristics, including office hours, patient-physician ratios, and call frequency, may affect ED use. This information could lead to interventions aimed at increasing a family's ability to get needed care without long waits and optimize ED use.

## CONCLUSIONS

Difficulty obtaining medical care without long waits is associated with nonurgent pediatric ED use. Efforts to optimize ED use should focus on actual and perceived barriers to obtaining needed care in a timely fashion from a family's usual source of primary care. In addition, we have shown that the CAHPS survey is a potentially valuable tool to assess ED use and its association with the ability to receive care from a PCP. Future studies are planned to assess the effect of an inability to obtain medical care from a PCP for a wider variety of complaints.

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## What This Study Adds

Previous studies investigating pediatric ED use have focused on the demographic characteristics of children and families to explain differential use. The effect of the relationship between the family and PCP on ED use has been largely unexplored.

This study used a validated measure, the Consumer Assessment of Health Plans (CAHPS) survey, to show that difficulty meeting medical needs from a PCP is associated with nonurgent ED use. The finding of an association between parental reported difficulty getting care without long waits from a PCP and nonurgent ED use provides evidence not only of a new risk factor for ED use but also that the CAHPS measure can be used to assess parental level of unmet needs and its relationship to ED use.

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