

Emergency department visits by urban African American children with asthma

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Background: Asthma morbidity among African American children has been identified as a significant national health concern. High emergency department use is one index of this morbidity and may reflect disease severity, disease management, and social factors.

Objective: This study examined the prevalence and correlates of emergency department use and other indices of asthma morbidity among a sample of urban, low-income, African American children.

Methods: Parents of 392 elementary school children with asthma who had consented to participate in an asthma education program were interviewed by phone according to a standardized protocol.

Results: Children had a mean of 6.2 days of restricted activity (SD 8.1) and 7.9 symptomatic nights (SD 8.1). The mean number of school days missed because of asthma was 9.7 (SD 13.5). Among children with asthma symptoms in the past 12 months, 73.2% could identify a specific physician or nurse who provided asthma care. For those families without an identified asthma primary care provider, 39.3% received their usual asthma care from the emergency department. A total of 43.6% of the children had been to the emergency department for asthma care without hospitalization in the previous 6 months. Close to 80% of children reported using one or more prescribed asthma medication, and of these only 12% reported using inhaled anti-inflammatory medications. Families of children who had used the emergency department in the prior 6 months reported more asthma symptoms, lower social support, problems paying for health care, and the absence of a hypoallergenic mattress cover and that they had seen a physician for regular asthma care in the past 6 months.

Conclusions: We conclude that asthma management for children in the inner city relies on episodic care and emergency care, that asthma medication management does not conform to current guidelines, and that asthma symptoms resulting in school absences and workdays lost are prevalent. (*J Allergy Clin Immunol* 2000;105:83-90.)

Key words: Asthma, minority, emergency department, school absences, African American children

Abbreviations used

ED: Emergency department
OR: Odds ratio

Asthma is the most common chronic disease of childhood, with asthma exacerbations and wheezing resulting in more than 2 million visits per year to pediatricians.¹ The direct and indirect costs associated with asthma in the United States have been reported to exceed \$6 billion a year.² Morbidity and mortality is disproportionately high for African American children, with hospitalization rates for children less than 5 years old almost triple that of white children.³

In 1978 to 1979 Mak et al⁴ surveyed 2898 families of elementary school children in inner-city Baltimore to determine the prevalence of asthma and to examine the pattern of primary care and emergency department (ED) use in children with asthma. This study documented the higher prevalence of asthma among African American children (1.5 times that of whites), the frequency of school absenteeism attributed to asthma (close to 50% of children missing 6 or more days because of asthma), and most notably the very high use of the ED as the primary source of asthma care. Mak et al reported that nearly 50% of the children surveyed who had active asthma received their asthma care from the ED and that 58% of these children reported 1 or more ED visits for asthma in the previous 6 months. By sixth grade 40% of the children had been hospitalized at least once for asthma.

In the years since Mak et al published their study, considerable attention has been focused on this excess morbidity among urban African American children.⁵⁻⁸ The increased availability of inhaled anti-inflammatory medications and the recognition of asthma primary care and education as critical parts of effective asthma management have changed medical practice. Reflecting this changing knowledge base, the National Heart, Lung, and Blood Institute issued practice guidelines for asthma as part of the National Asthma Education Program in 1991.⁹ That same year, as part of an inner-city asthma education program, this study surveyed families of children with asthma attending elementary schools in both Baltimore, Md, and Washington, DC, 12 years after Mak et al conducted their survey. Using populations similar to those in the study of Mak et al, we examined the prevalence of reported ED use by urban African American children with asthma enrolled in this inner-city asthma study. In

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addition, we examined the baseline demographic, economic, asthma health, environmental, and social variables associated with increased asthma school absences and ED care for asthma.

METHODS

Sample identification

Forty-two elementary schools in urban Baltimore, Md, and Washington, DC (21 Baltimore, 21 Washington), were selected for this study according to the following selection criteria: (1) African American population >85% of student body, (2) >350 students enrolled, and (3) administrative consent to participate in an asthma education program. Families of children with asthma identified by review of school emergency health cards (required for all students) were invited by mail and phone to participate in an asthma education study. Families providing informed consent were enrolled in the study. The Institutional Review Board of the Johns Hopkins Institutions and the school boards of the participating cities approved this study.

Baseline survey procedures

Families providing consent to participate were called at home over a 4-week period in 1992 by trained phone surveyors. Families without telephones or those who could not be reached were mailed a card with a toll-free number for the survey company and were offered a \$20 incentive to call in and complete the survey. Phone interviews performed according to a standardized protocol were conducted with the enrolled child's primary caretaker (before participation in the asthma education study) and averaged approximately 20 to 25 minutes.

Baseline survey instrument

A 170-item questionnaire included questions about asthma diagnosis; source of regular asthma care; asthma symptoms; social, behavioral and demographic factors; school absences; hospitalizations; and ED use. Social support was measured with an 11-item subset of the 14-item Duke–University of North Carolina Functional Social Support Scale,¹⁰ a scale of perceived availability and adequacy of instrumental support and affectionate relationships. This Likert-type scale asks participants questions in 4 content areas: quantity of support, confidant support, affective support, and instrumental support. The original 14-item scale demonstrated test-retest reliability of 0.66 and average item remainder correlations of affective support and confidant support of 0.64 and 0.62, respectively. Internal consistency analysis of the shortened scale yielded a Cronbach's α of .85. A composite index of asthma symptoms (Asthma Symptom Index) that has been described elsewhere¹¹ was calculated for each child on the basis of parental reports of numbers of days of restricted activity and number of nights with asthma symptoms over the past 6 months. Higher index scores reflect more frequent symptoms. Concurrent validity of this index was confirmed by examining the association of this index with other index values of asthma severity. The Asthma Symptom Index was significantly associated with the number of school days missed ($F = 5.09$, degrees of freedom 2, $P < .01$), ED visits ($F = 11.4$, degrees of freedom 2, $P = .0001$), and parental global rating of asthma severity (chi-square 45.5, degrees of freedom 8, $P < .001$).

Statistical analyses

After initial descriptive statistics were examined, a series of chi-square analyses were conducted to compare the characteristics of children who had visited the ED for asthma care in the past 6 months compared with those who had not. ANOVAs and t tests were performed to compare the mean number of asthma-related

school days absent by each demographic, economic, asthma health, and social variable. Because of the exploratory nature of these analyses, we present here significant observations without correction for multiple comparisons (ie, Bonferroni correction); thus the increased risk of a type I error should be recognized.

Logistic regression was used to identify which baseline variables were significantly related to ED use. Multiple regression analysis was used to identify baseline predictors of school absences. Candidate predictor variables included in the regression analyses were selected to reflect the following domains: (1) demographic (age, sex, parental education), (2) economic (maternal working status, problems paying for health care, health insurance/medical assistance status), (3) asthma health (asthma symptom index, asthma medications, asthma primary care), (4) environmental (pets, smoking, mattress cover), and (5) social (presence of father in home, Duke Social Support score). For logistic regression, odds ratios and corresponding 95% confidence intervals are presented for those predictors that remained in the model at the 0.05 significance level. SAS version 6.07 (SAS Institute, Cary, NC) was used to conduct all analyses.¹²

RESULTS

Identification and enrollment of children with asthma

Review of health emergency cards in Baltimore identified 777 (10.8%) children of 7162 whose parents reported that their children had asthma and 782 (7.4%) children of 10,538 in Washington, DC. Of these 1559 identified children with asthma, 508 (32.6%) families expressed interest in participating and were enrolled into the study after providing informed consent.

Questionnaires were completed for 420 (82.7%) of enrolled participants, and of these 137 (32.6%) used the toll-free number and were paid a \$20 incentive. The primary caretaker respondent was identified as the child's mother for 86.5% of the sample and the grandmother for 6.9%. Of this sample, 397 (95%) reported that the enrolled child had physician-diagnosed asthma and 392 (93.3%) caretakers reported both physician-diagnosed asthma and the presence of asthma symptoms (ie, wheezing, coughing, chest tightness, shortness of breath) within the past 12 months. Only those children with physician-confirmed symptomatic asthma were included in the following analyses.

Baseline demographic characteristics

Ninety-seven percent of the children were African American, 2% were white, and 1% were of other ethnicity. Fifty-eight percent were boys and 42% were girls. The mean age was 8.3 years (SD 2.0 years). Twenty-nine percent of these children had a sibling with asthma in the home and 13.8% had a mother with asthma. More than two thirds of the primary caretakers reported finishing high school (69.4%) and 43.1% were employed full time. Only 19% of the families had fathers living in the household and close to 40% of these families were receiving medical assistance.

Asthma primary care

Among these children with asthma symptoms in the past 12 months, 73.2% could identify a specific physi-

TABLE I. Asthma medication usage in urban African American children (n = 392)

Variable	Percent	No.
No asthma medication	15.6	61
Nonprescribed asthma medication only (Primatene mist, cough medicine, decongestants)	4.3	17
Prescribed asthma medicine*	80.1	314
β-Agonist only	42.7	134
Theophylline only	10.8	34
β-Agonist and theophylline	27.7	87
Cromolyn sodium (Intal) (alone or in combination)	8.0	25
Inhaled steroids (alone or in combination)	3.5	11
Oral steroids (alone or in combination)	7.3	23

*Percent of those children prescribed asthma medication (n = 314).

cian or nurse who provided asthma care. For those families without an identified asthma primary care provider, 39.3% received their usual asthma care from the ED and 53% received care at a clinic facility. Sixty-five percent of all families reported receiving some form of regular nonemergency asthma care within the previous 6 months.

Among those with an identified primary caretaker, 29.4% reported that they received care only for an emergency and 16.1% received care only once a year. Children with no medical care coverage were significantly less likely to identify a primary care provider than were those children with medical coverage (private insurance, health maintenance organization, medical assistance) (51.2% vs 80.5%, chi-square 15.4, degrees of freedom 2, $P = .001$) and far more likely to receive only emergency care (51.2% vs 35.8%, chi-square 15.8, degrees of freedom 2, $P = .001$) than were children with medical coverage.

Asthma medications

Close to 80% of children reported using one or more prescribed asthma medication, 4.3% reported using only over-the-counter medications to treat asthma symptoms (eg, Primatene Mist, cough medicines, decongestants), and 15.6% reported taking no medications (Table I). Of the children taking prescribed medications, 43% were using a β-agonist only (inhaled or oral), 28% were using a β-agonist combined with theophylline, 11% reported using theophylline only, 8% reported using cromolyn sodium (Intal) (alone or in combination with other asthma medications), and 4% reported using inhaled steroids (alone or in combination with other asthma medications). Twenty-three children (7%) were taking oral steroids at the time of the baseline interview.

Asthma morbidity: Symptoms, ED use, hospitalizations, and school absences

Children had a mean of 6.2 days of restricted activity (SD 8.1 days) and 7.9 symptomatic nights (SD 8.1 nights) attributable to asthma during the month before the survey date (Table II). Fourteen percent of the chil-

TABLE II. Index values of asthma morbidity in urban African American children (n = 392)

	Mean (SD)	Range (%)
No. of days with cough, wheeze, or shortness of breath in past month	6.2 (8.1)	None = 41.7 1-7 = 20.7 8-14 = 23.8 ≥15 = 13.8
No. of nights with cough, wheeze, or shortness of breath in past month	7.9 (8.1)	None = 24.3 1-7 = 24.5 8-14 = 34.8 ≥15 = 16.4
No. of ED visits in past 6 months	1.0 (1.7)	0 = 56.4 1 = 17.9 2-3 = 17.9 ≥4 = 7.9
No. of school days missed in last school year	9.8 (13.5)	0 = 14.2 1-5 = 37.9 6-19 = 33.3 ≥20 = 14.7
No. of work days missed by parent because of asthma in last year (n = 291)*	2.1 (3.0)	0 = 48.1 1-2 = 21.3 3-4 = 13.4 ≥5 = 17.2

*One hundred one parents did not work outside the home.

dren had 15 or more restricted activity days. The mean number of school days missed because of asthma over the past school year was 9.7 (SD 13.5 days) with 14.4% reporting no absences, 37.5% with 1 to 5 absences, 33% with 6 to 19 asthma absences, and 15.2% more than 19 absences. Parents reported missing a mean of 2.1 work days (SD 3.0 days) in the past year attributable to the child's asthma. A total of 43.6% of the children had been to the ED for asthma care without hospitalization in the previous 6 months. In the 6 months before the survey, 18.3% of the children had visited the ED for asthma without hospitalization once, 17.8% had made 2 to 3 visits, and 2.9% had made 4 or more visits. Sixteen percent of the children had received asthma care in an ED in their lifetime 18 or more times, with 5% of families reporting more than 40 visits. In the previous 6 months, 7.1% reported having been hospitalized overnight for asthma. Forty-three percent of all children had been hospitalized overnight for asthma at least once in their lives. Forty-six percent of those children with an identified primary care provider had been hospitalized in the past compared with 35% of those without a primary care provider (chi-square 3.50, degrees of freedom 1, $P = .06$). Of those children who only sought asthma care for an emergency, 39.7% had been hospitalized in the past compared with 44.7% for those who received regular asthma care at least once a year (chi-square .905, degrees of freedom 1, $P > .10$). Children receiving medical assistance were not hospitalized significantly more than those with private insurance or those in a health maintenance organization (47.7% vs 39.1%, chi-square 2.25, degrees of freedom 2, $P > .10$).

As shown in Table III, children with more day or night asthma symptoms had more days absent from school compared with those who had fewer symptoms. Similar-

TABLE III. Correlates Of asthma-related school absences* in urban African American children (n = 392)

Variable	No.	Mean No. of absences	SD	Statistical significance
Child's grade				
Kindergarten	26	17.3	23.1	$P = .0002$ ($K > 2-6$, $1 > 2, 4, 5, 6$)
1st	52	14.8	17.3	
2nd	78	9.8	10.5	
3rd	70	10.7	16.7	
4th	66	6.5	7.8	
5th	67	6.9	7.7	
6th	27	5.1	6.5	
Problems paying for health care				
Yes	167	12.3	16.2	$P = .0002$
No	221	7.8	10.6	
No. of days of asthma-related restricted activity in past month				
None	161	7.5	12.1	$P = .04$ (none < 8-14, 15+)
1-7	80	10.5	13.4	
8-14	92	11.6	14.2	
15+	54	12.2	15.4	
Regular use of asthma medicine				
Yes	337	10.5	14.1	$P = .009$
No	51	5.2	7.2	
Caretaker works outside the home				
Yes	186	11.4	15.1	$P = .01$
No	201	8.0	11.2	
Siblings with asthma				
Yes	178	8.1	12.9	$P = .02$
No	214	11.2	13.8	
Asthma primary care in past 6 months				
Yes	249	11.3	13.4	$P = .002$
No	138	7.0	13.2	
ED visits in past 6 months				
Yes	169	12.7	13.7	$P = .0001$
No	219	7.5	12.9	
Asthma Symptom Index				
0-7	149	8.0	11.7	$P = .007$ (0-7, 8-19 < 20+)
8-19	158	9.9	13.1	
20+	79	12.7	16.8	

*Number of asthma-related school absences for past school year reported by caretaker.

ly, children whose asthma required more medical management as indicated by ED visits and hospitalizations also reported significantly more school days absent. Families who reported problems paying for asthma care (physician visits, medications, or transportation) had more days of school absence than those reporting no problems (mean 12.3 days, SD 16.2 days, vs mean 7.8 days, SD 10.5 days, $P = .002$). Fewer school absences were reported when the primary caretaker worked outside the home (mean 8.0 days, SD 11.2 days, vs mean 11.4 days, SD 15.1 days, $P = .01$).

Correlates of ED use

Table IV shows analyses of the percent of children who had used the ED one or more times in the previous 6 months. Children who reported more asthma symptoms (day and night) and more frequent visits to the physician for routine care were more likely to have been seen in the ED for asthma care. Children with a hypoallergenic mat-

tress cover were less likely to have been seen in the ED (odds ratio [OR] 2.32, $P = .005$). Families without a father in the home and with lower self-reported social support were more likely to have sought ED care (father in home OR 2.0, low vs high social support OR 1.5, medium vs high social support OR 1.6, $P = .03$). Families who reported problems paying for medical care and families receiving medical assistance or self-pay were also more likely to have used the ED (problems paying OR 2.3, $P < .0001$; type of insurance OR 1.5, $P = .05$). Caretaker's education level, taking asthma medications, having an asthma physician or nurse, presence of a smoker in the household, and child's sex, grade, age, and type of medication were not related to ED use.

Multivariate predictors of ED use

The potential predictors of ED use were further examined by entering them into multivariate analytic models. Variables entered included (1) demographic (age, sex,

TABLE IV. Correlates of asthma-related ED visits in urban African American children

Variable	No.	Percent with ED visit	OR (95% CI)	Statistical significance
Mattress cover				
Yes	62	27.4	1.0*	$P = .005$
No	330	46.7	2.3 (1.3-4.2)	
Caretaker works outside home				
Yes	203	38.9	1.0*	$P = .05$
No	188	48.9	1.5 (1.0-2.3)	
Asthma symptom index				
Low	150	33.3	1.0*	$P < .0001$
Medium	160	45.0	1.6 (1.0-2.6)	
High	80	60.0	3.0 (1.7-5.3)	
Duke Social Support Score				
High	132	34.9	1.0*	$P = .034$
Medium	138	48.9	1.6 (1.0-2.6)	
Low	122	50.0	1.9 (1.1-3.1)	
Father living at home				
Yes	87	47.2	2.0 (1.2-3.3)	$P = .007$
No	305	31.0	1.0*	
School days missed				
None	55	12.7	1.0*	$P < .0001$
1-5	147	40.8	4.7 (2.0-11.2)	
6-19	129	48.8	6.5 (2.8-15.5)	
20+	57	68.4	14.9 (5.6-39.2)	
Problems paying for health care				
Yes	170	55.3	2.3 (1.5-3.5)	$P < .0001$
No	222	34.7	1.0*	
Asthma primary care				
Yes	252	53.2	3.1 (2.0-4.9)	$P < .0001$
No	139	26.6	1.0*	

OR, Odds ratio; CI, confidence interval.

*Percent of children with one or more ED visits within previous 6 months reported by caretaker.

parental education), (2) economic (maternal working status, problems paying for health care, health insurance/medical assistance status), (3) asthma health (asthma symptom index, asthma medications, asthma primary care), (4) environmental (pets, smoking, mattress cover), and (5) social (presence of father in home, Duke Social Support Score). Logistic regression analysis was used to examine the predictors of ED use. As shown in Table V, the strongest predictor of ED use was having seen a physician for asthma primary care in the past 6 months. Children with the highest level of symptoms were also more likely to have been seen for ED visits. Caregivers who reported low social support and problems paying for health care were more likely to have taken their children to the ED for asthma care, and the absence of a hypoallergenic mattress cover was associated with a higher likelihood of an ED visit.

DISCUSSION

More than 12 years after Mak et al⁴ reported on the high prevalence of ED use among African American children in urban Baltimore, our study found continued high use among children in inner-city Baltimore and Washington enrolled in an asthma education study. Mak et al reported that 58% of the children they surveyed had been

TABLE V. Logistic regression analysis for ED use in past 6 months (n = 386)

Variable	OR	95% Confidence interval	Statistical significance
Mattress cover*	0.5	0.3-.9	$P = .032$
Asthma primary care†	2.9	1.8-4.6	$P = .0001$
Problems paying for health care‡	1.9	1.2-3.0	$P = .004$
Social support§			
Low vs high	1.7	0.98-2.8	$P = .061$
Medium vs high	1.7	0.97-2.9	$P = .065$
Asthma symptoms			
Medium vs low	1.3	0.8-2.1	$P = .300$
High vs low	2.0	1.1-3.6	$P = .025$

*Mattress cover on child's bed, yes/no.

†Seen physician for regular asthma care in past 6 months, yes/no.

‡Caretaker reports problems paying for any health care–related expenses, yes/no.

§Duke Social Support Score.

||Asthma symptom index (day and night symptoms).

seen in the ED one or more times in the previous 6 months compared with 43.6% in this survey. Like Mak et al, we found that a significant percentage of the surveyed children (43% compared with 35% in the study of Mak

et al) had been hospitalized overnight for an asthma exacerbation at least once in their lifetimes. School absences attributable to asthma were common, with 48.2% missing 6 or more days a year because of asthma (compared with 48% in Mak et al) and an average loss of 9.8 days (SD 13.5 days). Our study differed from that conducted by Mak et al in that we surveyed families in both Baltimore and Washington, DC, and included only families that had consented to be enrolled in an asthma education program. The estimated prevalence of asthma-related morbidity, such as school absences, ED use, and hospitalizations, however, appears remarkably comparable. This suggests that only modest changes or progress in reducing the high rates of asthma morbidity have been made in these urban communities in the past decade despite continuing advances in the pharmacologic treatments for asthma.

The frequent ED use observed in this study reflects the high levels of asthma morbidity reported by families, with children experiencing day or night asthma symptoms an average of 25% of the days of the month. Parents' work lives were also affected, with primary caretakers missing an average of 2 days of work per year because of the child's asthma. We found that the availability of an identified primary care provider and the presence of insurance or Medicaid were not sufficient to guarantee that families of children with asthma obtained regular asthma primary care. Despite the significant impact of asthma in these families' lives and the availability of an identified asthma care provider in 80% of the families, many families received infrequent asthma care, with 47.2% of the children receiving asthma care only once a year or in an emergency. Poor access to primary care has been frequently cited as a possible factor contributing to excess morbidity among low-income African American asthmatic patients.¹³⁻¹⁹ Many studies have confirmed that minority children are more likely than white children to be uninsured and poor and to have single-parent households, all factors that may limit access to regular asthma care.^{15,16} However, even with apparent access to an asthma care provider many families in our study received infrequent preventive care.

Halfon et al¹⁵ examined the factors associated with regular use of the ED in a national sample of US children. They report that black race, single-parent families, lower education, and urban setting were all risks for higher ED use, independent of specific indicators of need or health insurance status. The decision to seek asthma primary care is influenced by other family and environmental factors. The Institute of Medicine report on access to care¹⁷ has suggested a model of access to personal health care services that more broadly defines access to care as "the timely use of health care services to achieve the best possible health outcome" and proposes that health care use is influenced by the presence of structural, financial, and personal barriers to care. Transportation to appointments, clinic hours and procedures, and copayments may discourage nonurgent health care. Wood et al¹⁸ surveyed 2182 families and found that

being uninsured, poor, or nonwhite were independent predictors of children less than 17 years old having less access to preventive or general medical care. However, even if families had health insurance, this study found that low-income and nonwhite children still had lower use of preventive care, higher ED use, and more financial barriers to care than did children from more affluent families. Like the Wood study, the impact of financial barriers was reflected in our data, with caregivers who reported difficulty paying for asthma care also reporting more ED care and school absences. Financial barriers were reported by both insured and uninsured families, including difficulty paying for prescriptions, copayments, and transportation. However, unlike the study of Wood et al, in this survey more frequent physician visits for asthma were associated with an increased, rather than decreased, likelihood of ED care, independent of the frequency of asthma symptoms. It is important to recognize that the correlational nature of this analysis does not include information of the temporal relationship between primary care visits and ED care. The increased frequency of physician visits may have followed episodes of ED care, reflecting the follow-up care of an asthma exacerbation. Furthermore, because few of the children in this study appeared to be receiving preventive pharmacologic treatment for asthma from their primary care providers, it may be that frequent physician visits for asthma reflected daytime, office-based treatment of exacerbations (eg, office-based nebulizer treatments) for the same children who sought frequent ED care for nighttime exacerbations. Finally, because data on physician visits and ED visits are based on caregiver reports, the accuracy of the frequencies reported for these visits cannot be confirmed.

Although inhaled anti-inflammatory agents were widely available at the time of this study and were the recommended therapy for many of these children by National Asthma Education Program guidelines, we found a low prevalence of use. The episodic nature of the asthma care received by children in this study may account for the low prevalence of inhaled anti-inflammatory therapy as a primary treatment reported in this survey (10%). Lozano et al¹⁹ reviewed Medicaid data for children aged 3 to 17 years receiving asthma care services in the Seattle-Tacoma metropolitan area. They found that African American children had 34% higher odds of using theophylline than white children did. Although they found no racial differences in the use of anti-inflammatory medications, the investigators suggested that the greater burden of asthma (as reflected in a greater number of ED visits and hospitalizations) should have resulted in more intensive, prophylactic therapy in African American children. Lozano also observed that African American children had a 70% higher likelihood of using the ED than white children did, after insurance status and type of provider were controlled. Children who are seen only in EDs or only for annual pediatric visits are unlikely to receive regular, monitored prophylactic asthma therapy. Another possible explanation for the limited use of inhaled steroids and sodium cromolyn

is the failure of pediatric practitioners at the time of this survey (1991) to recognize their important role in the management of symptomatic asthma.

Family and patient beliefs about asthma and asthma management may also serve as barriers to care. Haire-Joshu et al²⁰ examined the attitudes of low-income urban asthma patients toward preventive asthma care and self-management. They found that 21% of African American adults treated at an inner-city ED for an acute attack disagreed with the need for routine asthma care compared with 2% of asthma patients surveyed in a private practice ($P = .001$). Three fourths (75%) of these ED patients reported that they "tried to fight asthma attacks [themselves] rather than getting medical help" compared with 49% of the private patients ($P = .01$). Our finding that high ED use was unrelated to having a primary care provider or having health insurance may reflect community beliefs and norms for the management of asthma rather than poor access to care.

Considerable attention has recently been focused on the contribution of environmental factors, particularly dust mite and cockroach antigens,²¹⁻²⁷ to the excess asthma morbidity found in the inner city. Horowitz et al³⁰ reported a dose-response relationship between the level of cockroach antigen collected in the homes of adolescents with asthma and the level of asthma severity. We have previously reported that families in this study reported the presence of common household environmental asthma triggers, such as dust (53%), cockroach (15%), smoking (72%), cats (34%), and dogs (27%).²⁷ Although our study was not designed to measure the contribution of environmental triggers to asthma morbidity, we were intrigued to find that the presence of a mattress cover was associated with a lower likelihood of an ED visit in the past 6 months. The presence of a mattress cover may reflect some measure of better asthma knowledge and management or decreased asthma symptom severity through allergen control.

We found that when the primary caregiver believed that she had low social support her child was more likely to have been to the ED in the previous 6 months. Fisher et al²⁸ reported that African American mothers who reported being socially isolated were more likely to seek ED care for their children with asthma independent of asthma severity. This may reflect that caregivers with less instrumental (ie, practical) and affective support have greater difficulty managing their children's day-to-day asthma, resulting in asthma flares, or that caregivers without support may feel less capable of managing an after-hours acute asthma attack without the aid of emergency care. The 24-hour availability of professional care and advice available at an ED for a wheezing child may be most readily used by the mother with the fewest alternative sources of support.

This study's findings must be interpreted with some caution. This study relied on a structured interview rather than clinical records, so it is likely that parental reports of asthma morbidity are subject to recall bias. Furthermore, all surveyed families had consented to participating in a school-based asthma education program. Therefore, this

sample might be biased toward families that are either more concerned about the child's asthma or more in need of asthma education and services. However, the similarity of the asthma morbidity and health care use baseline data found in this intervention study is remarkably similar to those of other inner-city asthma surveys that did not enroll participants in an asthma intervention.^{4,29} For this reason we believe that our participants are representative of urban African American families of asthmatic patients.

In summary, this study confirms that asthma management for children in the inner city continues to rely largely on episodic and emergency care, that asthma medication management within these urban communities does not conform to current treatment guidelines, and that asthma symptoms resulting in school days and work days lost remain prevalent.

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