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Preventive Asthma Care Delivery in the Primary Care Office: Missed Opportunities for Children with Persistent Asthma Symptoms

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Abstract

Objective—To describe which NHLBI preventive actions are taken for children with persistent asthma symptoms at the time of a primary care visit and determine how care delivery varies by asthma symptom severity.

Methods—We approached children (2-12yo) with asthma from Rochester, NY, in the waiting room at their doctor's office. Eligibility required current persistent symptoms. Caregivers were interviewed via telephone within 2 weeks after the visit regarding specific preventive care actions delivered. Bivariate and regression analyses assessed the relationship between asthma symptom severity and actions taken during the visit.

Results—We identified 171 children with persistent asthma symptoms (34% black, 64% Medicaid) from October 2009-January 2011 at 6 pediatric offices. Overall delivery of guideline-based preventive actions during visits was low. Children with mild persistent symptoms were least likely to receive preventive care. Regression analyses controlling for demographics and visit type (acute or follow-up asthma visit vs. non-asthma visit) confirmed that children with mild persistent asthma symptoms were less likely than those with more severe asthma symptoms to receive preventive medication action (OR .34 [95%CI .14-.84]), trigger reduction discussion (.39[.19-.82]), recommendation of follow-up (.40[.19-.87]), and receipt of action plan (.37[.16-.86]).

Conclusions—Many children with persistent asthma symptoms do not receive recommended preventive actions during office visits, and children with mild persistent symptoms are the least likely to receive care. Efforts to improve guideline-based asthma care are needed, and children with mild persistent asthma symptoms warrant further consideration.

Keywords

asthma; childhood; severity; prevention; primary care

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Conflicts of interest: None

Background

The National Heart Lung and Blood Institute (NHLBI) guidelines for the diagnosis and management of asthma outline specific preventive care actions that should be taken for all children with persistent symptoms.[1] However, despite the availability of these guidelines, inadequate preventive asthma care is well documented.[2-10] Most prominently, national guidelines recommend that all children with persistent symptoms take a controller medication daily for the prevention of symptoms. However, many children with persistent asthma do not receive controller medications and overuse of short-acting rescue medications is common.[3, 9, 11, 12]

Additionally, many providers do not accurately document severity of their patient's asthma,[13, 14] provide written care plans,[2, 4, 6] make appropriate adjustments to therapy,[4] or recommend referral or regular follow-up.[2, 4] Non-adherence to guidelines has been identified as a significant contributing factor to high rates of asthma morbidity in the United States.[9]

Deficits in the provision of guideline-based care have been well-documented, both from the physician's perspective[4, 8, 15, 16] and the from the patient perspective,[6, 10, 11] with most attention focused on inadequate prescription of controller medications.[3, 9, 17] However, relatively little is known about what specifically happens during an ambulatory care doctor's office visit for a pediatric patient with asthma, when providers have an opportunity to take advantage of their face-to-face time with the family to provide guideline-based preventive asthma care.

Additionally, studies documenting non-adherence to guidelines have focused principally on visits specifically for asthma.[16, 18] However, opportunities to deliver preventive asthma care also exist at non-asthma related visits, and these visits often represent missed opportunities for care. Especially for disadvantaged populations where healthcare access can be challenging, each healthcare interaction represents a potential opportunity for asthma assessment and preventive care delivery. In considering the development of targeted interventions to improve asthma care, there is a need for better understanding of the delivery of specific guideline-based actions and the frequency in which they occur during ambulatory care office visits.

To better understand physician adherence to national guidelines, we focused on preventive asthma care actions occurring during an ambulatory care office visit, and factors associated with the delivery of preventive asthma care. This study aims to: 1) Describe which NHLBI preventive actions are taken for children with persistent asthma symptoms at the time of an ambulatory care office visit, and 2) Determine how preventive care delivery varies by severity of patient's asthma symptoms in the preceding four weeks.

Methods

Setting and subjects

We collected data for this study from the control group of an ongoing randomized trial, Prompting Asthma Intervention in Rochester – Uniting Parents and Providers (PAIR-UP), in Rochester, NY. Caregivers (parent or guardian) of children between the ages of 2-12, with documentation of asthma in their medical records (asthma diagnosis or medications), were approached in the waiting room prior to their appointment with a healthcare provider at 12 participating urban primary care practices from October 2009 to January 2011. All patients with indication of asthma in their medical charts were approached unless a recruiter was not available at the visit time. Prior to their scheduled primary care visit, caregivers completed a

brief (ten minute) interviewer-administered structured screening tool to assess eligibility for the study, based on their level of asthma symptom severity in the past four weeks. Children whose caregivers reported persistent asthma symptoms based on NHLBI guidelines at the time of the pre-visit screening interview were eligible for enrollment. We included children who were visiting their provider for any reason (i.e. well child exams, illness visits, asthma-related visits); eligibility required that children have a visit with a physician, physician assistant, or nurse practitioner (staff or social work visits were ineligible). Only one child per family was eligible for enrollment; for families with more than one eligible child, we asked caregivers to choose which child they wanted to participate. We obtained written informed consent from the primary caregiver and assent from children seven years or older. Families were given a ten dollar grocery store gift certificate after completing the baseline survey. The University of Rochester and Rochester General Health System's Institutional Review Boards approved the study protocol.

For the PAIR-UP randomized trial, each of the 12 participating practices were matched based on size and demographics and randomly assigned as either a treatment or usual care site. Families enrolled at treatment sites received a parent and provider prompting intervention at the time of the visit, to aid in assessment of symptoms and support guideline-based asthma care. Families enrolled at usual care sites did not receive the provider prompting intervention. To provide an accurate depiction of usual care, this analysis only includes data from subjects enrolled at the 6 practices randomly assigned as usual care sites who had follow-up data available (95% of subjects).

Assessment

After consent, a brief interviewer-administered baseline assessment was completed in the waiting room prior to the child's visit with their healthcare provider. Within two weeks following the visit, caregivers were re-contacted via telephone, and study staff used a structured interview tool to inquire about specific preventive care actions their child received at the office visit. Caregivers were asked detailed questions regarding any discussion of the child's asthma or change to the child's asthma treatment plan, including specific items regarding medications, triggers, smoke exposure and follow-up care.

Assessment of Severity of Asthma Symptoms—During the baseline assessment, we assessed asthma symptom severity using a series of structured questions regarding symptoms adapted from NHLBI guidelines for asthma assessment and treatment.[1] Caregivers were asked to report on the number of days that their child experienced any cough, wheeze, shortness of breath, or tightness in the chest during the day, frequency of nighttime symptoms, and frequency of rescue medication use for symptom relief in the prior four weeks. Caregivers were also asked to report the child's activity limitation due to asthma in the prior four weeks and the number of asthma exacerbations that required the child to take oral steroids in the past year. As required by the eligibility criteria, all children had persistent symptoms in the prior four weeks. Based on the symptoms reported, we classified the subject's symptom severity according to NHLBI guidelines as either mild persistent, moderate persistent or severe persistent.[1]

The number of symptom-free days in the prior 14 days (defined as the number of days that the child remained symptom-free with no signs of asthma such as wheezing, coughing, tightness in the chest, or shortness of breath within a 24 hour period including daytime and nighttime) was also recorded at both the baseline and the follow-up survey. This outcome measure, consistent with the symptom monitoring suggested by the national guidelines for asthma care, was used as an additional measure of asthma symptom severity.[19] Due to the short time-frame between the baseline and 2-week follow-up assessment, we used the report

of symptoms at follow-up to substantiate the parent's report of persistent symptoms collected at baseline.

Assessment of Preventive Care Delivery—For the follow-up telephone survey, we used a structured interview tool to gather detailed information regarding specific preventive care actions delivered during the child's visit with their healthcare provider. Caregivers were asked about any changes to their asthma medications and treatment plan, including whether the provider prescribed a new controller medication, stepped-up a dose of previously prescribed controller medication, recommended re-starting a previously prescribed medication or encouraged adherence with an existing prescription. The survey also addressed how the healthcare provider assessed the child's asthma (i.e. whether the provider specifically inquired about the frequency of daytime and nighttime symptoms) and about any asthma education (i.e. demonstrated proper medication technique, counseled on avoiding or reducing exposure to triggers including smoke) provided to the child and caregiver during the visit. Lastly, we inquired about other guideline recommended actions like receipt of an asthma action plan or use of a peak flow meter. All questions were based upon assessment and guidelines for the diagnosis and treatment of asthma published by NHLBI[1] and were designed to identify what guideline-based actions were delivered at the office visit. We also conducted blinded reviews of medical records to confirm caregiver report of several key preventive care actions delivered at the visits.

Assessment of Covariates—We inquired about family demographics, including child's age, race, ethnicity (Hispanic or not Hispanic), insurance type, language spoken at home, caregiver age, caregiver education, caregiver marital status, smokers living in the home, and primary caregiver smoking status. The reason for the healthcare visit was recorded and categorized as either asthma visits (including acute and follow-up visits) or non-asthma visits (well child, non-asthma sick or follow-up, and other visits). We also collected information about the child's currently prescribed medications including if the child has a prescription for a controller medication (inhaled corticosteroid, mast cell stabilizer or leukotriene modifiers).

Analysis

We performed analyses using SPSS version 17 software (Statistical Product and Service Solutions 17.0; SPSS Inc, Chicago, IL). We used Pearson's chi-squared tests and t-tests to compare asthma symptom severity with demographic variables and delivery of preventive care. We also used general logistic regression analyses to explore the relationship between preventive care delivery and symptom severity, controlling for age, race, ethnicity, Medicaid status, caregiver education, type of visit, and smokers in the household. For the regression analyses, asthma symptom severity was dichotomized into two categories: mild persistent or moderate to severe persistent symptoms. A 2-sided alpha <.05 was considered statistically significant.

Results

We identified 171 children with persistent asthma symptoms from the 6 different ‘usual care’ primary care clinics (response rate: 78%; range 17-47 subjects enrolled/clinic). The mean time from the doctor's visit to completion of the follow-up interview was 7.3 (±8.8) days. Based on NHLBI asthma severity classifications, 47% reported mild persistent symptoms, 30% moderate persistent, and 22% severe persistent symptoms in the prior four weeks at enrollment. Children were on average six years old, and 58% were male. By caregiver report, 34% of the children were Black and 38% had Hispanic ethnicity. The majority of children (64%) were insured by Medicaid. Almost half (48%) of the children

lived in a home with one or more smoker, and only 56% reported a current prescription for a controller asthma medication.

Table 1 shows demographic characteristics of the sample, smoke exposure, and reason for the healthcare visit by asthma symptom severity. Demographic characteristics were not statistically different between children with different levels of symptom severity. However, visit reason varied significantly by symptom severity level. Overall, 21% of children were at their provider's office for an asthma appointment (either acute exacerbation or follow-up). Children with more severe asthma were significantly more likely (p=.01) to be at the doctor's office for asthma than those with less severe symptoms (12% vs. 24% vs. 36% for mild persistent, moderate persistent, and severe persistent symptoms, respectively).

Overall delivery of guideline-based preventive actions during visits was low (Table 2) across all symptom severity categories. Only 19% of caregivers reported that their child received a preventive medication action, defined as either a prescription of a new controller medication, a step-up in therapy, or counseling on adherence to an existing controller medication treatment plan. While 76% of caregivers reported that they discussed asthma with their child's doctor during their visit, fewer than half reported that their doctor asked specific questions about daytime symptoms, nighttime symptoms, and rescue medication use. Additionally, only 25% reported receiving an asthma action plan and 31% of parents reported that their child's doctor suggested a specific asthma follow-up for the child. Medical charts were available for review for almost ¾ of subjects (72%). Substantiating caregiver report, there was 85% agreement regarding preventive medication actions at the time of the visit, 77% agreement regarding the provision of asthma action plans, and 73% agreement regarding recommendation of a specific follow-up visit.

Children with more severe asthma symptoms received more preventive care actions at their office visits, including preventive medication action, receipt of asthma action plan, and recommendation of a specific asthma follow-up visit, than those with more mild symptoms (all $p<.05$). Only 10% of children with mild persistent symptoms received a preventive medication action at their visit, and only 16% reported that they received an asthma action plan outlining how to use their medications to manage their asthma. Discussion of medications, triggers, and how smoke makes asthma worse were also significantly correlated with increased symptom severity (all $p<.05$). Caregivers of children with more severe asthma symptoms were significantly more likely to report that their child's healthcare provider specifically asked about the child's daytime, nighttime symptoms and rescue medication use (all $p<.05$). Though children with severe symptoms were more likely to receive preventive care actions, it is notable that the rates of preventive care were still very low for all children, even for those in the severe persistent symptom group.

We next used regression analyses to further explore the independent relationship between asthma symptom severity and preventive care delivery (Table 3). The moderate and severe persistent symptom categories were combined for these analyses to assure adequate power. Logistic regression analyses controlling for visit type/reason, smoke exposure, and demographic variables confirmed that children with mild persistent asthma symptoms were significantly less likely than those with moderate to severe persistent symptoms to receive preventive medication action (OR .34[95%CI .14-.84]), discussion of trigger reduction (.39[.19-.82]), recommendation of an asthma follow-up (.40[.19-.87]), and receipt of action plan (.37[16-.86]). Caregivers of children with mild persistent symptoms were also significantly less likely to report that their provider specifically asked about daytime symptoms and rescue medication use than those with moderate to severe persistent symptoms. Symptom severity level was not independently associated with whether the healthcare provider inquired about the child's nighttime symptoms, medications, emergency care or missed

school due to asthma, nor whether the provider prescribed medication refills, used a peak flow meter or provided counseling for smoking cessation (results not shown). Visits for children being seen specifically for asthma (compared to a non-asthma visit) were more likely to include discussion of trigger reduction (OR 3.4[95%CI 1.4-8.3]), receipt of asthma action plan (2.8[1.2-6.9]), suggestion of follow-up (4.1[1.7-9.7]) and inquiry about daytime symptoms (3.2 [1.4-7.2]) and rescue medication use (3.0[1.2-7.0]).

Lastly, we looked at the report of symptoms from the follow-up survey to consider whether the children's symptoms were transient, or whether they continued after the healthcare visit (we did not anticipate significant improvement in symptoms due to the brief duration between the assessment points). Children in the mild persistent symptom group reported on average 10 symptom-free days in the prior 14 days both at baseline and at the time of follow-up. Children in the moderate to severe persistent symptom group experienced 5 symptom-free days in the prior 14 days at baseline and 6 days at follow-up. Thus, all children, including those in the mild persistent symptom group, continued to experience significant asthma symptoms after their visit.

Discussion

Our results reinforce previous findings that many children with asthma are not receiving guideline-based preventive care. Overall, caregivers reported that their providers are not implementing many of the key preventive care actions at office visits that are recommended for all children with persistent asthma symptoms. We found that not only are children with all levels of persistent symptoms receiving inadequate preventive care actions at a visit, but also that children with mild persistent symptoms are receiving the least care. This is consistent with a prior study in which we found that a composite index of preventive care measures at a healthcare visit correlated with increased asthma severity.[2] We also found that the children in our sample still reported experiencing significant symptoms following their appointment. This continuation of symptoms highlights that action was warranted in many of these cases, and that opportunities to improve control and decrease morbidity were likely missed, particularly at non-asthma visits.

The NHLBI first published guidelines for care in 1991 with updates distributed in 1997 and 2007; nonetheless, significant deficits in care are still present. Among children in this study with severe persistent symptoms, fewer than 1/3 received a preventive medication action. Innovative solutions to improve the adoption and implementation of national care guidelines are needed to promote preventive care.

Various barriers to the delivery of guideline-based care have been identified. Cabana et al. found that lack of time, poor understanding, low self-efficacy and disagreement with the guidelines were reasons physicians cited for not providing NHLBI guideline-based care.[7, 15] Additionally, patient factors may contribute to non-adherence, including concerns and lack of understanding about preventive medications, perceptions of asthma as an episodic illness, and poor access to care.[7, 20, 21]

Several studies have identified divergence between provider standards of care and the recommendations of the national guidelines,[22, 23] including controversy about the use of daily inhaled corticosteroids for children with mild persistent asthma,[22, 24] and the use of peak flow for regular monitoring and evaluation.[23] Our findings suggest that providers are more likely to address asthma if the patient is presenting to their office for asthma symptoms or if the patient has very severe and prominent symptoms. Providers often underestimate the severity of their patient's asthma symptoms[13] which may cause them to provide less preventive asthma care,[14] further contributing to the overall deficit in care for children with

mild persistent asthma symptoms. Thus, it appears that children with mild persistent symptoms are not being treated until their symptoms become more severe, and providers are missing potential opportunities to reduce and prevent morbidity.

Our findings suggest that discussion-based items (i.e., discussed asthma or medications) occur more commonly than action-based items (i.e., prescription of new medication). Notably, while many caregivers reported discussing asthma with their child's provider, only 10% of children with mild persistent symptoms received a preventive medication action, where according to guidelines, due to their persistent symptoms, all of these children warranted some sort of preventive medication action (new controller medication or step-up in therapy prescription or reinforcement of adherence). Further investigation into reasons for non-adherence to specific guideline recommendations and what influences provider decisions about care may be helpful in improving children's asthma care.

There are several potential limitations to this study. Due to our limited sample size, we were unable to explore the potential differences among the six clinical practice sites used for this analysis. There may have been important differences in the economic, clinical, training, or patient demographic traits that could have contributed to differences seen in care. Practice characteristics may unveil another part of the story and warrant future investigation.

Additionally, all practices serve a primarily urban population within the Rochester, NY area, and our results can only be generalized to similar populations. We were unable to determine whether an updated asthma action plan or prescription refill was recently provided prior to the visit. Further, we did not collect information regarding the use of spirometry, however spirometry is not routinely provided in the primary care practices involved in the study.

Our outcomes assessment relied on caregiver report or chart documentation, thus the occurrence of some preventive care actions may not have been fully captured. Though follow-up data were collected shortly after the healthcare visits, caregivers may not remember details of the care received, and there may be guideline-based actions that are not being captured by caregiver recall or chart documentation. However, when we compared key preventive care items with visit documentation in medical records, agreement levels were high. Additionally, the use of caregiver report has been found to be accurate documentation of quality of asthma care[25] and could be considered to encapsulate the most central and pertinent perspective in the child's asthma care. If a guideline-based action occurs but the caregiver does not remember, the impact of the action on the child's asthma is likely limited.

This study is strengthened by its inclusion of symptom data from follow-up shortly after the child's visit, allowing us to confirm that this population continues to experience significant asthma symptoms and reducible morbidity. Further, this study included children from multiple primary care practices, provides greater detail about asthma care received during a primary care visit than is presented in other studies, and by including both asthma and non-asthma visits, it gives an important broader view of deficits in guideline-based care.

These findings have several important implications. Many children with persistent asthma symptoms are not receiving recommended preventive asthma actions during primary care office visits, and children with mild persistent symptoms are the least likely to receive preventive care. National guidelines are still not being implemented consistently, and physicians are missing opportunities to provide the preventive care that children with persistent asthma need. As the list of recommended services to deliver at a healthcare visits continues to grow,[26, 27] and providers continue to face the barriers of insufficient time and competing concerns at healthcare visits, missed opportunities to optimize preventive care are common.[27, 28] Additionally, intricacies of the asthma care guidelines can make them

difficult to interpret and challenging to implement. Thus novel, time efficient and simplified methods are needed to facilitate the delivery of effective guideline-based preventive asthma care for all children with persistent asthma, including those children with mild persistent symptoms.

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What's New

Children with persistent asthma symptoms are not receiving recommended preventive care during primary care visits, and children with mild persistent symptoms are least likely to receive care. Improvements in care are needed, with consideration for those with mild persistent symptoms.

Table 1

Demographics and Other Characteristics at Enrollment

	Level of Persistent Asthma Symptoms in Prior 4 Weeks			
	Overall N=171	**Mild N=81**	**Moderate N=51**	**Severe N=39**
Age (years) *	6.4 (3.0)	6.8 (3.0)	5.7 (2.8)	6.5 (3.0)
Gender				
Male	99 (58%)	48 (59%)	31 (61%)	20 (51%)
Female	72 (42%)	33 (41%)	20 (39%)	19 (49%)
Race				
Black	59 (34%)	33 (41%)	13 (26%)	13 (33%)
White	37 (22%)	16 (20%)	12 (24%)	9 (23%)
Spanish/Puerto Rican/Hispanic/Latino/Mexi can/Chi cano/Cuban	50 (29%)	22 (27%)	15 (29%)	13 (33%)
Other	25 (15%)	10 (12%)	11 (22%)	4(10%)
Ethnicity				
Hispanic	65 (38%)	29 (36%)	21 (41%)	15 (38%)
Non-Hispanic	106 (62%)	52 (64%)	30 (59%)	24 (62%)
Insurance type				
Medicaid	109 (64%)	49 (60%)	31 (61%)	29 (74%)
Private Insurance	62 (63%)	32 (40%)	20 (39%)	10 (26%)
Language spoken at home				
English	120 (70%)	59 (73%)	33 (65%)	28 (72%)
Spanish	5 (3%)	1 (1%)	1 (2%)	3 (8%)
English and Spanish	44 (26%)	21 (26%)	15 (29%)	8 (20%)
Other	2 (1%)	0	2 (4%)	0
Caregiver age (years) *	33.4 (7.9)	34.3 (7.7)	32.2 (7.3)	33.2 (1.4)
Caregiver education				
High School Graduate or greater	124 (72%)	59 (73%)	38 (74%)	27 (69%)
Less than High School	47 (28%)	22 (27%)	13 (26%)	12 (31%)
Caregiver marital status				
Married	64 (37%)	36 (44%)	19 (37%)	9 (23%)
Single	107 (63%)	45 (56%)	32 (63%)	30 (77%)
Caregiver smokes	54 (32%)	24 (30%)	16 (31%)	14 (36%)
One or more smoker in home	83 (48%)	41 (51%)	21 (41%)	21 (54%)
Reason for visit **				
Asthma (attack or follow-up)	36 (21%)	10 (12%)	12 (24%)	14 (36%)

	Level of Persistent Asthma Symptoms in Prior 4 Weeks			
	Overall N=171	**Mild N=81**	**Moderate N=51**	**Severe N=39**
Other (well child, non-asthma sick or follow-up)	135 (79%)	71 (88%)	39 (76%)	25 (64%)
Current controller medication prescription reported* **	96 (56%)	39 (48%)	32 (63%)	25 (64%)

* Mean (SD)

** statistically significant based on p-value <.05

*** Controller medication defined as inhaled corticosteroid, mast cell stabilizer or leukotriene modifier

Table 2

Visit Actions by Symptom Severity Level

	Level of Persistent Asthma Symptoms in Prior 4 Weeks				p-value
Visit Action	**Overall N=171**	**Mild N=81**	**Moderate N=51**	**Severe N=39**	
Preventive Medication Action (New controller medication or step-up in therapy prescribed, or encouraged adherence with existing therapy)*	33 (19%)	8 (10%)	14 (28%)	11 (28%)	.01
Discussed asthma*	130 (76%)	55 (68%)	40 (78%)	35 (90%)	.03
Discussed asthma medications*	108 (64%)	44 (55%)	39 (76%)	25 (64%)	.04
Discussed trigger reduction*	68 (40%)	23 (28%)	23 (45%)	22 (56%)	.01
Referral made to asthma specialist	15 (9%)	5 (6%)	4 (8%)	6 (15%)	.25
Discussed smoke making asthma worse*	106 (62%)	42 (52%)	33 (65%)	31 (80%)	.01
Provider suggested smoking cessation (n= 54)	33 (61%)	12 (50%)	13 (81%)	8 (57%)	.13
Provided refill of any asthma medication	61 (36%)	24 (30%)	18 (35%)	19 (49%)	.33
Provided asthma action plan*	43 (25%)	13 (16%)	14 (28%)	16 (41%)	.01
Peak flow measured	15 (9%)	7 (9%)	5 (10%)	3 (8%)	.94
Provider asked about frequency of daytime asthma symptoms*	70 (41%)	24 (30%)	21 (41%)	25 (64%)	.01
Provider asked about frequency of nighttime asthma symptoms*	76 (45%)	29 (36%)	22 (43%)	25 (64%)	.02
Provider asked about rescue medication use*	83 (49%)	31 (39%)	23 (55%)	24 (63%)	.03
Provider asked about ED visits/hospitalizations	64 (37%)	25 (31%)	20 (39%)	19 (49%)	.16
Provider asked about missed school due to asthma	57 (34%)	24 (30%)	18 (35%)	15 (38%)	.62
Provider suggested specific asthma follow-up visit*	52 (31%)	16 (20%)	18 (35%)	20 (49%)	.01

*statistically significant based on p-value <.05

Table 3

Logistic Regression Models: Mild Persistent Asthma Symptoms Predicting Visit Actions (Dichotomized Symptom Severity Levels)

Visit Action	B	S.E.	W	OR (95% CI)	P-Value
Preventive Medication Action (New controller medication or step-up in therapy prescribed or encouraged adherence with existing therapy)	-1.07	.46	5.54	.34 (.14-.84)	.02
Discussed trigger reduction	-.94	.38	6.18	.39 (.19-.82)	.01
Discussed smoke making asthma worse	-1.00	.40	6.43	.37 (.17-.80)	.01
Provided asthma action plan	-.98	42	5.44	.37 (.16-.86)	.02
Provider suggested specific asthma follow-up visit	-.91	.40	5.37	.40 (.19-.87)	.02
Provider asked about frequency of daytime symptoms	-.77	.34	5.01	.46 (.24-.91)	.02
Provider asked about rescue medication use	-.68	.34	4.04	.50 (.26-.99)	.04

Included in regressions: Age, Race, Ethnicity, Medicaid, Caregiver Education, Type of visit, Smokers in household, Symptom severity (mild, moderate to severe persistent symptoms in prior 4 weeks)