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Challenges in Providing Preventive Care To Inner-city Children with Asthma

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Introduction

Asthma affects 7.1 million US children and is the number one cause of pediatric emergency department (ED) visits. ^(1–3) Although the scientific understanding of the pathophysiology of asthma and the quality of asthma therapies have significantly improved over the past thirty years, asthma morbidity remains high and preventive care low for inner-city children. Low-income, African American children have 4.1 times higher ED visits and a death rate 7.6 times higher than rates of non-Hispanic white children, ⁽⁴⁾ yet minority low-income children are the least likely to receive adequate guideline based therapy. ^(5–7) Further, Hispanic and Black children have higher rates of inadequate health care insurance when compared to white children. ⁽⁸⁾ This disparity in asthma morbidity among inner-city children often results from inadequacies of the health care delivery system ⁽⁸⁾ as well as from individual patient, caregiver and health care provider factors.

Preventive asthma care among inner-city children is challenging due to a variety of factors including health care system/organizational and provider characteristics, patient and family attitudes and beliefs, and psychosocial and environmental factors. These factors impact a child's opportunity to receive preventive care for asthma, and if missed, can result in increased asthma morbidity and health care costs. (Figure 1) Specific health care system/organizational challenges are lack of access to quality medical care including long wait times and unavailability of health care appointments, lack of transportation to clinic sites and lack of access to specialty asthma care. One health care provider characteristic that is especially challenging to preventive care for inner-city children with asthma is non-adherence to national asthma guidelines by health care providers. Self-reported rates of

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adherence of primary care providers to national asthma guidelines are low^(9–11) and may lead to misclassification of asthma severity and control for the child due to guideline unfamiliarity. This misclassification of severity may contribute to the underuse of anti-inflammatory medications consistently reported in inner-city children.^(12–15) Family and patient attitudes and beliefs about asthma care, psychosocial factors including caregiver depression and life stress^(16–19) and environmental factors found in the child's home and neighborhood are other major challenges to preventive asthma care in inner-city children. We purposely selected to focus on four major challenges to providing preventive care (family and patient attitudes and beliefs, lack of access to quality medical care, psychosocial and environmental factors) based on prior evidence and our own observation of these challenges in research with inner city children with asthma over the past decade. Pediatric nurses are in contact with children with asthma and their families in a variety of settings including schools, community health, primary care, emergency department, and inpatient units. Our goal for this manuscript is to describe the four main challenges to preventive asthma care for inner-city children with asthma, address cost issues related to preventive care and provide recommendations for use by pediatric nurses across settings.

Challenges to Preventive Asthma Care

1. Caregiver/Family Attitudes and Beliefs about Asthma Care

Common caregiver/family attitudes and beliefs about asthma preventive care are (1) lack of appreciation for preventive asthma medication and follow-up care when a child with asthma is asymptomatic and (2) distrust and worry about side effects of medications.^(5, 21, 22) The evidence from several studies indicate that even when appropriate preventive asthma medications are prescribed, only 30–50% of children with asthma who require daily preventive medications received adequate doses anti-inflammatory medications.^(13, 14, 23) Common contributors to nonadherence to daily preventive medication use in children with asthma are caregiver and child misunderstanding of the role of daily anti-inflammatory medications in treating asthma. For instance, caregivers may believe that the child's asthma is not severe enough to require daily medication, noted in many nonadherent adult patients with asthma⁽²²⁾ and consistent with caregiver reports of high symptom days but low use of daily preventive medications by their child.^(6, 14, 24) Moreover, administration of daily preventive medications is complex with complicated medication regimens and delivery systems. Accurate use of metered dose inhalers (MDIs), dry powder inhalers, and nebulizers requires cooperation and coordination from the child. Use of spacers with MDIs significantly enhances aerosolized medication deposition into the lung instead of the mouth or pharynx and is recommended for use by all children and adolescents who are prescribed MDI administered asthma medications.

Parental worry about medication dependence and reduced effectiveness of long-term use of asthma medications has been reported.^(14, 22) In our current study of 300 inner-city children aged 3 to 10 years with persistent asthma and frequent emergency department visits for asthma, nearly one third of parents reported they were very worried about the side effects of their child's asthma medications. (Table 1) This level of parental worry is most likely related to concerns of potential long term effects, misperception of type of steroid medication (non anabolic steroid) and perceived risk of dependence.⁽²⁵⁾

Child age appears to be associated with adherence to preventive care appointments due to competing school and work demands. In our behavioral intervention study of children with persistent asthma, younger children were significantly more likely to attend a primary care follow-up visit for asthma than older children most likely due to competing school or work obligations of older children that impeded attending a PCP appointment during daytime hours.⁽²⁶⁾ Alternately, caregivers may be more concerned about asthma symptoms and

acute exacerbations in younger children who are less able to communicate their asthma symptoms or unable to communicate their symptoms as compared to older children. Furthermore, because older children may self-manage their asthma, parental awareness of symptoms may be decreased.

Guideline based asthma treatment is based on accurate recognition and reporting of symptoms by the family and appropriate severity classification by the health care provider. A critical premise of effective asthma self-management is the caregiver and/or child's ability to communicate their symptom level to the health care provider and have the provider accurately assign a severity level that indicates treatment guidelines. Communication about asthma severity may be impaired by poor symptom perception on part of the child or parent^(27, 28) or inappropriate symptom labeling by the parent or health care provider. For example, mislabeling cough as non-asthma may result in misdiagnosis and inadequate treatment of asthma. Asthma symptom perceptions by parents and children are multidimensional and include both non-specific symptoms such as fatigue, malaise, and fear.⁽²⁹⁾ Miscommunication about symptom frequency and severity between parents and providers may result in an inaccurate assessment of severity leading to an inappropriate medication regimen and uncontrolled asthma.⁽¹³⁾

Recommendations to Improve Understanding of Caregiver/Family Attitudes and Beliefs about Asthma Care

- Identify and discuss parental attitudes, beliefs and worries about medications including, potential side effects and dependence on asthma medications.
- Teach parents and school age children specific and non-specific symptoms of asthma and identify child symptom descriptors for parents and teachers to use.
- Monitor younger and newly diagnosed children with asthma more frequently due to the parent and child's evolving ability to recognize asthma symptoms.^(27, 30)

2. Lack of Access to Quality Medical Care: Patient and Health Care Provider Factors

Common health care system/organizational barriers to preventive care encountered by inner-city children with asthma include lack of available primary care appointments, long wait times or inconvenient times to schedule appointments,^(31, 32) lack of endorsement by the child's primary care provider for the need to follow-up after ED visits,^(33, 34) lack of transportation, lack of affordable child care, fear of losing job for attending multiple medical appointments and lack of referral to specialty care for treatment when indicated.⁽²⁴⁾

Several behavioral interventions targeting system/organizational barriers have shown modest improvement in providing preventive asthma care including school-based screening, health care provider prompting for guideline-based care and parent web-based feedback interventions.^(35–39) Successful physician feedback interventions for asthma include providing specific asthma health information feedback to the child's primary care provider regarding the child's symptom frequency and frequency of ED visits.⁽¹⁵⁾ Another physician feedback intervention sent providers information regarding their patient's adherence to inhaled corticosteroid (ICS) use as compared with prescribed doses.⁽³⁸⁾ Although case management, another successful organizational intervention for high risk children, is usually reimbursable it is not standard practice in all health care settings. Moreover, case management is often inadequately structured to significantly impact inner-city children with complex social needs such as family mental health issues⁽¹⁸⁾ or poor quality housing.

Alternate health care delivery models, school-based and mobile health vans, have shown potential to impact system/organizational barriers to preventive care for inner-city children

with asthma. One promising intervention is an asthma therapy program consisting of monitoring asthma control + administering daily preventive medications and is delivered in public schools.⁽³⁹⁾ Based on the research team's prior successful model using directly observed therapy (DOT) of preventive medications to children with persistent asthma by school health staff,⁽³⁹⁾ the asthma therapy intervention was improved by the addition of a web-based communication between an asthma care coordinator, the child's health care provider and the school. The intervention is integrated within school and community systems and pilot data indicate that the majority of children received preventive medications during school.⁽⁴⁰⁾

Use of mobile health vans is increasing in popularity as a way to improve access to care for a variety of medical and dental diseases.^(41, 42) The mobile clinics are predominantly utilized at schools that offer the advantages of providing multiple sites for care, eliminating transportation issues, and resulting in decreased missed appointments.⁽⁴²⁾ The Breathmobile program, a mobile health clinic providing specialty asthma care, is an innovative solution to increasing access to specialty care for underserved children with asthma.⁽⁴³⁾ Children attending the Baltimore Breathmobile had significant reduction in symptom free days, urgent care visits and improved controller medication use that resulted in significant and is an effective model of health care delivery for underserved children.⁽⁴¹⁾

Nonadherence by health care providers to national asthma guidelines is another significant challenge to preventive care for inner-city children with asthma. Over a decade ago, national asthma guidelines were published by the National Heart, Lung, and Blood Institute's (NHLBI) National Asthma Education and Prevention Program (NAEPP) as an attempt to standardize, improve quality of asthma care and disseminate best practices for asthma management.⁽⁴⁴⁾ However, provision of preventive asthma medication is strikingly low in minority inner-city children⁽⁵⁾ with rates of anti-inflammatory medication use between 40–60% of inner-city children with persistent asthma,^(9, 20) less than half (44%) receive a written asthma action plan, only half (51%) receive advice regarding environmental control⁽⁷⁾ and only 23–24% of these children are seen by an asthma specialist.^(24, 45) Despite most pediatricians (88%) indicating awareness and access to the guidelines, there is a wide gap between preventive care of children with asthma and the NAEPP guidelines with low rates of adherence by primary care providers.^(9–11) Rates of 39–53% have been reported for specific guideline components with 53% for prescribing corticosteroids and 39% complying with instruction of daily peak flow meter use.^(46, 47) Several reasons for physician nonadherence to the NAEPP guidelines include time and staff limitations for delivery of recommendations, low reimbursement for visits that provide patient education and medication monitoring, clinician low self-efficacy for correctly dosing anti-inflammatory medications and teaching peak flow meter use,⁽⁴⁸⁾ lack of time for education specific to guideline components that involved intensive teaching and counseling,⁽⁴⁷⁾ low self-efficacy about counseling for smoking cessation and clinical inertia or the failure to change therapy when the disease is uncontrolled.⁽⁴⁹⁾ Other reasons for nonadherence to guidelines in part are based on provider beliefs including lack of agreement with safety of long-term corticosteroid use (concerns of cushingoid effects, osteoporosis, growth stunting and cataract development),⁽⁴⁶⁾ clinician underestimation of children's asthma severity,^(13, 50) difficulty convincing parents to administer inhaled corticosteroids when they are concerned about side effects,⁽⁴⁶⁾ and language barriers in families with English as a Second Language (ESL) who may be unable to understand proper medication dosage and administration. In summary, most pediatric providers are aware of the national asthma guidelines, have access to a copy of the guidelines, yet adherence to specific guideline components remains low.

Recommendations to Improve Access to Quality Medical Care

- Provide alternate health care sites for inner-city children with asthma either through school-based asthma programs, community or mobile health care clinics when available.
- Enroll patients into comprehensive disease management or case management programs that provide transportation, appointment reminders and electronic communication with the patient's health care provider to improve quality of care and monitor asthma status on a regular basis.
- Encourage endorsement of national asthma guidelines by local pediatric professional organizations (American Academy of Pediatrics (AAP), National Association of Pediatric Nurse Practitioners and Nurses (NAPNAP) and National Association of School Health Nurses NASN) to improve pediatric health care provider awareness and use of national asthma guidelines.^(9, 46, 47)
- Provide practical workshops for health care providers, parents and children to provide hands on experience with asthma devices, medications, and smoking cessation counseling.

3. Psychosocial factors

Several psychosocial factors are also known to create barriers to preventive care for children with asthma. In particular, caregiver psychological symptoms and life stress related to residence in low-income, inner-city communities negatively influence decisions about asthma self-management and increase asthma morbidity through treatment non-adherence and unnecessary healthcare utilization.^(51–55) Both caregiver anxiety and depressive symptoms are associated with poor asthma outcomes^(56, 57) but research with inner-city populations increasingly suggests that caregiver depression is a particularly strong predictor of child asthma attacks⁽⁵⁸⁾, ED visits,⁽⁵⁹⁾ and hospitalizations.⁽⁶⁰⁾ Even when the child's asthma severity is taken into account, caregivers with high levels of depressive symptoms are 30% more likely to report an ED visit by their child than those with low symptomatology.⁽⁶¹⁾

It is well established that successful asthma self-management requires the caregiver to possess both skill competencies and focused attention to carefully assess and monitor the child's symptoms, administer the correct dosage of preventative medication and stepped up therapy when needed, and to be cognizant of environmental hazards such as mold, rodent infestation, and dust.^(44, 62) However, depressive symptoms may reduce the caregiver's capacity for quick and critical thinking that is essential to proper decision-making about asthma management and healthcare utilization.^(63, 64) The clouded judgment may in turn result in avoidable ED and urgent care visits.

Life stress associated with inner-city residence similarly creates barriers to preventive care by disrupting asthma self-management activities.⁽⁶⁵⁾ Intimate partner violence (IPV), one example of life stress, is related to poorer health outcomes. The relationship of IPV and asthma in children was examined using the Behavioral Risk Factor Surveillance System (BRFSS) survey conducted in ten U.S. states/territories. Women who experienced IPV at any point in their lifetime were significantly more likely to report that their children ever had or currently have asthma compared to women who had never experienced IPV.⁽⁶⁶⁾

Both acute (e.g., exposure to violence) and chronic (e.g., housing instability, poverty) stressors divert attention away from monitoring the child's symptoms and administering controller medicine.⁽⁶⁷⁾ Simply stated, inner-city, low-income caregivers mobilize sparse

resources to support “the family’s daily survival and future stability” (pg. 706).⁽⁶⁸⁾ Adverse social conditions create a barrier to preventive care when a caregiver’s physical, financial, and psychological resources are consumed in their efforts to ensure the safety and well-being of the family unit, leaving little time or energy for proper asthma self-management. In summary, caregiver depression symptoms and life stress may erode their ability to perform asthma self-management behaviors as prescribed by the NHLBI, leading to increased asthma morbidity, healthcare utilization, and cost.

Recommendations for to Improve Psychosocial Challenges

- Provide regular screening of caregiver depression in child asthma clinical encounters with referrals to community mental health treatment providers for follow-up care.
- Provide screening for IPV during child asthma encounters and make appropriate referrals to mental health treatment and community resources to address IPV.
- Caregivers of inner-city minority children with asthma may benefit from counseling strategies to help them cope with contemporary life stressors associated with poverty.⁽⁶⁹⁾

4. Environmental Factors: Home and Neighborhood Characteristics

Physical and psychosocial aspects of the environment both in the home and neighborhood play a significant role in pediatric asthma morbidity. Children in rural environments are at a lower risk of asthma compared to children in urban environments.⁽⁷⁰⁾ In inner city environments, air pollution is one significant factor. Yet, the home serves as another primary source of allergen and irritant exposures for children contributing to an increased sensitization to allergens.⁽⁷¹⁾ Allergen sensitivity and exposure are associated with increased asthma morbidity, particularly in sensitized individuals with asthma.⁽⁷²⁾ The factors associated with this increased sensitization are often related to poverty and poor housing conditions in inner cities and low-income children are more frequently exposed to environmental triggers than non-poor children⁽⁷³⁾ including high levels of indoor allergens.⁽⁷⁴⁾ Substandard housing conditions result in exposure to high cockroach and mouse allergen levels⁽⁷⁵⁾ dust mites, and mold related to water and roof leaks. Increased moisture in the home not only augments mold growth but provides a rich environment for dust mite proliferation. A recent study that pooled allergen, housing conditions, and other data from nine asthma studies found that high cockroach allergen was associated with cracks or holes in walls, high dust mite allergen with mold odors, and mouse allergens with signs of rodents.⁽⁷⁶⁾ Furthermore, water leaks and below average housekeeping was associated with high cockroach allergen. Increased moisture in the home not only augments mold growth but provides a rich environment for dust mite proliferation. Without pest management, these infestations result in high allergen load in the home resulting in an increased risk of an asthma exacerbation. These high indoor exposures are supported by observation in our current cohort of 300 inner-city children with asthma who reported high levels of rodent and cockroach exposure (mice: 46%; cockroach infestation: 28%). (Table 1)

Other indoor exposures include nitrogen dioxide associated with the use of gas stoves and exposure to second-hand smoke (SHS). Both indoor nitrogen dioxide exposure and SHS are associated with negative respiratory effects in asthma.⁽⁷⁷⁾ In a recent study of 469 families of children with asthma in a large city, gas stoves were present in 88% of the homes and the median level of indoor nitrogen dioxide was high.⁽⁷⁷⁾ This higher nitrogen dioxide level was related to lower peak flow levels among the children during the colder months.⁽⁷⁷⁾ Another prevalent indoor exposure for children is second hand smoke. Importantly, between 40–67% of inner-city children with asthma reside with at least one smoker.⁽⁷³⁾ This has

important implications for children living in substandard housing with poor ventilation. Objective evidence of SHS exposure in a large study of children with asthma reported that the median level of cotinine/creatinine, a biomarker for SHS exposure, was 42.4 ng/mg in children living in homes with a smoker as compared to 18.0 ng/mg in children not residing with a smoker.⁽⁷⁷⁾ Our data confirm the high prevalence of SHS exposure in inner-city children with asthma, with over half (59%) of the children residing with a smoker in their home. (Table 1)

Besides the physical home environment, psychosocial aspects of neighborhoods and communities influence asthma morbidity. Even though some communities may share low SES and environmental exposures, such as poor housing or high outdoor pollution, they may not share excess asthma morbidity.^(67, 78–80) This paradox has resulted in studies examining the role of psychosocial factors within neighborhoods to help explain these differences. For example, researchers have found that individual perceptions of stressors related to living in high risk neighborhoods and actual community level indicators are also significantly related to asthma morbidity. Community level stressors include poverty, unemployment or underemployment, limited social capital, and high crime and violence exposure.⁽⁸⁰⁾ Exposure to community violence is one specific factor related to asthma morbidity. Caretakers of children with asthma and who were exposed to community violence, reported more lost sleep and symptom days among their children.⁽⁸¹⁾ In a recent longitudinal study of children with asthma under the age 10 years and residing in Chicago, community violence was also associated with increased asthma risk, although it did not fully explain asthma risk when controlling for individual level and other neighborhood level factors.⁽⁸²⁾

On the other hand, protective factors at the community level have been described. Cagney and colleagues, for example, studied the paradox of foreign born Latinos having a respiratory health advantage if they lived in an enclave of other foreign born Latinos. The explanation for this protective advantage was described as the sense of cohesiveness or collective efficacy present in the community.⁽⁷⁸⁾ This level of trust and attachment within a community maybe protective for families who feel a sense of cohesiveness and know they can rely on neighbors for assistance if their child has asthma symptoms.⁽⁶⁷⁾

Recommendations for to Improve Physical and Neighborhood Factors

- Assist families to identify specific allergen triggers for their child including awareness of both indoor and outdoor allergens and air pollutant exposures. Provide individualized and comprehensive education about simple household preventive measures such as use of mousetraps, cockroach bait, and repair of water leaks to avoid mold exposure.
- Provide smoking cessation resources to families with smoker in the home. National Quitline 1-800-Quit Now.
- Families living in substandard housing may benefit from referral and counseling strategies to help them seek alternative living conditions.
- Assess for exposure to violence; referral to stress reduction program or to programs that provide counseling to those exposed to violence.
- Promote social cohesion in communities and build social capital (i.e., connections within and between social networks) to create better living conditions to improve health.

5. Cost of challenges to providing preventive care to inner city children with asthma

Costs create challenges with respect to asthma generally and asthma preventive care specifically in a number of ways. First, asthma is costly for families. A recent report indicated that the mean out of pocket costs for medication related to asthma was \$151 for children younger than 5 years and just slightly higher (\$154) for children ages 5–18.⁽⁸³⁾ Another study, this time focusing on families of children with asthma in which an adult is employed, found that children having asthma was associated with higher employee costs (health care, prescriptions, sick leave, and short-term disability) and the children's health care (\$862) and prescription spending (\$534).⁽⁸⁴⁾ With a 20% copayment (common in many insurance policies) the combination of health care and prescriptions for children would result in approximately \$280 of additional out-of-pocket costs per year for the family.

A key in interpreting these results is to recognize that these costs are not a small amount for families in difficult economic situations and asthma in general (and uncontrolled asthma specifically) are associated with poverty.⁽¹⁾ The resources required for routine asthma care compete with other uses of familial resources including child care for other children and a variety of costs to help improve the environment. For example, extermination for mice and cockroaches, air cleaners in the child's bedroom, and mattress covers for dustmite prevention are all non-negligible expenses and usually not covered by insurance. These preventive activities may be given even lower priority than preventive medications as the impacts are apparent only in the longer term and individuals with limited financial resources tend to focus on uses of resources with the most immediate outcomes.

Summary and Implications

In summary, preventive asthma care for inner-city children is challenging due to multiple health care system/organizational, caregiver and family, health care provider, psychosocial and environmental factors that negatively impact preventive care. (Table 2) Several recommendations to minimize the barriers to preventive asthma care are suggested for pediatric nurses who care for these high risk children across multiple settings. To enhance asthma self-management and reduce barriers to preventive care, clinical work with this population must extend beyond screening for traditional environmental risk factors (e.g., allergens and irritants) to also include comprehensive assessment of caregiver attitudes and beliefs, caregiver stressors and targeted referrals for modifiable psychosocial stressors that influence caregiver behaviors. Further, pediatric health care providers can monitor the level of stress, anxiety, or depression and recommend either management strategies or links to services that might help them to manage these stressors. Because exposure to allergens and irritants plays a significant role in asthma morbidity, families may need assistance with identification of specific allergen triggers, awareness of indoor and outdoor exposures and their effects on children with asthma. Effective allergen and pollutant exposure remediation involves individualized and comprehensive family education about household preventive measures such as use of mousetraps, cockroach bait, and repair of water leaks to avoid mold exposure. Last, endorsement of national guidelines by local pediatric professional organizations to improve pediatric health care provider awareness and use of national asthma guidelines is recommended.

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Key Points

1. Major challenges to preventive asthma care are encountered by inner-city children and include family and patient attitudes and beliefs, lack of access to quality medical care, psychosocial and environmental factors.
2. Pediatric nurses can impact these challenges by identifying parental attitudes and beliefs about asthma medications, parental depression and stress, and environmental exposures. Remediation of these challenges may require referral to community resources such as asthma specialist, community mental health clinics, and smoking cessation clinics.
3. Alternate or supplemental health care sites such as school-based asthma programs, community or mobile health care clinics or disease case management programs may enhance access to preventive care for high risk inner city children.

Figure 1.
Challenges to Preventive Care for Inner-city Children with Asthma

Table 1

Baseline Characteristics of Inner-city Children with Persistent Asthma enrolled in Pediatric Asthma Alert Intervention N=300

Characteristic	Number (%)
Child age	
Mean (SD)	5.65 (2.2)
Race/Ethnicity	
African American	286 (95.4)
Hispanic/Latino	3 (1.0)
White	4 (1.3)
Other	7 (2.3)
Health Insurance Type	
Medicaid	275 (91.7)
Private	24 (8.0)
Self-pay	1 (0.3)
Caregiver Characteristics	
Caregiver Age	
Mean (SD)	31.5 (7.0)
Marital Status	
Single	210 (70.0)
Married	56 (18.7)
Other	34 (11.3)
CES-D (n=298)	
16 (Clinical cut off for depressive symptoms)	102 (34.2)
Caregiver Daily Life Stress	
Mean (SD) (Range: 0 = No stress and 10= high stress)	6.33 (2.9)
Caregiver Asthma Life Stress	
Mean (SD) (Range: 0 = No stress and 10= high stress)	5.16 (3.7)
Child Health Characteristics	
Symptom Days past 2 weeks	
0–3	98 (32.7)
4 or more (not controlled)	202 (67.3)
Symptom Nights (N=299)	
0–2	101 (33.8)
3 or more (not controlled)	198 (66.2)

Characteristic	Number (%)
Number of ED visits for asthma past 6 months	
None	13 (4.4)
1–2	157 (52.3)
3 or more	130 (43.3)
Routine preventive asthma care visits past 6 months	
None	29 (9.7)
1	75 (25.0)
2	76 (25.3)
3 or more	120 (40.0)
Seen by asthma specialist last 2 years	
YES	58 (19.3)
Asthma Action Plan in the home	
Yes	103 (34.3)
Uses a Spacer for inhaled medications	
Yes	276 (92.0)
Uses a Peak Flow meter in home	
Yes	73 (24.3)
Use Home Remedies for Asthma (n=296)	
Yes	100 (33.8)
Worried or concerned about child's asthma medications and side effects ^a (N=299)	
Very, Very worried or Very worried	92 (30.8)
Fairly or Somewhat or A little worried	65 (21.7)
Hardly or Not worried	142 (47.5)
Smoker in the home	
Yes	177 (59.0)
Cockroaches in home	
Yes	84 (28.0)
Mice in the home	
Yes	137 (45.7)
Violence Exposure (Seeing violence in the neighborhood)	69 (23.0)

^aItem from Pediatric Asthma Caregivers Quality of Life Questionnaire (85)

Table 2

Summary of Recommendation by Challenge

Challenge	Recommendations
Caregiver and Family Attitudes and Beliefs about Asthma Care	<ul style="list-style-type: none"> Identify and discuss parental attitudes, beliefs and worries about medications Teach parents and school age children specific and non-specific symptoms of asthma and identify child symptom descriptors for parents and teachers to understand. Monitor younger and newly diagnosed children with asthma more frequently due to evolving ability to recognize asthma symptoms.
Lack of Access to Quality Medical Care	<ul style="list-style-type: none"> Provide alternate health care sites such as school-based asthma programs, community or mobile health care clinics when available. Enroll patients into comprehensive disease management or case management programs. Encourage endorsement of guidelines by local pediatric professional organizations (American Academy of Pediatrics (AAP), National Association of Pediatric Nurse Practitioners and Nurses (NAPNAP) and National Association of School Health Nurses NASN) to improve pediatric health care provider awareness and use of national asthma guidelines. Provide practical workshops to provide hands on experience with asthma devices, medications, smoking cessation counseling and models of asthma care.
Psychosocial Factors	<ul style="list-style-type: none"> Regular screening of caregiver depression in child asthma clinical encounters with referrals to community mental health treatment providers for follow-up care. Caregivers of inner-city minority children with asthma may benefit from counseling strategies to help them cope with contemporary life stressors associated with poverty.
Environmental Factors	<ul style="list-style-type: none"> Assist families to identify specific allergen triggers for their child. Provide individualized and comprehensive education about simple household preventive measures such as use of mousetraps, cockroach bait, and repair of water leaks to avoid mold exposure. Provide smoking cessation resources to families with smoker in the home. National Quitline 1-800-Quit Now. Families living in substandard housing may benefit from referral and counseling strategies to help them seek alternative living conditions. Assess for exposure to violence; referral to stress reduction program or to programs that provide counseling to those exposed to violence. Promote social cohesion in communities and build social capital (i.e., connections within and between social networks) to create better living conditions to improve health.