Published in final edited form as:

J Pediatr Health Care. 2018 ; 32(6): 612–619. doi:10.1016/j.pedhc.2018.05.006.

Provider Counseling About Secondhand Smoke Exposure for Urban Children With Persistent or Poorly Controlled Asthma

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Abstract

Urban children continue to be exposed to secondhand smoke (SHS), and this is particularly concerning for children with asthma. The objective of this study is to describe SHS exposure among urban children with asthma and assess SHS counseling delivered at primary care visits. We interviewed caregivers of 318 children (2–12 years) with persistent asthma at the time of a health care visit and reviewed medical records. We found that one third (32%) of children lived with a caregiver who smoked and that 15% lived with other smokers. Children whose care-givers smoked had the lowest prevalence of home smoking bans compared with homes with other smokers and no smokers (65% vs. 72% vs. 95%, respectively). Overall, 67% of caregivers received some SHS counseling. Providers most often counseled caregiver smokers; counseling occurred less frequently for caregivers in homes with other or no smokers. Further efforts to improve provider SHS counseling for all children with asthma are needed.

Keywords

Asthma; secondhand smoke; health care provider; counseling

INTRODUCTION

Asthma is one of the most common chronic conditions of childhood, and it affects minority children in under-served urban populations disproportionately (Bloom, Cohen, & Freeman,

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Conflicts of interest: None to report.

2010; Kitsantas, Kornides, Cantiello, & Wu, 2013; Pacheco et al., 2014). These children are also more likely to be exposed to respiratory irritants that exacerbate asthma symptoms, including secondhand tobacco smoke (SHS). Tobacco smoke exposure clearly increases asthma morbidity, including nocturnal symptoms, frequency of exacerbations, emergency department visits, and probability of intubation (Beeber, 1996; Evans et al., 1987; Halterman, Aligne, Auinger, McBride, & Szilagyi, 2000; Lee & Le, 2013; LeSon & Gershwin, 1995; Morkjaroenpong et al., 2002; Strachan & Carey, 1995; Wisnivesky et al., 2008). In fact, the National Heart, Lung and Blood Institute's guidelines for the management of asthma specifically recommend that primary care providers assess smoke exposure at each office visit to provide cessation counseling and recommend measures to reduce exposure to smoke (Dubay & Kenney, 2002).

Although counseling about the harms of smoking and smoke exposure by a medical provider can effectively support smoking cessation and lead to reduced exposure in homes (Emmons et al., 2001; Wall, Severson, Andrews, Lichtenstein, & Zoref, 1995; Winickoff et al., 2013), such counseling is not delivered consistently in the primary care office (Beck, Daughtridge, & Sloane, 2002; Frankowski, Weaver, & Secker-Walker, 1993; Winickoff et al., 2005; Zapka et al., 1999; Zapka et al., 2000). For caregivers of children with asthma, this represents a significant loss of opportunity (McQuaid, Walders, & Borrelli, 2003; Piper et al., 2013; Wall et al., 1995; Winickoff, Hibberd, Case, Sinha, & Rigotti, 2001; Winickoff, Hillis, Palfrey, Perrin, & Rigotti, 2003) to address a substantial contributing factor to asthma morbidity (DiFranza, Aligne, & Weitzman, 2004; Ehrlich et al., 2001). Parents may be more likely to visit their child's doctor than their own primary care provider (Winickoff et al., 2013), highlighting the need for pediatric providers to routinely address SHS smoke exposure and smoking cessation with parents.

Missed opportunities for providers to address smoking and smoke exposure with caregivers of children with asthma have been reported (Wall et al., 1995; Winickoff et al., 2001); however, less is known about how smoking counseling rates may differ for caregivers who smoke compared with non-smoking caregivers. Some nonsmoking caregivers live in a home where there are no smokers at all, and some live in a home where there are other people who smoke. Although counseling about children's smoke exposure may seem most pertinent for a caregiver who is a smoker, nonsmoking caregivers might be seeking advice on strategies to reduce or eliminate smoke exposure in their homes. The objectives of this study were to (a) describe SHS exposure among a high-risk population of urban children with persistent asthma and (b) assess differences in smoke exposure and the delivery of secondhand smoke (SHS) counseling among 3 subgroups: caregivers who smoke, nonsmoking caregivers with other smokers in the home, and no-smoking caregivers with no smokers in the home.

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METHODS

Setting and Participants

This study uses data from the Prompting Asthma Intervention in Rochester -Uniting Parents and Providers (PAIR-UP) intervention, a cluster randomized trial conducted in 12 primary care offices in urban Rochester, NY ([www.clinicaltrials.gov](https://www.clinicaltrials.gov/ct2/show/study?term=PAIR-UP&rank=1) identifier: NCT01105754; Halterman et al., 2014). The six intervention practices included provider and caregiver prompting at the time of an office visit to optimize communication between providers and caregivers and promote delivery of preventive asthma care. Six other practices were assigned to the usual care arm of the study. For this study, we used data from the six usual care practices that did not receive the prompting intervention. Eligible participants included caregivers of children 2 to 12 years old with persistent or poorly controlled asthma symptoms based on National Heart, Lung and Blood Institute guidelines. Families were enrolled in the waiting room before their visit with a health care provider. Eligible health care visits included well-child visits, asthma-related visits, and any other visit in which the child was seen by a physician or nurse practitioner (excluding nurse-only visits for immunizations or forms). Families were excluded if they spoke a language other than English or Spanish, if the child had another chronic condition, or if the family did not have access to a telephone for follow-up surveys. Written informed consent from the primary caregiver and assent from children 7 years or older was obtained with an 80% participation rate. Both the University of Rochester and Rochester General Health System's institutional review boards approved the study protocol.

We collected information regarding asthma severity, smoke exposure, and child and family demographics in person, in the waiting room before the child's visit with the health care provider. We conducted telephone surveys within 2 weeks of the health care visit, as well as structured medical record reviews, to assess the providers' discussions about SHS and SHS counseling delivered at the time of the health care visit. All surveys were administered in either English or Spanish, based on the caregiver's preference.

Assessment of SHS Exposure

In the initial survey, we asked caregivers if they currently smoked tobacco cigarettes, cigars, or pipes, and we also asked if anyone else living in the child's home smoked tobacco products. We divided the sample into three groups: (a) caregiver smokers (including smoking caregivers living with no other smokers in the home and smoking caregivers who live with other smokers), (b) only other smoker (non-smoking caregivers with at least one other person in the home who smokes), and (c) no smokers' (none of the individuals living in the child's home smoke).

We also inquired about home and car smoking rules and defined a smoking ban as no smoking allowed in the home or car, with no exceptions (Biener, Cullen, Di, & Hammond, 1997; Bleakley, Hennessy, Mallya, & Romer, 2014; Wakefield et al., 2000). A total smoking ban was defined as having both a home smoking ban and a car smoking ban. We also asked caregivers if any visitors smoked in the home in the prior 7 days and whether the child was exposed to SHS in a car in the past 7 days (Hovell et al., 1994; Matt et al., 1999). We

defined *any SHS exposure* to include any of the following: any smokers living in the home, no smoking bans, and someone smoked in the home or car in the past 7 days.

Assessment of Provider SHS Counseling

During the telephone follow-up survey, which was completed within 2 weeks of the index visit, caregivers were asked specific questions to assess whether their child's provider discussed the harms of SHS and provided counseling to reduce SHS at the time of the visit. These questions included items adapted from the Social Climate Survey of Tobacco Control, such as *Did your child's doctor tell you that smoke exposure can make your child's asthma symptoms worse?*, *Did your child's doctor discuss the importance of having a no-smoking rule in your home, with no exceptions?*, and *Did your child's doctor talk about how you can decrease your child's exposure to smoke?* (McMillen, Winickoff, Klein, & Weitzman, 2003). We also conducted structured medical record reviews to assess the provider's documentation of SHS exposure assessment and counseling at the visit. We consider counseling to have occurred if either the caregiver or provider indicated discussion or counseling during the visit.

Assessment of Covariates

Family demographics, including child's age, race (White, Black, or other), ethnicity (Hispanic or not Hispanic), Medicaid/public insurance coverage (yes/no), caregiver education (<high school or high school), caregiver marital status (married/domestic partner or single), and caregiver language preference (English or Spanish) was ascertained at the initial visit.

Using a structured survey, caregivers reported their child's asthma symptoms and severity based on the national guideline criteria (Cloutier, Wakefield, Carlisle, Bailit, & Hall, 2002); children were categorized as having either mild persistent or moderate/severe persistent asthma. Caregivers reported the reason for their child's visit, and visits were categorized as either a well-child examination, asthma-related visit, or other illness/follow-up visit. We collected information on provider type (medical doctor/doctor of osteopathic medicine vs. nurse practitioner/physician assistant) and whether the provider was the child's primary care provider (yes/no) via the medical record review.

Analysis

We performed analyses using IBM SPSS, version 22.0 software. Chi-square and analysis of variance tests were used to compare SHS exposure and SHS counseling between care-giver smokers, other smokers, and no smokers. We used multivariate logistic regression analysis to assess SHS counseling provision by who smokes in the home, controlling for potentially confounding variables including insurance, child race, marital status, reason for visit, primary care provider, and asthma severity. A two-sided alpha less than .05 was considered statistically significant.

RESULTS

Overall, 318 families were recruited into the six control practices (participation rate = 80%). We were able to complete initial follow-up interviews and medical record reviews for 298 (94%) participants. Table 1 reports the demographic and baseline characteristics of the participants. Most children were male (60%), 32% were Black, 40% were Hispanic, and 67% were covered by Medicaid/Public insurance, with a mean age of 6.7 years. All children had persistent asthma, and many experienced moderate to severe persistent asthma symptoms (61%). A quarter (24%) were being seen for an asthma-related visit. Most children (64%) saw a physician during their visit, 36% saw a nurse practitioner or physician assistant, and 61% were seen by their routine primary care provider (rather than another provider in the practice). Forty-one percent of caregivers were married, 77% had a high school education or higher, and 31% spoke Spanish. A third (32%) of caregivers reported smoking tobacco, and almost half of the children lived with one or more smokers (47%). The proportion of children who lived with a smoker was higher among those reporting Black race, those with Medicaid/Public insurance, and those who lived with an unmarried caregiver (Table 1).

Overall, 53% of families reported any SHS exposure. Table 2 shows SHS exposure among children with caregiver smokers, other smokers, and no smokers living in the home. Home smoking bans were reported less frequently in families with caregiver smokers and other smokers, compared with no smokers (65% vs. 72% vs. 95%, $p < .001$), with similar trends reported for car smoking bans (73% vs. 76% vs. 97%, $p < .001$) and total smoking bans (51% vs. 59% vs. 93%, $p < .001$). Furthermore, approximately one third of children living with caregiver smokers and other smokers were exposed to SHS through someone smoking in the home in the prior 7 days (35% and 31%, respectively).

When considering discussions about smoke at the time of the health care visit, overall, more than two thirds of care-givers (67%) received some form of SHS discussion or counseling, but fewer caregivers were asked about smoking in the car (42%) or counseled about how to decrease SHS exposure (48%) or the importance of implementing a no-smoking rule in the home (42%) and car (42%). Figure 1 displays primary care provider SHS counseling delivered at the time of the health care visit for caregivers who smoke compared with nonsmoking caregivers living with other smokers, and caregivers with no smoking in the home. Providers most often counseled caregiver smokers (83%) yet specifically discussed how to decrease their child's SHS exposure only 64% of the time even among this group. Overall counseling occurred less frequently among non-smoking caregivers with other smokers in the home (72%) and among caregivers with no smokers in the home (56%). Providers infrequently provided documentation of SHS exposure and SHS counseling, with only 28% recording SHS exposure (or lack of exposure) in the medical record and 5% documenting that SHS counseling occurred at the visit.

Table 3 shows the results of multivariate regression analysis exploring SHS counseling provision by who smokes in the home, controlling for potentially confounding variables (insurance type, child race, marital status, reason for visit, primary care provider, and asthma severity). Compared with the caregiver smoker group, there were lower odds among the no

smoker group for the child's provider to counsel that SHS can make asthma worse (odds ratio [OR] = 0.34, 95% confidence interval [CI] = [0.18, 0.62]), provide strategies to reduce SHS exposure (OR = 0.37, 95% CI = [0.21, 0.67]), discuss the importance of home smoking bans (OR = 0.39, 95% CI = [0.22, 0.69]), and to deliver any form of SHS discussion or counseling (OR = 0.30, 95% CI = [0.15, 0.60]). Similarly, those in the other smoker group had significantly lower odds of their child's provider discussing that SHS can make asthma worse (OR = 0.35, 95% CI = [0.16, 0.76]) compared with those in the caregiver smokers group.

DISCUSSION

Secondhand tobacco smoke exposure is clearly harmful for children with asthma (Abulhosn, Morray, Llewellyn, & Redding, 1997; Canadian Paediatric Society, 1986; Chilmonczyk et al., 1993; Institute of Medicine, 2000; Mannino, Homa, & Redd, 2002; Murray & Morrison, 1988, 1989; Oddo et al., 1999; Strachan & Cook, 1998; Weiss, Tager, Speizer, & Rosner, 1980), and provider counseling is recommended at each visit to support caregivers' efforts to decrease their children's exposure (Fagnano, Conn, & Halterman, 2008; Mannino, Moorman, Kingsley, Rose, & Repace, 2001; U.S. Department of Health and Human Services, 2006). For this study, we aimed to explore SHS exposure among a high-risk group of urban children with persistent asthma and to assess SHS counseling provided by pediatric primary care providers to caregivers who smoke, as well as to nonsmoking caregivers who either live with other smokers or live with no smokers in the home.

Consistent with prior studies, we found that exposure to SHS continues to be high in this vulnerable population (Blaakman, Tremblay, Halterman, Fagnano, & Borrelli, 2013; Ferrante et al., 2014; Lang et al., 2013). Almost half of the children in our sample lived with a smoker, and a quarter of families did not ban smoking in their homes and cars. This is particularly striking because all of the children included in this study had persistent asthma. Although there have been substantial efforts to reduce rates of cigarette smoking in the United States, including increasing taxes on cigarettes, implementing public smoking bans, requiring warning labels, and disseminating graphic advertising, smoking rates continue to be high among low-income, minority populations (Clark, Leventhal, Ahluwalia, & Cropsey, 2015). Unfortunately, this results in children's continued exposure to harmful environmental tobacco smoke.

Young children should have routine health maintenance visits with their primary care providers at least annually (Bloom, Jones, & Freeman, 2013), and national asthma guidelines recommend that children with asthma see their provider at least twice a year to provide ongoing symptom monitoring and adjust for asthma therapy as needed (Dubay & Kenney, 2002). However, many children from poor, urban communities do not see their providers routinely (Kirby, Taliaferro, & Zuvekas, 2006; Mead & Fund, 2008), making it even more important to avoid missed opportunities for preventive care when visits occur. For children with asthma, pediatric providers should routinely assess exposure to SHS, educate caregivers on the harms of smoke exposure, and counsel about strategies to reduce SHS exposure. Providers can refer care-givers to their own health care providers for smoking cessation support and nicotine replacement and send specific referrals to community

resources and quit lines. We found that most providers (67%) in our study discussed SHS exposure during their encounters with caregivers of children with asthma. However, they more commonly addressed SHS when the primary care-giver was a smoker. Counseling was less consistently delivered to nonsmoking caregivers, even if they lived with a smoker in the home.

For children with asthma, pediatric providers should routinely assess exposure to SHS, educate caregivers on the harms of smoke exposure, and counsel about strategies to reduce SHS exposure.

One explanation for the higher rates of SHS counseling among the caregiver smoker group is that providers may smell cigarette smoke on the caregiver or children, thus prompting the provider to address SHS during those encounters. Providers have the opportunity to directly provide cessation counseling and resources to a smoker who is present in the office, yet they may be less likely to consider empowering nonsmoking caregivers to address the other smokers living in their homes. It may be more difficult to consider smoke reduction strategies, for example, for a care-giver whose family is living with and is financially supported by a smoker (e.g., grandmother), because the caregiver may not be comfortable enough or able to ask the home owner not to smoke in his or her own home. However, it is important to note that children in the other smoker group had similar rates of SHS exposure to children in the caregiver smoker group; in both cases, more than 30% of caregivers reported that someone smoked in the home in the past 7 days. Although it may be more difficult to limit SHS exposure in this subgroup, it is critical to consider counseling strategies. Suggestions could include strategies to implement smoking bans in the home, providing pamphlets and other educational materials delineating the harms of SHS, and offering smoking cessation resources and referrals for other smokers living in the child's home.

The implementation of home and car smoking bans can be helpful not only in reducing children's exposure to secondhand smoke, but also can help individuals cut down on their smoking and promote smoking cessation (Messer, Mills, White, & Pierce, 2008; Mills, Messer, Gilpin, & Pierce, 2009; Pizacani et al., 2004; Zabolocki et al., 2014). Although many families in this study reported some discussion of SHS or counseling at the health care visit, fewer than half reported specific discussions about the importance of having a home or car smoking ban, and only 48% discussed strategies to help the family decrease the child's SHS exposure. Clear messages about how to reduce SHS exposure may be needed to see long-term benefits of SHS counseling.

There are some limitations to this study. All of the SHS exposure data are based on caregiver report, and rates of SHS may have been underreported because of social desirability bias (McCarville, Sohn, Oh, Weiss, & Gupta, 2013), because we did not have objective SHS exposure data for this study. We assessed provider discussions about SHS and counseling from both caregiver report and medical record review, but few providers documented this discussion in their patients' medical records. Although it is possible that rates of SHS counseling were higher than what was reported, it is likely that if caregivers do not recall that SHS counseling was provided, the counseling had limited effectiveness. This study uses

data from an inner-city sample of children with persistent or poorly controlled asthma who presented at their medical providers' offices, and therefore can be generalized only to similar populations.

Despite these limitations, this study has many strengths. We used data from a large sample of children with significant asthma, and detailed information about their health care encounters was available. Furthermore, the sample includes children enrolled at the time of a health care visit; thus, it is a group able to access to the health care system. Thus this study explores what happens when children are actually seen by their providers, presenting a best-case scenario in terms of providing SHS counseling to a high-risk population. SHS exposure may be even more common among poor, urban children who do not see a health care provider regularly (Clark et al., 2015; Kirby et al., 2006; Mead & Fund, 2008).

SHS exposure remains common and should be assessed regularly for all children with asthma. Among this population of caregivers of a child with persistent asthma presenting to a primary care provider, SHS counseling is commonly delivered to caregivers who smoke. However, further efforts to improve provider SHS counseling for all children with asthma and to provide specific approaches to reduce exposure are needed. Specific strategies to support SHS reduction for caregivers of children living with other smokers should be further studied and promoted.

Further efforts to improve provider SHS counseling for all children with asthma and to provide specific approaches to reduce exposure are needed.

Acknowledgments

This work was funded by a grant from the National Heart, Lung and Blood Institute of the National Institutes of Health (1R01HL091835).

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FIGURE 1.

Caregiver report of health care provider's secondhand smoke discussion and counseling by who smokes in the home. * $p < .05$, ** $p < .001$.

TABLE 1.

Demographics and baseline characteristics

Characteristics	Overall (N = 318)	Caregiver smokers (n = 102)	Other smokers (n = 46)	No smokers (n = 170)	p
Child gender (male), n (%)	191 (60)	54 (53)	25 (54)	112 (66)	.075
Child age in years, M (SD)	6.70 (2.9)	7.10 (3.1)	6.41 (2.8)	6.55 (2.9)	.250
Child Hispanic, n (%)	126 (40)	41 (40)	15 (33)	70 (41)	.568
Child race, n (%)					
White	77 (24)	11 (11)	13 (28)	53 (31)	.002
Black	103 (32)	44 (43)	15 (33)	44 (26)	
Other	138 (43)	47 (46)	39 (39)	73 (43)	
Medicaid/public insurance, n (%)	214 (67)	81 (79)	32 (70)	101 (59)	.003
Caregiver married, n (%)	129 (41)	28 (28)	25 (54)	76 (45)	.002
Caregiver high school education, n (%)	243 (77)	75 (76%)	36 (78)	132 (78)	.921
Caregiver Spanish speaking, n (%)	99 (31)	28 (28)	11 (24)	60 (35)	.208
Child asthma severity: moderate to severe persistent, n (%)	193 (61)	64 (64)	21 (46)	107 (63)	.077
Reason for visit, n (%)					
Well child	119 (37)	36 (35)	21 (46)	62 (36)	.797
Asthma	75 (24)	25 (24)	10 (22)	40 (24)	
Other	124 (39)	41 (40)	15 (33)	68 (40)	
Provider is an MD/DO	187 (64)	62 (64)	22 (52)	103 (67)	.202
Provider is child's primary care provider	183 (61)	55 (56)	26 (58)	102 (66)	.263

Note. DO, doctor of osteopathic medicine; M, mean; MD, doctor of medicine; SD, standard deviation. Boldface values indicate a statistical significance of $p < .01$.

TABLE 2.

Caregiver reported secondhand smoke exposure, *n* (%)

SHS exposure	Overall (<i>N</i> = 318)	Caregiver smokers (<i>n</i> = 102)	Other smokers (<i>n</i> = 46)	No smokers (<i>n</i> = 170)	<i>p</i>
Home smoking ban	242 (81)	65 (65)	33 (72)	144 (95)	<.001
Car smoking ban	255 (86)	73 (73)	35 (76)	147 (97)	<.001
Total smoking ban	219 (74)	51 (51)	27 (59)	141 (93)	<.001
Someone smoked in home in prior 7 days	56 (18)	36 (35)	14 (31)	6 (4)	<.001
Someone smoked in car in prior 7 days	42 (14)	24 (24)	12 (26)	6 (4)	<.001

Note. SHS, secondhand smoke. Boldface values indicate a statistical significance of $p < .001$.

TABLE 3.

Multiple logistic regression models predicting SHS counseling, *OR* [95% CI]

“Did your child’s provider...”	Caregiver smokers (<i>n</i> = 100)	Other smokers (<i>n</i> = 46)	No smokers (<i>n</i> = 152)
... tell you that smoke can make asthma worse?	—	0.35 [0.16, 0.76] *	0.34 [0.18, 0.62] *
... talk to you about how to decrease your child’s exposure to smoke?	—	0.87 [0.40, 1.88]	0.37 [0.21, 0.67] *
... discuss the importance of having a no-smoking rule in home?	—	0.60 [0.28, 1.29]	0.39 [0.22, 0.69] *
... discuss the importance of having a no-smoking rule in car?	—	0.77 [0.36, 1.67]	0.64 [0.36, 1.13]
... specifically ask if anyone in child’s home smokes?	—	0.72 [0.33, 1.56]	0.71 [0.40, 1.27]
... specifically ask if anyone smokes with child in car?	—	1.18 [0.55, 2.52]	0.81 [0.46, 1.43]
... provide any SHS discussion or action?	—	0.57 [0.23, 1.40]	0.30 [0.15, 0.60] *

Note. Regression models include who smokes in home, insurance type, race, marital status, reason for visit, routine primary care physician, and asthma severity. CI, confidence interval; OR, odds ratio; SHS, secondhand smoke.

* Boldface values indicate a statistical significance of $p < .01$.