

Strict Smoke-free Home Policies Among Smoking Parents in Pediatric Settings

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ABSTRACT

OBJECTIVE: To examine strict smoke-free home policies among smoking parents assessed in pediatric offices.

METHODS: We analyzed baseline parental survey data from 10 control practices in a national trial of pediatric office-based tobacco control interventions (Clinical Effort Against Secondhand Smoke Exposure, CEASE). We used logistic regression models with generalized estimating equations to examine factors associated with strict smoke-free home policies.

RESULTS: Subjects were 952 parents who were current smokers. Just over half (54.3%) reported strict smoke-free home policies. Few reported being asked (19.9%) or advised (17.1%) regarding policies by pediatricians. Factors associated with higher odds of policies were child 5 years or younger (adjusted odds ratio [aOR] 2.43, 95% confidence interval [CI] 1.53, 3.86), nonblack race/ethnicity (aORs 2.17–2.60, 95% CIs 1.25–5.00), non-Medicare (HMO/private (aOR 1.84, 95% CI 1.31, 2.58); self-pay/other aOR 1.76, 95% CI 1.12, 2.78); well-child versus sick child visit (aOR 1.61, 95% CI 1.11,

2.34), fewer than 10 cigarettes per day (aOR 1.80, 95% CI 1.31, 2.47), no other home smokers (aOR 1.68, 95% CI 1.26, 2.25), only father smoking (aOR 1.73, 95% CI 1.06, 2.83), and strict smoke-free car policy (aOR 3.51, 95% CI 2.19, 5.64).

CONCLUSIONS: Nearly half of smoking parents did not have strict smoke-free home policies. Parents were less likely to report policies if they were heavier smokers, black, living with other smokers, or attending a sick child visit; if they did not have a young child or smoke-free car policy; if they had a child on Medicaid; and if anyone other than only the father smoked. Few pediatricians addressed or recommended strict smoke-free home policies in an office visit. The pediatric office encounter represents a currently missed opportunity to intervene regarding smoke-free homes, particularly for high-risk groups.

KEYWORDS: environmental tobacco smoke; parental smoking; secondhand smoke; smoking

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WHAT'S NEW

Only about half of smoking parents assessed in pediatric settings had strict smoke-free home policies. Few were asked about or advised to implement a smoke-free home policy. Greater pediatrician intervention is needed to protect children from tobacco smoke exposure.

TOBACCO SMOKE EXPOSURE, defined as exposure to secondhand and thirdhand smoke, poses serious harm to infants and children.^{1,2} Risks of secondhand smoke exposure include sudden infant death syndrome (SIDS), acute respiratory infections and symptoms, otitis media, decreased lung function, exacerbation of asthma, hospitalizations, dental caries, mental health problems, cognitive deficits, and poorer mental health outcomes.^{3,4,5,6,7} Secondhand smoke exposure has also been associated with

school absenteeism in children aged 6 to 11 years.⁸ An emerging literature raises concerns regarding genotoxicity and other potential risks of thirdhand smoke, defined as exposure to toxicants that remain and new toxicants that form after tobacco smoke dissipates.^{9,10} In 2006, the Surgeon General concluded that there is no risk-free level of tobacco smoke exposure,³ and total smoking cessation with 100% smoke-free policies is the only way to protect against exposure.

The majority of tobacco smoke exposure for children occurs at home,³ with 21% of homes in the United States permitting smoking indoors.¹¹ Implementation of smoke-free home policies significantly reduces tobacco smoke exposure^{9,12,13} and associated health risks. For example, a 1% increase in prevalence of smoke-free homes with infants has been shown to decrease SIDS rates by 0.4%.¹⁴ Smoke-free homes are also associated with reduced adolescent smoking, increased quitting

among adults, and lower relapse rates among quitters.^{15,16,17,18,19,20}

A consistent predictor of not having a smoke-free home policy is presence of smokers in the home.^{21,22} Less evidence is available regarding implementation of smoke-free home policies in homes with smokers. Results from the International Tobacco Control Four Country Study suggest that among smokers, higher socioeconomic status, presence of a child (particularly a young child) and other nonsmoking adults, positive attitudes to smoke-free public spaces, lower levels of cigarette consumption, beliefs that secondhand smoke causes cancer and smoke-free spaces are the norm, having fewer smoking friends, and having quit or being in the process of quitting are associated with having a smoke-free home policy.^{23,24,25} In addition, smoke-free homes are more likely when the smoker is male and in homes with no other household smokers,^{17,18} and less likely among African American smokers.^{18,23} However, with the exception of 1 report,²¹ these prior studies were conducted outside of the pediatric office setting and did not specifically focus on parents, and most relied on national and/or retrospective survey data. Thus, the generalizability to parents of children assessed in pediatric practices is unclear.

The pediatric outpatient visit creates a teachable moment to address parental smoking and provide specific feedback on risks to children of home smoking in order to motivate change.²⁶ The current study was conducted in 10 geographically distinct offices nationally and used the immediate context of the pediatric visit, thus providing the best opportunity to date for examining the pediatric setting as a specific venue for addressing smoke-free homes. Understanding current practices regarding intervention and factors associated with smoke-free homes in this specific context may help pediatricians and other child health care clinicians better target interventions for the critical population of parents who smoke, are assessed in pediatric offices, and do not have strict rules prohibiting smoking inside the home. In addition, whereas prior surveys assessed presence of smoke-free home policies, we recognized the possibility of home smoking despite a smoke-free home policy, and only specified the strictly enforced smoke-free home outcome if there was a policy as well as no recent reported smoking in the home.

To our knowledge, this is the first study to use a strictly enforced smoke-free home policy as the outcome, which is more reflective of both the policy and the practice of keeping a smoke-free home. Data for this study were based on exit interviews, which provide the closest approximation of parental behaviors among those who are actually assessed in pediatric practice and which reduce the likelihood of recall bias.

Our goals were to examine the prevalence of parent-reported strict smoke-free home policies, parental report of receiving pediatrician intervention for a smoke-free home, and factors associated with report of having a strict smoke-free home among a large sample of smoking parents assessed in the pediatric office setting.

METHODS

OVERVIEW

This study uses baseline data from the Clinical Effort Against Secondhand Smoke Exposure (CEASE), a national cluster randomized controlled trial of a pediatric office-based intervention with parents for tobacco cessation and implementation of strict smoke-free homes and car policies.^{26,27} The study was conducted in the Pediatric Research in Office Settings (PROS) practice-based research network of the American Academy of Pediatrics (AAP).²⁸ Baseline surveys were conducted from June 2009 to March 2011. Institutional review board approval was obtained from the Massachusetts General Hospital, Boston, the AAP, and local practice institutional review boards when required by the practices. The clinical trials registration number is NCT00664261.

SETTING AND PARTICIPANTS

Data were drawn from the 10 control practices in the CEASE trial. This report is restricted to control practices to better reflect usual care. Data were gathered in exit interviews conducted after patient encounters with pediatricians, by which point pediatricians in intervention practices would have already received training in CEASE intervention protocols. Control practices were located in 8 states (AK, CT, MO, NM, PA, SC, TN, VA) and recruited through the PROS network on the basis of the following criteria: 1) included 3 or more practitioners; 2) not housed within a medical school or university; 3) saw 50 or more patients per day; and 4) saw 10 or more patients per day whose parents smoke. All adults exiting the pediatric office after their child's visit in these practices were eligible for a screening survey if they were able to complete the interviews in English. Interviewees were eligible for the full study if they were the parent or legal guardian of the child assessed that day ("parents"), indicated smoking a cigarette, even a puff, in the past 7 days, were at least 18 years old, had a contact number where they could be reached over the next year, and had not completed the interviews during a prior visit (either for that child or a different one).

PROCEDURES

Research assistants (1 per practice) trained by project staff recruited participants immediately after the child's visit. They approached all adults with children ages 0 to 18 presenting for any type of visit for a 14-item screening survey. Research assistants invited parents who indicated smoking and met all eligibility criteria to participate in the CEASE study; those who consented were asked an additional 14 enrollment survey questions. Participating parents were given \$5 at the conclusion of enrollment. Research assistants enrolled approximately 100 parents per practice.

MEASURES

Items drawn from the screening survey include parent age (18 to 24, 25 to 44, and ≥ 45 years), age of youngest

child at visit (≤ 5 , 6 to 10, and ≥ 10 years to reflect different developmental stages and for comparison to prior research), parent education (highest grade completed: high school or less, more than high school), parent race/ethnicity (Hispanic, non-Hispanic black, non-Hispanic white, other), child insurance status (HMO/private insurance, self-pay, Medicaid, other), reason for visit (well-child visit, sick child visit, other), whether asked and advised about smoking and smoke-free policies (“*At any time in your visit today did anyone ask if you . . . smoke cigarettes? . . . have a smoke-free home? During your visit today, did a doctor nurse or other health care provider advise you to have a smoke-free home? . . . advise you to quit smoking?*”), and smoking behaviors (“*Have you smoked a cigarette, even a puff, within the past 7 days? Are you seriously considering quitting smoking within the next 6 months? . . . within the next 30 days?* [stage of change], *Have you used any other form of tobacco within the past 30 day?*” [coded as pipe/cigar yes/no]).

Items from the Enrollment Questionnaire include number of cigarettes smoked per day (< 10 , ≥ 10 to indicate light vs. heavy smokers), number of other smokers in the home, who smokes (categorized as father only vs. all other combinations), belief about thirdhand smoke harm (“*Breathing air in a room today where people smoked yesterday can harm the health of babies and children*,” coded as agree + strongly agree = agree vs. disagree + strongly disagree = disagree), strict smoke-free home policy (outcome measure: “*During the past 3 months, has anyone smoked anywhere in your home, even a puff*” = no + “*Which of these 3 statements best describes the rules about smoking in your home?* = “*No one is allowed to smoke anywhere*” vs. “*Smoking is permitted in some places or at some times*” or “*Smoking is permitted anywhere*”), and strict smoke-free car policy (as above, no smoking in car in past 3 months + no one is allowed to smoke in car).

ANALYSIS

The primary outcome was parent report of a strict smoke-free home policy. Summary statistics were used to provide descriptive data on the sample (parent and child), followed by bivariate analyses (chi-squares) to examine the relationship between being asked or advised regarding smoke-free homes and receiving advice to quit, and to compare differences between smokers with and without strict smoke-free home policies for individual variables. The final multivariable model of factors associated with having a strict smoke-free home policy included all demographic variables and other variables significant at the .10 level in the latter bivariate analyses. Adjusted odds ratios and 95% confidence intervals were reported for each variable from the final model. To retain the number of observations included in the multivariable model, a “not applicable” (NA) category was created for variables with 10 or more missing values (for NA, child age, $n = 12$; thirdhand smoke belief, $n = 17$; strict smoke-free car policy, $n = 19$). Potential multicollinearity was examined

by the variance inflation factor. Both bivariate and multivariable analyses were conducted using logistic regression models with generalized estimating equations techniques to account for the physician clustering. A 2-tailed $P < .05$ was considered statistically significant. All analyses were conducted by SAS software version 9.3 (SAS Institute, Cary NC).

RESULTS

A total of 981 parents were enrolled in the 10 control practices. Of these, 29 were missing the smoke-free home outcome variable, resulting in a final sample of 952 smoking parents for the current analyses. Parent and child characteristics are presented in Table 1. Over half of parents were of non-Hispanic white race/ethnicity (62.9%) and had children with Medicaid coverage (64.7%). Compared to PROS practices in general, this sample has a higher prevalence of child Medicaid coverage (22% overall for PROS) and is at the high end for participants of a minority group (25% to 36% for PROS).²⁸ Just over half of parents had a high school education or less (58.7%). A similar proportion of parents identified the reason for the visit as a well-child visit (42.7%) or a sick child visit (41.9%). The most common form of parental tobacco use was cigarettes, with few using other forms of tobacco (1.4%, data not shown in Table 1). Just over half of parents reported smoking ≥ 10 cigarettes per day (53.3%) and having other smokers at home (59.1%).

About half of parents reported a strict smoke-free home policy (54.3%), and only one-fifth reported a strict smoke-free car policy. Yet most parents believed that thirdhand smoke is harmful (91.3%). Few reported being asked by their child’s health care provider about smoking (22.9%) or advised to quit (12.2%). Similarly, few reported having been asked whether they had a smoke-free home (19.9%) or advised to have a smoke-free home (17.1%). Among parents who were asked whether they had a smoke-free home, 43.8% had also been advised to quit smoking (vs. 4.7% of those who were not asked about a smoke-free home; $\chi^2(1) = 209.95$; $P < .0001$), and among parents who were advised to have a smoke-free home, 61.7% had also been advised to quit (vs. 2.1% of those who were not advised to have a smoke-free home; $\chi^2(1) = 443.50$; $P < .0001$; data not shown in Table 1).

Table 1 also presents results of bivariate analyses of differences between homes with and without strict smoke-free policies by selected parent and child characteristics hypothesized to predict presence of smoke-free homes among smoking parents. Strict smoke-free home policies were significantly more frequent among families with younger children, those with higher parental education, all racial/ethnic groups relative to non-Hispanic blacks, all payment groups relative to Medicaid, those attending well-child versus sick child visits, lighter smokers, those with no additional household smokers, homes with father only smoking (vs. all other combinations), those who agreed that thirdhand smoke is harmful,

Table 1. Parent and Child Characteristics and Factors Associated With Parent Report of Strict Smoke-free Home Policy (n = 952)

Variable	% Overall	% Policy Present	% No Policy Present	P
Parent reports a strict smoke-free home policy	54.3
Parent age				.071
≥45 y	6.6	41.3 ^a	58.7	
25–44 y	67.4	53.7	46.3	
18–24 y	26.0	59.1 ^a	40.9	
Age of youngest child at visit				.007
>10 y	13.0	36.1 ^{a,b}	63.9	
6–10 y	17.8	47.9 ^{b,c}	52.1	
<5 y	69.3	60.2 ^{a,c}	39.8	
Parent education				.011
High school or less	58.7	49.2	50.8	
More than high school	41.3	61.7	38.3	
Parent race/ethnicity				.033
Non-Hispanic black	18.7	43.8	56.2	
Non-Hispanic white	62.9	55.8	44.2	
Hispanic	13.3	55.9	44.1	
Other	5.0	70.8	29.2	
Child insurance status				.001
Medicaid	64.7	47.6 ^{a,b,c}	52.4	
HMO/private insurance	28.0	66.4 ^a	33.6	
Self-pay	3.6	67.6 ^b	32.4	
Other	3.7	71.4 ^c	28.6	
Reason for visit				.037
Sick child	41.9	47.6 ^a	52.4	
Well child	42.7	60.6 ^a	39.4	
Other	15.4	55.1	44.9	
Parent tobacco use				<.0001
10 or more cigarettes/d	53.3	45.0	55.0	
<10 cigarettes/d	46.7	64.9	35.1	
Parent stage of change				(0.54)
Consider quitting in next 30 d	43.4	54.9	45.1	
Consider quitting in next 6 mo	29.3	56.1	43.9	
Do not consider quitting in next 6 mo	27.3	51.4	48.6	
Other home smokers				<.0001
Any (≥1)	59.1	48.7	51.3	
None	40.9	62.5	37.5	
Who smokes				<.0003
All other combinations	87.3	52.3	47.7	
Father only	12.7	71.4	28.6	
Parent believes thirdhand smoke is harmful				.043
Disagree	8.7	40.7	59.3	
Agree	91.3	55.2	44.8	
Parent reports having a strict smoke-free car policy				<.0001
No	80.2	47.6	52.4	
Yes	19.8	82.7	17.3	

^{a-c}Indicates which subgroups are different at $P \leq .05$ within each characteristic.

and those reporting a strict smoke-free car policy ($P < .05$ or less for all). No differences were found for stage of change.

All demographic variables and those with $P < .10$ in bivariate analyses were entered into the multivariable logistic regression model (Table 2). The variance inflation factor for each variable was <2.5 , indicating no evidence of multicollinearity. The Hosmer-Lemeshow chi-square test was not significant ($P = .49$), indicating an adequate fit for the model. Variables associated with greater likelihood of having a strict smoke-free home policy were having a younger child (≤ 5 years vs. ≥ 10 years), being of any racial/ethnic category other than non-Hispanic black, having a payment status other than Medicaid, attending a well-child versus a sick child visit, smoking

<10 cigarettes per day versus ≥ 10 , having no other household smokers versus any, having father only smoking versus all other combinations, and having a strict smoke-free car policy. Parent age, parent education, and belief in thirdhand smoke harm were not significantly associated with having a strict smoke-free home policy after adjusting for other factors.

DISCUSSION

Overall, about half (54.3%) of smoking parents surveyed at the time of their child's visit to a pediatric office reported having a strict smoke-free home policy. Very few reported having been asked about having a smoke-free home by their child's health care provider

Table 2. Factors Associated With Strict Smoke-free Home Policy in Smoking Parents: Results of Multivariable Logistic Regression Adjusting for Clustering (Generalized Estimating Equations) (n = 948)

Characteristic	aOR (95% CI)
Parent age	
≥45 y	Reference
25–44 y	1.62 (0.84, 3.13)
18–24 y	1.66 (0.80, 3.45)
Age of youngest child at visit	
>10 y	Reference
6–10 y	1.54 (0.95, 2.51)
≤5 y	2.43 (1.53, 3.86)*
Parent education	
High school or less	Reference
More than high school	1.34 (0.99, 1.81)
Parent race/ethnicity	
Non-Hispanic black	Reference
Non-Hispanic white	2.17 (1.43, 3.29)*
Hispanic	2.29 (1.25, 4.18)*
Other	2.60 (1.35, 5.00)*
Child insurance status	
Medicaid	Reference
HMO/private insurance	1.84 (1.31, 2.58)*
Self-pay/other/NA	1.76 (1.12, 2.78)*
Reason for visit	
Sick child	Reference
Well child	1.61 (1.11, 2.34)*
Other	1.45 (0.89, 2.36)
Parent tobacco Use	
10 or more cigarettes/d	Reference
<10 cigarettes/d	1.80 (1.31, 2.47)*
Other home smokers	
≥1	Reference
No others	1.68 (1.26, 2.25)*
Who smokes	
All other combinations	Reference
Father only	1.73 (1.06, 2.83)*
Parent believes thirdhand smoke is harmful	
Disagree	Reference
Agree	1.56 (0.92, 2.65)
Parent reports having a strict smoke-free car policy	
No	Reference
Yes	3.51 (2.19, 5.64)*

aOR = adjusted odds ratio; CI = confidence interval.

* $P \leq .05$.

or advised to implement a smoke-free home (19.9% and 17.1%, respectively). This is in stark contrast to the 82% of parents of children with asthma who reported being asked by a physician or nurse about home smoking in a prior study.²⁹

Parents assessed in the pediatric setting in the current trial were more likely to report having a strictly enforced smoke-free home policy if their household included a young child, had no other household smokers, and was of a higher socioeconomic status (child not on Medicaid); if the parent was of any racial/ethnic category other than non-Hispanic black; if the parent smoked <10 cigarettes per day (vs. ≥10); and if only the father smoked (vs. any other combinations of smokers). These findings were consistent with prior studies in other settings with different populations of smokers and differing methodologies.^{17,18,23,24,25} In addition, for the current sample, being assessed for a well-child visit (vs. sick child visit) and re-

porting a strict smoke-free car policy were associated with report of a strict smoke-free home policy.

Two-thirds or more of families are assessed in the pediatric setting each year, providing a unique—and currently missed—opportunity for providers to intervene regarding strict smoke-free homes.^{30,31} Screening and advising parents who smoke to quit remains critical and is acceptable to parents.^{27,32,33} Adding screening and advising for smoke-free homes can extend protection to all children and provide an interim step for parents not yet ready to quit. At least some evidence supports the effectiveness of such intervention.³⁴ Further research is needed to identify optimal frequency and content of this intervention to avoid overloading parents with anticipatory guidance topics in a single visit³⁵ as pediatricians weigh priorities for intervention with families with whom they often have long-term relationships. However, the magnitude of preventable harm of tobacco smoke exposure for children^{1,2} lends urgency to the need to address cessation and smoke-free homes at all clinical encounters even for parents who were not previously interested, and is consistent with clinical guidelines.^{1,36} Parents who reported being asked or advised regarding a smoke-free home were over 9 times more likely to have also received advice to quit, suggesting that pediatricians can combine these interventions during a patient encounter.

The focus on strict smoke-free home policies (no smoking allowed at all in the home and no smoking, even a puff, actually occurs) signals the importance of messaging regarding complete smoke-free home status even when children are not present. This rubric provides a potentially new way for pediatricians to frame the discussion around a broader cessation imperative³⁷ that stresses that there is no completely safe way to be a parent and a smoker. Strict rules regarding any smoke exposure in the home provide a first step in protecting children and also impose a barrier to smoking that enhances smoking cessation.^{17,18,19,20}

Parents who smoke attempt a variety of strategies to reduce their children's exposure to tobacco smoke exposure, including restricting areas where they smoke, ventilating rooms by opening a window or using a fan, smoking near an open door, and not smoking around the child.^{13,38} These strategies have little or no benefit, and implementing a 100% smoke-free home ban is the only way to meaningfully protect children from tobacco smoke exposure in the setting in which they are most often exposed.^{3,12,39} Even outdoor smoking may not completely eliminate exposure. Parents who smoke outside should be advised to close doors and windows to the home to significantly reduce, though not completely eliminate, in-home exposure,³⁹ as well as to wash hands and even change clothes after smoking. In addition, parents should be advised not to take children outside with them when they smoke. This may pose challenges, particularly to single parents who cannot leave an infant or small child alone while they go outside to smoke. Brainstorming solutions with parents may be important to success.

Understanding factors associated with having a strict smoke-free home can inform clinical interventions. For example, although presence of younger children may sensitize pediatricians and parents to implement change, continued vigilance in advising smoke-free homes for parents of older children is critical to reducing morbidity attributable to tobacco smoke exposure and to decreasing likelihood of tobacco uptake in adolescence.^{9,12,13,16} More intense and/or culturally tailored interventions may be needed for heavier smokers, homes with multiple smokers, lower socioeconomic status patients, and African American families. Pediatricians may be particularly effective in delivering this message by tailoring it to the child's specific illnesses and thus mobilizing parental altruism and concern for their children. Tailored messaging may be particularly applicable during sick visits, which were associated with lower likelihood of having a strict smoke-free home policy. Parents who bring their children to well visits may differ from those who do not, and it is possible that higher risk families may come in more frequently for sick visits. Thus, although well visits may afford more time for discussing tobacco use and home policies, extending intervention to sick visits may provide greater penetration into populations at higher risk for allowing home smoking at a time when personalizing the risk may be most relevant. The increased likelihood of a strict smoke-free home policy when only the father smokes, though likely under representing this subgroup (as most participants were mothers), is consistent with at least 1 prior report.⁴⁰ This finding suggests that mothers may be more influential in setting the smoking policies for the household and may make particularly good partners for intervention. The association between smoke-free homes and cars suggests the importance of concurrently advising strict smoke-free policies in both locations.⁴¹

One limitation of this study is reliance on parent self-report for home and car policies, and other smoking variables. However, the high rate of self-reported parental smoking in homes and the low rate of reporting car policies suggest that parents were willing to provide at least some socially undesirable responses. A second limitation is that pediatricians may have increased their intervention regarding smoke-free homes by virtue of being in this study, even though they were in the control group, particularly because they were aware that their patients were being interviewed immediately after the visit. However, this serves to further highlight the magnitude of the problem, suggesting that the low level of screening and intervention observed may actually be greater than what typically occurs in the pediatric office setting. A third limitation is that the study uses cross-sectional data, which precludes inference of causality. A fourth limitation is that this study was conducted in 10 pediatric practices and with English-speaking parents only. However, the consistency of this current pattern of findings in these pediatric settings with prior research in multiple other settings^{17,18,23,24,25} suggests the stability of results regarding factors associated with smoke-free homes among smoking parents.

In conclusion, the current study demonstrated that nearly half of smoking parents assessed in pediatric settings did not report having a strict smoke-free home policy, and few were asked or advised by the pediatrician regarding such a policy. The resulting tobacco smoke exposure produces serious and preventable risks for children. Pediatricians are uniquely positioned to deliver a message to parents directly relating their smoking behaviors and practices to their children's health. Advising strict smoke-free home policies is critical in parallel with tobacco cessation and as a first step for parents who are not yet willing to quit. Awareness of factors associated with presence and absence of smoke-free homes can guide clinician interventions. If effective, consistent intervention at pediatric visits, including sick child visits, can have significant public health impact through reducing disease risk and preventing later tobacco uptake in children of smokers.

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