

# Implementation of a Parental Tobacco Control Intervention in Pediatric Practice

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## KEY WORDS

Smoking cessation, tobacco smoke exposure, parental smoking, pediatrics, secondhand smoke

## ABBREVIATIONS

AAP—American Academy of Pediatrics  
CEASE—Clinical Effort Against Secondhand Smoke Exposure  
CI—confidence interval  
MGH—Massachusetts General Hospital  
NRT—nicotine replacement therapy  
OR—odds ratio  
PROS—Pediatric Research in Office Settings  
RA—research assistant  
RCT—randomized controlled trial  
TSE—tobacco smoke exposure

Dr Winickoff conceived of and conducted the trial as principal investigator. He conceived of and designed this article, drafted the manuscript and revised it, and takes full responsibility for the final submission. Drs Nabi-Burza, Wasserman, and Ossip made substantial intellectual contributions to the design, analysis, and interpretation of data; edited the manuscript; and revised and approved the final submitted manuscript. Dr Chang advised on and conducted data analyses, participated in the interpretation of results, and approved the final manuscript as submitted. Ms Finch, Drs Woo and Klein, Ms Dempsey, Mr Drehmer, Mrs Hipple, Ms Weiley, and Mrs Murphy made substantial intellectual contributions to the conception and design, editing the manuscript, and approved the final manuscript as submitted. Dr Regan supervised the designing of the data collection instruments data, data collection, managed the database, made significant contribution to the design, critically reviewed the manuscript, and approved the final manuscript as submitted. Dr Rigotti made substantial intellectual contributions to the conception and design of the study, analysis and interpretation of data, editing the manuscript, and approved the final manuscript as submitted.

This trial has been registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (identifier NCT00664261).

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**WHAT'S KNOWN ON THIS SUBJECT:** Young adult smokers frequently encounter the health care system as parents coming in for their child's medical visit. Child health care clinicians, however, do not typically provide smoking cessation assistance to parents.



**WHAT THIS STUDY ADDS:** This national cluster-randomized trial demonstrates that a tobacco dependence intervention for parents can be effectively implemented in routine pediatric outpatient practice.

## abstract



**OBJECTIVE:** To test whether routine pediatric outpatient practice can be transformed to assist parents in quitting smoking.

**METHODS:** Cluster RCT of 20 pediatric practices in 16 states that received either CEASE intervention or usual care. The intervention gave practices training and materials to change their care delivery systems to provide evidence-based assistance to parents who smoke. This assistance included motivational messaging; proactive referral to quitlines; and pharmacologic treatment of tobacco dependence. The primary outcome, assessed at an exit interview after an office visit, was provision of meaningful tobacco control assistance, defined as counseling beyond simple advice (discussing various strategies to quit smoking), prescription of medication, or referral to the state quitline, at that office visit.

**RESULTS:** Among 18 607 parents screened after their child's office visit between June 2009 and March 2011, 3228 were eligible smokers and 1980 enrolled (999 in 10 intervention practices and 981 in 10 control practices). Practices' mean rate of delivering meaningful assistance for parental cigarette smoking was 42.5% (range 34%–66%) in the intervention group and 3.5% (range 0%–8%) in the control group ( $P < .0001$ ). Rates of enrollment in the quitline (10% vs 0%); provision of smoking cessation medication (12% vs 0%); and counseling for smoking cessation (24% vs 2%) were all higher in the intervention group compared with the control group ( $P < .0001$  for each).

**CONCLUSIONS:** A system-level intervention implemented in 20 outpatient pediatric practices led to 12-fold higher rates of delivering tobacco control assistance to parents in the context of the pediatric office visit. *Pediatrics* 2013;132:109–117

Quitting smoking adds an average of 7 years to a parent's life,<sup>1</sup> eliminates most of their children's tobacco smoke exposure (TSE),<sup>2–4</sup> eliminates smoking-related poor pregnancy outcomes for all future pregnancies,<sup>5</sup> addresses the primary cause of house fire mortality,<sup>6,7</sup> decreases the accessibility of cigarettes and odds that teens become smokers,<sup>8–10</sup> and improves the financial resources of disadvantaged families.<sup>11</sup> Therefore, helping parents quit smoking is a critically important national priority. The child health care setting may provide the most frequent and sometimes only access to the health care system for parents who smoke. Parents who smoke are often underserved medically, but see their child's doctor an average of 4 times each year,<sup>12</sup> significantly more than they themselves see a clinician.<sup>13–16</sup> Even modest cessation rates can have a significant impact on the health of families when applied consistently over time and when the disease burden is high.<sup>11</sup> One of 2 smokers will die of an illness attributable to their smoking.<sup>17,18</sup> Missing this opportunity to help parents quit smoking may mean greater cancer and cardiovascular disease risk in this population of young adults.

The effectiveness of smoking cessation strategies is well established. According to meta-analyses from the 2008 update of the US Public Health Service Guideline for the Treatment of Tobacco Use and Dependence,<sup>19</sup> counseling, quitline, and nicotine replacement therapy (NRT) are each more effective than placebo or usual care. Combining these therapies has been demonstrated to be more effective than individual components alone.<sup>19</sup> Furthermore, a meta-analysis recently demonstrated the effectiveness of parental smoking cessation initiated in the pediatric context.<sup>20</sup> Effective strategies to help parents quit smoking are currently not implemented in the pediatric outpatient setting, despite this strong evidence that a child's visit to the doctor provides a teachable moment for

parental smoking cessation.<sup>21–23</sup> Our team has shown that parents accept smoking cessation medications and quitline enrollment in this clinical context.<sup>24,25</sup> The extent to which these evidence-based tobacco control strategies could be routinely implemented in the pediatric outpatient setting is not known. This cluster randomized controlled trial is the first to test whether a tobacco dependence intervention for parents can be effectively implemented in routine pediatric outpatient practice.

## METHODS

### Sample

This cluster randomized controlled trial was conducted in partnership with the Pediatric Research in Office Settings (PROS), the practice-based research network of the American Academy of Pediatrics (AAP). PROS includes more than 700 practice sites throughout the United States.<sup>26</sup> Compared with AAP general practitioners, PROS practitioners are more likely to practice in rural and urban inner-city areas and less likely to practice in suburban areas. As of 2009, PROS involved more than 4% of the nation's 42 000 practicing generalist pediatricians.<sup>27</sup> Visits to PROS practices are comparable to national office visit data from the National Ambulatory Medical Care Survey.<sup>26,28</sup>

For this study, we invited the participation of all PROS practices that (1) included at least 3 practitioners, (2) were not housed within a medical school or parent university, (3) saw at least 50 patients per day, and (4) saw at least 10 patients per day with 1 or more parent smokers. The first 22 practices that responded were enrolled and randomly assigned to intervention or control groups. Sample size calculations were based on having at least 20 practices per arm completing the full study protocol, including accrual of the necessary parent subjects. The sample size calculations assume  $\alpha = 0.05$ ,  $1-\beta$  (power) = 0.80, 2-tailed test of

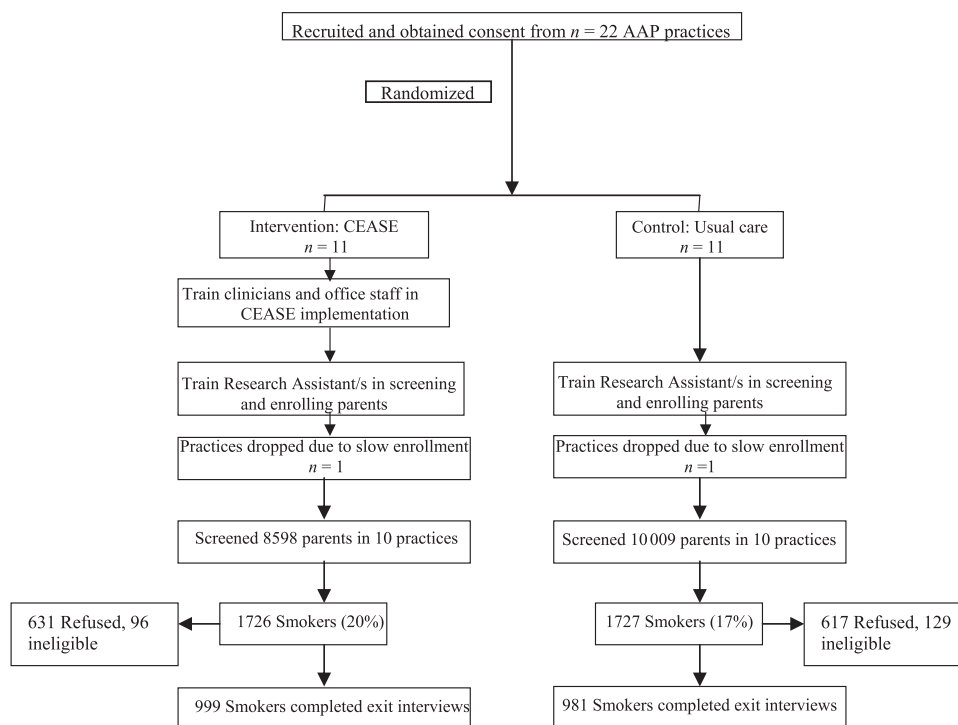
significance, and 20 total practices (10 intervention and 10 control). Each group had only 1 dropout, because of slow subject enrollment defined as <1 subject per day. The 20 practices in which data were collected were located in 16 states Alaska, Virginia, Connecticut, New Mexico, Pennsylvania, Missouri, South Carolina, Tennessee, Massachusetts, Oregon, Ohio, Oklahoma, Illinois, West Virginia, Maryland, and South Dakota. Institutional review board approval was obtained from the Massachusetts General Hospital (MGH), the AAP, and local practice institutional review boards when required by the practices.

### Randomization

Figure 1 displays the study design. Participating practices randomly assigned to intervention or usual care control groups were stratified by the prevalence of smoking among parents in the practice (categorized as  $\geq 30\%$ , 20%–29%, and <20%) and by practice size (dichotomized as more than 4 individual clinicians versus 2–4 clinicians). A random generator (from MS Excel; Microsoft Corporation, Redmond, WA) was used to generate a sequence of group assignments within each of the 6 blocks created by combining the 2 strata. To assign practices to the appropriate stratum of parental smoking prevalence, each participating practice distributed the Practice Population Survey to all parents of patients seen at that site on 3 consecutive days and returned all completed surveys to MGH staff, who entered and analyzed results. MGH staff forwarded baseline smoking rate to PROS staff, who entered each practice identification in the next available slot in the appropriate block in the random allocation sequence. This protocol determined assignment to either the control or intervention group. The practices were aware of their assignment.

### Data Collection

Research assistants (RAs) attempted to recruit a consecutive sample of 100



**FIGURE 1**  
Randomization design.

parents as they exited the pediatric office after their child's visit between June 1, 2009, and March 7, 2011. All adults with children up to the age of 18 years, presenting for any type of visit, were asked to complete a screening survey consisting of 14 questions regarding demographics, reason for visit, whether the parent was asked about smoking rules in the car and/or home, and smoking behaviors. Parents were eligible for the full study if they were the parent or legal guardian of the child seen that day (hereafter referred to as parents), indicated that they had smoked a cigarette, even a puff, in the past 7 days, were at least 18 years old, and had not already enrolled in the study during a prior visit (whether for that child or a different one). The RA invited parents who met all eligibility criteria to participate in the Clinical and Community Effort Against Secondhand Smoke Exposure (CEASE) study, obtained written informed consent, and administered an additional 14-item enrollment survey that included questions

regarding the tobacco control services they received during that day's visit. Participating parents were given \$5 at the conclusion of enrollment. RAs enrolled approximately 100 parents at each practice. If both parents were present and both smoked cigarettes, both were eligible for enrollment.

### Intervention

The intervention was based on 10 years of work on CEASE, an evidence-based system for implementing tobacco dependence treatment of parents in the pediatric setting.<sup>11,16,21,22,29–32</sup> The intervention includes (1) routine screening for parental tobacco use using a CEASE Action Sheet, which helped the office staff identify each smoking family member and document smoking status in the child's medical record; (2) motivational messaging that is based on the parents' own concerns as well as potential teachable moments that may be cued by the child's illness; and (3) recommendation and possible provision of nicotine patch and gum by the clinician,

and enrollment in the free state quitline. The intervention is designed to function within existing systems of care; research staff deliver none of the clinical tobacco dependence treatment. Before the RAs begin parent screening and enrollment, practices completed a chart review of at least 10 charts. Once the practice reached  $\geq 60\%$  of the charts including a completed CEASE Action Sheet, the study team scheduled a start date for the RA to start data collection (usually within 7 days of the practice implementing the intervention).

Practices were first trained to use the CEASE intervention as follows. The principal investigator conducted an initial 1-hour individual training session with the pediatric practice leader to identify necessary office systems changes, followed 1 to 2 weeks later by a 1-hour group session with all available clinical and office staff to discuss how to deliver the 3 critical implementation steps (1. Ask, 2. Assist, 3. Refer) in the context of the clinical office care that they currently delivered. Lunch was offered as an

incentive to improve attendance at the meeting. Brief clinical counseling videos, created for CEASE, covered the likely scenarios that clinicians would encounter with parents who smoke and provided an overview of strategies for integrating tobacco cessation screening, assistance, and referral into visits with parents in the pediatric setting. These videos demonstrate how clinicians who have limited time to see a patient can address tobacco use in the pediatric health care setting, covering strategies, such as eliciting information about interest and readiness to quit smoking, respectfully setting an agenda to discuss smoking, helping the smoker set an action plan for cessation, working with parents to establish a completely smoke-free home and car, and using brief motivational messaging to discuss the effect of tobacco smoke exposure on the child's health. Clinicians were encouraged to watch the videos after the 1-hour group meeting. Continuing medical education credits were offered for attendance at training sessions. Sixty-two child health care providers, including pediatricians, registered nurses, and medical assistants, were trained to deliver the intervention during the course of the study. The approximate training time per clinician is between 2 and 3 hours, which includes attending the training phone call and watching the videos.

Practices were sent office materials, including a smoking cessation pharmacotherapy poster that featured direct to consumer marketing and had a dosing guide for quick reference for those clinicians who wished to prescribe pharmacotherapy, practice-initiated materials like "quit cards" (business cards with quitline information), and a menu of other customizable available materials for display or distribution that could be customized based on the state-specific information, such as the quitline number. Innovative aspects of the intervention included the 3-step Ask, Assist, Refer ap-

proach (as opposed to the more traditional 5 As approach); pediatricians prescribing NRT to parents of their patients; and a 1-page implementation guide to help the practice implement the intervention. Other important aspects were an optional local press release announcing the availability of the intervention for parents, and the previously mentioned customizable office materials.

### Measures

The primary aim of the study was to test the implementation of the CEASE intervention as measured by the tobacco control services actually delivered to parents who smoke. Parents were considered to have received any tobacco cessation assistance (the primary outcome) if they answered yes to any one of the following questions administered during the exit interview: During your visit today, did a doctor, nurse or other health care provider (1) discuss medicine to help you quit smoking (for example, nicotine replacement gum, patch, lozenge, or other medicine), (2) discuss methods and strategies (other than medicine) to help you quit smoking, or (3) suggest you use a telephone quitline or other program to help you quit smoking? Questions used in this study to assess tobacco control service delivery were used previously in our other inpatient or outpatient studies.<sup>16,22</sup> Covariates collected included gender, age, race, education, smoking history, smoking behavior inside the home and car, and attitudes about the dangers of child's TSE.

### Data Analysis

SAS version 9.3 (SAS Institute, Cary, NC) was used for all analyses. All analyses were intention-to-treat regardless of the amount of intervention delivered in each practice. The primary outcome was the proportion of parents who received assistance with quitting smoking beyond simple advice. In the bivariate analysis, we used both  $\chi^2$  tests and lo-

gistic regression models with generalized estimating equations to adjust for physician clustering to compare the proportion of parents receiving assistance between intervention and control groups. The analyses were conducted for overall and subgroups stratified by demographic, smoking behavior, and practice level variables. We also performed a multivariable logistic regression model to determine the intervention effect adjusting for factors that were unbalanced between intervention and control groups. To determine whether any patient or practice characteristics were associated with delivering assistance to parents who smoked, we conducted a separate analysis limited to the intervention practices only. All predictors of clinician behavior that were significant at the  $P < .1$  level in the bivariate analyses were considered as potential covariates in the multivariable model. The generalized estimating equation approach was used in all logistic regression models to account for physician clustering.

### RESULTS

Thirty-two RAs screened 8598 parents exiting the intervention practices and 10 009 parents exiting the control practices. Self-reported smoking rates were 20% in the intervention and 17% in the control condition, respectively. Of the 1630 eligible smokers in the intervention group, 999 (61%) enrolled, compared with 981 (61%) of 1598 eligible smokers in control practices (Fig 1).

Table 1 presents characteristics of the enrolled parents. The average age was 30 years and 22% of the parents in the study were fathers. The 2 groups were slightly imbalanced, possibly owing to practice-level randomization. The intervention group had more white parents, fewer black non-Hispanic parents, fewer Hispanic parents, fewer college graduates, more cigarettes smoked per day, and lower rates of private insurance coverage for children. Intervention

practices tended to be slightly larger, have higher smoking rates, and were more likely to use an electronic health record.

The intervention group, compared with control group, had a higher rate of providing counseling beyond simple advice by discussing various methods and strategies to quit smoking (24% vs 2%,  $P \leq .001$ ), prescribing nicotine replacement medication (12% vs 0%,  $P \leq .001$ ), and enrolling parents in the quit-line (10% vs 0%,  $P \leq .001$ ). Of all parental smokers in the study, 42.5% in the intervention condition and 3.5% in the control condition received any tobacco control assistance ( $P < .001$ ) (Fig 2).

The overall effect of the intervention on receipt of cessation assistance was observed within strata of participants defined by a broad range of demographic, behavioral, and practice variables (Table 2). At the individual clinician level, the majority (77%) in intervention practices delivered assistance to parents who smoke, whereas 6 of 7 in control practices did not (Fig 3).

In a multivariable logistic regression model that adjusted for demographics (parent's race/ethnicity, education level, child's age category, and insurance coverage), behavioral factors (daily versus nondaily smoker, number of cigarettes per day), and practice factors (practice size and baseline smoking rate), delivering assistance was strongly associated with the intervention (odds ratio [OR] 29.3, 95% confidence interval [CI] 12.8–44.7). Other factors entered into the model did not alter these results appreciably. In a multivariable logistic model examining only the intervention group, factors associated with providing higher rates of assistance included routine well-child visits (OR 1.6, 95% CI 1.2–2.2), and minority race (OR 1.4, 95% CI 1.01–2.0).

## DISCUSSION

This cluster randomized controlled effectiveness trial demonstrated that the

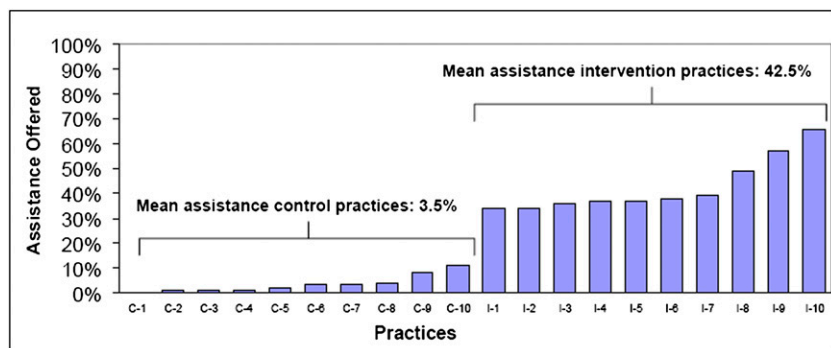
CEASE intervention program could be successfully implemented in the child health care setting. Practices in the intervention group had a 12-fold higher rate of delivering tobacco control assistance to parents compared with practices in the control group, without

the use of research staff to deliver the clinical intervention. Furthermore, this outcome is attributable to most physicians in the intervention practices delivering assistance to parents who smoke, supporting the conclusion that the change was truly at the system level

**TABLE 1** Characteristics of Enrolled Parents (Total  $n = 1980$ )

Characteristic	Control %	Intervention %	P Value
	$n = 981$	$n = 999$	
Age: mean (range)	30.6 (18–65)	30.0 (18–78)	.69 <sup>a</sup>
18–24	25.8	27.1	
25–44	67.7	66.5	
>45	6.4	6.4	
Gender			.93 <sup>a</sup>
Male	22.0	21.3	
Female	77.9	78.6	
Race and ethnicity			<.0001 <sup>a</sup>
Hispanic	13.7	8.2	
Non-Hispanic >1 race	2.5	3.0	
Non-Hispanic black or African American	19.8	11.3	
Non-Hispanic Asian	0.5	0.4	
Non-Hispanic Native Hawaiian or other	1.2	3.5	
Non-Hispanic white	61.5	72.9	
Education			<.0001 <sup>a</sup>
<High school	14.5	16.4	
High school graduate	45.0	47.5	
Some college	26.8	29.0	
College graduate	13.5	6.6	
Other smokers in home			.67 <sup>a</sup>
1	41.1	40.1	
>1	58.9	59.9	
Child's age: mean, mo	17.5	11.5	.022 <sup>a</sup>
<1 y	29.1	23.8	
1–4 y	34.4	39.0	
5–9 y	18.8	20.0	
10–14 y	12.6	11.2	
>14 y	3.9	5.2	
Home and car smoking policy			
Strictly enforced smoke-free home, %	52.7	52.6	.53
Strictly enforced smoke-free car, %	19.1	20.6	.44
No. cigarettes/d: mean	10.3	11.7	.0007 <sup>a</sup>
1–9	47.1	38.9	
>10	52.8	61.0	
% Daily smoker	82.3	87.3	.005
Child's insurance coverage			<.0001 <sup>a</sup>
Medicaid	64.5	69.8	
Private insurance/HMO	27.1	20.2	
Other/self-pay	7.1	9.9	
Type of visit			.093 <sup>a</sup>
Well child	43.5	41.9	
Sick visit/Others	56.5	58.1	
Practice size			<.0001 <sup>a</sup>
≤4 clinicians	20.0	40.0	
>4 clinicians	80.0	60.0	
Overall smoking rate in the practice			<.0001 <sup>a</sup>
<15%	40.0	10.0	
15%–20%	20.0	30.0	
>20%	40.0	60.0	
Electronic Health Record	30.4	50.2	<.0001

<sup>a</sup> P-value for the whole category.



**FIGURE 2**

Rates of tobacco control assistance for parental smokers in 10 control vs 10 intervention practices.

and not simply a few physicians in each practice accounting for the demonstrated change. Put another way, in the control condition, most did nothing to help parents quit smoking but in the intervention condition, most assisted at least some parents in quitting smoking.

Development of the intervention was informed by more than a decade of work. The CEASE intervention is adaptable to the particular practice's staffing, resources, and physical configuration,<sup>29</sup> and practices choose materials relevant to their own particular systems of care. Prior research describes these conceptually grounded and focus groups tested strategies for parental tobacco control now available for implementation in the pediatric outpatient setting, including the Ask, Assist, Refer clinical action framework.<sup>30,31</sup>

This is the first national study in which pediatricians provided NRT prescriptions directly to parents in the context of the child's clinic visit. Pediatricians were given a number to call if there were any problems or issues with the study and there were no reported adverse events related to prescribing NRT. We received no complaints from parents' primary care providers about distribution of prescriptions for this over-the-counter medication to their patients. The poster with the dosing guide for pharmacotherapy provided a quick reference for those clinicians who wish to prescribe

pharmacotherapy so that they save time required to look up the requested medication to treat the parent's tobacco dependence. The American Medical Association policy amended its tobacco control policy and now recommends that clinicians treat people who smoke with the available tobacco dependence treatments regardless of the clinical context in which they are encountered.<sup>33</sup> This policy was specifically written to support pediatricians who want to give NRT prescriptions for parents who smoke.

Our work with clinicians in this study identified noncoverage of NRT as the biggest concern. Where NRT is not covered, physicians told us that they stopped offering prescriptions for parents. Overall enthusiasm for the intervention is greatly diminished when these clinicians cannot get NRT, the most effective single component of the intervention,<sup>34</sup> into the hands of parents who smoke. However, all NRT will be covered by public insurance by 2014.<sup>35</sup> This trial may also help motivate and justify private insurers to move to covering NRT at least in the context in which a covered patient has children. Future work will be needed to study the sustainability of the intervention when NRT is more uniformly covered, in anticipation of the changes in Centers for Medicare and Medicaid Services regulation. Critical next steps include studying implementation in a nation-

ally generalizable context of pediatric practices, measurement of institutional sustainability,<sup>36</sup> and cost-effectiveness<sup>37</sup>; key parameters that will influence national adoption.

The study has a number of limitations. First, 1 practice in the intervention group and 1 practice in the control group dropped out of the study because of slow enrollment, leaving us with our target number of 10 practices in each condition. Although differential drop out might reflect inability to perform the intervention, the fact that we had 1 in each condition was reassuring. Second, PROS practices are not completely representative of national pediatric practices; however, based on estimates of 1545 patients per PROS practitioner, PROS practitioners care for an estimated 2.7 million of the nation's children.<sup>26</sup> Third, providing customized state-specific materials and telephone support during office training meetings may be an important part of optimizing the implementation strategy. This extra support may be a critical feature in the success of the trial, and therefore, the availability of an online CEASE module that guides implementation for the Ask, Assist, Refer strategy may be necessary but not sufficient to promote effective implementation nationally. Last, implementation does not equal sustained intervention. Without attention to the problem of how to sustain this intervention, it will likely weaken and dissipate over time.<sup>36,38,39</sup> Incorporating the intervention into the standard electronic health record may help universal integration into pediatric work flow in the future.

The 2006 and 2010 Surgeon General reports conclude that there is no safe level of tobacco smoke exposure.<sup>40,41</sup> Protection of children from the dangers of household TSE includes helping parents quit smoking.<sup>30</sup> The generalizable intervention model used in this study, meeting the new quality improvement recertification requirement, was recently

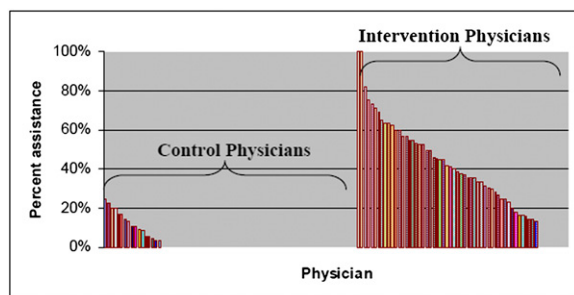
**TABLE 2** Enrolled Parents Who Received Any Tobacco Cessation Assistance (Total *n* = 1980)

Characteristic	Control %	Intervention %	<i>P</i> Value (Unadjusted)	<i>P</i> Value (Adjusted for Physician Clustering)
	<i>n</i> = 981	<i>n</i> = 999		
Overall	3.5	42.5	<.0001	<.0001
Age: mean, range				
18–24	3.2	41.0	<.0001	<.0001
25–44	3.6	43.4	<.0001	<.0001
>45	3.2	40.6	<.0001	.001
Gender				
Male	2.8	40.8	<.0001	<.0001
Female	3.5	43.1	<.0001	<.0001
Race and ethnicity				
Hispanic	3.0	46.3	<.0001	.0005
Non-Hispanic >1 race	4.0	56.7	<.0001	.007
Non-Hispanic black or African American	5.7	40.7	<.0001	.002
Non-Hispanic Asian	20.0	25.0	.90	.76
Non-Hispanic Native Hawaiian or other	8.3	45.7	.025	.063
Non-Hispanic white	2.5	41.3	<.0001	<.0001
Education				
<High school	2.1	43.9	<.0001	.0007
High school graduate	3.4	41.9	<.0001	<.0001
Some college	3.4	43.1	<.0001	<.0001
College graduate	5.3	39.4	<.0001	.0002
Other smokers in home				
1	2.5	41.4	<.0001	<.0001
>1	4.2	43.3	<.0001	<.0001
Child's age: mean, mo				
<1 y	2.8	44.5	<.0001	<.0001
1–4 y	4.7	42.1	<.0001	<.0001
5–9 y	4.9	46.5	<.0001	.0001
10–14 y	0.8	35.7	<.0001	.0001
>14 y	0	36.5	<.0001	.0001
Strictly enforced smoke-free home, %				
Yes	5.0	40.8	<.0001	<.0001
No	1.8	44.3	<.0001	<.0001
Strictly enforced smoke-free car (%)				
Yes	3.2	45.6	<.0001	.0002
No	3.5	41.7	<.0001	<.0001
No. cigarettes/day:				
1–9	3.2	36.8	<.0001	<.0001
>10	3.7	46.3	<.0001	<.0001
Daily smoker	3.6	44.0	<.0001	<.0001
Child's insurance coverage				
Medicaid	3.6	41.9	<.0001	<.0001
Private insurance/HMO	3.0	40.1	<.0001	<.0001
Other/self-pay	2.9	35.3	.003	.013
Type of visit				
Well child	3.3	43.5	<.0001	<.0001
Sick visit/Others	4.6	38.5	<.0001	.0003
Practice type				
<4 clinicians	6.1	43.8	<.0001	.063
>4 clinicians	2.8	41.7	<.0001	.0007
Overall smoking rate in the practice				
<15%	4.4	46.9	<.0001	.22
15%–20%	1.5	36.8	<.0001	.039
>20%	3.5	44.6	<.0001	.006
Electronic Health Record	1.3	36.5	<.0001	.012

recognized as an “innovation in medicine” by the Agency for Healthcare Research and Quality<sup>42</sup> and could spread rapidly across child health care settings to help families eliminate tobacco use. Essential national environmental factors external to pediatric practices are now in place to maximize the potential for practice change with this intervention. These features are (1) an available quitline in every state<sup>43</sup>, (2) publically covered cessation medication<sup>44</sup>, (3) a required continuing medical education project addressing quality improvement to obtain pediatric recertification<sup>45</sup> (an online, tailored, self-paced module where clinicians work on a full practice implementation over the course of several months of self-study and hands-on improvement cycles; this module satisfies the new American Board of Pediatrics Maintenance of Certification Performance in Practice requirement, creating a natural “pull” for the training<sup>45</sup>), and (4) a social climate in which it is acceptable and even expected that parents receive cessation support from any health care clinician.<sup>24,25</sup>

## CONCLUSIONS

This study demonstrates that an intervention, including routine screening for parents who smoke, NRT medication prescription for parents, and enrollment in free state tobacco quitlines, can be implemented as part of routine child health care outpatient practice nationally. The high disease burden of parental tobacco use and low current levels of intervention in this population highlight the need for exploring all promising options to reach these young adult parental smokers. Future studies are needed to determine how all effective components of the intervention can be sustained and optimized to promote parental smoking cessation over time in this clinical context.



**FIGURE 3**  
Rates of assistance by physician in control versus intervention practices.

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## REFERENCES

- Taylor BV, Oudit GY, Kalman PG, Liu P. Clinical and pathophysiological effects of active and passive smoking on the cardiovascular system. *Can J Cardiol*. 1998;14(9):1129–1139
- Wilson KM, Klein JD, Blumkin AK, Gottlieb M, Winickoff JP. Tobacco-smoke exposure in children who live in multiunit housing. *Pediatrics*. 2011;127(1):85–92
- Johansson A, Hermansson G, Ludvigsson J. How should parents protect their children from environmental tobacco-smoke exposure in the home? *Pediatrics*. 2004;113(4). Available at: [www.pediatrics.org/cgi/content/full/113/4/e291](http://www.pediatrics.org/cgi/content/full/113/4/e291)
- Matt GE, Quintana PJ, Hovell MF, et al. Households contaminated by environmental tobacco smoke: sources of infant exposures. *Tob Control*. 2004;13(1):29–37
- Winickoff JP, Healey EA, Regan S, et al. Using the postpartum hospital stay to address mothers' and fathers' smoking: the NEWS study. *Pediatrics*. 2010;125(3):518–525
- Aligne CA, Stoddard JJ. Tobacco and children. An economic evaluation of the medical effects of parental smoking. *Arch Pediatr Adolesc Med*. 1997;151(7):648–653
- Centers for Disease Control and Prevention (CDC). Nonfatal residential fire-related injuries treated in emergency departments—United States, 2001. *MMWR Morb Mortal Wkly Rep*. 2003;52(38):906–908
- Farkas AJ, Distefan JM, Choi WS, Gilpin EA, Pierce JP. Does parental smoking cessation discourage adolescent smoking? *Prev Med*. 1999;28(3):213–218
- Farkas AJ, Gilpin EA, White MM, Pierce JP. Association between household and workplace smoking restrictions and adolescent smoking. *JAMA*. 2000;284(6):717–722
- Robinson LA, Klesges RC, Zbikowski SM. Gender and ethnic differences in young adolescents' sources of cigarettes. *Tob Control*. 1998;7(4):353–359
- Winickoff JP, Berkowitz AB, Brooks K, et al; Tobacco Consortium, Center for Child Health Research of the American Academy of Pediatrics. State-of-the-art interventions for office-based parental tobacco control. *Pediatrics*. 2005;115(3):750–760
- Newacheck PW, Stoddard JJ, Hughes DC, Pearl M. Health insurance and access to primary care for children. *N Engl J Med*. 1998;338(8):513–519
- Fiore MC, Bailey WC, Cohen SJ. *Treating Tobacco Use and Dependence*. Rockville, MD: US Department of Health and Human Services, Public Health Service; 2000
- Rigotti NA. Clinical practice. Treatment of tobacco use and dependence. *N Engl J Med*. 2002;346(7):506–512
- Rowland D, Lyons B, Salganicoff A, Long P. A profile of the uninsured in America. *Health Aff (Millwood)*. 1994;13(2):283–287
- Winickoff JP, Buckley VJ, Palfrey JS, Perrin JM, Rigotti NA. Intervention with parental smokers in an outpatient pediatric clinic using counseling and nicotine replacement. *Pediatrics*. 2003;112(5):1127–1133
- Gellert C, Schöttker B, Brenner H. Smoking and all-cause mortality in older people: systematic review and meta-analysis. *Arch Intern Med*. 2012;172(11):837–844
- Peto R. Smoking and death: the past 40 years and the next 40. *BMJ*. 1994;309(6959):937–939
- Fiore MC, Jaen CR, Baker TB. *Treating Tobacco Use and Dependence: 2008 Update*. Rockville, MD: US Department of Health and Human Services, Public Health Service; 2008
- Rosen LJ, Guttman N, Hovell MF, et al. Development, design, and conceptual issues of project zero exposure: A program to protect young children from tobacco smoke exposure. *BMC Public Health*. 2011;11:508
- Winickoff JP, Hibberd PL, Case B, Sinha P, Rigotti NA. Child hospitalization: an opportunity for parental smoking intervention. *Am J Prev Med*. 2001;21(3):218–220
- Winickoff JP, Hillis VJ, Palfrey JS, Perrin JM, Rigotti NA. A smoking cessation intervention for parents of children who are hospitalized for respiratory illness: the stop tobacco outreach program. *Pediatrics*. 2003;111(1):140–145
- Winickoff JP, McMillen RC, Carroll BC, et al. Addressing parental smoking in pediatrics and family practice: a national survey of parents. *Pediatrics*. 2003;112(5):1146–1151
- Winickoff JP, Tanski SE, McMillen RC, Hipple BJ, Friebely J, Healey EA. A national survey



- of the acceptability of quitlines to help parents quit smoking. *Pediatrics*. 2006;117(4). Available at: [www.pediatrics.org/cgi/content/full/117/4/e695](http://www.pediatrics.org/cgi/content/full/117/4/e695)
25. Winickoff JP, Tanski SE, McMillen RC, Klein JD, Rigotti NA, Weitzman M. Child health care clinicians' use of medications to help parents quit smoking: a national parent survey. *Pediatrics*. 2005;115(4):1013–1017
  26. Slora EJ, Wasserman RC. PROS: a research network to enhance practice and improve child health. *Pediatr Ann*. 2010;39(6):352–361
  27. Shipman SA, Lurie JD, Goodman DC. The general pediatrician: projecting future workforce supply and requirements. *Pediatrics*. 2004;113(3 pt 1):435–442
  28. Bocian AB, Wasserman RC, Slora EJ, Kessel D, Miller RS. Size and age-sex distribution of pediatric practice: a study from Pediatric Research in Office Settings. *Arch Pediatr Adolesc Med*. 1999;153(1):9–14
  29. Winickoff JP, Park ER, Hipple BJ, et al. Clinical effort against secondhand smoke exposure: development of framework and intervention. *Pediatrics*. 2008;122(2). Available at: [www.pediatrics.org/cgi/content/full/122/2/e363](http://www.pediatrics.org/cgi/content/full/122/2/e363)
  30. Dempsey JH, Friebely J, Hall N, Hipple B, Nabi E, Winickoff JP. Parental tobacco control in the child healthcare setting. *Curr Pediatr Rev*. 2011;7(2):115–122
  31. Hall N, Hipple B, Friebely J, Ossip DJ, Winickoff JP. Addressing family smoking in child health care settings. *J Clin Outcomes Manag*. 2009;16(8):367–373
  32. Winickoff JP, Hipple B, Drehmer J, et al. The Clinical Effort Against Secondhand Smoke Exposure (CEASE) a decade of lessons learned. *J Clin Outcomes Manag*. 2012;19(9):414–419
  33. Winickoff JP, Davis R. Collaborative Approach to Addressing Tobacco Use and Dependence; CSA Rep. 3, A-04; Appended: Res. 444, A-05. *American Medical Association Policy H-490.917: Physician Responsibilities for Tobacco Cessation* June 2005
  34. Fiore MC, Jaen C. A clinical blueprint to accelerate the elimination of tobacco use. *JAMA*. 2008;299(17):2083–2085
  35. Medicaid Prescription Drug Coverage. In: The Patient Protection and Affordable Care Act 2010 Title II Subtitle F Section 2502. Washington, DC; 2010
  36. Scheirer MA, Dearing JW. An agenda for research on the sustainability of public health programs. *Am J Public Health*. 2011;101(11):2059–2067
  37. Glasgow RE. What types of evidence are most needed to advance behavioral medicine? *Ann Behav Med*. 2008;35(1):19–25
  38. Scheirer MA, Hartling G, Hagerman D. Defining sustainability outcomes of health programs: illustrations from an on-line survey. *Eval Program Plann*. 2008;31(4):335–346
  39. Shediach-Rizkallah MC, Bone LR. Planning for the sustainability of community-based health programs: conceptual frameworks and future directions for research, practice and policy. *Health Educ Res*. 1998;13(1):87–108
  40. US Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke: A Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, Coordinating Center for Health Promotion, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2006
  41. US Department of Health and Human Services. *How Tobacco Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease: A Report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2010
  42. Winickoff JP. Pediatrician-led program increases provision of smoking cessation support, boosts quit rates among parents. *Innovations in Medicine* 2011. Available at: <http://innovations.ahrq.gov/content.aspx?id=2580>. Accessed August 1, 2012
  43. North American Quitline Consortium. Residents of all 50 states have access to quitlines. Home page. Available at: [www.naquitline.org/](http://www.naquitline.org/). Accessed September 17, 2011
  44. Mann C. New Medicaid tobacco cessation services. *Center for Medicaid, CHIP and Survey & Certification, Department of Health & Human Services*, Baltimore, Maryland. In: SDL # 11-007. ACA # 17. June 2011.
  45. Winickoff JP, Dempsey JH, Friebely J, Hipple B, Lazoric S. *EQIPP: Eliminate Tobacco Use and Exposure*. Elk Grove Village, IL: American Academy of Pediatrics; 2011

(Continued from first page)

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