

# Evaluation of Pediatricians' Adherence to Tobacco Prevention, Control, and Treatment Guidelines Before and After an Educational Outreach Program

Timothy Beaty, MD,\* Adriana C. Dornelles, ScD,<sup>†</sup> Terese Sahuque, RN,<sup>‡</sup> Fernando Urrego, MD<sup>‡</sup>

\*Department of Pediatric Pulmonology, Emory University, Atlanta, GA

<sup>†</sup>Office of Biostatistics Support and

<sup>‡</sup>Department of Pediatric Pulmonology, Ochsner Clinic Foundation, New Orleans, LA

---

## ABSTRACT

**Background:** Tobacco use is the world's leading single preventable cause of death. Because children exposed to second- and third-hand smoke are at risk for smoke-related morbidity, pediatricians have an obligation to address tobacco use in their practices. The purpose of this study was to measure physician adherence to the American Academy of Pediatrics' guidelines on tobacco prevention, control, and treatment before and after the implementation of an educational outreach program.

**Methods:** Charts were randomly selected from pediatric clinics before and after the educational outreach. The intervention consisted of a review of the guidelines and available tools physicians could implement into their practices. We measured the rates of adherence to the guidelines before and after the educational outreach.

**Results:** We analyzed 213 charts (116 pre- and 97 posteducation). The proportion of families screened for tobacco smoke exposure was comparable between the pre- and postintervention groups (67.2% vs 59.8%,  $P=0.317$ ). The postintervention group had a higher proportion of counseling compared to the preintervention group (51.5% vs 31.9%,

$P<0.05$ ). We found no statistically significant change in the rate of screening or referral to smoking cessation services.

**Conclusion:** Current guidelines to reduce tobacco use are underutilized. Educational outreach may increase the rate of counseling. Physician acceptance of guidelines is urgently needed to affect the tobacco epidemic.

---

## INTRODUCTION

Tobacco use is the world's leading preventable cause of death. Children exposed to second- and third-hand smoke are at risk for smoke-related morbidity yet have limited options for avoiding exposure. Tobacco smoke exposure in infants and children increases the risk for sudden infant death syndrome, lower respiratory tract infections, middle ear disease, severe asthma, and slowed lung growth.<sup>1,2</sup> Morbidity extends beyond the respiratory system to include increased risks for kidney disease and neurobehavioral disorders.<sup>3,4</sup> Every possible effort should be made to decrease the burden of tobacco-related diseases. Many medical societies have published guidelines to help physicians integrate tobacco control guidelines into clinical practice. The American Academy of Pediatrics (AAP) recommends that pediatricians screen for tobacco smoke exposure at every visit and offer smoking parents counseling, treatment, and referral to quit lines.<sup>5,6</sup>

Despite existing guidelines, however, Winickoff et al<sup>7</sup> have shown that pediatricians rarely screen for smoking and that rates of counseling and referral to state quit lines are low. These results may be attributed to a lack of physician awareness and familiarity with published guidelines, as well as a lack of knowledge regarding available tools.<sup>8</sup> Previous studies that used direct physician education to increase adherence to tobacco control guidelines as the intervention did not include pediatric providers<sup>9,10</sup> and did not directly measure physician adherence to the intervention.<sup>11</sup> More recently, Winickoff et al<sup>12</sup>

---

Address correspondence to  
Fernando Urrego, MD  
Department of Pediatric Pulmonology  
Ochsner Clinic Foundation  
1315 Jefferson Hwy.  
New Orleans, LA 70121  
Tel: (504) 428-6901  
Fax: (504) 842-0084  
Email: furrego@ochsner.org

**Keywords:** Smoking—prevention and control, tobacco products, tobacco smoke pollution

The authors have no financial or proprietary interest in the subject matter of this article.

measured physician adherence to tobacco control guidelines by asking parents if recommended services were actually provided.

Effective interventions to improve physician adherence to tobacco control guidelines are needed. The American College of Chest Physicians (ACCP) recommends continuing medical education interventions to improve physician practice performance.<sup>13</sup> Live interactive sessions are more effective than printed material alone.

The primary aims of this study were to measure the rate of a pediatric group's adherence to the AAP tobacco prevention and control guidelines and to determine if an educational outreach activity with live interactive sessions would increase adherence to the guidelines and the use of tools to implement the guidelines.

Our study occurred during the institution's transition to a new electronic medical record system. The use of electronic medical records reportedly facilitates providers' use of recommended treatment guidelines by providing prompts at the point of care.<sup>14,15</sup> As a secondary outcome, we compared the 2 electronic medical record (EMR) systems—Ochsner Clinical Workstation (OCW) and Epic (Verona, WI)—in use to determine if one were more effective than the other in helping physicians adhere to the AAP tobacco control guidelines.

## METHODS

Using a random number chart process, we selected charts from Ochsner's pediatric clinics. Outcomes were measured before and after educational outreach sessions. Education modules were presented during physicians' lunch hour, and lunch was provided. During education sessions, physicians watched a PowerPoint presentation that included a review of the AAP guidelines and discussed the tools available to implement guidelines into their practices. These guidelines were taken from the AAP technical report that recommends documentation of screening for tobacco exposure, counseling, treatment, and referral to smoking cessation services.<sup>5</sup>

Tools were obtained from the AAP Julius B. Richmond Center of Excellence website<sup>16</sup> and included material from Clinical Effort Against Secondhand Smoke Exposure (CEASE).<sup>17,18</sup> CEASE provides patient screening questionnaires and clinical pathways to guide providers. We also used the ACCP Tobacco Dependence Treatment ToolKit<sup>19</sup> and the Quit With Us, Louisiana website<sup>20</sup> as sources. Material distributed included patient questionnaires to assess tobacco dependency, treatment algorithms, and instructions on how to refer smokers to the Fax-to-Quit program. We only used material available to the public and free to download. The trainers encouraged

physicians to use the provided tools, document efforts to educate patients, and use recommended tobacco billing codes. Billing codes included International Classification of Diseases-9 diagnostic codes 305.1 (tobacco use disorder) and 986.84 (toxic effects of tobacco); counseling codes 99406 (counseling time greater than 3 minutes but less than 10 minutes) and 99407 (counseling time greater than 10 minutes); and V15.89 (other specified personal history presenting hazards to health) and E869.4 (accidental poisoning secondary to tobacco smoke).

We compared the rates of adherence to the guidelines pre- and postintervention by reviewing every encounter available in the chart. All visits before the date of the outreach were considered for preintervention analysis. Any encounter that occurred after the outreach date was considered for postintervention analysis. Variables collected included patient age, the number of well-child-check (WCC) visits, the number of sick visits for nonrespiratory complaints, and the number of visits for respiratory complaints. We recorded visit type separately to assess whether the reason for the visit predicted tobacco screening. Respiratory complaints included nasal congestion, nasal discharge, ear pain, throat pain, cough, wheezing, and chest pain. Nonrespiratory events were those not related to the respiratory system. We reviewed clinic notes to assess the documentation of patient and parental smoking status, counseling, treatment, or referral to smoking cessation services. We also identified the billing codes used.

Adherence to the guidelines was defined as documentation of patient and/or parental smoking status, counseling given, and referral to either the state Fax-to-Quit program or the smoking cessation clinic. Explicit documentation of a discussion with the family regarding the negative effects of active and second-hand smoke exposure indicated counseling. We also identified the use of tobacco-related billing codes for the visit. Data collection was the same for both EMR systems analyzed, and we compared the systems using the postintervention data.

Our institutional board review approved this study. We employed 2 sample tests of proportion to assess statistical significance. All tests were 2-tailed, and a *P* value <0.05 was considered statistically significant. Statistical analyses were performed using STATA v.11 (College Station, TX).

## RESULTS

We reviewed 213 charts for analysis: 116 preintervention charts and 97 postintervention charts (Table 1). The mean patient age for both groups was  $12.2 \pm 5.62$  years. We found a mean of  $4.20 \pm 7.7$  visits with respiratory complaints. Seven patients were

**Table 1. Overall Characteristics of the Study Sample (n=213)**

Variable	n	Mean ± SD (%)	Min-Max
Age, years	213	12.20 ± 5.62	0-19
Well child check		2.42 ± 2.89	0-13
Sick nonrespiratory visit		4.19 ± 7.07	0-13
Sick respiratory visit		4.20 ± 7.72	0-58
Patient smoker	7	16.86 ± 0.9	16-18
Parent smoker <sup>a</sup>	17	(8.05)	
Preintervention group	116	(54.6)	
Postintervention group	97	(45.5)	
Screened for tobacco smoke exposure	136	(63.8)	
Counseled	87	(40.9)	
Referred for treatment <sup>b</sup>	1	(0.48)	
Billed <sup>c</sup>	1	(0.48)	

<sup>a</sup>Father or mother is a smoker.

<sup>b</sup>Referral to quit line/smoking cessation clinic.

<sup>c</sup>Use of appropriate billing code.

SD, standard deviation.

smokers, and 17 patients lived in families with at least 1 smoker. Overall, physicians screened 136 families (63.8%) for tobacco smoke exposure and counseled 87 families (40.9%).

Table 2 shows pre- and postintervention data. Patients in the preintervention group were older and had a higher mean of sick visits (nonrespiratory and respiratory) than patients in the postintervention group. The proportion of families screened for tobacco smoking in the pre- and postintervention groups was comparable (67.2% vs 59.8%,  $P=0.317$ ). The proportion of parents who were smokers in the preintervention group compared to the postintervention group was significantly higher (12.9% vs 2.1%,  $P<0.05$ ). The proportion of families receiving counseling efforts increased after the intervention (31.9% vs 51.5%,  $P<0.05$ ). No parent was offered treatment,

referral to a cessation clinic, or referral to quit lines. One patient was counseled and referred for treatment. Prior to the intervention, pediatricians did not use the recommended tobacco billing codes. After the intervention, only 1 chart included the recommended smoking cessation counseling codes.

A comparison of EMR systems was available only for postintervention data (Epic had not been implemented during the preintervention period). A total of 97 charts with documentation in both systems were available for review. Fifty-eight (60%) patients were screened using OCW, and 56 (58%) patients were screened using the Epic system. Thirty-six patients were screened in both systems, and 18 were not screened in either OCW or Epic. No statistical difference was noted between the 2 systems in regard to their ability to improve physician adherence to tobacco control guidelines.

## DISCUSSION

In the present study, we sought to determine whether our pediatric group was adhering to the AAP's tobacco control and prevention guidelines and whether an educational outreach would increase physician adherence to the guidelines. In general, pediatricians screened at least 64% of families for second-hand smoke exposure. Counseling, however, was only conducted in 41% of clinic visits. After the educational outreach, the rate of counseling increased ( $P<0.05$ ), but we found no statistically significant difference in the rate of screening, treatment, billing, or referral to quit lines. The reason for the visit was not predictive of whether pediatricians screened for tobacco smoke exposure.

Our results are in line with results from other studies assessing pediatricians' adherence to other clinical practice guidelines. The *Bright Futures* guidelines were developed to improve the quality and consistency of care by providing pediatricians with specific recommendations for every WCC.<sup>21</sup> The

**Table 2. Comparison Between Before and After Educational Outreach**

Variable	Preintervention (n=116) Mean ± SD (%)	Postintervention (n=97) Mean ± SD (%)	P
Age, years	16.07 ± 1.67	8.93 ± 1.67	<0.001
Well child check	3.96 ± 3.13	0.57 ± 0.52	<0.001
Sick nonrespiratory visit	7.31 ± 8.39	0.45 ± 0.63	<0.001
Sick respiratory visit	7.41 ± 9.30	0.34 ± 0.72	<0.001
Parent smoker <sup>a</sup>	15 (12.9)	2 (2.1)	0.029
Screened	78 (67.2)	58 (59.8)	0.317
Counseled	37 (31.9)	50 (51.5)	0.003

<sup>a</sup>Father or mother is a smoker.

SD, standard deviation.

Patient Protection and Affordable Care Act states that providers must, at a minimum, provide preventive services as stated in the *Bright Futures* handbook.<sup>22</sup> A recent paper assessing adherence to the *Bright Futures* guidelines, however, revealed that pediatricians are not following recommended guidelines.<sup>23</sup> Mangione-Smith et al<sup>24</sup> found that pediatric patients receive less than 50% of recommended preventive services. Several other studies have shown that pediatric healthcare providers are not adhering to basic preventive care, including recommendations for dental evaluation and referral,<sup>25</sup> acute otitis media treatment,<sup>26</sup> and overweight screening.<sup>27</sup>

We acknowledge that physician medical decision-making is complex and depends on many factors, such as physician experience and knowledge, patient characteristics and values, and weight of the clinical evidence.<sup>28</sup> Isaac et al<sup>29</sup> found that, in general, the AAP's guidelines are not always based on evidence but rather on expert opinion. We believe that the AAP's tobacco prevention and control recommendations are based on ample evidence<sup>1</sup> and that their implementation should be strongly encouraged. If pediatricians are unwilling to treat parents' tobacco dependency, every effort should be made to refer them to smoking cessation services or parent support groups.<sup>30</sup>

A potential bias in our results is the heterogeneity of the comparison groups. We found a higher proportion of older patients in the preintervention group than the postintervention group. The number of WCC, sick nonrespiratory, and sick respiratory visits was significantly higher in the preintervention group compared to the postintervention group. These differences in patient characteristics reflect a real-world clinic that is likely to see patients of different ages at different times for different complaints. Pediatricians are encouraged to screen at every visit, regardless of the age or chief complaint. That the group with the higher rate of smoking exposure was also the group with the higher proportion of sick visits is of clinical interest.

Comparison of the 2 EMR systems at the institution revealed that neither was able to significantly impact physician adherence to tobacco control guidelines. Screening was not statistically different between them.

## CONCLUSIONS

Our pediatric group is not adhering to the AAP tobacco control guidelines. Educational outreach efforts increased the rate of counseling but did not make a significant change in treatment or referral to tobacco cessation services. Our review of the 2 EMR

systems showed that neither system was superior in increasing the screening rates.

Current evidence-based guidelines to reduce tobacco use are underutilized. Physician acceptance of guidelines is urgently needed to affect the tobacco epidemic. Optimizing EMR systems with reminders and access to treatment algorithms is likely to improve quality of care.

## REFERENCES

1. U.S. Department of Health and Human Services. *The Health Consequences of Involuntary Exposure to Tobacco Smoke. A Report of the Surgeon General.* June 27, 2006. <http://www.surgeongeneral.gov/library/reports/secondhandsmoke/index.html>. Accessed June 18, 2013.
2. Best D; Committee on Environmental Health; Committee on Native American Child Health; Committee on Adolescence. From the American Academy of Pediatrics: Technical report—secondhand and prenatal tobacco smoke exposure. *Pediatrics.* 2009 Nov; 124(5):e1017-e1044. Epub 2009 Oct 19.
3. García-Esquinas E, Loeffler LF, Weaver VM, Fadrowski JJ, Navas-Acien A. Kidney function and tobacco smoke exposure in US adolescents. *Pediatrics.* 2013 May;131(5):e1415-e1423. Epub 2013 Apr 8.
4. Kabir Z, Connolly GN, Alpert HR. Secondhand smoke exposure and neurobehavioral disorders among children in the United States. *Pediatrics.* 2011 Aug;128(2):263-270. Epub 2011 Jul 11.
5. Committee on Environmental Health; Committee on Substance Abuse; Committee on Adolescence; Committee on Native American Child Health. From the American Academy of Pediatrics: Policy statement—Tobacco use: a pediatric disease. *Pediatrics.* 2009 Nov;124(5):1474-1487. Epub 2009 Oct 19. Erratum in: *Pediatrics.* 2010 Apr;125(4):861.
6. Sims TH; Committee on Substance Abuse. From the American Academy of Pediatrics: Technical report—Tobacco as a substance of abuse. *Pediatrics.* 2009 Nov;124(5):e1045-e1053. Epub 2009 Oct 19.
7. Winickoff JP, McMillen RC, Carroll BC, et al. Addressing parental smoking in pediatrics and family practice: a national survey of parents. *Pediatrics.* 2003 Nov;112(5):1146-1151.
8. Cabana MD, Rand CS, Powe NR, et al. Why don't physicians follow clinical practice guidelines? A framework for improvement. *JAMA.* 1999 Oct 20;282(15):1458-1465.
9. Cockburn J, Ruth D, Silagy C, et al. Randomised trial of three approaches for marketing smoking cessation programmes to Australian general practitioners. *BMJ.* 1992 Mar 14;304(6828): 691-694.
10. Ockene JK, Lindsay EA, Hymowitz N, et al. Tobacco control activities of primary-care physicians in the Community Intervention Trial for Smoking Cessation. COMMIT Research Group. *Tob Control.* 1997;6(Suppl 2):S49-S56.
11. Curry SJ, Ludman EJ, Graham E, Stout J, Grothaus L, Lozano P. Pediatric-based smoking cessation intervention for low-income women: a randomized trial. *Arch Pediatr Adolesc Med.* 2003 Mar; 157(3):295-302.
12. Winickoff JP, Nabi-Burza E, Chang Y, et al. Implementation of a Parental Tobacco Control Intervention in Pediatric Practice. *Pediatrics.* 2013 Jun 24. Epub ahead of print.

13. Davis D, Galbraith R; American College of Chest Physicians Health and Science Policy Committee. Continuing medical education effect on practice performance: effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest*. 2009 Mar;135(3Suppl):42S-48S.
14. Davis AM, Cannon M, Ables AZ, Bendyk H. Using the electronic medical record to improve asthma severity documentation and treatment among family medicine residents. *Fam Med*. 2010 May;42(5):334-337.
15. Rapp KI, Jack L Jr, Post R, et al. The HEAL, Phase II Project: enhancing features of an electronic medical record system to improve adherence to asthma guidelines. *J Health Care Poor Underserved*. 2013 Feb;24(1 Suppl):20-28.
16. American Academy of Pediatrics. Julius B. Richmond Center of Excellence. <http://www2.aap.org/richmondcenter>. Accessed June 18, 2013.
17. Winickoff JP, Park ER, Hipple BJ, et al. Clinical effort against secondhand smoke exposure: development of framework and intervention. *Pediatrics*. 2008 Aug;122(2):e363-e375.
18. Hall N, Hipple B, Friebely J, Ossip DJ, Winickoff JP. Addressing family smoking in child health care settings. *J Clin Outcomes Manag*. 2009 Aug;16(8):367-373.
19. American College of Chest Physicians. Tobacco Dependence Toolkit. <http://tobaccodependence.chestnet.org>. Accessed June 18, 2013.
20. The Louisiana Campaign for Tobacco-Free Living and the Louisiana Department of Health and Hospitals Tobacco Control Program. Quit With Us, Louisiana. <http://quitwithusla.org>. Accessed June 18, 2013.
21. Hagan JF, Shaw JS, Duncan PM. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. Elk Grove Village, IL: American Academy of Pediatrics; 2008.
22. Foy JM. Implementing Bright Futures guidelines for well-child care in North Carolina. *N C Med J*. 2013 Jan-Feb;74(1):28-33.
23. Norlin C, Crawford MA, Bell CT, Sheng X, Stein MT. Delivery of well-child care: a look inside the door. *Acad Pediatr*. 2011 Jan-Feb;11(1):18-26.
24. Mangione-Smith R, DeCristofaro AH, Setodji CM, et al. The quality of ambulatory care delivered to children in the United States. *N Engl J Med*. 2007 Oct 11;357(15):1515-1523.
25. Long CM, Quinonez RB, Beil HA, et al. Pediatricians' assessments of caries risk and need for a dental evaluation in preschool aged children. *BMC Pediatr*. 2012 Jul 11;12:49.
26. Chu CH, Wang MC, Lin LY, Shiao AS. Physicians are not adherent to clinical practice guidelines for acute otitis media. *Int J Pediatr Otorhinolaryngol*. 2011 Jul;75(7):955-959. Epub 2011 May 25.
27. Burman NJ, Cabana MD, Maselli JH, Hilton JF, Patel AI. Missing documentation of weight and height at preventive visits for children. *Clin Pediatr (Phila)*. 2012 Oct;51(10):933-938. Epub 2012 Apr 17.
28. Bauchner H, Simpson L, Chessare J. Changing physician behaviour. *Arch Dis Child*. 2001 Jun;84(6):459-462.
29. Isaac A, Saginur M, Hartling L, Robinson JL. Quality of reporting and evidence in American Academy of Pediatrics guidelines. *Pediatrics*. 2013 Apr;131(4):732-738. Epub 2013 Mar 25.
30. 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 Jun 28;11:508.

*This article meets the Accreditation Council for Graduate Medical Education and the American Board of Medical Specialties Maintenance of Certification competencies for Patient Care and Practice-Based Learning and Improvement.*