Tobacco Smoke Exposure and Health-Care Utilization Among Children in the United States

Ashley L. Merianos, PhD, CHES[1], **Cathy Odar Stough, PhD**[2], **Laura A. Nabors, PhD, ABPP**[1], and **E. Melinda Mahabee-Gittens, MD, MS**[3]

[1]Health Promotion and Education Program, School of Human Services, University of Cincinnati, Cincinnati, OH, USA

[2]Division of Behavioral Medicine and Clinical Psychology, Cincinnati Children's Hospital Medical Center, Cincinnati, OH, USA

[3]Division of Emergency Medicine, Cincinnati Children's Hospital Medical Center, College of Medicine, University of Cincinnati, Cincinnati, OH, USA

Abstract

Purpose: The purpose of this study was to assess patterns of health-care utilization among children who potentially had tobacco smoke exposure (TSE) compared to those who were not exposed.

Design: A secondary data analysis of the 2011 to 2012 National Survey on Children's Health was performed.

Setting: Households nationwide were selected.

Participants: A total of 95 677 children aged 0 to 17 years.

Measures: Sociodemographic characteristics, TSE status, and health-care visits were measured.

Analysis: Multivariable logistic regression models were performed.

Results: A total of 24.1% of children lived with smokers. Approximately 5% had home TSE. Participants who lived with a smoker were significantly more likely to have had a medical care visit (odds ratio [OR] = 1.22, confidence interval [CI] = 1.21–1.22) and were more likely to seek sick care or health advice at an emergency department(OR = 1.23, CI = 1.23–1.24) but were less likely to have had a dental care visit (OR = 0.82, CI = 0.82–0.83) than those who did not live with a smoker. Similar findings were found among participants who had home TSE.

Conclusion: TSE is a risk factor for increased use of pediatric medical care. Based on the high number of children who potentially had TSE and received sick care or health advice at an

emergency emergency department, this setting may be a venue to deliver health messages to caregivers.

Keywords

secondhand smoke; tobacco use; health-care utilization; pediatrics

Purpose

Tobacco smoke exposure (TSE) has been consistently associated with an increased prevalence of childhood morbidity including increased bronchiolitis, asthma exacerbations, respiratory infections, and sudden infant death syndrome.[1] Yet, in 2011 to 2012, 24.7 million US children were exposed to tobacco smoke.[2] TSE-related illnesses may contribute to increased demand for health-care services and they represent a great proportion of preventable childhood morbidity.[1] Thus, the American Academy of Pediatrics[3] (AAP) identifies tobacco use as a pediatric disease due to the harm to children caused by use and TSE. Further, the AAP encourages implementing initiatives during all health-care visits in order to decrease TSE and related harms.

Research on the association between TSE and health-care utilization has produced inconsistent findings, suggesting a complex relationship. Studies have reported caregiver smoking and TSE exposure are associated with an increased number of physician visits for children with asthma,[4] respiratory symptoms,[5] emergency department visits for respiratory symptoms,[6] and hospital admissions.[7] In contrast, TSE has been associated with a decreased number of preventive care visits,[8] health-care visits for asthma,[9] and hospital admissions for asthma.[4] Further, some research has not found differences between TSE and number of primary care visits, emergency visits, or hospital admissions.[8] For these reasons, examining patterns of health-care utilization in a national sample of children who live with smokers and have home TSE is warranted.

The aim of the present study was to compare patterns of health-care utilization among children who were potentially exposed to tobacco smoke compared to those who were not exposed using a nationally representative sample of children aged 0 to 17 years. We hypothesized that children who live with smokers or have home TSE use more health-care services than children who do not live with smokers or do not have home TSE.

Methods

Design

The data for this study are from the 2011 to 2012 National Survey on Children's Health (NSCH), and the present study's analyses were performed in 2015. This survey was conducted by the US Centers for Disease and Control Prevention's National Center for Health Statistics, with funding provided from the US Department of Health and Human Services' Maternal and Child Health Bureau.[10] The purpose of the survey was to provide national and state-specific prevalence estimates for a range of children's health and well-

being indicators in combination with information on the child's family context and neighborhood environment.[10]

Sample

The 2011 to 2012 NSCH was a telephone survey conducted between February 2011 and June 2012. It consisted of a total sample of 95 677 children from birth through 17 years of age, with approximately 1 850 interviews collected per state. A list-assisted random digit dial sample of landline telephone numbers and an independent random digit dial sample of cell phone numbers were called to find households with children 0 to 17 years from each of the 50 states including the District of Columbia. The cell phone sample was new for survey administration, and landline and cell phones make up the complete sample. Prior research indicates that answering machines and caller ID have contributed to a decline in response rates of conducting telephone surveys and that individuals are substituting landline telephones with cell phones.[11,12] Thus, individuals have a greater frequency of answering their cell phones compared to a landline phone; the inclusion of cell phones may have increased NSCH response rates. If more than 1 age-eligible child lived in the household, 1 child was randomly selected to be included in the study sample. Interviews lasted on average 33 to 34 minutes and were conducted in English, Spanish, or 1 of 4 Asian languages. The respondent was identified by the interviewer as a parent or guardian with knowledge of the child's health status and health-care. The interview completion rate among known households with children was 54.1% for the landline sample and 41.2% for the cell phone sample.[13] The research ethics review board of National Center for Health Statistics approved data collection procedures. Verbal informed consent for survey participation was obtained after informing respondents of the voluntary and confidential nature of the survey. Analyses were conducted for the total 95 677 children from birth to 17 years of age.

Measures

1.   We investigated 5 health-care visit outcome variables using a yes/no scale:

     a.   Medical care visit was derived from the question "During the past 12 months, did [sampling child] see a doctor, nurse, or other health-care professional for any kind of medical care including sick child care, well-child checkups, physical examinations, and hospitalizations?"

     b.   Preventive medical care visit was derived from the question "During the past 12 months, did [sampling child] see a doctor, nurse, or other health-care provider for preventive medical care such as physical examination or well-child checkup?"

     c.   Specialty care visit was derived from the question "Specialists are doctors like surgeons, heart doctors, allergy doctors, skin doctors, and others who specialize in one area of health-care. During the past 12 months, did [sampling child] see a specialist (other than a mental health professional)?"

     d.   Dental care visit was derived from the question "During the past 12 months, how many times did [sampling child] see a dentist for any kind

of dental care, including checkups, dental cleaning, X-rays, or filling cavities?"

    e. Preventive dental care visit was derived from the question "During the past 12 months, how many times did [sampling child] see a dentist for preventive dental care, such as checkups and dental cleanings?"

2. Usual place for sick care or health advice for the sampling child was investigated using the question "Is there a place that [sampling child] usually goes when (he/she) is sick or you need advice about (his/her) health?" If respondents answered "yes," they were asked the following question: "Is it a doctor's office, emergency department, hospital outpatient department, clinic, or some other place?"

The 2 main TSE variables were household smokers and home TSE. The presence of household smokers was assessed with the question "Does anyone in your household use cigarettes, cigars, or pipe tobacco?" Home TSE was assessed with the question "Does anyone smoke inside the child's home?" and was only asked of respondents who answered "yes" to the question on household smokers. If caregivers answered "yes" to both questions, the child was considered positive for both household smokers and home TSE.

Covariates considered were the sampling child's gender, age, and race/ethnicity (white, black, Hispanic, and multiracial), mothers' education (less than a high school graduate, high school graduate, and more than high school), household composition (2-parent biological or step families, single mother, and other family type), household poverty status measured as a ratio of family income to federal poverty level (FPL; <100%, 100%−199%, 200%−399%, and >400%), and insurance type (public, private, and no insurance).

Analysis

NSCH data were collected through a complex sample design involving unequal selection probabilities of children within households and stratification of households within states. We applied sampling weights to adjust for potential nonresponse biases and account for noncoverage of nontelephone households. Resulting estimates are generalizable to all US noninstitutionalized children aged 0 to 17 years, since the weighting procedure includes a raking adjustment to parallel each US state's weighted survey responses to selected demographic characteristics of the state's noninstitutionalized population 17 years and younger. Bivariate associations between whether there was a household smoker and sociodemographic characteristics were tested with χ^2 analyses. Similar analyses were performed between home TSE status and sociodemographics. Then, multivariable regression analyses were performed to examine whether (1) living with a household smoker or (2) having home TSE predicted health-care utilization. Specifically, a series of multivariable logistic regression models with a step-wise selection procedure were performed to derive the odds ratios (OR) and covariate-adjusted prevalence of exposure for each type of health-care visit outcome (ie, any medical visit, preventive medical care visit, specialty care visit, any dental care visit, and preventive dental care visit) and usual place for sick care or health advice (eg, doctor's office, emergency department). All data were conducted by using SPSS version 23.0.

Results

Child gender had near equal distribution: 51.2% were males and 48.8% were females. The majority of sampling children were white (52.5%) followed by Hispanic (23.0%), black (13.5%), and multiracial (10.3%). Two-thirds of the children lived in a biological, 2-parent home (65.6%), 19.0% lived with a single mother, 8.8% lived in a step family, 2-parent home, and 6.7% had other family household composition. Most mothers of sampling children completed more than high school (63.8%), 21.9% were high school graduates, and 14.3% did not graduate from high school. Based on FPL, 22.4% had a family income less than 100% FPL, 21.5% were 100% to 199% FPL, 28.5% were 200% to 399% FPL, and 27.8% had a family income more than 400% FPL. More than half had private health insurance (57.4%), 37.1% had public health insurance (eg, Medicaid, Children's Medicaid), and 5.6% were currently uninsured. A total of 24.1% of the 95 677 children lived with smokers. Approximately 5% had home TSE.

In the past 12 months of survey completion, a total of 88.1% children had any medical care visit, 84.4% had a preventive medical care visit, 22.6% had a specialty care visit, 77.5% had any dental care visit, and 77.2% had a preventive dental care visit. Most sampling children (91.4%) had a usual place for sick care or health advice; 76.6% usually went to a doctor's office for sick care or health advice, 2.4% usually went to a hospital emergency department, 2.4% usually went to a hospital out-patient department, 18.4% usually went to a clinic or health center, and 0.1% usually went to a retail store or minute clinic.

Sociodemographic characteristics in relation to household smokers and home TSE are described in Table 1. Child's gender, age, race/ethnicity, household composition, mother's education, household poverty status, and insurance type significantly differed based on household smokers and home TSE.

A series of multivariable logistic regression models, while adjusting for covariates, indicated that children who lived with a smoker were more likely to have had a preventive visit (odds ratio [OR] = 1.10, confidence interval [CI] = 1.09–1.10), a specialty visit (OR = 1.01, CI = 1.00–1.01), or a medical care visit including sick care, checkups, or physical examinations (OR = 1.22, CI = 1.21–1.22). Children who lived with a smoker were less likely to have had a dental care visit (OR = 0.82, CI = 0.82–0.83) or preventive dental care visit (OR = 0.81, CI = 0.80–0.81; Table 2). Overall, children who lived with a smoker were more likely to have a usual place for sick care or health advice (OR = 1.03, CI = 1.03–1.03); specifically, children were significantly more likely to have usual care at the following places: a doctor's office (OR = 1.05, CI = 1.05–1.06), hospital emergency department (OR = 1.23, CI = 1.23–1.24), hospital outpatient department (OR = 1.01, CI = 1.00–1.01), or retail store or minute clinic (OR = 1.53, CI = 1.50–1.55). Children who lived with a smoker were less likely to report a clinic or health center (OR = 0.92, CI = 0.92–0.92) as a usual place for sick care or health advice. Multivariable logistic regression analyses indicated that children who had home TSE were more likely to have had a medical care visit (OR = 1.35, CI = 1.34–1.35) or a preventive care visit (OR = 1.32, CI = 1.31–1.32). Children who had home TSE were less likely to have had a specialty care visit (OR = 0.92, CI = 0.91–0.92), a dental care visit (OR = 0.77, CI = 0.76–0.77), or a preventive dental care visit (OR = 0.73, CI = 0.73–0.74; Table

3). Overall, children who had home TSE were less likely to have a usual place for sick care or health advice (OR = 0.90, CI = 0.90–0.91); children were significantly less likely to have usual care at a clinic or health center (OR = 0.85, CI = 0.85–0.86). Children who had home TSE were more likely to have usual care at the following places: a doctor's office (OR = 1.06, CI = 1.05–1.06), a hospital emergency department (OR = 1.40, CI = 1.38–1.40), a hospital outpatient department (OR = 1.19, CI = 1.18–1.20), or a retail store or minute clinic (OR = 1.30, CI = 1.26–1.34) as usual places for sick care or health advice.

Discussion

Among a nationally representative sample, approximately one-quarter of children lived with a smoker corresponding to a weighted total of 17.6 million children and approximately 5% had home TSE equivalent to 3.6 million children. Compared to the 2007 NSCH, self-reported rates of TSE have decreased over the past several years from 19.1 million children who lived with a smoker (26.2%) and 5.5 million children who had home TSE (7.6%).[14] Although self-reported NSCH TSE rates have slightly decreased, recent research that assessed TSE using serum cotinine, a metabolite of nicotine that is an optimal assessment of TSE,[15] found that 15 million children aged 3 to 11 years and 9.6 million children aged 12 to 19 years were exposed to tobacco smoke.[2] These higher rates, compared to the present study's results, are not surprising since caregivers typically do not report their child's accurate level of TSE.[6,16,17] Thus, it is important to note that children who live with a smoker, despite reporting no one smokes inside the home, are still at risk of exposure.

We found a considerable difference between self-reported rates of smokers in the home compared to home TSE. This association suggests that home TSE rates may actually be higher than the rates self-reported by caregivers, given that the home is the most common source of TSE for children.[18] Additionally, prior evidence suggests that the majority of nonsmokers who live with a smoker are exposed to TSE.[19] As smoke-free policies have increased in public places and work places in recent years, private settings such as homes and cars are becoming greater sources of exposure.[18] The prevalence of home smoking bans has increased over the past 2 decades, but there has been a disproportionately slower decline in home TSE since less than half of households with a smoker have adopted voluntary smoke-free home rules.[20] Thus, efforts are still widely needed to promote voluntary smoke-free policies in the home and to encourage smoking cessation among caregivers.

As hypothesized and similar to previous research,[4,5] children who lived with a smoker and who had home TSE were more likely to have had any medical care visit including sick care, checkups, or physical examinations in the past year. Greater use of any medical care may be related to the fact that children with TSE are more likely to experience a variety of health conditions and illnesses.[21,22] Further, it is particularly concerning that children with TSE are less likely to have a usual place of care due to recent efforts to increase the presence of patient-centered medical homes. Lack of a usual place of care also limits the opportunities for medical providers to monitor changes in these children's health over time. When children with TSE do have a regular place of care, emergency departments and retail store/minute clinics were the most likely sources of care, suggesting these settings may be suitable venues for providing interventions for these families.

Children who lived with a smoker and who had home TSE were significantly more likely to seek sick care or health advice at an emergency department. Research indicates that there are high rates of biochemically validated TSE in children who present to the pediatric emergency department.[6] Given the high acceptability of tobacco-related interventions among caregivers who smoke in this setting,[23] the emergency department may be an optimal venue for delivering interventions to decrease child TSE and increase caregiver quit attempts.[24,25]

Contrary to our hypothesis, children who lived with a smoker and who had home TSE were less likely to have had a dental care visit including checkups, X-rays, or fillings in the past year. This association is concerning, given children with TSE are at greater risk of dental caries.[26] Further, smoking cessation interventions at dental visits are not widespread.[27,28] Taken together, efforts are needed to increase dental visits among children who have TSE and to increase smoking cessation counseling among smokers during dental visits.

Limitations

There are several factors that may limit the generalizability of the study results. For instance, data are based on self-report, and as such social desirability may have influenced information provided by caregivers who might have been very sensitive to reporting if they smoked in the home. The NSCH may have resulted in sampling bias that influenced parameter estimates due to the data collection procedures. Although the NSCH may not be truly representative of the US population due to the low capture rate, the NSCH does provide information consistent with the overall survey's purpose to provide estimates of child data for key health indicators and generate information about children, their families, and neighborhoods. Further, the phrasing of the home TSE question may have also influenced social desirability bias (eg, "inside the child's home" vs "in your home"). Based on the self-report nature of the TSE questions, underreporting or overreporting may have occurred.[29,30] Biochemical validation of results would provide a more precise measure of TSE. Due to self-report, caregivers may have not known the differences between what type of place (eg, doctor's office vs clinic or health center) they go most often for their child's medical care. Data from behavioral observations, reports from another family member, or biochemical validation of the child's TSE status would provide a way to verify information provided by caregivers. The NCHS does not measure the child's smoking status, which may confound results in the older age group. The NCHS is cross-sectional in nature. Evidence on the impact of TSE over the course of children's development would provide more information on health-care utilization. Finally, analyses were based on single items or questions. Although questions were specific and easy to understand, use of standardized measures might have provided more accurate information.

Significance

Our results indicate that TSE is a risk factor for increased use of medical care. Based on the high number of children who lived with a smoker or were exposed to tobacco smoke inside the home and received sick care or health advice at an emergency department, this setting may be a potential venue for health messages to inform caregivers about the dangers of TSE for children. The AAP and prior research recommends screening and documenting TSE as standard care during health-care visits.[3,31,32] Moreover, the practice of screening all

caregivers for tobacco use and for child TSE may provide an ideal way for health professionals to begin discussions about child TSE at "teachable moments" during pediatric health-care visits when the caregiver is focused on child health. These visits may be opportunities when caregivers are very open to education about risks of TSE and benefits to reducing child exposure to tobacco smoke. Physicians should consider using minimal counseling, which is a state-of-the-art, brief intervention that lasts less than 3 minutes and has been proven to increase tobacco abstinence rates.[33] Future research on the longitudinal effects of TSE on child health and the impact of interventions to reduce TSE will provide further information about health risks for children and ideas about ways to mitigate these risks through health messaging and prevention programming.

Funding

References

1. US Department of Health and Human Services. The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General. Rockville, MD: US Department of Health and Human Services, Office of the Surgeon General; 2014.

2. Homa DM, Neff LJ, King BA, et al. Vital signs: disparities in nonsmokers' exposure to secondhand smoke—United States, 1999–2012. MMWR. 2015;64(4):103–108. [PubMed: 25654612]

3. American Academy of Pediatrics. Policy statement—tobacco use: a pediatric disease. Pediatrics. 2009;124(5):1474–1487. [PubMed: 19841108]

4. Mannino DM, Homa DM, Redd SC. Involuntary smoking and asthma severity in children: data from the Third National Health and Nutrition Examination Survey. Chest. 2002;122(2):409–415. [PubMed: 12171810]

5. Jacobs-van der Bruggen MAM, Wijga AH, Brunekreef B, et al. Do parents who smoke underutilize health-care services for their children? A cross sectional study within the longitudinal PIAMA study. BMC Health Serv Res. 2007;7(1):83–89. [PubMed: 17565678]

6. Mahabee-Gittens EM, Gordon JS. Missed opportunities to intervene with caregivers of young children highly exposed to secondhand tobacco smoke. Prev Med. 2014;69:304–305. [PubMed: 25449690]

7. Leung GM, Ho LM, Lam TH. Secondhand smoke exposure, smoking hygiene, and hospitalization in the first 18 months of life. Arch Pediatr Adolesc Med. 2004;158(7):687–693. [PubMed: 15237069]

8. McBride CM, Lozano P, Curry SJ, Rosner D, Grothaus LC. Use of health services by children of smokers and nonsmokers in a health maintenance organization. Am J Public Health. 1998; 88(6): 897–902. [PubMed: 9618616]

9. Crombie IK, Wright A, Irvine L, Clark RA, Slane PW. Does passive smoking increase the frequency of health service contacts in children with asthma? Thorax. 2001;56(1):9–12. [PubMed: 11120897]

10. Child and Adolescent Health Measurement Initiative. Fast Facts: 2011/12 National Survey of Children's Health. US Department of Health and Human Services; 2012 http://www.childhealthdata.org/learn/facts. Accessed November 1, 2015.

11. Blumberg SJ, Luke JV, Cynamon ML. Telephone coverage and health survey estimates: evaluating the need for concern about wireless substitution. Am J Public Health. 2006;96(5):926–931. [PubMed: 16571707]

12. Kempf AM, Remington PL. New challenges for telephone survey research in the twenty-first century. Annual Rev Public Health. 2007;28(1):113–126. [PubMed: 17094769]

13. Centers for Disease Control and Prevention. 2011–2012 National Survey of Children's Health frequently asked questions. http://www.cdc.gov/nchs/slaits/nsch.htm. Published 2012. Updated 2013. Accessed November 1, 2015.

14. Singh GK, Siahpush M, Kogan MD. Disparities in children's exposure to environmental tobacco smoke in the United States, 2007. Pediatrics. 2010;126(1):4–13. [PubMed: 20587673]

15. Benowitz NL. Cotinine as a biomarker of environmental tobacco smoke exposure. Epidemiol Rev. 1996;18(2):188. [PubMed: 9021312]

16. Howrylak JA, Spanier AJ, Huang B, et al. Cotinine in children admitted for asthma and readmission. Pediatrics. 2014;133(2): e355–e362. [PubMed: 24446438]

17. Butz AM, Bollinger ME, Halterman JS, et al. Factors associated with second-hand smoke exposure in young inner-city children with asthma. J Asthma. 2011;48(5):449–457. [PubMed: 21545248]

18. 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, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2006.

19. Centers for Disease Control and Prevention. Vital signs: nonsmokers' exposure to secondhand smoke—United States, 1999–2008. MMWR Morb Mortal Wkly Rep. 2010;59(35):1141–1146. [PubMed: 20829748]

20. Centers for Disease Control and Prevention. Prevalence of smoke free home rules—United States, 1992–1993 and 2010–2011. MMWR Morb Mortal Wkly Rep. 2014;63(35):765–769. [PubMed: 25188494]

21. Weitzman M, Cook S, Auinger P, et al. Tobacco smoke exposure is associated with the metabolic syndrome in adolescents. Circulation. 2005;112(6):862–869. [PubMed: 16061737]

22. Kum-Nji P, Meloy L, Herrod HG. Environmental tobacco smoke exposure: prevalence and mechanisms of causation of infections in children. Pediatrics. 2006;117(5):1745–1754. [PubMed: 16651333]

23. Mahabee-Gittens EM, Gordon J. Acceptability of tobacco cessation interventions in the pediatric emergency department. Pediatr Emerg Care. 2008;24(4):214–216. [PubMed: 18431218]

24. Mahabee-Gittens EM, Gordon JS, Krugh ME, Henry B, Leonard AC. A smoking cessation intervention plus proactive quitline referral in the pediatric emergency department: a pilot study. Nicotine Tob Res. 2008;10(12):1745–1751. [PubMed: 19023825]

25. Mahabee-Gittens EM, Khoury JC, Ho M, Stone L, Gordon JS. A smoking cessation intervention for low-income smokers in the ED. Am J Emerg Med. 2015;33(8):1056–1061. [PubMed: 25976268]

26. Aligne CA, Moss ME, Auinger P, Weitzman M. Association of pediatric dental caries with passive smoking. JAMA. 2003; 289(10):1258–1264. [PubMed: 12633187]

27. Tong EK, Strouse R, Hall J, Kovac M, Schroeder SA. National survey of U.S. health professionals' smoking prevalence, cessation practices, and beliefs. Nicotine Tob Res. 2010;12(7):724–733. [PubMed: 20507899]

28. Tremblay M, Cournoyer D, O'Loughlin J. Do the correlates of smoking cessation counseling differ across health professional groups? Nicotine Tob Res. 2009;11(11):1330–1338. [PubMed: 19770488]

29. Avila-Tang E, Elf JL, Cummings KM, et al. Assessing secondhand smoke exposure with reported measures. Tob Control. 2013; 22(3):156–163. [PubMed: 22949496]

30. Prochaska JJ, Grossman W, Young-Wolff KC, Benowitz NL. Validity of self-reported adult secondhand smoke exposure. Tob Control. 2015;24(1):48–53. [PubMed: 23997071]

31. Pbert L, Klein JD, Farber H, et al. State-of-the-art office-based interventions to eliminate youth tobacco use: the past decade. Pediatrics. 2015;135(4):734–747. [PubMed: 25780075]

32. Lustre BL, Dixon CA, Merianos AL, Gordon JS, Zhang B, Mahabee-Gittens EM. Assessment of tobacco smoke exposure in the pediatric emergency department. Prev Med. 2016;85:42–46. [PubMed: 26794047]

33. Fiore MC, Jaén CR, Baker TB, et al. Treating Tobacco Use and Dependence: 2008 Update Rockville, MD: US Department of Health and Human Services, Public Health Service; 2008.

So WHAT? Implications for Health Promotion Practitioners and Researchers

What is already known on this topic?

TSE causes physical health consequences in children including respiratory symptoms, increased infections, and exacerbated asthma. Few studies have examined whether TSE translates into more frequent pediatric health-care utilization.

What does this article add?

TSE contributes to increased use of health-care services. Settings with high volume of children with TSE, including emergency departments, are potential outlets for health messages to inform caregivers about the dangers of child TSE.

What are the implications for health promotion practice or research?

Offering smoking cessation interventions to caregivers in health-care settings with high volume of children with TSE is needed. The practice of screening all caregivers for tobacco use and child TSE during these visits may provide an ideal way for health professionals to begin discussions about child TSE at "teachable moments" during health-care visits when the caregiver is focused on child health.

Table 1.

Sociodemographic Characteristics of Children 0 to 17 Years Old by Household Smokers and Home TSE in the United States, 2011 to 2012.

Sociodemographic Characteristics	Household Smokers			Home TSE		
	Lives With Nonsmoker (n = 72 617), n (%)[a]	Lives With Smoker (n = 22 137), n (%)[a]	P Value	No Home TSE (n = 90 125), n (%)[a]	Home TSE (n = 4623), n (%)[a]	P Value
Child gender						
Female	35 262 (76.1)	10 651 (23.9)	<.001	43 710 (95.2)	2199 (4.8)	<.001
Male	32 276 (75.7)	11 463 (24.3)		46 314 (95.0)	2423 (5.0)	
Child age						
0–9 years old	38 316 (76.4)	11 557 (23.6)	<.001	48 182 (96.7)	1687 (3.3)	<.001
10–17 years old	34 301 (75.2)	10 580 (24.8)		41 943 (93.1)	2936 (6.9)	
Child race/ethnicity						
White	47 101 (73.9)	14 217 (26.1)	<.001	58 472 (94.8)	2843 (5.2)	<.001
Black	6731 (75.0)	2132 (25.0)		8073 (91.0)	790 (9.0)	
Hispanic	10 033 (81.7)	2637 (18.3)		12 312 (98.1)	358 (1.9)	
Multiracial	7598 (73.5)	2840 (26.5)		9872 (94.9)	566 (5.1)	
Household composition						
2-parent biological	53 788 (80.3)	12 295 (19.7)	<.001	64 155 (97.1)	1924 (2.9)	<.001
2-parent stepfamily	3854 (59.1)	2696 (40.9)		5891 (90.4)	658 (9.6)	
Single mother	10 290 (71.0)	4800 (29.0)		13 759 (91.5)	1331 (8.5)	
Other family type	4296 (67.6)	2227 (32.4)		5841 (91.2)	681 (8.8)	
Mother education						
Less than high school	4183 (70.5)	2505 (29.5)	<.001	6019 (92.9)	669 (7.1)	<.001
High school graduate	10 002 (64.2)	6046 (35.8)		14 599 (91.4)	1447 (8.6)	
More than high school	53 419 (82.0)	11 147 (18.0)		62 785 (97.3)	1781 (2.7)	
Household poverty status						
<100%	8924 (66.3)	5832 (33.7)	<.001	13 032 (90.4)	1721 (9.6)	<.001
100%–199%	11 379 (68.6)	5 634 (31.4)		15 649 (92.9)	1364 (7.1)	
200%–399%	22 400 (77.4)	6298 (22.6)		27 644 (96.8)	1053 (3.2)	
400%	29 914 (87.8)	4373 (12.2)		33 800 (98.8)	485 (1.2)	
Insurance type						
Public	16 832 (66.0)	10 246 (34.0)	<.001	24 379 (91.5)	2695 (8.5)	<.001

| | Household Smokers | | | Home TSE | | |
Sociodemographic Characteristics	Lives With Nonsmoker (n = 72 617), n (%)[a]	Lives With Smoker (n = 22 137), n (%)[a]	P Value	No Home TSE (n = 90 125), n (%)[a]	Home TSE (n = 4623), n (%)[a]	P Value
Private	52 344 (82.9)	10 208 (17.1)		61 043 (97.6)	1507 (2.4)	
No insurance	2642 (70.6)	1338 (29.4)		3636 (93.9)	344 (6.1)	

Abbreviation: TSE, tobacco smoke exposure.

[a] n refers to raw scores and percentages are weighted.

Table 2.

Adjusted Prevalence Health-Care Visits According to Household Smokers in Children 0 to 17 Years Old in the United States, 2011 to 2012.

Household Smokers	Health-Care Visits		Multivariable Regression [a]	
	No, n (%) [b]	Yes, n (%) [b]	OR	95% CI
Any medical care visit				
Child lives with nonsmoker	7086 (11.6)	65 435 (88.4)	Ref	Ref
Child lives with smoker	2655 (12.5)	19 438 (87.5)	1.22^c	1.21–1.22
Preventive medical care visit				
Child lives with nonsmoker	10 339 (15.1)	61 772 (84.9)	Ref	Ref
Child lives with smoker	3815 (16.9)	18 100 (83.1)	1.10^c	1.09–1.10
Specialty care visit				
Child lives with nonsmoker	53 742 (76.8)	18 813 (23.2)	Ref	Ref
Child lives with smoker	17 049 (79.2)	5059 (20.8)	1.01^c	1.00–1.01
Any dental care visit				
Child lives with nonsmoker	12 061 (21.0)	56 482 (79.0)	Ref	Ref
Child lives with smoker	5372 (27.1)	15 617 (72.9)	0.82^c	0.82–0.83
Preventive dental care visit				
Child lives with nonsmoker	12 265 (21.3)	56 184 (78.7)	Ref	Ref
Child lives with smoker	5490 (27.8)	15 447 (72.2)	0.81^c	0.80–0.81
Has usual place for sick care or health advice				
Child lives with nonsmoker	4019 (8.4)	68 473 (91.6)	Ref	Ref
Child lives with smoker	1680 (9.1)	20 410 (90.9)	1.03^c	1.03–1.03
Doctor's office as usual place for sick care or health advice				
Child lives with nonsmoker	14 172 (22.8)	54 822 (77.2)	Ref	Ref
Child lives with smoker	5396 (25.3)	15 461 (74.7)	1.05^c	1.05–1.06
Hospital emergency department as usual place for sick care or health advice				
Child lives with nonsmoker	68 130 (97.9)	864 (2.1)	Ref	Ref
Child lives with smoker	20 315 (96.8)	542 (3.2)	1.23^c	1.23–1.24

| | Health-Care Visits | | Multivariable Regression[a] | |
Household Smokers	No, n (%)[b]	Yes, n (%)[b]	OR	95% CI
Hospital outpatient department as usual place for sick care or health advice				
Child lives with nonsmoker	67 507 (97.6)	1487 (2.4)	Ref	Ref
Child lives with smoker	20 244 (97.4)	613 (2.6)	1.01[c]	1.00–1.01
Clinic or health center as usual place for sick care or health advice				
Child lives with nonsmoker	57 231 (81.9)	11 763 (18.1)	Ref	Ref
Child lives with smoker	16 640 (80.7)	4217 (19.3)	0.92[c]	0.92–0.92
Retail store/minute clinic as usual place for sick care or health advice				
Child lives with nonsmoker	68 936 (99.9)	58 (0.1)	Ref	Ref
Child lives with smoker	20 833 (99.9)	24 (0.1)	1.53[c]	1.50–1.55

Abbreviations: CI, confidence interval; OR, odds ratio; Ref, referent.

[a] Step-wise regression controlling for mother education, household composition, poverty level, insurance, child gender, child age, and child race/ethnicity.

[b] n refers to raw scores and percentages are weighted.

[c] $P<.001$.

Table 3.

Adjusted Prevalence of Health-Care Visits According to Home TSE Among Children 0 to 17 Years Old in the United States, 2011 to 2012.

| Home TSE | Health-Care Visits | | Multivariable Regression[a] | |
	No, n (%)[b]	Yes, n (%)[b]	OR	95% CI
Any medical care visit				
No home TSE	9071 (11.7)	80 391 (88.3)	Ref	Ref
Home TSE	669 (13.3)	3937 (86.7)	1.35[c]	1.34–1.35
Preventive medical care visit				
No home TSE	13 211 (15.5)	76 241 (84.5)	Ref	Ref
Home TSE	942 (17.1)	3626 (82.9)	1.32[c]	1.31–1.32
Specialty care visit				
No home TSE	67 162 (77.2)	22 883 (22.8)	Ref	Ref
Home TSE	3626 (80.3)	986 (19.7)	0.92[c]	0.91–0.92
Any type of dental care visit				
No home TSE	16 188 (22.2)	68 810 (77.8)	Ref	Ref
Home TSE	1244 (27.4)	3285 (72.6)	0.77[c]	0.76–0.77
Preventive dental care visit				
No home TSE	16 481 (22.6)	68 386 (77.4)	Ref	Ref
Home TSE	1273 (28.5)	3241 (71.5)	0.73[c]	0.73–0.74
Has usual place for sick care or health advice				
No home TSE	5240 (8.4)	84 718 (91.6)	Ref	Ref
Home TSE	459 (12.1)	4159 (87.9)	0.90[c]	0.90–0.91
Doctor's office as usual place for sick care or health advice				
No home TSE	18 311 (23.2)	67 235 (76.8)	Ref	Ref
Home TSE	1255 (26.8)	3044 (73.2)	1.06[c]	1.05–1.06
Hospital emergency department as usual place for sick care or health advice				
No home TSE	84 304 (97.7)	1242 (2.3)	Ref	Ref
Home TSE	4135 (95.4)	164 (4.6)	1.40[c]	1.38–1.40

	Health-Care Visits		Multivariable Regression[a]	
Home TSE	No, n (%)[b]	Yes, n (%)[b]	OR	95% CI
Hospital outpatient department as usual place for sick care or health advice				
No home TSE	83 578 (97.6)	1968 (2.4)	Ref	Ref
Home TSE	4167 (96.8)	132 (3.2)	1.19[c]	1.18–1.20
Clinic or health center as usual place for sick care or health advice				
No home TSE	70 521 (81.6)	15 025 (18.4)	Ref	Ref
Home TSE	3346 (81.2)	953 (18.8)	0.85[c]	0.85–0.86
Retail store/minute clinic as usual place for sick care or health advice				
No home TSE	85 470 (99.9)	76 (0.1)	Ref	Ref
Home TSE	4293 (99.9)	6 (0.1)	1.30[c]	1.26–1.34

Abbreviations: CI, confidence interval; OR, odds ratio; Ref, referent; TSE, tobacco smoke exposure.

[a] Step-wise regression controlling for mother education, household composition, poverty level, insurance, child gender, child age, and child race/ethnicity.

[b] n refers to raw scores and percentages are weighted.

[c] $P < .001$.