

The Impact of Retail Cigarette Marketing Practices on Youth Smoking Uptake

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Objective: To examine the differential associations of cigarette retail marketing practices on youth smoking uptake.

Design: Analyses from annual, nationally representative, cross-sectional surveys of 8th, 10th, and 12th graders in the United States.

Setting: The February 1999 through June 2003 Monitoring the Future surveys involved 109 308 students and data on retail cigarette marketing collected from 966 communities in which the students reside, as part of the Bridging the Gap Initiative: Research Informing Practice and Policy for Healthy Youth Behavior.

Participants: A total of 26 301 students were selected for this study.

Main Exposures: Point-of-sale advertising, promotions, prices, and placement.

Outcome Measure: Using a smoking uptake measure to account for stages that identify the process by

which adolescents begin smoking, we calculated odds ratios and confidence intervals through generalized ordered logit analyses, with weighted data that controlled for demographic and socioeconomic characteristics and accounted for clustering at the community level.

Results: Higher levels of advertising, lower cigarette prices, and greater availability of cigarette promotions were associated with smoking uptake. Advertising increased the likelihood of youth initiating smoking, price increased the likelihood of smoking at most levels of uptake, and availability of promotions increased the likelihood that youth will move from experimentation to regular smoking.

Conclusions: Cigarette retail marketing practices increase the likelihood of smoking uptake. These findings suggest that specific restrictions on retail cigarette marketing may reduce youth smoking.

Arch Pediatr Adolesc Med. 2007;161:440-445

CHILDHOOD EXPERIMENTATION with cigarettes and progression to regular use remains a public health concern. Research¹ shows that initiating smoking at a younger age is associated with eventually smoking more cigarettes per day than initiating smoking at an older age, suggesting that delaying the onset of smoking may affect the likelihood of becoming addicted to cigarettes or becoming a heavy smoker. It is also estimated that adolescents who started smoking in the mid to late 1990s will smoke for at least 16 years if male and 20 years if female.² Thus, smoking will be a long-term addiction for many current adolescent smokers. Furthermore, youth who initiate smoking at an early age are at an increased risk for developing long-term health consequences.³ Because increasing levels of smoking experience increase the likelihood of future smoking,³ many researchers⁴⁻⁷ have begun to use

stages of smoking experience to predict the transition to future established smoking.

In an attempt to determine what is causing adolescents to progress toward regular smoking, several studies have linked tobacco industry marketing practices to adolescent susceptibility to smoke⁸⁻¹⁰ and progression toward established smoking.¹¹⁻¹⁹ Existing

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evidence shows that initiation of daily smoking among youth seems to increase during periods of high promotional activity by the tobacco industry.¹⁶ Furthermore, a similar study¹³ examining smoking initiation trends in adolescent subgroups from 1979 to 1989, with trends in cigarette pricing and tobacco marketing expenditures, shows that although cigarette prices increased during the study's time period, so did tobacco marketing expenditures for coupons, value-added items, and promotional allowances. This

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suggests the industry may have increased its promotional activity to offset the increasing cost of cigarettes. Furthermore, although provisions were agreed on to restrict certain types of marketing and youth access to tobacco as part of the 1998 Master Settlement Agreement (MSA), there is evidence the tobacco industry is turning more and more to retail stores as outlets for its marketing efforts.²⁰ In fact, in 2003, the tobacco industry spent \$14.2 billion on retail advertising and price and other promotions, which accounts for 94% of all its 2003 advertising and promotional spending.²¹

In this study, we examine the influence of cigarette retail marketing strategies on the progression of adolescents from experimentation to established smoking using data collected from February 1999 through June 2003 in nationally representative samples of 8th-, 10th-, and 12th-grade students. To our knowledge, this is the first study to examine the differential effects of these retail marketing strategies on smoking uptake at the national level. The strengths of this study are that most of the data were collected after the implementation of the MSA provisions, allowing for an examination of the post-MSA retail cigarette environment; and its ability to simultaneously examine the impact that objectively collected measures of the cigarette retail environment have on youth smoking uptake.

METHODS

YOUTH SMOKING DATA

Cross-sectional data were collected from February 1999 through June 2003 from 109 308 students in schools participating in their second year of the Monitoring the Future (MTF) survey, funded by the National Institute on Drug Abuse. The MTF survey uses a multistage sampling design to obtain nationally representative samples of 8th-, 10th-, and 12th-grade students, with modal ages of 14, 16, and 18 years, respectively.²² Community boundaries were defined as the area from which each MTF school drew at least 80% of its student population. Community data collection activities, funded by the Robert Wood Johnson Foundation as part of the Bridging the Gap Initiative: Research Informing Practice and Policy for Healthy Youth Behavior, occurred in approximately 200 MTF communities each year (totaling 966 community areas from 1999 through 2003).

The uptake measure, which is described in detail elsewhere,⁶ has been validated to show that current smoking status and intentions to smoke are reliable predictors of future smoking. Briefly, this measure includes stages that identify the process by which adolescents begin smoking. Three MTF questions were used to create the uptake measure: (1) ever smoking, (2) smoking in the past 30 days, and (3) intention to smoke in the next 5 years. The uptake measure included the following categories: (1) never smoker, (2) puffer, (3) nonrecent experimenter, (4) former established smoker, (5) recent experimenter, and (6) current established smoker. A *puffer* was defined as someone who has smoked once or twice. A *nonrecent experimenter* was defined as a student who smoked occasionally, but not in the past 30 days. A *former established smoker* was defined as a student who smoked regularly in the past (not the past 30 days). A *recent experimenter* was defined as someone who smoked occasionally, but not regularly, in the past 30 days. A *current established smoker* was defined as someone who smoked regularly at the time of the survey, or smoked regularly in the past and smoked in the past 30 days. Because some of the MTF questions used to create this mea-

sure are asked of a subset of students, this study is limited to this subsample of respondents.

CIGARETTE MARKETING DATA

Observational data collection occurred annually in retail stores in the communities around the approximately 200 schools participating in their second year of MTF surveys. Community boundaries were defined as the area from which each school drew most of its student population. Using the census TIGER (Topologically Integrated Geographic Encoding and Referencing system; a Web mapping application, sponsored by the US Census Bureau, for the United States) files, maps of each community were created and a list of potential tobacco retailers located within each community was generated based on retailer-reported standard industry classification codes. Screener calls were conducted by telephone to identify which of these stores sold tobacco products. If the total number of outlets selling tobacco in a community was 30 or fewer, all outlets were observed; this was the case in 82.0% of communities. If more than 30 outlets sold tobacco products, a random sample of 30 stores was selected, along with a random sample of replacement stores (for use if a store on the primary list was closed, was determined to be unsafe, could not be located, or did not sell tobacco or alcohol). If the list of retail stores was fewer than 30 in a given community, field staff were instructed to add any additional stores selling tobacco products that they identified in the field. Field staff also added the store nearest the index school if it was not included in the sample. There were 17 476 stores in the 5-year sample, with a mean of 18.1 (SD, 9.9) stores per community.

Observations were conducted in each retail outlet using trained field staff teams composed of a lead and an assistant observer. The 2-person teams served as a reliability check for each site observation. If there was disagreement on any measure, field staff would return to the store to verify the measure prior to leaving the community. The purpose of the retail observations was to unobtrusively collect information on tobacco product placement, the extent of related advertising and promotions, and tobacco prices. Advertising included parking lot, other exterior (eg, store window), and interior advertising, while promotions included special price offers, on-pack coupons, and retail value-added promotions (eg, buy 1 get 1 free or gift with purchase). Observers collected these data during an approximately 10-minute visit to each selected store. Field staff were instructed to alternate collecting information on posted nominal prices (including excise taxes, but excluding sales tax) and price-based promotional offers for Marlboro (Philip Morris USA, Richmond, Va) and Newport (Lorillard Tobacco Company, Greensboro, NC) cigarettes from store to store to yield approximately equal numbers of stores for each brand. If a store did not sell one of the brands, then the other was substituted. Marlboro and Newport were selected because they are the brands most widely used by teenagers, accounting for approximately 78% of the usual brand smoked.²³ Information was also collected on low-height advertisements (<105 cm from the ground) and functional objects (branded objects that have some use, such as clocks, trash cans, and grocery baskets).

Two of the cigarette marketing variables are defined as the proportion of stores in each community that had a given type of marketing. For example, the promotions variable reflects the proportion of stores in the community that offered some type of promotion for Marlboro or Newport. Similarly, the placement variable reflects the proportion of the stores with clerk assist-only cigarette placement.

For advertising, a scale (Cronbach α = 0.70) was constructed, which equals the sum of 5 separate variables representing the proportion of stores in a site having any (1) property, (2) exterior, (3) interior, (4) functional object, or (5) low-height adver-

Table 1. Descriptive Statistics

Explanatory Variable	Proportion*	Standard Deviation	Range
Cigarette marketing variables			
Advertising scale†	2.56	0.76	0 to 5
No self-service placement	0.83	0.21	0 to 1
Any vs no promotions	0.48	0.26	0 to 1
Premium-price cigarettes, \$†	3.62	0.58	2.37 to 6.84
Control variables			
Grade			
8‡	0.34	0.47	0 to 1
10	0.34	0.47	0 to 1
12	0.32	0.47	0 to 1
Male sex	0.47	0.49	0 to 1
Student's weekly income, \$†	52.93	55.42	0 to 278.20
Lives with both parents	0.77	0.42	0 to 1
Father's educational level	0.55	0.49	0 to 1
Mother's educational level	0.59	0.49	0 to 1
Race			
African American	0.11	0.32	0 to 1
White‡	0.68	0.46	0 to 1
Hispanic origin	0.11	0.31	0 to 1
Asian	0.03	0.17	0 to 1
Other	0.05	0.22	0 to 1
Year†	2001	1.41	1999 to 2003
Setting			
Urban	0.23	0.42	0 to 1
Suburban	0.42	0.49	0 to 1
Rural‡	0.35	0.48	0 to 1
Smoke-free air index†	13.16	12.11	-22.5 to 51.0
PUP index†	1.78	1.06	0 to 3
Youth access index†	17.22	6.95	3 to 29

Abbreviation: PUP, purchase, use, or possession.

*For proportions, 0.83 indicates 83% of the sample, except where otherwise indicated. For the sample, N = 26 301.

†Data are given as the sample mean (eg, \$3.62 is the average price for premium-brand cigarettes across the 5 years of the study).

‡Referent category.

tising. Sensitivity analyses were conducted by testing alternative constructs, including a measure representing the proportion of stores in a site having increasing levels of advertising. Results were consistent across measures. Therefore, we present the most straightforward advertising construct.

The measure of price is the average price of premium-brand cigarettes (Marlboro and Newport) across all stores in a community. To account for changes in the relative price of cigarettes over time, our price measure is deflated by the national Consumer Price Index, published by the Bureau of Labor Statistics (2003). Methods for the youth surveys and the community data collection were reviewed and approved by an appropriate institutional review board.

CONTROL VARIABLES

Key state tobacco control policies were controlled for in the models. These include an index reflecting the comprehensiveness and extent of state restrictions on smoking, adjusted for preemption; an index of state policies banning minors' purchase, use, or possession of tobacco products; and an index of state policies restricting youth access to tobacco products. The smoke-free air index is the sum of restrictions on smoking in 9 different indoor locations, with each taking a value between 0 and 5 depending on the extent of the restriction, with points subtracted if there is statewide preemption of stronger local policies. The purchase, use, or possession index includes 3 di-

Table 2. Frequency Distribution of Smoking Experience

Behavior	Threshold	No. (%) of the Total
Never smoker	0	14 130 (53.7)
Puffer	1	5456 (20.7)
Nonrecent experimenter	2	1077 (4.1)
Former established smoker	3	815 (3.1)
Recent experimenter	4	1808 (6.9)
Current established smoker	5	3015 (11.5)
Total	6	26 301 (100.0)

chotomous variables (1 indicates law present; and 0, no law), representing the count of state policies prohibiting minors' possession, use, and purchase, respectively. The youth access index was constructed using the rating system developed by Alciati et al,²⁴ and includes information on 9 dimensions of youth access-related policies rated from 0 to 5 depending on the stringency of relevant provisions. The state-level tobacco-related policies were obtained from a tobacco database (ImpacTeen; available at: <http://www.impactteen.org>).

In addition, several variables were used to control for youth and community factors likely to affect smoking behavior, including grade (8, 10, and 12), sex, race/ethnicity (black or African American, white or Caucasian, Hispanic, Asian, and other), lives with both parents, student income from a job or other sources, indicators of parental educational level (some college or more), year of data collection, and urbanization of the community. Urbanization level was obtained from the National Center for Education Statistics for each school. Other data are taken from the MTF surveys. Cases with missing data on any variable were eliminated from analyses.

ANALYSIS

Analyses were run using computer software (Stata, version 9.2; StataCorp, College Station, Tex). Generalized ordered logit models were run using gologit²⁵ procedures in the software (Stata), requesting Wald tests to determine if the coefficients between thresholds were significantly different for the gologit models and using the lincom statement for requested contrasts. We used a generalized ordered logit model to capture the differential effects of cigarette marketing on our varying thresholds of smoking uptake. A standard ordered logit model, also called a proportional odds model, assumes the effect of the independent variables is the same for all categories of the dependent variable. The generalized ordered logit model relaxes the proportional odds assumption and allows the effects of the explanatory variables to have varying effects on different levels of smoking uptake. We defined 6 levels of smoking uptake; thus, there are 5 thresholds to separate these stages. The complex sample design was accounted for by using sampling weights to adjust for differential selection probabilities, and adjusting for clustering by site—defined as school enrollment zone—to compute robust standard errors. All analyses controlled for student grade, sex, race/ethnicity, whether the student lives with both parents, student's income from work and other sources, father's and mother's level of education (college or more), urbanization, state-level tobacco control policies, and year of data collection.

RESULTS

There were 26 301 students in the study, with 34.3%, 33.6%, and 32.1% of 8th, 10th, and 12th graders, respectively (**Table 1**). Stores in observed communities had nearly 3

Table 3. Results of the Generalized Ordered Logit Model for Smoking Uptake*

Store Variable	Threshold 1: Nonsmoker to Puffer	Threshold 2: Nonrecent Experimenter	Threshold 3: Former Established Smoker	Threshold 4: Recent Experimenter	Threshold 5: Current Established Smoker
Advertising scale	1.08 (1.02-1.14)†	1.05 (0.99-1.12)	1.04 (0.97-1.11)	0.99 (0.92-1.07)	0.99 (0.91-1.07)
Premium price	0.87 (0.74-1.02)	0.76 (0.64-0.89)‡	0.77 (0.65-0.92)†	0.81 (0.67-0.98)†	0.79 (0.63-0.98)†
Presence of promotions	1.08 (0.92-1.27)	1.15 (0.96-1.37)	1.19 (1.00-1.44)†	1.22 (1.01-1.48)†	1.38 (1.11-1.72)†
Self-service placement	0.94 (0.76-1.17)	0.89 (0.71-1.12)	0.92 (0.72-1.16)	0.80 (0.63-1.02)	0.79 (0.57-1.08)

*Data are given as odds ratio (95% confidence interval). The sample N = 26 301. All models include intercepts and control for grade; sex; race/ethnicity; whether the student lives with both parents; student's income; father's and mother's level of education (college or more); urbanization; state-level smoke-free air policies; state-level youth purchase, use, and possession policies; state-level youth access policies; and year of data collection. Complete model results are available from the corresponding author on request.

† $P < .05$.

‡ $P < .001$.

(2.56) of 5 types of advertising. In contrast, only 17.0% of stores within each community had some type of self-assist placement, but 48.0%, or nearly half, of all stores had some type of price-based cigarette promotion. The average price for premium-brand cigarettes was \$3.62.

Table 2 contains the frequency distributions for smoking experience. Overall, 53.7% of the sample had never smoked. The next most frequent category was puffers (20.7%); also at the high end, 11.5% of the sample were current established smokers. The mean for smoking uptake was 1.23, indicating that the average student was somewhere between a puffer and a nonrecent experimenter.

Table 3 reports the results of the generalized ordered logit model examining movement across the smoking uptake thresholds by retail cigarette marketing strategy. Thresholds 1 through 5 refer to the 6 different levels of smoking uptake reported in Table 2. For example, threshold 1 refers to a movement from "never smoker" to "puffer," and so on. Results for threshold 1 showed that an increase in moving up a level on the advertising scale (the proportion of stores in a community having an additional type of advertising) will increase the odds of an adolescent moving from the nonsmoking to the initiation (puffer) stage of uptake by a factor of 1.08, or a relative increase of 8%. We did test for interaction effects between grade and advertising (results not shown). Results showed a significant interaction effect for 8th graders and advertising. All other results remained unchanged. Beginning at threshold 2, advertising was no longer significant; price had a strong significant negative effect on smoking uptake. In fact, results suggest that for every dollar increase in price, the odds that an adolescent will move on to the next level of smoking decrease by 24%. The magnitude of the effect of higher cigarette prices on smoking uptake varies slightly by threshold; but overall, this finding was consistent across the remaining thresholds (3-5). Beginning at threshold 3, the presence of promotions had a positive significant effect on moving youth along the smoking uptake continuum. Results of thresholds 4 and 5 also showed that the proportion of stores having any promotions significantly increased the odds of youth moving to higher levels of smoking uptake.

The results of the pairwise Wald tests showed significant differences in moving from threshold 1 to 2 for price

($P = .03$), while the effects of price are equal across the remaining stages of uptake. For promotions, we found significant differences in moving from threshold 3 to 5 and from threshold 4 to 5 ($P = .05$ for both).

To better assess the magnitude of the association between cigarette marketing and youth smoking uptake, we conducted a series of simulations to produce estimates of how cigarette marketing influences the different thresholds of smoking uptake for varying levels of availability for advertising and promotions. Specifically, the predicted probabilities were calculated for the model estimated in Table 3 by separately setting the advertising and promotion variables to their minimum and maximum values found in the sample, holding all other independent variables at their mean. Simulations were performed using the *pvalue* option in the computer software used (Stata, version 9.2) to assess the impact of these various changes in marketing measures on youth smoking uptake.

We used the estimates from our model to predict changes in uptake if stores went from having approximately 2½ different types of advertising to having no advertising or if stores had all 5 types of advertising. If stores had no advertising, there would be a relative 11.25% decline in puffers, while increasing the types of advertising in stores to include the 5 captured in our scale would result in a 10.86% increase in puffers.

For promotions, we examined changes in smoking uptake if they went from being available in just less than half of stores to being available in either all stores (100%) or no stores. If all stores had some type of promotions, current established smokers would experience a relative increase of 16.58%. On the other hand, completely eliminating promotions would result in a 13.39% relative decline in current established smokers.

COMMENT

The results of this study show cigarette marketing strategies have differential effects on the progression from initiation and experimentation with cigarettes to regular smoking. Specifically, our results suggest point-of-sale advertising is associated with encouraging youth to try smoking, whereas cigarette promotions are associated with

Table 4. The BTG Cigarette Retail Marketing Trends by Year*

Cigarette Marketing Measure	1999	2000	2001	2002	2003
Point-of-sale advertising scale	2.61	2.71	2.73	2.40	2.40
Premium-priced cigarettes	2.94	3.32	3.48	3.75	3.75
Any vs no promotions	0.52	0.39	0.40	0.49	0.59
Multipack discounts	0.27	0.15	0.14	0.23	0.17
Cents off/special advertised price	0.37	0.27	0.30	0.39	0.55
Gift with purchase	0.06	0.08	0.10	0.11	0.04
Clerk-assist placement	0.68	0.78	0.83	0.91	0.90

Abbreviation: BTG, Bridging the Gap Initiative.

*The promotion measure differs slightly between 1999 and subsequent years. In 1999, the presence of a variety of promotions for any brand was collected; from 2000 on, the presence of promotions for Marlboro (Philip Morris USA, Richmond, Va) or Newport (Lorillard Tobacco Company, Greensboro, NC) cigarettes only was collected. This is most likely the cause of the decrease in the presence of promotions from 1999 to 2000.

influencing those youth already experimenting with cigarettes to progress to regular smoking, with established smokers being most influenced by promotional offers.

The advertising measure used in our study represents the level or amount of point-of-sale advertising that is present in communities. This pervasiveness of advertising may influence youth initiation of smoking by creating the belief that smoking is a normative behavior.³ As previously mentioned, we also tested for interactions between grade and advertising, which did not substantively alter our results or the implications of this study. Results did show that 8th graders are more influenced by advertising than 10th and 12th graders. This reinforces our overall finding that advertising impacts the early stages of smoking, which is where we would expect to find the younger students.

Our findings are consistent with previous literature,^{10,14,26-28} which has shown a link between advertising and promotions and encouraging adolescents to initiate smoking. There is also evidence that point-of-sale advertising influences youths' intentions to smoke in the future.²⁹ Some studies^{12,14,15} have also found a relationship between receptivity to tobacco "advertising" and progressing to established smoking. We did not find any evidence of point-of-sale advertising influencing current established smokers. However, these studies^{12,14,15} used measures that captured youths' receptivity to cigarette advertisements and tobacco promotional items (ie, a T-shirt or a hat). This study disentangled these marketing strategies to look at point-of-sale advertising and promotions separately. Thus, although our results show advertising has no influence on established smokers, our findings are consistent with previous studies given that our results show promotions are important in the later stages of uptake.

Furthermore, these findings support previous research^{30,31} that shows price-based promotional offers are particularly appealing to young price-sensitive smokers. Thus, the beneficial effects of higher cigarette prices are undermined when youth are able to take advantage of cigarette promotions. In addition, our results suggest higher cigarette prices are associated with discouraging youth from progressing to established smoking at most levels of smoking uptake. Price was only insignificant at threshold 1, possibly because youth who first initiate to-

bacco use are more likely to obtain cigarettes from a source other than a store.³² This finding is particularly significant because the latest Federal Trade Commission Cigarette Report²¹ shows a substantial increase in price discounts (71.4% or \$10.78 billion), such as buy downs, paid to retailers in 2003 to reduce the price of cigarettes to consumers. Beginning in 2002, there was a definite shift away from retail value-added promotions toward price discounts,²¹ which would be reflected in the recorded cigarette price rather than through the presence of a promotional offer. This shift toward price discounts is reflected in the data used for this study, which can be seen in **Table 4**. After steady increases, there was no change in price between 2002 and 2003, and the largest increase in the presence of promotions occurred in the category of cents off/special advertised price.

There are some limitations in our marketing data: (1) the lack of information on the content of the point-of-sale advertising, (2) the promotions variable does not capture the full extent of promotions that may have been available in the stores during data collection, and (3) our price measure is an average of prices collected across stores in the community and is unweighted because we have no information regarding each store's share of cigarette sales. Yet, these measures are still more local and, for promotions and price, more specific to the brands youth smoke than anything that has been used in previous studies.

Since the implementation of the MSA, the cigarette industry has shifted its marketing efforts away from more traditional media, such as print advertising, toward retail marketing efforts.²⁰ Our findings provide evidence that the retail environment is associated with youth smoking uptake. Therefore, although the MSA restricted the cigarette industry's advertising and promotional activities, and the industry itself has restricted its advertising in magazines, the increase in cigarette retail marketing is, at least partly, offsetting any benefits of other MSA-related marketing reductions.

These results are of particular significance because, to our knowledge, no previous study has examined the differential impact of objectively collected measures of cigarette marketing strategies on smoking uptake. Overall, our results provide evidence that restricting point-of-sale advertising will discourage youth from trying smoking, and policies that increase cigarette prices and/or restrict price-

based promotions will have a long-term positive impact by preventing youth from moving farther along the smoking uptake continuum toward regular smoking.

Accepted for Publication: November 20, 2006.

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Financial Disclosure: None reported.

Funding/Support: This study was supported by the Robert Wood Johnson Foundation and the Centers for Disease Control and Prevention. The MTF survey is supported by the National Institute on Drug Abuse.

Role of the Sponsor: The funding bodies had no role in data extraction and analyses, in the writing of the manuscript, or in the decision to submit the manuscript for publication.

Disclaimer: The views expressed herein are those of the authors and do not necessarily reflect the views of the Robert Wood Johnson Foundation, the Centers for Disease Control and Prevention, the University of Illinois at Chicago, or the University of Michigan, Ann Arbor.

Additional Information: The material contained in this article is based on Dr Slater's thesis, in partial fulfillment of the requirements for the doctoral degree at the Graduate College of the University of Illinois at Chicago.

Acknowledgment: We thank Bridging the Gap colleagues for their input into instrument design; Jaana Myllyluoma, PhD, and colleagues at Battelle Centers for Public Health Research and Evaluation for data collection; and Deborah Kloska for assistance with data analysis.

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