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# Parental Awareness of Youth Tobacco Use and the Role of Household Tobacco Rules in Use Prevention

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abstract

**BACKGROUND AND OBJECTIVES:** Noncigarette tobacco use is increasing. In this study, we reexamined (1) parental knowledge or suspicion of their children's tobacco use and (2) associations of household tobacco-free rules with youth initiation.

**METHODS:** Participants were youth (aged 12–17) in waves 1 to 4 (2013–2018) of the Population Assessment of Tobacco and Health Study. A pseudo cross-sectional time-series analysis ( $N = 23\,170$ ) was used to examine parent or guardian knowledge or suspicion of their child's tobacco use according to youth-reported use categories: cigarette only, electronic cigarette only, smokeless tobacco only, noncigarette combustible only, and poly use. A longitudinal analysis among wave 1 never users ( $n = 8994$ ) was used to examine rules barring tobacco inside the home and whether parents talked with youth about not using tobacco as predictors of youth tobacco initiation after 1 to 3 years. Survey-weighted multivariable models were adjusted for tobacco use risk factors.

**RESULTS:** In all waves, parents or guardians much less often knew or suspected that their children used tobacco if youth only reported use of electronic cigarettes, noncigarette combustible products, or smokeless tobacco compared with cigarettes. Youth tobacco initiation was lower when youth and parents agreed that rules prohibited all tobacco use throughout the home (1-year adjusted odds ratio: 0.74; 95% confidence interval: 0.59–0.94) but not when parents talked with youth about tobacco (adjusted odds ratio: 1.08; 95% confidence interval: 0.94–1.23).

**CONCLUSIONS:** Many parents are unaware of their children's noncigarette tobacco use. Setting expectations for tobacco-free environments appears more effective at preventing youth tobacco initiation than parents advising children not to use tobacco.



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Ms Wu and Dr Chaffee conceptualized the research question and analytic strategy, conducted the statistical analysis, and contributed to drafting and revising the manuscript; and both authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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**WHAT'S KNOWN ON THIS SUBJECT:** Parents are not always cognizant of cigarette smoking by their children. Living in smoke-free homes is associated with less youth cigarette smoking. Parental awareness and the impact of tobacco-free homes for noncigarette tobacco use has not been examined in studies.

**WHAT THIS STUDY ADDS:** Although most parents are aware of their children's cigarette smoking, substantially fewer know or suspect other tobacco use. Unlike talking to children about tobacco, setting strict rules about tobacco use in the home is associated with less youth tobacco initiation.

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Parents hold influential roles in preventing youth tobacco use. Children of nonsmoking parents are less likely to initiate tobacco smoking themselves,<sup>1-7</sup> and interventions that actively engage parents have revealed promise in reducing youth tobacco, alcohol, and illicit substance use.<sup>8</sup> Creating tobacco-free home environments is one approach parents may take to set norms and expectations about tobacco use.<sup>9</sup> Children and/or young adults who live in households with strict rules against smoking are less likely to try or regularly smoke cigarettes.<sup>9-12</sup> Setting household rules for all family members and visitors may be more effective than invoking tobacco use rules applicable only to children, which are not necessarily associated with less youth smoking.<sup>13</sup>

Talking explicitly to children about not using tobacco represents another possible approach to discourage tobacco use. Parent-child antitobacco communication has been associated cross-sectionally with greater quit intentions among youth already using tobacco<sup>14</sup> but has been inconsistently associated with cigarette smoking among youth overall.<sup>10,15</sup> For both household rules and talking about tobacco, existing studies are predominantly cross-sectional and focused only on cigarette smoking.

Parents face new challenges in addressing youth substance use in a changing tobacco landscape. Although youth cigarette smoking is declining, use of noncigarette products, notably electronic cigarettes (e-cigarettes), is sharply increasing.<sup>16,17</sup> Often small, sweet-smelling, and unfamiliar to parents in appearance, e-cigarettes may be easier than cigarettes for children to conceal, possibly contributing to less parental awareness about youth use.<sup>18</sup> Even for cigarettes, previous findings suggest parental awareness lapses. In one study, among adolescents who smoked 1 to 5 cigarettes a day, only 39% of parents

were aware of their use.<sup>19</sup> In another, 43% of parents correctly identified that their child had smoked a cigarette within the last 6 months.<sup>20</sup>

In the current study, we consider parental knowledge or suspicion, household rules, and talking with youth about tobacco in a nationally representative longitudinal study of youth. Specifically, using data from the youth component of the Population Assessment of Tobacco and Health (PATH) Study, we addressed 2 main research questions using 2 different analytical approaches. First, we conducted a time-series analysis using 4 waves of PATH Study youth data (2013–2018) to assess parent or guardian knowledge or suspicion that their child uses tobacco. Next, we estimated longitudinal associations of household rules and talking to children about tobacco with youth tobacco initiation over 1, 2, and 3 years. We aim to characterize lapses in parental awareness and to evaluate potential parental strategies to prevent youth tobacco initiation.

## METHODS

### Data Source

The PATH Study is an ongoing household cohort study of tobacco use and health among US youth (aged 12–17) and adults.<sup>21</sup> An area-probability, 4-stage stratified sampling design was implemented at wave 1 (September 2013 to December 2014) to represent the US noninstitutionalized civilian population. Parents (or guardians) were asked about their participating children separately from questionnaires administered to youth directly. The weighted wave 1 response rate for the youth survey was 78.4% among households screened for participation.<sup>21</sup> Respondents were followed annually in waves (wave 2: October 2014 to October 2015; wave 3: October 2015 to October 2016; wave 4: December

2016 to January 2018). Respondents who reached age 18 before follow-up were invited to join the adult component. “Shadow youth,” aged 9 to 11 at wave 1, were invited to join the study at the wave at which they reached age 12. An additional “replenishment” youth sample was enrolled at wave 4.

### Ethical Considerations

PATH Study investigators obtained a National Institutes of Health certificate of confidentiality and ethical approval from the Westat Institutional Review Board. Parents or guardians provided informed consent for assenting youth. Youth received \$25 for participation and parents or guardians received \$10. In the present analysis, we used fully deidentified public use files.<sup>22</sup>

### Measures

Each wave, youth responded separately about lifetime use (ever, even once or twice) and past 30-day use ( $\geq 1$  day in the past 30 days) of multiple tobacco products. For this analysis, tobacco use was categorized as never use, former use (ever used  $\geq 1$  product but none in the past 30 days), and past 30-day use of only cigarettes, only e-cigarettes, only noncigarette combustible products (cigars, pipes, hookah, bidis, and/or kreteks), only smokeless tobacco (snuff, chewing tobacco, snus, and/or dissolvable tobacco), and polytobacco (use of products from  $\geq 2$  of these groups). The wave 2 questionnaire introduced the term “electronic nicotine products,” of which “e-cigarettes (including vape pens and personal vaporizers)” was a subset. In this analysis, we considered the most inclusive electronic nicotine product wording at each wave as e-cigarette use.

The first research question was used to assess parent or guardian knowledge or suspicion of their child’s tobacco use. Each wave, parents or guardians were asked, “As

far as you know, has [child's first name] ever smoked a cigarette or used other tobacco products, such as e-cigarettes, cigars, a pipe, a hookah, smokeless tobacco, dissolvable tobacco, bidis, or kreteks?" Parents were categorized as knowing or suspecting tobacco use if endorsing "you know that she/he has" or "you strongly suspect she/he has." The responses "you don't think she/he has" and "you are confident that she/he has not" were categorized as not aware or suspicious. "Don't know" responses were uncommon (<0.2% each wave) and were coded as not aware or suspicious.

The second research question involved longitudinal analyses of youth tobacco use initiation. Parents or guardians and youth were independently asked to consider "rules about using tobacco inside your home" as applied to "everyone who might be in your home, including children, adults, visitors, guests, or workers." Separate items referred to "tobacco products that are burned, such as cigarettes, cigars, pipes, or hookah" and "tobacco products that are not burned, like smokeless tobacco, dissolvable tobacco, and e-cigarettes." Endorsing that product use "is not allowed anywhere or at any time inside my home" was classified as strict household rules, whereas endorsing "in some places or at some times," "anywhere and at any time," or "don't know" was considered more permissive. Additionally, youth were asked, "In the past 12 months, have your parents or guardians talked with you, even once, about not using any type of tobacco product?" which we categorized as "yes" versus "no" or "don't know."

For both research questions, covariables included in multivariable models were parent or guardian educational attainment (4 levels: less than high school through college graduate); the child's age (12–14 vs 15–17 years), sex, and race and/or

ethnicity; whether anyone who now lives with the child uses tobacco (any product versus none, by child-report); and whether the child lives somewhere else with another parent (at least part-time versus never). Models of parental knowledge or suspicion additionally included whether the parent or guardian was the child's biological mother. Models of tobacco initiation additionally included child ever use of alcohol and cannabis, whether the child has a curfew (both school nights and weekend nights), and the sensation-seeking score.<sup>23</sup>

### Statistical Analysis

Of the total number of youth respondents in wave 1 ( $n = 13\,651$ ), wave 2 ( $n = 12\,172$ ), wave 3 ( $n = 11\,814$ ), and wave 4 ( $n = 14\,798$ ), the pseudo cross-sectional time-series analysis was limited to respondents with nonmissing data for parent knowledge or suspicion of youth tobacco use (wave 1:  $n = 13\,600$ ; wave 2:  $n = 12\,129$ ; wave 3:  $n = 11\,807$ ; wave 4:  $n = 14\,701$ ). In this pseudo time-series, each cross-sectional wave is weighted to be nationally representative, but some participants appear in multiple waves, resulting in  $n = 52\,237$  observations from  $n = 23\,170$  individuals. Longitudinal analyses were limited to youth who had never used any tobacco product as of wave 1. We assessed the outcome, initiation of tobacco use, at waves 2, 3, and 4, defined as reporting ever use of  $\geq 1$  tobacco product as of the time point of interest, including youth who "aged-up" into the adult survey by reaching age 18 at follow-up (sample sizes: wave 1 to 2,  $n = 8994$ ; wave 1 to 3,  $n = 8340$ ; wave 1 to 4:  $n = 7691$ ).

For the pseudo time-series analysis, parental knowledge or suspicion of their child's tobacco use was modeled as the dependent variable by using logistic regression with wave-specific, cross-sectional, balanced repeated replicate weights, allowing each wave

to be nationally representative despite participant overlap. Youth tobacco use category was the main predictor variable, with tobacco use  $\times$  survey wave interaction terms added to assess wave-specific differences in parental knowledge or suspicion according to youth tobacco use status.

For longitudinal analyses, youth tobacco initiation at waves 2, 3, and 4 were the dependent variables in separate logistic regression models with longitudinal weights. Wave 1 household tobacco rules and talking about not using tobacco were the main predictor variables. Household rules was specified as a 5-level categorical variable: both parent or guardian and child endorse more permissive rules on both product types, both endorse strict rules on burned tobacco (one or both more permissive for not-burned tobacco), both endorse strict rules on not-burned tobacco (one or both more permissive for burned tobacco), parent and youth discordant on both product types, and both endorse strict rules on both products types.

As exploratory analyses, we examined several alternative model specifications. We hypothesized that changes in social environments as youth age could reduce any impact of household rules on tobacco initiation over time. Therefore, we explored interactions of household rules with baseline age. Additionally, we explored whether household rules may differentially impact initiation of different types of tobacco by specifying multinomial logistic regression models for a 4-level dependent variable: no initiation, initiation of combustible tobacco only, initiation of noncombustible tobacco only, initiation of both product types. Finally, given that exposures and covariables are potentially time varying, we specified a repeated-measures model using generalized estimating equations for 1-year initiation outcomes, taking any

observation of a youth tobacco never user in waves 1, 2, and 3.

For all models, missing covariable values (2.6% of covariable data) were multiply imputed (15 replications). Although missingness was uncommon for any one tobacco use variable (1.4% of tobacco data), missing tobacco responses were also imputed when examining parental knowledge or suspicion because missingness compounded when deriving categories: 7.7% of participant observations were missing  $\geq 1$  tobacco variable. Analyses were conducted by using Stata 16.0 (Stata Corp, College Station, TX). Results were considered statistically significant at  $P < .05$ .

## RESULTS

Tobacco poly use was the most common behavior among current youth tobacco users in waves 1 to 3; in wave 4, e-cigarette only use was most common (Table 1). Among polytobacco users, 77% to 80% reported smoking cigarettes, depending on the survey wave. Social and demographic variables were similar in distribution over time (Table 1).

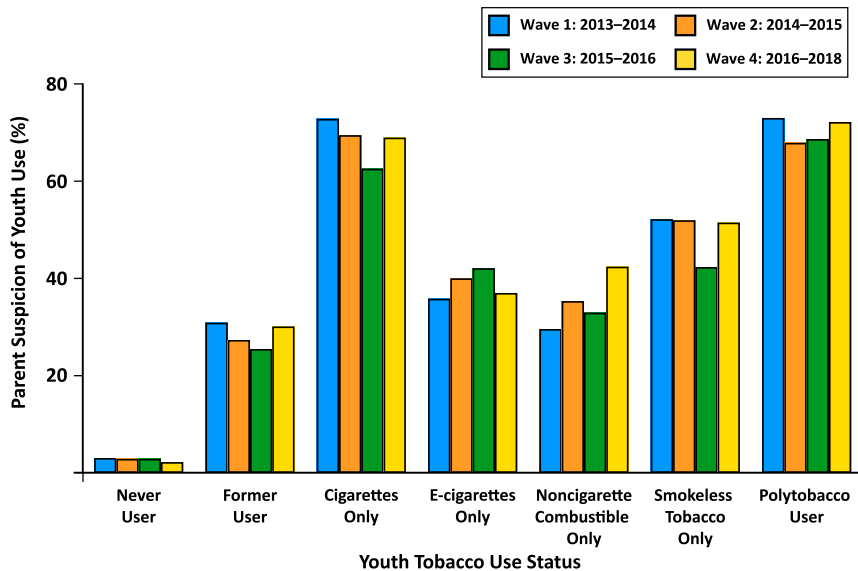
In all waves, parents or guardians were substantially less likely to report knowledge or suspicion that their children had used tobacco if their children reported use of only e-cigarettes, noncigarette combustible products, or smokeless tobacco compared with use of cigarettes or multiple tobacco products (Fig 1, Supplemental Table 3). In covariable-adjusted models, other factors associated with greater parent knowledge or suspicion included lower parent educational attainment; the child being older, being male, identifying as non-Hispanic white, living with a tobacco user, or residing in another home; and the parent respondent being the child's mother (Supplemental Table 3).

**TABLE 1** Tobacco Use Status and Characteristics of Study Sample

	Wave 1: 2013–2014 (n = 13 600) <sup>a</sup>	Wave 2: 2014–2015 (n = 12 129) <sup>a</sup>	Wave 3: 2015–2016 (n = 11 807) <sup>a</sup>	Wave 4: 2016–2018 (n = 14 701) <sup>a</sup>
Youth tobacco use status, % <sup>b</sup>				
Never user	79.4	77.7	79.4	81.0
Former user	12.1	14.8	13.9	12.1
Cigarettes only	1.9	1.5	1.2	1.3
E-cigarettes only	1.2	1.7	2.2	2.6
Noncigarette combustible only	1.5	1.1	0.6	0.5
Smokeless tobacco only	0.6	0.5	0.5	0.4
Polytobacco user	3.3	2.6	2.3	2.1
Other covariables				
Parent education, %				
Less than high school	18.0	12.7	12.2	12.2
High school or equivalent	18.1	21.9	21.0	21.5
Some college	32.2	31.6	32.2	31.5
College graduate	31.7	33.8	34.6	34.8
Parent respondent, %				
Other parent or guardian	33.7	32.3	31.8	32.8
Child's mother	66.3	67.7	68.2	67.2
Youth age, %				
12–14 y	50.5	50.7	50.4	49.8
15–17 y	49.5	49.3	49.6	50.2
Youth sex, %				
Male	51.4	51.3	51.4	51.2
Female	48.6	48.7	48.6	48.8
Youth race and/or ethnicity, %				
Non-Hispanic white	54.6	53.9	53.1	52.9
Non-Hispanic Black	13.9	13.5	13.1	13.4
Non-Hispanic other	9.2	9.5	10.0	10.0
Hispanic	22.2	23.1	23.9	23.8
Youth lives with tobacco user, %				
No	65.5	68.7	68.0	68.3
Yes	34.5	31.3	32.0	31.7
Youth home situation, %				
Resides in respondent's home	78.1	78.5	78.1	79.0
Lives in other home part-time	21.9	21.5	21.9	21.0
Youth alcohol use, %				
Never used	78.1	70.8	69.3	68.4
Ever used	21.9	29.2	30.7	31.6
Youth cannabis use, %				
Never used	86.6	89.0	90.4	89.9
Ever used	13.4	11.0	9.6	10.1
Youth evening curfew, %				
More permissive	19.4	19.6	19.9	21.9
Strict curfew all nights	80.6	80.4	80.1	78.1
Youth sensation-seeking score				
Mean score (range: 3–15)	7.8	7.8	7.6	7.4

<sup>a</sup> The analytic sample was restricted to individuals not missing the variable parent knowledge or suspicion of youth tobacco use. The sample size for individual variables may be smaller because of missing values.

<sup>b</sup> All percentages were weighted to be nationally representative by using wave-specific replicant weights.



**FIGURE 1**

Parent knowledge or suspicion of youth tobacco use according to actual youth tobacco use. Prevalence of parent or guardian knowledge or suspicion of youth tobacco use is shown by youth behavior and PATH Study wave. Knowledge or suspicion was defined as “knowing” or “strongly suspecting” that the child has ever used tobacco. Youth tobacco categories were determined by self-reported past 30-day use (see text). Percentages were weighted by using wave-specific replicant weights. Missing values were not imputed.

Among wave 1 youth who reported never using tobacco, most parent-child pairs mutually endorsed having strict household rules that prohibited use of any burned tobacco (78%) and not-burned tobacco (70%). Half (50%) of youth reported that a parent or guardian had talked with them about not using tobacco within the past 12 months. There was high percentage agreement between parent and youth responses regarding household rules (Supplemental Table 4), although interrater reliability was constrained under a high marginal prevalence of strict rules (Cohen’s  $\kappa$ : burned, 0.52; not burned, 0.40, unweighted data). Household rules and talking about tobacco were uncorrelated (Supplemental Table 4).

Strict household tobacco rules were associated with less tobacco initiation (Table 2). Among wave 1 tobacco never users, 15% initiated use of  $\geq 1$  tobacco product by wave 2, 24% by wave 3, and 33% by wave 4. At all

time points, children in households with the strictest rules prohibiting tobacco use had 20% to 26% lower odds of tobacco initiation compared with children in the most permissive households (adjusted for known risk factors) (Table 2). Households with strict rules only for burned or not-burned tobacco were also numerically associated with less initiation compared with the most permissive households, albeit not statistically significantly in these groups of smaller sample size. In contrast, youth who reported that their parent or guardian had talked with them about not using tobacco did not demonstrate lower odds of tobacco initiation; in fact, tobacco initiation was higher at waves 3 and 4 (Table 2). Other factors positively associated with tobacco initiation in all waves were the child being older; the child living with another tobacco user; the child residing at least part-time in another home; the child having used alcohol or cannabis; and greater sensation seeking (Table 2).

In exploratory analyses, although interaction by child age was not statistically significant overall, numerically, strict household rules were associated with lower odds of tobacco initiation among children who were younger at wave 1 (Supplemental Table 5). In multinomial models, strict household rules were associated with lower odds of noncombustible tobacco initiation at all 3 time points but not necessarily with lower odds of combustible tobacco initiation (Supplemental Table 6). However, initiation of only combustible tobacco was uncommon (eg, 1-year initiation: combustible only, 2.9%; noncombustible only, 7.1%; both, 5.0%), which yielded imprecise estimates. In the repeated-measures analysis, strict household rules remained associated with lower odds of tobacco initiation within a year (Supplemental Table 7).

## DISCUSSION

In this assessment, we identified substantial lapses in parents’ awareness of their children’s tobacco use. Most parents or guardians registered suspicion when their children smoked cigarettes or reported polytabacco use (typically including cigarettes). Only approximately half as many knew or suspected when their children used only e-cigarettes or noncigarette combustible products. Of parental strategies to prevent future tobacco use by their children, setting strict household rules that prohibit all forms of tobacco use by anyone within the home was associated with less youth tobacco initiation, whereas talking with children about tobacco was not.

The percentage of parents aware or suspecting their children’s cigarette smoking (~70%) was higher than in previous findings suggesting poor parental awareness of youth smoking



**TABLE 2** Associations of Household Tobacco Use Rules With Youth Tobacco Initiation

	Tobacco Initiation Follow-up Period, Adjusted Odds Ratio (95% Confidence Interval)		
	Wave 1 to Wave 2 (1 y)	Wave 1 to Wave 3 (2 y)	Wave 1 to Wave 4 (3 y)
Household tobacco rules <sup>a</sup>			
More permissive: both product types (reference)	—	—	—
Strict rules: burned tobacco	0.86 (0.66–1.12)	0.82 (0.64–1.04)	0.84 (0.67–1.07)
Strict rules: not-burned tobacco	0.74 (0.53–1.03)	0.76 (0.56–1.04)	0.84 (0.62–1.13)
Parent and child discordant on rules	0.85 (0.61–1.17)	0.99 (0.74–1.33)	1.04 (0.78–1.39)
Strict rules: both product types, parent and child	0.74 (0.59–0.94)	0.75 (0.61–0.93)	0.80 (0.65–0.99)
Talked about tobacco <sup>b</sup>			
Parent did not talk about using tobacco (reference)	—	—	—
Parent talked to child about not using tobacco	1.08 (0.94–1.23)	1.15 (1.02–1.29)	1.22 (1.09–1.36)
Other covariables			
Parent education (reference: less than high school)			
High school or equivalent	1.02 (0.83–1.27)	1.00 (0.83–1.22)	0.95 (0.79–1.14)
Some college	1.00 (0.82–1.22)	0.95 (0.79–1.13)	0.99 (0.84–1.17)
College graduate	0.75 (0.61–0.93)	0.78 (0.65–0.94)	0.91 (0.76–1.08)
Youth age (reference: 12–14 y)			
15–17 y	1.89 (1.65–2.17)	1.87 (1.66–2.11)	1.77 (1.58–1.98)
Youth sex (reference: male)			
Female	0.96 (0.84–1.10)	0.98 (0.87–1.10)	0.85 (0.76–1.14)
Youth race and/or ethnicity (reference: non-Hispanic white)			
Non-Hispanic Black	0.90 (0.72–1.11)	0.76 (0.64–0.92)	0.66 (0.55–0.78)
Non-Hispanic other	0.88 (0.68–1.14)	0.85 (0.68–1.06)	0.71 (0.58–0.88)
Hispanic	1.19 (1.01–1.41)	1.07 (0.92–1.24)	0.88 (0.77–1.02)
Youth lives with tobacco user (reference: no)			
Yes	1.46 (1.25–1.71)	1.45 (1.25–1.66)	1.44 (1.26–1.65)
Home situation (reference: respondent's home)			
Lives in other home part-time or more	1.28 (1.09–1.51)	1.33 (1.15–1.54)	1.41 (1.22–1.62)
Youth alcohol use (reference: never)			
Ever used	2.57 (2.15–3.06)	2.51 (2.12–2.96)	2.40 (2.02–2.85)
Youth cannabis use (reference: never)			
Ever used	2.93 (2.18–3.94)	3.82 (2.80–5.19)	4.02 (2.85–5.66)
Youth evening curfew (reference: more permissive)			
Youth strict curfew all nights	1.12 (0.94–1.32)	1.07 (0.92–1.24)	1.07 (0.93–1.23)
Youth sensation-seeking score (Continuous variable, per unit, range: 3–15)			
	1.16 (1.13–1.20)	1.16 (1.13–1.18)	1.16 (1.14–1.19)

Missing values were multiply imputed for covariables and missing tobacco initiation outcomes. Models were weighted with longitudinal survey weights. —, not applicable.

<sup>a</sup> Category definitions (sample sizes) are as follows: more permissive rules: both parent and child endorsed more permissive rules for combustible and noncombustible tobacco (wave 1 to wave 2:  $n = 929$ ; wave 1 to wave 3:  $n = 843$ ; wave 1 to wave 4:  $n = 771$ ); strict rules for burned tobacco: both parent and child endorsed strict rules for combustible tobacco, but one or both endorsed more permissive rules about noncombustible tobacco (wave 1 to wave 2:  $n = 1191$ ; wave 1 to wave 3:  $n = 1102$ ; wave 1 to wave 4:  $n = 1002$ ); strict rules for not-burned tobacco: both parent and child endorsed strict rules for noncombustible tobacco, but one or both endorsed more permissive rules about combustible tobacco (wave 1 to wave 2:  $n = 490$ ; wave 1 to wave 3:  $n = 442$ ; wave 1 to wave 4:  $n = 401$ ); parent and child discordant on rules: parent and child endorsed different levels of permissiveness for both product types (wave 1 to wave 2:  $n = 567$ ; wave 1 to wave 3:  $n = 527$ ; wave 1 to wave 4:  $n = 484$ ); strict rules for both product types, parent and child: both parent and child endorsed strict rules for combustible and noncombustible tobacco (wave 1 to wave 2:  $n = 5817$ ; wave 1 to wave 3:  $n = 5426$ ; wave 1 to wave 4:  $n = 5033$ ).

<sup>b</sup> Sample sizes are as follows: parent did not talk about using tobacco or do not know (wave 1 to wave 2:  $n = 4448$ ; wave 1 to wave 3:  $n = 4129$ ; wave 1 to wave 4:  $n = 3801$ ); parent talked to child about not using tobacco (wave 1 to wave 2:  $n = 4546$ ; wave 1 to wave 3:  $n = 4211$ ; wave 1 to wave 4:  $n = 3890$ ).

(~40%).<sup>19,20</sup> Greater awareness may be due to increasing social concern around youth smoking or survey measurement differences. However, low parental awareness of e-cigarette use belies rising public and media attention surrounding youth vaping. Constantly changing e-cigarette device designs and terminology pose an increasing challenge for parents to recognize, whereas lack of smoke and odor enhance concealability.<sup>18</sup> Notably, PATH Study data were collected before a 2019 outbreak of

vaping-associated lung injury,<sup>24</sup> which could heighten parental awareness going forward. Cigarette-smoking youth smoke more frequently than e-cigarette users use e-cigarettes, potentially increasing parental awareness opportunities. Lower awareness for cigars and hookah, which do produce smoke and odors, suggests a wider need for parents to monitor for all tobacco products, including those they may perceive as less common or concerning.

Findings related to tobacco-free households align with previous research revealing that home antismoking attitudes and rules contribute significantly to youth smoking prevention.<sup>9,25,26</sup> The present work suggests that this benefit extends beyond cigarettes to include initiation of any tobacco product use. Creating home tobacco-free environments offers the additional advantage of protecting children from harmful

secondhand smoke exposure and may also benefit household adults by aiding smoking cessation.<sup>27</sup>

Our results align with longitudinal findings revealing a benefit of household smoking bans, whether or not youth lived with smokers.<sup>28</sup> Our finding that the benefits of strict household rules appear greatest at younger ages suggests a need for additional focused prevention when adolescents transition to young adulthood and potentially enter new social environments. Unexpectedly, strict household tobacco rules were more strongly associated with prevention of noncombustible tobacco use than combustible tobacco use. This result must be interpreted cautiously because many youth initiate use of both product types, and strong concordance between burned and not-burned household tobacco rules makes it difficult to isolate independent effects. Nonetheless, setting household tobacco use rules may be a promising tool against the rise in youth e-cigarette use.

Contrary to rules governing tobacco use in the home, youth who reported that their parent or guardian had talked with them about not using tobacco were at higher odds of initiating tobacco use after 2 or 3 years. An implication of this result is that telling children not to use tobacco does not benefit youth compared with setting norms and examples via tobacco-free rules that apply to everyone. Alternatively, it is possible that parents were more inclined to talk about tobacco with youth already at elevated risk of

tobacco use on the basis of personality aspects not captured by study variables.<sup>15</sup> In the current study, we did not measure the quality or frequency of parents' antitobacco communication: likely key elements of effectiveness.<sup>13</sup> Therefore, although strong household rules appears to be a much more promising approach, it should not necessarily be concluded that all parental communication is unhelpful in youth tobacco use prevention.

Advantageously, the current study features a large, prospective, nationally representative sample. To our knowledge, this analysis is the first to assess prospective outcomes of home tobacco use policies on youth initiation of cigarette and noncigarette tobacco use and the first national study to assess parental awareness of their children's use of multiple noncigarette tobacco products. Numeric findings were robust to the length of follow-up and adjusted for an extensive suite of established youth tobacco use risk factors.

Among methodologic considerations and limitations, the main outcome measure in this study, initiation of any tobacco use, is a critical milestone, particularly among youth for whom daily smoking may develop over several years.<sup>29</sup> However, long-term established tobacco use deserves attention in future research. Speculatively, youth might report tobacco use differently with in-home (near parents) questionnaire administration versus in-school (near peers) questionnaire administration,

with unclear impact on the present results. In our 2- and 3-year models, we did not account for the timing of tobacco initiation or time-varying exposures or covariables. However, in an 11-year longitudinal study in Italy, the authors reported that living with smoking family members in adolescence and absence of a household smoking ban in young adulthood were both associated with established smoking among young adults.<sup>30</sup> In the current study, findings were similar in a 1-year repeated-measures analysis that allowed for intraperson variation.

## CONCLUSIONS

Results strongly support tobacco-free home environments as part of comprehensive tobacco control strategies. From a regulatory standpoint, clearly labeling emerging and novel products as tobacco products, along with greater public communication targeting parents about the appearance, forms, and possible harms of noncigarette tobacco, would position parents for better surveillance of their children's tobacco use. In pediatric practice, raising parental awareness of noncigarette tobacco products should be part of tobacco anticipatory guidance and prevention support.<sup>31</sup>

## ABBREVIATIONS

e-cigarette: electronic cigarette  
PATH: Population Assessment of Tobacco and Health

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## REFERENCES

1. Borland BL. Relative effects of low socio-economic status, parental smoking and poor scholastic performance on smoking among high school students. *Soc Sci Med.* 1975;9(1): 27–30



2. Bauman KE, Foshee VA, Linzer MA, Koch GG. Effect of parental smoking classification on the association between parental and adolescent smoking. *Addict Behav.* 1990;15(5): 413–422
3. Peterson AV Jr., Leroux BG, Bricker J, et al. Nine-year prediction of adolescent smoking by number of smoking parents. *Addict Behav.* 2006;31(5): 788–801
4. Hill KG, Hawkins JD, Catalano RF, Abbott RD, Guo J. Family influences on the risk of daily smoking initiation. *J Adolesc Health.* 2005;37(3):202–210
5. Gilman SE, Rende R, Boergers J, et al. Parental smoking and adolescent smoking initiation: an intergenerational perspective on tobacco control. *Pediatrics.* 2009;123(2). Available at: <https://pediatrics.aappublications.org/content/123/2/e274>
6. Mahabee-Gittens EM, Xiao Y, Gordon JS, Khoury JC. The dynamic role of parental influences in preventing adolescent smoking initiation. *Addict Behav.* 2013; 38(4):1905–1911
7. Vuolo M, Staff J. Parent and child cigarette use: a longitudinal, multigenerational study. *Pediatrics.* 2013;132(3). Available at: [www.pediatrics.org/cgi/content/full/132/3/e568](http://www.pediatrics.org/cgi/content/full/132/3/e568)
8. Allen ML, Garcia-Huidobro D, Porta C, et al. Effective parenting interventions to reduce youth substance use: a systematic review. *Pediatrics.* 2016; 138(2):e20154425
9. Emory K, Saquib N, Gilpin EA, Pierce JP. The association between home smoking restrictions and youth smoking behaviour: a review. *Tob Control.* 2010; 19(6):495–506
10. Jackson C, Henriksen L. Do as I say: parent smoking, antismoking socialization, and smoking onset among children. *Addict Behav.* 1997;22(1): 107–114
11. Proescholdbell RJ, Chassin L, MacKinnon DP. Home smoking restrictions and adolescent smoking. *Nicotine Tob Res.* 2000;2(2):159–167
12. Clark PI, Schooley MW, Pierce B, Schulman J, Hartman AM, Schmitt CL. Impact of home smoking rules on smoking patterns among adolescents and young adults. *Prev Chronic Dis.* 2006;3(2):A41
13. Harakeh Z, Scholte RHJ, de Vries H, Engels RCME. Parental rules and communication: their association with adolescent smoking. *Addiction.* 2005; 100(6):862–870
14. Tworek C, Schauer GL, Wu CC, Malarcher AM, Jackson KJ, Hoffman AC. Youth tobacco cessation: quitting intentions and past-year quit attempts. *Am J Prev Med.* 2014;47(2, suppl 1): S15–S27
15. Ennett ST, Bauman KE, Foshee VA, Pemberton M, Hicks KA. Parent-child communication about adolescent tobacco and alcohol use: what do parents say and does it affect youth behavior? *J Marriage Fam.* 2001;63(1): 48–62
16. Cullen KA, Gentzke AS, Sawdey MD, et al. E-cigarette use among youth in the United States, 2019. *JAMA.* 2019;322(21): 2095–2103
17. Gentzke AS, Creamer M, Cullen KA, et al. Vital signs: tobacco product use among middle and high school students - United States, 2011-2018. *MMWR Morb Mortal Wkly Rep.* 2019;68(6):157–164
18. Patel M, Czaplicki L, Perks SN, et al. Parents' awareness and perceptions of JUUL and other e-cigarettes. *Am J Prev Med.* 2019;57(5):695–699
19. Williams RJ, McDermit DR, Bertrand LD, Davis RM. Parental awareness of adolescent substance use. *Addict Behav.* 2003;28(4):803–809
20. Yang H, Stanton B, Cottrel L, et al. Parental awareness of adolescent risk involvement: implications of overestimates and underestimates. *J Adolesc Health.* 2006;39(3):353–361
21. Hyland A, Ambrose BK, Conway KP, et al. Design and methods of the Population Assessment of Tobacco and Health (PATH) Study. *Tob Control.* 2017;26(4): 371–378
22. National Addiction & HIV Data Archive Program. Population Assessment of Tobacco and Health (PATH) Study series. Available at: <https://www.icpsr.umich.edu/icpsrweb/NAHDAP/series/606>. Accessed February 27, 2020
23. Stephenson MT, Hoyle RH, Palmgreen P, Slater MD. Brief measures of sensation seeking for screening and large-scale surveys. *Drug Alcohol Depend.* 2003; 72(3):279–286
24. Lozier MJ, Wallace B, Anderson K, et al.; Lung Injury Response Epidemiology/ Surveillance Task Force. Update: demographic, product, and substance-use characteristics of hospitalized patients in a nationwide outbreak of e-cigarette, or vaping, product use-associated lung injuries - United States, December 2019. *MMWR Morb Mortal Wkly Rep.* 2019;68(49):1142–1148
25. Chassin L, Presson CC, Todd M, Rose JS, Sherman SJ. Maternal socialization of adolescent smoking: the intergenerational transmission of parenting and smoking. *Dev Psychol.* 1998;34(6):1189–1201
26. Farkas AJ, Gilpin EA, White MM, Pierce JP. Association between household and workplace smoking restrictions and adolescent smoking. *JAMA.* 2000;284(6): 717–722
27. Gilpin EA, White MM, Farkas AJ, Pierce JP. Home smoking restrictions: which smokers have them and how they are associated with smoking behavior. *Nicotine Tob Res.* 1999;1(2):153–162
28. Albers AB, Biener L, Siegel M, Cheng DM, Rigotti N. Household smoking bans and adolescent antismoking attitudes and smoking initiation: findings from a longitudinal study of a Massachusetts youth cohort. *Am J Public Health.* 2008; 98(10):1886–1893
29. Gervais A, O'Loughlin J, Meshefedjian G, Bancej C, Tremblay M. Milestones in the natural course of onset of cigarette use among adolescents. *CMAJ.* 2006;175(3): 255–261
30. Gorini G, Carreras G, Cortini B, et al. Smoke-free homes and youth smoking behavior in Italy: findings from the SIDRIAT longitudinal study. *Nicotine Tob Res.* 2016;18(11):2075–2082
31. Farber HJ, Walley SC, Groner JA, Nelson KE; Section on Tobacco Control. Clinical practice policy to protect children from tobacco, nicotine, and tobacco smoke. *Pediatrics.* 2015;136(5): 1008–1017