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Prevalence and characteristics of secondhand smoke and secondhand vapor exposure among youth

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Abstract

Background—It is well-established that secondhand smoke (SHS) is harmful, and concern about the potential dangers associated with secondhand vapor (SHV) (i.e., vapor from electronic vapor products, EVP) is growing. The present study examines the prevalence and characteristics associated with SHS and SHV exposure.

Methods—Data from youth aged 11–17 who completed the 2016 Florida Youth Tobacco Survey (n= 58,616) were analyzed. Demographics, past 30-day SHS and SHV exposure, environmental factors, cigarette and EVP use status, SHS and SHV harm perceptions, and tobacco susceptibility were assessed. Weighted multivariable logistic regressions were performed to examine characteristics associated with SHS and SHV exposure, and SHS and SHV exposure with tobacco susceptibility.

Results—Overall, 42% of Florida youth reported SHS exposure and 29% reported SHV exposure during the past 30 days. Living in a home where tobacco use was permitted (vs. not permitted) was positively associated with SHS (AOR 2.57) and SHV exposure (AOR 1.56). Perceived SHS as harmful (vs. not harmful) was positively associated with SHS (AOR 1.73) and SHV exposure (AOR 1.97), while perceived SHV as harmful was negatively associated with SHS (AOR 0.86) and SHV exposure (AOR 0.56). SHS and SHV exposure were significantly associated with susceptibility to cigarette and EVP use (AOR 1.40 and 2.08, respectively).

Conclusions—Almost one-third of Florida youth reported SHV exposure. Factors associated with SHS and SHV exposure are somewhat similar, and exposure to SHS and SHV is associated

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with tobacco susceptibility in youth. Promoting tobacco-free homes is needed to protect youth from SHS and SHV exposure.

Keywords

Secondhand smoke; secondhand vapor; electronic vapor products; tobacco-free policy

INTRODUCTION

Secondhand smoke (SHS) exposure in the US continues to be a public health concern. The harms of SHS have been well-documented. It is known to cause lung cancer and heart disease in adults, and to increase risk for respiratory infections, ear problems, and asthma among children.[1] Significantly, there is no safe level of SHS exposure.[1] While cigarette smoking prevalence has been declining,[2] 56% of US youth overall, and 48% of US youth who have never used tobacco products, continued to report SHS exposure in 2016.[3] Home exposure is particularly problematic as youth spend much time in the home setting. In 2016, 24% of US youth reported SHS exposure at home.[3]

Electronic vapor product (EVP) use, which includes electronic cigarettes (e-cigarettes) or other electronic nicotine delivery systems, has grown among US adults and youth. In 2015, 3.5% of adults reported currently using e-cigarettes.[4] Among high school students, the prevalence in 2016 was approximately 11%, up from 1.5% in 2011.[5] Secondhand vapor (SHV) is the passive exposure to vapor from EVP.[6] To date, there is limited data regarding the prevalence of SHV exposure. In 2014, almost a tenth of middle and high school students reported living with someone who used e-cigarettes.[7] With the increasing prevalence of EVP use, this is likely an underestimation. While much less is known regarding the health effects of SHV, emerging evidence suggests it is not benign. A systematic review found SHV contains not only elevated levels of nicotine but other compounds, such as formaldehyde and metals.[8] People exposed to SHV have increased levels of cotinine, suggesting bystanders can absorb nicotine through exposure to SHV.[9,10] Additionally, there are concerns that exposure to EVP use can renormalize smoking.[11] For instance, a recent study of non-smoking high school students in Florida found that, controlling for prior EVP use, living with an EVP user was associated with increased perception that adult cigarette smoking was acceptable among peers and in the community.[6] However, while the study controlled for living with a current smoker, the association could still be confounded by living with an EVP user who previously smoked.

Previous work has investigated factors associated with susceptibility to smoking among youth, such as smoking-related beliefs,[12], social environment,[13] and media exposure. [14] While less is known about susceptibility to EVP use, one study found it to differ by cigarette smoking status.[15] Exposure to SHS and SHV may also increase susceptibilities to use tobacco products. Among youth, SHS exposure has been associated with susceptibility to use cigarettes[13,16] and EVP.[17] Further, a previous study found that living with an EVP user was associated with susceptibility to cigarette smoking in youth.[6]

The current literature on SHS and SHV is limited in several ways. Firstly, the measurements of SHS and SHV exposures have been limited to using proxies such as living with a

smoker[7] or EVP user.[6,7] This is a major limitation because it assumes users smoke or vape in the home with others, and does not take into consideration whether youth are exposed to SHS and SHV from people they do not live with both in and outside the home. Secondly, while SHS has been more extensively studied, very little is known about the prevalence of SHV exposure and factors correlated with SHV exposure. Finally, the complex relationships between SHS and SHV exposures and youth susceptibilities to cigarettes and EVP use have not been fully elucidated, particularly the relationship between SHV exposure and susceptibility to EVP use.

The aims of the current study are to 1) assess the prevalence of SHS and SHV exposure among youth, 2) examine characteristics associated with SHS and SHV exposure, and 3) evaluate whether SHS and SHV exposure are related to youth's susceptibility to using cigarettes and/or an EVP.

METHODS

Florida Youth Tobacco Survey

The Florida Youth Tobacco Survey (FYTS) is a school-based cross-sectional survey administered annually.[18] In the even years, county-level demographic data of the sampled schools were collected in addition to indicators of tobacco use and SHS exposure. A two-stage cluster probability design was utilized. In the first stage, a random sample of public middle and high schools was selected. In the second stage, a sample of classrooms was randomly selected from within each selected school. All students in those classes were then asked to participate in the paper-and-pen survey. Data from the 2016 survey was used in this analysis. All public high school and middle schools in Florida's 67 counties were included in the sampling frame, and 753 schools out of the selected 756 comprised the sample. All counties required parental consent. The sample included 33,558 participating high school students (71% participation rate) and 36,082 participating middle school students (78% participation rate).[18] Analyses were restricted to youth between the ages of 11 and 17 (n = 58,616). This study is a secondary data analysis on de-identified data and thus determined by the National Institutes of Health Office of Human Subject Research Protection to be exempted from the review of Institutional Review Board.

Measures

Secondhand Smoke and Secondhand Vapor Exposure—In two separate questions, students indicated if in the past 30 days they were in the same room with someone using cigarettes and if they rode in a car with someone using cigarettes. Participants were considered exposed to SHS if they answered yes to being in a room and/or being in a car with someone using cigarettes. Comparable questions were used to assess SHV exposure.

Susceptibility to Cigarettes and Susceptibility to Electronic Vapor Products—Following the general approach used by Piece and colleagues,[19] susceptibility to cigarettes was assessed by asking participants if they thought they would use either cigarettes now, in the next year, or 5 years from now. They were also asked if they would use cigarettes if offered by a best friend. Answer choices for each were *yes*, *no*, *not sure*. Participants were

susceptible to cigarettes if they answered *yes* or *not sure* to any of the 4 questions. Similarly, comparable questions were used to assess susceptibility to EVP. Participants were susceptible to EVP if they answered *yes* or *not sure* to any of the 4 questions.

Demographic Characteristics—The demographic information collected included age, gender, race/ethnicity, metropolitan status, housing, and asthma status. Youth were categorized into middle school (MS) (ages 11–13) and high school (HS) (ages 14–17) based on age. Race/ethnicity was assessed by asking participants if they were Hispanic or Latino (yes/no) and the best category that described them (American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White, other). Responses were recoded into 7 categories (Hispanic, non-Hispanic American Indian/Alaskan Native, non-Hispanic Asian, non-Hispanic Black, non-Hispanic Native Hawaiian or Other Pacific Islander, non-Hispanic White, non-Hispanic other).

For metropolitan status, counties were divided into 6 categories based upon the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties, which utilizes metropolitan statistical areas (MSA) and micropolitan statistical areas.[20] These included large central metro (MSA of 1 million population that contain the entire population of the largest principal city of the MSA, or are completely contained within the largest principal city of the MSA, or contain at least 250,000 inhabitants of any principal city of the MSA); large fringe metro (MSA of at least 1 million population that does not qualify as large central); medium metro (MSA of 250,000–999,999 population), small metro (counties in MSAs < 250,000 population); micropolitan (counties in micropolitan statistical areas); noncore (counties not in micropolitan statistical areas). Out of 67 counties in Florida, 5 were large central metros, 11 were large fringe metros, 19 were medium metros, 9 were small metros, 7 were micropolitan, and 16 were noncore. Participants were also asked what type of building they live in (stand-alone single-family, trailer/mobile home, townhouse/duplex, condominium/apartment, other).

Asthma status was assessed by asking if the participant had an asthma attack in the past 12 months (I have never had asthma, yes, no, not sure, I no longer have asthma), and was recoded into yes (yes), no (all other responses), and undetermined (missing).

Tobacco Environment—Participants indicated whether anyone who lives in their home use cigarettes and/or EVP, and these variables were recoded into 5 categories (lives with no tobacco users, lives with smokers only, lives with EVP users only, lives with both smokers and EVP users, undetermined). Home tobacco practices were assessed by asking participants, “Is tobacco use allowed in your home?” (yes/no).

Tobacco User Status and Perceptions—Participants were asked if they had ever tried EVP, and how many days in the past 30 days they used an EVP. Participants were considered never EVP users if they answered no to ever using and if they did not indicate EVP use in the past 30 days. Ever, non-current EVP users were those who vaped previously, but less than 3 days in the last month. This was done to prevent youth who happened to try an EVP in last month and are unlikely to continue use as being considered current users.[21] Current EVP users were youth who have tried EVP and used them for at least 3 days in the past

month. The same process was used to categorize youth as never cigarette smokers; ever, non-current cigarette smokers; and current cigarette smokers. Finally, these categories were combined into an aggregate product user status with 6 categories (never user; ever, noncurrent EVP user but never cigarette smoker; ever, noncurrent cigarette smoker but never EVP user; ever, noncurrent EVP and cigarette user; current EVP and/or cigarette user; undetermined).

Harm perceptions of SHS and SHV were assessed by asking participants two separate items for each exposure on whether they think smoke from other people's cigarettes/cigars or EVP is harmful to them (yes/no).

Statistical Analysis

Analyses were weighted to be representative of middle school and high school students in Florida and account for clustered sampling. Data were analyzed using survey procedures in SAS version 9.4 (SAS Institute Inc., Cary, North Carolina, USA).

Differences in demographic composition of youth exposed to SHS versus SHV were examined through weighted chi-square tests. Weighted logistic regression models were used to examine characteristics associated with SHS and SHV exposure. Variables were entered into the logistic regression model in sequential blocks. The first block included demographic variables, second block included tobacco environment variables, and the final block included tobacco user status and perceptions variables. We reported the results of a variable in any block as adjusted for the variables in the previous block.

Weighted logistic regression models were also performed to evaluate associations of SHS and SHV exposure with tobacco susceptibility adjusted for demographics, tobacco environment, and secondhand exposures. These analyses were restricted to youth who had never used cigarettes or EVP (n = 40,202). Significance was set at $p=0.05$.

RESULTS

Table 1 shows the weighted distributions of the overall sample and by exposure status. Overall, 42.1% of Florida youth reported SHS exposure and 29.0% reported SHV exposure during the past 30 days.

The prevalence for both SHS and SHV exposure was significantly higher in HS than MS youth. Girls (vs. boys), youth who had an asthma attack in the last year (vs. those without asthma), those that lived in a house allowing tobacco use (vs. those whose homes banned tobacco use), and those who believed SHS is harmful (vs those who did not believe SHS was harmful) had higher odds of exposure to both SHS and SHV (Table 2). Conversely, the belief that SHV is harmful had a significant negative association with SHS and SHV exposure. There were racial/ethnic differences in exposure, e.g., compared to non-Hispanic Whites, except for non-Hispanic American Indians or Alaskan Natives, all groups were less likely to be exposed to SHS and all except non-Hispanic Native Hawaiian or other Pacific Islanders were less likely to be exposed to SHV.

Metropolitan status was also significantly associated with SHS and SHV exposure. In general, youth that lived in increasingly rural counties were more likely to be exposed to SHS. In contrast, youth in large fringe metro and medium metro counties were more likely to report SHV exposure compared to youth in large central metros. Housing status was only associated with SHS exposure, such that adolescents in trailers or mobile homes were more likely to be exposed to SHS compared to youth in standalone housing.

Living with a tobacco user was significantly associated with both SHS and SHV exposure but in slightly different respects. Youth that reported living with both cigarette and EVP users were most likely to be exposed to SHS compared to youth that did not live with tobacco users. In contrast, youth that reported living with only EVP users were most likely to report SHV exposure compared to youth not living with tobacco users.

Associations with adolescents' susceptibility to cigarettes and susceptibility EVPs were also assessed (Table 3) among youth who had never tried cigarettes or EVP. High schoolers were more likely to be susceptible to EVP use than middle schoolers, controlling for all other factors and girls less likely to be susceptible than boys to cigarette smoking only. Compared to non-Hispanic Whites, Hispanics, non-Hispanic Blacks and non-Hispanic others were more susceptible to both cigarette and EVP use, controlling for other factors; non-Hispanic American Indians or Alaskan Natives were more susceptible to cigarette use only. Independent of exposure status, youth that reported living with EVP users and youth living with both smokers and EVP users were more likely to be susceptible to both cigarette and EVP use compared to youth who did not live with smokers and EVP users. Allowing tobacco in the home was significantly associated with increased odds of youth's susceptibility to both cigarette and EVP use when compared to those that live in a home that banned tobacco.

Youth exposed to SHV alone, youth exposed to SHS alone, and youth exposed to both SHV and SHS were all significantly more likely to be susceptible to EVP use than unexposed youth. While SHS exposure alone was not associated with increased susceptibility to cigarettes, exposure to both SHS and SHV together did have a significant positive association.

DISCUSSION

The most recent national survey assessing the prevalence of adolescent exposure to SHS found a rate of 29%, but this was based on whether students reported living with a cigarette user and did not include exposure from other people.[7] We expanded the literature by more specifically measuring SHS exposure inside and outside the home, and found that 42% of youth in Florida reported SHS exposure. Since this may be due to regional variation, future studies should use measures that capture SHS exposure inside and outside of the home. We found SHV exposure to be less prevalent than SHS exposure.[7] However, given the potential health concerns of SHV[9,10] and the potential for it to renormalize smoking,[11] our estimation of 29% of youth being exposed is high and warrants attention.

Prevalence of cigarette smoking for both adults and youth is higher in rural areas,[22,23] which may lead to increased SHS exposure, while consistent differences in EVP use has not been found.[22] Similar to a previous study with adults,[23] youth in nonmetropolitan areas (nonmetro) had higher odds of exposure compared to youth in metropolitan areas (metro). Further, youth in different forms of multi-unit housing, including trailers or mobile homes, townhouses or duplexes, and condos or apartments, were all more likely to be exposed to SHS than youth in standalone houses, which may reflect differences in tobacco use or smoke-free rules in multiunit housing.[24] Additionally, metro status or housing type may be proxies for socioeconomic status, which has previously been associated with SHS exposure in children.[25] Of note, housing status was not associated with SHV exposure and metro status had a less consistent association, suggesting EVP use may not differ by metro status or housing type.

Our findings indicate that home tobacco policies may be important in decreasing prevalence of SHS and SHV exposures. Nationally, among non-tobacco using youth, prevalence of SHS exposure in the home increased from over 8% in homes with complete rules (i.e., smoking never allowed) to almost 80% in homes that were not smoke-free.[3] Fortunately, we found almost 88% of youth in Florida to report having a home tobacco use policy, compared to 80% of youth nationally reporting having smoke-free homes in 2013.[3] Of note, these findings were independent of whether someone in the house smoked or used EVP. Our results are limited in that participants were not asked about tobacco policies in cars and our results do not differentiate between participants exposed in a room versus in a car. Cartmell and colleagues[26] found that of students who reported exposure to SHS in one place only, two-thirds reported exposure only in the car, and prevalence of SHS exposure in cars has been shown to be higher in those with no smoke-free vehicle rules.[3]

Previous research has found that youths' beliefs regarding the harm of cigarettes[27–29] and EVP[30,31] are associated with use of these products. We sought to understand if perceived harm of secondhand exposure was similarly associated with likelihood of secondhand exposures. Youth who believed SHS was harmful to their health had higher odds of SHS and SHV exposure compared to youth that did not find SHS harmful. Fischer and Kramer[7] similarly found students who thought about the harmful chemicals in tobacco had higher level of SHS exposure, and attributed it to those that are exposed are more likely to think about the harmful effects. In contrast, youth who believed SHV was harmful to their health were less likely to be exposed to both SHS and SHV than youth who did not believe SHV was harmful. The reasons for these findings are unclear. Perhaps, given EVP use is more prevalent among youth than adults,[2,5] youth may be more likely to be exposed to SHV through peer use than adult use. If this is true, youth who believe SHV is harmful may be more in control of avoiding exposure by not associating with peers who use EVP. Conversely, if youth are mostly exposed to SHS due to adults smoking, their belief of harms may instead be due to their exposure. These youths may be less capable of avoiding SHS exposure.

Another contribution of this study was the evaluation of whether SHS and SHV exposures are associated with tobacco use susceptibility. Current research suggests SHS exposure may increase susceptibility to cigarette smoking[13,16,32,33] and e-cigarette use,[17] and SHS

exposure may mediate the association between parents smoking and students smoking.[34] To our knowledge, no studies have evaluated the relationship between SHV exposure and tobacco susceptibility. We found exposure to both SHS and SHV together increased the likelihood of susceptibility to smoking. While SHS exposure alone was not significant, it is possible the association is mediated through living with a smoker[6] or lack of home tobacco ban, which were controlled for in our findings. Concordant with previous research,[17] SHS exposure increased the likelihood of EVP susceptibility. We further found that SHV exposure had an even stronger association with EVP susceptibility. Thus, interventions to reduce youth's exposure to SHS and SHV may be a potential avenue to combat the high prevalence of EVP use among youth.[5]

This study has several limitations. As the sample is comprised of students attending public middle and high schools in Florida, our results may not be generalizable nationally, to youth in living in other states, or to youth not enrolled in public schools. Additionally, this study was cross-sectional and therefore causality cannot be inferred. While our definition of secondhand exposures was more specific than other studies that used proxies, such as whether a student lived with a tobacco user,[7] it is still limited by being based on self-reported data. Thus, there may be recall biases or even exposures that youth were unaware of. Our study also has strengths, including a very large, diverse state-representative sample and a more specific measure of both SHS and SHV exposures in an enclosed space beyond participants' homes. Although the latest National Youth Tobacco Survey measured exposure to SHV, it uses a single item which is not specific to indoor and enclosed space exposure. [35]

In conclusion, almost a third (29%) of youth reported SHV exposure, and the factors associated with SHS and SHV exposure are similar but not identical. Further, SHS and SHV exposures are associated with youth susceptibility to tobacco products. Programs targeted at reducing SHS will likely have an impact on SHV as well if smoke free education and policies are expanded to be tobacco free initiatives. For instance, the state of Florida has already taken initiatives to help reduce SHS and SHV. As of 2017, more than 58% of Florida's public housing authorities have implemented smoke-free policies, several of which include EVP coverage.[36] Future research should examine the impact of such smoke free policies on SHS and SHV exposure among youth, as well the physical settings in which youth are exposed to SHS and SHV to better inform additional interventions. Families should be encouraged to have tobacco free homes and cars, and evidence-based policies should be implemented to restrict tobacco use in multi-unit housing.

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What this paper adds

- Secondhand smoke exposure causes significant health issues and secondhand vapor exposure could be harmful.
- The prevalence and associated characteristics with secondhand vapor exposure are largely unknown.
- Overall, 29% of youth reported secondhand vapor exposure in the past 30-days.
- Secondhand smoke exposure and secondhand vapor exposure increased youth's susceptibility to future tobacco product use.

Table 1

Characteristics of sample and prevalence of exposure to secondhand smoke and secondhand vapor, 2016
Florida Youth Tobacco Survey (n=58,616)

Characteristics	Secondhand Exposure		
	Overall N (%)	SHS N (%)	SHV N (%)
Age			
Middle school (11–13)	24147 (34.7%)	9372 (36.0%)	5096 (20.7%)
High School (14–17)	34469 (65.3%)	15307 (41.7%)	11925 (33.8%)
Gender			
Female	29688 (50.4%)	13603 (43.8%)	8807 (29.9%)
Male	28184 (49.6%)	10767 (35.6%)	8004 (28.6%)
Race/ethnicity			
Hispanic	13875 (30.4%)	4864 (35.4%)	3505 (26.7%)
Non-Hispanic American Indian or Alaskan Native	762 (0.7%)	358 (42.9%)	234 (36.2%)
Non-Hispanic Asian	1525 (2.0%)	472 (29.3%)	309 (20.5%)
Non-Hispanic black	8730 (19.9%)	2947 (30.9%)	1590 (18.5%)
Non-Hispanic Native Hawaiian or Other Pacific Islander	292 (0.3%)	115 (36.1%)	93 (30.1%)
Non-Hispanic other	2395 (2.7%)	998 (38.2%)	657 (28.2%)
Non-Hispanic white	29353 (41.7%)	14265 (47.7%)	10237 (36.9%)
Metropolitan status			
Large central metro	4833 (12.0%)	1912 (37.3%)	1310 (26.8%)
Large fringe metro	12294 (26.6%)	4719 (36.1%)	3480 (29.8%)
Medium metro	19039 (37.3%)	7990 (41.3%)	5547 (29.8%)
Small metro	8378 (6.6%)	3930 (47.3%)	2829 (36.2%)
Micropolitan	5324 (7.5%)	2195 (40.8%)	1316 (25.1%)
Noncore	8748 (9.9%)	3933 (40.5%)	2539 (27.1%)
Housing			
Stand alone	37481 (66.9%)	15399 (39.5%)	11297 (30.5%)
Trailer/mobile home	7065 (6.3%)	3673 (51.5%)	2025 (31.3%)
Townhouse/duplex	3438 (8.0%)	1450 (39.7%)	990 (27.9%)
Condo/Apartment	4930 (11.9%)	1950 (37.0%)	1236 (24.4%)
Other	4674 (7.0%)	1859 (37.5%)	1276 (27.0%)
Asthma status (attack last year)			
Yes	2865 (4.7%)	1551 (50.6%)	1102 (37.1%)
No	53868 (91.7%)	22302 (39.1%)	15319 (28.8%)
Undetermined	1883 (3.6%)	826 (42.0%)	600 (31.4%)
Home Tobacco Environment			
Lives with no tobacco users	37728 (67.0%)	9763 (25.4%)	7790 (21.8%)
Lives with smokers only	11332 (17.6%)	8836 (75.7%)	2869 (26.6%)
Lives with EVP users only	2432 (4.1%)	840 (34.5%)	1952 (77.2%)
Lives with smokers and EVP users	5003 (7.5%)	4251 (84.2%)	3686 (73.5%)
Undetermined	2121 (3.8%)	989 (42.6%)	724 (34.3%)

Characteristics	Secondhand Exposure		
	Overall N (%)	SHS N (%)	SHV N (%)
Home tobacco use policy			
Allowed	8021 (12.2%)	6239 (77.2%)	3750 (49.0%)
Not allowed	46729 (87.8%)	16739 (34.4%)	12132 (26.5%)
Product User Status			
Never used	41884 (70.2%)	14783 (33.1%)	8285 (20.0%)
Ever, non-current EVP user but never cigarettes smoker	6361 (13.2%)	3080 (45.2%)	2994 (44.9%)
Ever, non-current cigarette smoker but never EVP user	2108 (3.0%)	1282 (57.0%)	629 (28.8%)
Ever, non-current EVP and cigarette user	3810 (6.2%)	2588 (65.5%)	2076 (55.0%)
Current EVP and/or cigarettes user	3535 (5.9%)	2575 (70.3%)	2759 (78.3%)
Undetermined	918 (1.6%)	371 (38.4%)	278 (29.1%)
Belief SHS is harmful			
Yes	52392 (89.9%)	22468 (40.6%)	15341 (29.8%)
No	5750 (10.1%)	2060 (32.4%)	1591 (25.6%)
Belief SHV is harmful			
Yes	31196 (52.0%)	11649 (35.4%)	6182 (20.3%)
No	26705 (48.0%)	12793 (44.6%)	10707 (39.2%)

All variables significantly associated with SHS and SHV, with $p < 0.01$.

SHS = Secondhand smoke exposure; SHV = Secondhand vapor exposure

Table 2

Characteristics associated with secondhand smoke and secondhand vapor exposure, 2016 Florida Youth Tobacco Survey (n=58,616)

Characteristics	SHS (AOR+95% CI)	SHV (AOR+95% CI)
<i>Block 1</i>		
Age		
Middle school (11–13)	1.00	1.00
High School (14–17)	1.29 (1.22, 1.37)	2.01 (1.88, 2.15)
Gender		
Female	1.43 (1.36, 1.49)	1.08 (1.02, 1.14)
Male	1.00	1.00
Race/ethnicity		
Hispanic	0.59 (0.55, 0.63)	0.64 (0.59, 0.69)
Non-Hispanic American Indian/Alaskan Native	0.83 (0.68, 1.01)	1.03 (0.83, 1.27)
Non-Hispanic Asian	0.47 (0.40, 0.54)	0.45 (0.37, 0.54)
Non-Hispanic black	0.49 (0.45, 0.52)	0.39 (0.35, 0.42)
Non-Hispanic Native Hawaiian or Other Pacific Islander	0.62 (0.47, 0.82)	0.74 (0.54, 1.02)
Non-Hispanic other	0.68 (0.60, 0.76)	0.68 (0.60, 0.77)
Non-Hispanic white	1.00	1.00
Metropolitan status		
Large central metro	1.00	1.00
Large fringe metro	0.95 (0.86, 1.06)	1.17 (1.02, 1.34)
Medium metro	1.15 (1.04, 1.27)	1.12 (0.99, 1.27)
Small metro	1.27 (1.12, 1.44)	1.31 (1.14, 1.50)
Micropolitan	1.28 (1.11, 1.47)	0.99 (0.84, 1.17)
Noncore	1.12 (0.99, 1.27)	1.01 (0.87, 1.17)
Housing		
Stand alone	1.00	1.00
Trailer/mobile home	1.57 (1.44, 1.71)	1.01 (0.92, 1.11)
Townhouse/duplex	1.18 (1.08, 1.28)	1.04 (0.93, 1.15)
Condo/Apartment	1.11 (1.02, 1.20)	0.94 (0.89, 1.04)
Other	1.02 (0.94, 1.11)	0.98 (0.88, 1.08)
Asthma status (attack last year)		
Yes	1.57 (1.42, 1.73)	1.47 (1.32, 1.65)
No	1.00	1.00
Undetermined	1.33 (1.18, 1.50)	1.36 (1.19, 1.55)
<i>Block 2</i>		
Home Tobacco Environment		
Lives with no tobacco users	1.00	1.00
Lives with smokers only	7.39 (6.87, 7.96)	1.11 (1.02, 1.20)
Lives with EVP users only	1.30 (1.14, 1.49)	11.54 (10.04, 13.27)
Lives with smokers and EVP users	10.65 (9.44, 12.02)	8.09 (7.28, 8.99)

Characteristics	SHS (AOR+95% CI)	SHV (AOR+95% CI)
Undetermined	2.24 (1.97, 2.77)	2.23 (1.85, 2.69)
Home tobacco use policy		
Allowed	2.57 (2.35, 2.81)	1.56 (1.44, 1.70)
Not allowed	1.00	1.00
<i>Block 3</i>		
Product User Status		
Never used	1.00	1.00
Ever, non-current EVP user but never cigarettes smoker	1.43 (1.29, 1.59)	2.24 (2.05, 2.46)
Ever, non-current cigarette smoker but never EVP user	2.08 (1.77, 2.44)	1.24 (1.06, 1.44)
Ever, non-current EVP and cigarette user	2.60 (2.29, 2.96)	3.14 (2.81, 3.52)
Current EVP and/or cigarettes user	3.48 (3.06, 3.95)	8.70 (7.62, 9.93)
Undetermined	1.33 (1.05, 1.68)	1.71 (1.34, 2.19)
Belief SHS is harmful		
Yes	1.73 (1.54, 1.93)	1.97 (1.76, 2.21)
No	1.00	1.00
Belief SHV is harmful		
Yes	0.86 (0.81, 0.92)	0.56 (0.53, 0.59)
No	1.00	1.00

Covariates in Block 1 were adjusted for each other. Covariates in each sequential block were adjusted for the variables in that block as well as the covariates in the preceding block(s).

SHS = Secondhand smoke exposure; SHV = Secondhand vapor exposure

Table 3

Characteristics associated with tobacco product susceptibility in youth who have never used EVP or cigarettes, 2016 Florida Youth Tobacco Survey (n=40,202)

Characteristics	Susceptibility to cigarettes (AOR +95% CI)	Susceptibility to EVP (AOR+95% CI)
Age		
Middle school (11–13)	1.00	1.00
High School (14–17)	1.05 (0.95–1.54)	1.54 (1.42–1.67)
Gender		
Female	0.75 (0.68–0.84)	0.93 (0.86–1.00)
Male	1.00	1.00
Race/ethnicity		
Hispanic	1.46 (1.29–1.64)	1.48 (1.35–1.63)
Non-Hispanic American Indian/Alaskan Native	1.63 (1.09–2.43)	1.22 (0.86–1.72)
Non-Hispanic Asian	0.92 (0.70–1.23)	0.97 (0.76–1.72)
Non-Hispanic black	1.44 (1.26–1.65)	1.59 (1.42–1.79)
Non-Hispanic Native Hawaiian or Other Pacific Islander	1.74 (0.93–3.25)	1.58 (0.98–2.55)
Non-Hispanic other	1.37 (1.10–1.70)	1.30 (1.07–1.57)
Non-Hispanic white	1.00	1.00
Metropolitan status		
Large central metro	1.00	1.00
Large fringe metro	1.20 (0.99–1.44)	1.12 (0.97–1.30)
Medium metro	1.28 (1.09–1.52)	1.10 (0.97–1.26)
Small metro	1.18 (0.98–1.43)	0.96 (0.82–1.12)
Micropolitan	1.34 (1.06–1.69)	0.97 (0.80–1.19)
Noncore	1.49 (1.20–1.84)	1.22 (1.04–1.44)
Housing		
Stand alone	1.00	1.00
Trailer/mobile home	1.24 (1.04–1.48)	1.00 (0.88–1.15)
Townhouse/duplex	1.15 (0.95–1.40)	1.08 (0.93–1.26)
Condo/Apartment	1.25 (1.06–1.46)	1.13 (1.00–1.29)
Other	1.47 (1.25–1.73)	1.02 (0.87–1.19)
Asthma status (attack last year)		
Yes	1.07 (0.87–1.31)	1.08 (0.91–1.27)
No	1.00	1.00
Undetermined	1.43 (0.98–2.09)	1.10 (0.80–1.51)
Home Tobacco Environment		
Lives with no tobacco users	1.00	1.00
Lives with smokers only	1.12 (0.98–2.09)	1.08 (0.97–1.20)
Lives with EVP users only	1.38 (1.03–1.87)	1.93 (1.57–2.39)
Lives with smokers and EVP users	1.45 (1.21–1.74)	1.33 (1.13–1.55)
Undetermined	1.48 (1.09–2.01)	1.22 (0.93–1.60)
Home tobacco use policy		

Characteristics	Susceptibility to cigarettes (AOR +95% CI)	Susceptibility to EVP (AOR+95% CI)
Allowed	1.70 (1.47–1.98)	1.60 (1.41–1.82)
Not allowed	1.00	1.00
Secondhand Exposure		
Exposed to SHS and SHV	1.40 (1.21–1.61)	2.08 (1.85–2.25)
SHS exposure only	1.08 (0.95–1.23)	1.18 (1.06–1.31)
SHV exposure only	0.82 (0.66–1.02)	2.09 (1.82–2.40)
No Secondhand exposure	1.00	1.00

EVP = electronic vapor products, SHS = Secondhand smoke exposure; SHV = Secondhand vapor exposure