

June 2010

# **Fiscal Year End Report 2010: Summary of Hookah Use and Number and Location of Hookah Bars in Florida**

Prepared for

**Florida Department of Health**  
Bureau of Tobacco Prevention Program  
4052 Bald Cypress Way, Bin C-23  
Tallahassee, FL 32399-1743

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## **1. INTRODUCTION**

This report examines the extent of hookah use and the presence of establishments that cater to hookah use in Florida. To provide context for our analyses, we began with a systematic search of the literature for studies of hookah use and/or hookah bars. We then used data from the Florida Youth Tobacco Survey (2007–2009 FYTS), the Florida Young Adult Tobacco Survey (2009 FL YATS), and the Florida Adult Tobacco Survey (2007–2009 FLATS) to estimate the prevalence of hookah use among youth, young adults, and adults in Florida. We also examined sociodemographic and personal characteristics associated with hookah use. Finally, we used data from Florida to estimate the number and location of establishments that cater to hookah use (hookah bars).

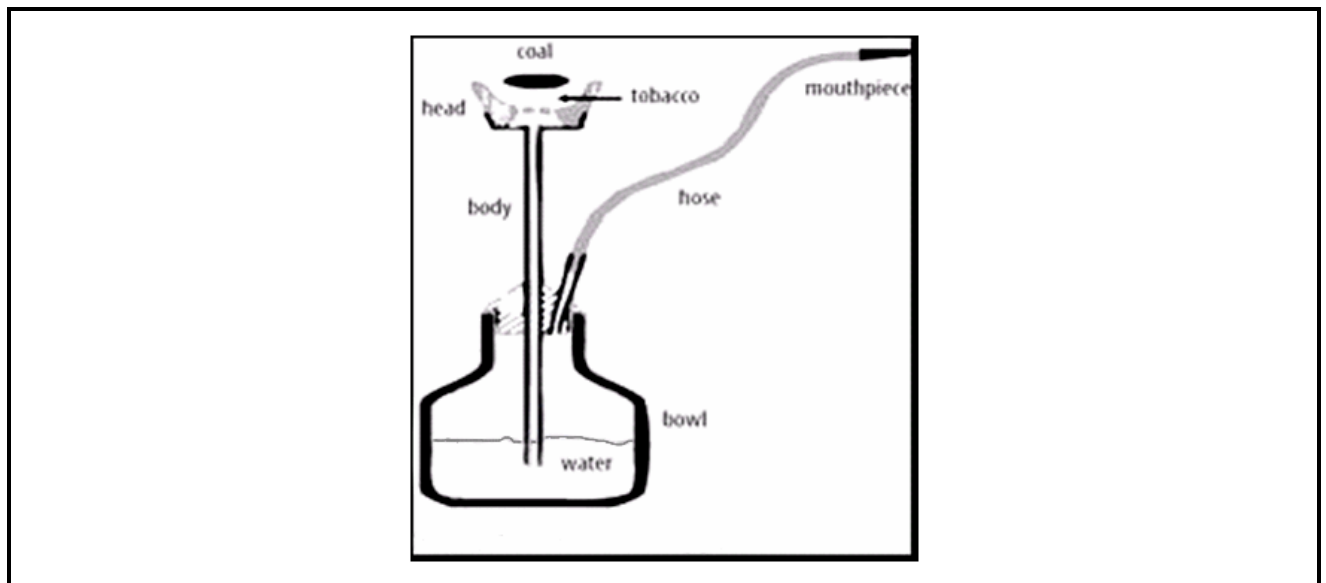


## 2. BACKGROUND

Tobacco use remains the single most preventable cause of death in the United States. Each year, cigarette smoking and exposure to secondhand smoke cause 443,000 deaths in this country (CDC, 2010). In the past few years, an old form of tobacco use, known as water pipe or hookah tobacco smoking, has increased worldwide (Dybing et al., 2005). In the United States, the prevalence of hookah tobacco smoking is unknown, but results from several U.S. studies conducted on convenience samples and/or state-level samples suggest that hookah use may be growing (Cobb et al., 2010).

Hookah is a tobacco smoking device that indirectly heats and burns loose tobacco and allows for tobacco smoke to pass through a bowl of water before it is inhaled through a hose attached to the same bowl (Figure 2-1) (American Lung Association, 2007). Smoking tobacco out of a hookah pipe is perceived as being less harmful than cigarette smoking largely because tobacco smoke is believed to get filtered in the water (Smith-Simone et al., 2008; Maziak et al., 2007). However, results from limited research on the health effects of hookah tobacco smoking do not indicate a reduction in health risks relative to cigarette smoking. Instead, these studies suggest that hookah smoking may lead to tobacco dependence and tobacco-related health problems, such as coronary heart disease and lung cancer (Smith-Simone et al., 2008; Jabbour et al., 2003; Gupta et al., 2001).

**Figure 2-1. Diagram of a Traditional Hookah**



Source: Reproduced from  
[http://www.who.int/tobacco/global\\_interaction/tobreg/Waterpipe%20recommendation\\_Final.pdf](http://www.who.int/tobacco/global_interaction/tobreg/Waterpipe%20recommendation_Final.pdf)



### 3. DATA AND METHODS

In this section, we outline the data sources and methods we used to (1) conduct a systematic literature review of U.S. studies on hookah use; (2) estimate the prevalence of hookah use among youth, young adults, and adults in Florida; and (3) estimate the number of hookah bars in Florida.

#### 3.1 Literature Review

##### 3.1.1 Data Sources

The literature review was conducted between April 20 and May 14, 2010. We compiled information about the prevalence of hookah use and the number of hookah bars in the United States using two Web-searchable databases:

- PubMed (1957–date) includes more than 19 million citations for biomedical articles from MEDLINE, life sciences journals, and online books (<http://www.ncbi.nlm.nih.gov/pubmed/>).
- Science Citation Index Expanded, which is the online version of Science Citation Index (1955–date), is a multidisciplinary database that provides data from more than 6,650 major scientific journals across 150 disciplines (<http://science.thomsonreuters.com/cgi-bin/jrnlst/jloptions.cgi?PC=D>).

##### 3.1.2 Identification Method

Search terms included all possible names for hookah (e.g., waterpipe, narghile, shisha, sheesha, goza, argilah, lula, lulava, shishe, nargila, cachimba, ghalyoon, chillim, hubble bubble, huqqa). We considered articles eligible for review based on four basic criteria illustrated in Table 3-1. We then read all eligible articles and reviewed those that estimated current or ever use of hookah anywhere in the United States and/or those that estimated the number and location of hookah bars in the United States.

**Table 3-1. Eligibility Criteria for Literature Review of Hookah Use and Hookah Bars in the United States**

Category	Criteria
Time period	2005 to date
Publication language	English
Study geography	United States
Publication types	Peer-reviewed journal articles

## **3.2 Prevalence of Hookah Use in Florida**

We conducted estimates of ever and current hookah use in Florida using three surveys:

- Florida Youth Tobacco Survey (2007–2009 FYTS)
- Florida Young Adult Tobacco Survey (2009 FL YATS)
- Florida Adult Tobacco Survey (2007–2009 FLATS)

### **3.2.1 Data**

#### *2007–2009 FYTS*

FYTS is a statewide confidential cross-sectional survey of public middle and high school students in Florida that includes measures of tobacco use and exposure to secondhand smoke. The survey has a two-stage cluster probability sample design: in the first stage, public schools are randomly selected to participate in the study; and in the second stage, classrooms are randomly selected from each of the selected schools to participate in the survey.

From 2007 through 2009, students were asked about ever smoking tobacco out of a waterpipe, and in 2009 they were also asked if they smoked tobacco out of a waterpipe in the past 30 days. In addition to hookah use questions, FYTS included questions about the use of cigarettes; cigars; smokeless tobacco; and bidis, kreteks, or tobacco in a pipe.

#### *2009 FL YATS*

FL YATS is a random-digit-dial study of young adults, aged 18 to 24, living in Florida. It is a cross-sectional survey designed to help understand how the Florida Bureau of Tobacco Prevention Program (BTPP) is influencing smoking rates among young adults in Florida. The FL YATS sample includes landline numbers and random-digit-dial cell phone numbers to improve the representativeness of the young adult sample.

The 2009 FL YATS included two questions related to hookah use. Specifically, the survey asked young adults about their current use of hookah (“Do you now use hookah pipes?”) and the frequency of using hookah (“Do you now use hookah pipes every day or some days?”). The survey also asked young adults about their current use of certain tobacco products (i.e., cigarettes; cigars; smokeless tobacco; and other tobacco products, such as snus, tobacco strips, toboka, and electric cigarettes).

#### *2007–2009 FLATS*

FLATS is a confidential telephone survey conducted annually by the Florida Department of Health and sponsored by the Centers for Disease Control and Prevention to provide smoking and tobacco-related health behavior information about the adult population in Florida.

Participation in the survey interview is based on random selection of adults from randomly selected telephone-equipped households in Florida.

From 2007 to 2009, adults were asked about ever use of certain tobacco products (i.e., cigarettes, cigars, hookah, and smokeless tobacco).

### **3.2.2 Sample Analysis Methods**

FYTS, FL YATS, and FLATS are statistically weighted to represent state-level estimates. We performed the analysis using Stata (11.0) complex survey design estimators, which account for sample weights, stratification, and clustering to provide representative estimates for the relevant population groups in Florida. Table 3-2 presents the sample size for each survey year included in the analysis for this report.

**Table 3-2. Sample Size by Year for FLATS, FL YATS, and FYTS, 2007–2009**

Survey	Year		
	2007	2008	2009
<b>FLATS</b>	4,350	8,355	4,614
<b>FL YATS</b>	—	—	2,044
<b>FYTS</b>	8,995	77,003	11,898

#### *Analysis of Trend in Ever Use*

Using the 2007 to 2009 data from FYTS and FLATS, we examined the trend in the prevalence of ever use of hookah and cigarettes. To test for the significance of the trend in use, we estimated a regression model that included only survey year as an explanatory variable but did not adjust for any additional covariates.

#### *Descriptive Analyses of Hookah Use in 2009*

We conducted descriptive analysis using 2009 data from each survey to present estimates of hookah use behaviors and the use of other tobacco products among youth, young adults, and adults. Additionally, we estimated the prevalence of hookah use behaviors by sociodemographic and personal characteristics, including gender, age, race, education or school grade, and a dichotomous indicator for using at least one tobacco product other than smoking tobacco from hookah. To examine the association between each of the select characteristics and hookah use, we performed Pearson's chi-square tests. Note that FYTS and FL YATS allow us to examine current hookah use, whereas FLATS only allows us to examine ever use of hookah.

### **3.3 Number and Location of Hookah Bars in Florida**

#### **3.3.1 Data**

To examine the number and location of hookah bars in Florida, we used a database of alcoholic beverages and tobacco licenses available from the Florida Department of Business and Professional Regulation Web site (<http://www.myfloridalicense.com/dbpr/index.html>). The database was updated on April 21, 2010, and provides a recent list of alcohol and tobacco licenses with information about type, status, expiration date, and corresponding business name and address of each license.

#### **3.3.2 Method**

We first compiled a refined list of tobacco retailer licenses by limiting the database to licenses for businesses with either a retail tobacco permit (license type code is 4012) or a dual license for alcoholic beverages and tobacco (license type code is 4006). We also required licenses to be active (primary and secondary active status database code is 20) and to be issued for businesses located in Florida.

We then used the refined list of tobacco licenses to identify hookah bars using two approaches. First, from the refined list, we identified retailer business names that include any possible variation of "hookah." This produced a preliminary list of 33 hookah bars. Next, from the same refined list, we captured hookah bars that do not have "hookah" variations in their licensed names, by matching the business names to business names listed in commercial Web sites that list hookah bars for each state ([hookah-hookah.com](http://hookah-hookah.com) and [hookah-bars.com](http://hookah-bars.com)). This approach helped identify an additional 41 hookah bars in Florida.

We also determined the locations of the 74 identified hookah bars and determined their proximity to the major Florida university campuses. We identified the locations using the Web site [geocoders.com](http://geocoders.com), and, for locations not identifiable on [geocoders.com](http://geocoders.com), we used the Google Maps search engine to provide complete and accurate latitude and longitude location. We used this latitude and longitude information to determine the distance between each hookah bar and the nearest campus.

## 4. RESULTS

### 4.1 Hookah Use in the United States: Results from the Literature Review

The literature review identified 13 published articles between 2005 and May 2010 that reported estimates of hookah use for populations or locations within the United States. These studies were conducted primarily among convenience samples of youth or young adults.

Of the 13 identified articles, 10 articles included estimates for ever use of hookah. All 10 reported prevalence estimates of more than 10%, and 7 reported prevalence estimates of more than 25%.

Nine of the 13 identified articles included estimates for current use of hookah. Five of the 9 estimated current hookah use at more than 10%, 2 estimated current use at close to 10% (9.5% and 7.5% from Primack et al., 2008 and 2010, respectively), and 2 estimated current use at less than 1% (0.3%) for a convenience sample of U.S. Air Force recruits (Ward et al., 2006).

Two articles were based on studies using state-level samples (Barnett et al., 2009; Primack et al., 2009). Barnett et al. (2009) used 2007 FYTS data and showed that the prevalence of ever hookah use in Florida was 4% among middle school students and 11% among high school students. Primack et al. (2009) used 2005 Arizona Youth Tobacco Survey data and estimated ever use of hookah in Arizona at 6.4% and current use of hookah at 3.5%.

Three articles reported the number of hookah bars in the United States, but these reports were based on press reports and trade publications (Cobb et al., 2010; Primack et al., 2008, 2009). Between 1999 and 2004, about 200 to 300 new hookah bars opened in the United States, often in big cities and near college or university campuses (Cobb et al., 2010; Primack et al., 2008). Anecdotal evidence also suggested a recent increase in hookah bars in Florida (<http://www.physorg.com>).

Table 4-1 lists abstracted data and key outcomes for the identified articles from the literature review. For each article, the table includes information about published year, authors, title, data source, age range and size of the study sample, estimates for hookah use behaviors, and/or reported number of hookah bars in the United States.

**Table 4-1. Data and Key Outcomes for Identified Articles from the Literature Review**

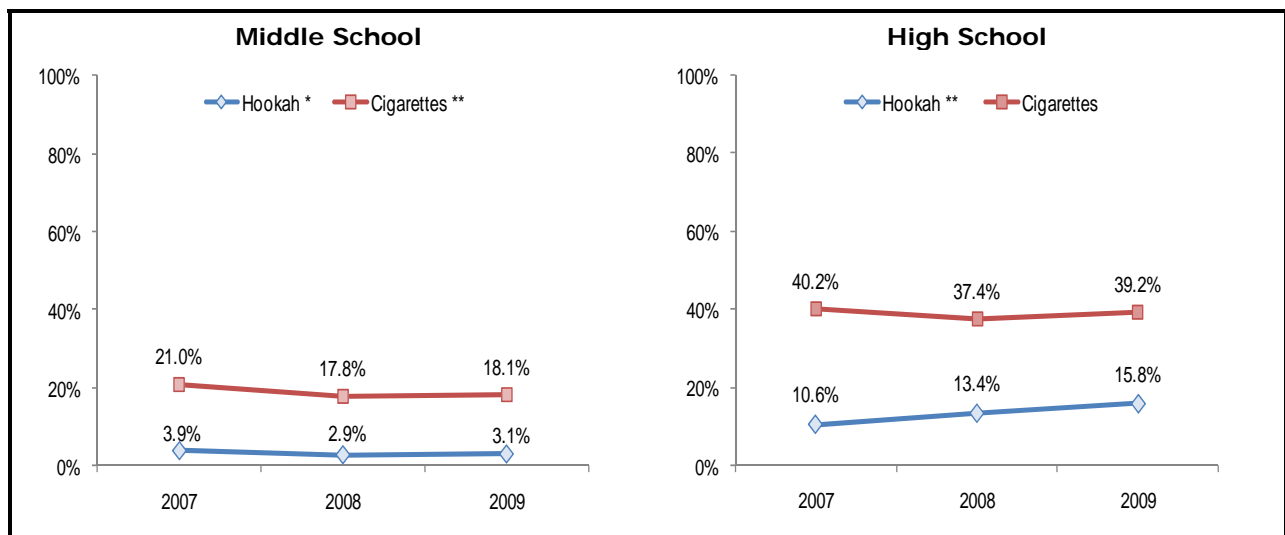
Published Year	Author(s)	Title	Source	Sample Size	Age Group of Study	Ever Used Hookah	Used Hookah in Past 30 Days	Number of Hookah Bars
2005	Templin et al.	Trends in tobacco use among Arab/Arab-American adolescents: preliminary findings	PubMed	2,454	High school students	36.0%	15.0%	--
2006	Rice et al.	Predictors of Arab American adolescent tobacco use	SCI (Expanded)	1,671	High school students (14–18)	27.0%	--	--
2006	Ward et al.	Waterpipe smoking among American military recruits	PubMed	20,673	17–35	--	0.3% (in past 12 months following basic military training)	--
2007	Smith et al.	Harm perception of nicotine products in college freshmen	PubMed	411	18–20	--	15.3%	--
2008	Grekin et al.	Argileh use among college students in the United States: an emerging trend	PubMed	602	Undergraduates	15.1%	--	--
2008	Primack et al.	Prevalence of and association with waterpipe tobacco smoking among college students	PubMed	647	Undergraduate and graduate students at University of Pittsburgh	41.0%	9.5%	200–300 opening in the United States from 1999–2004
2008	Eissenberg et al.	Waterpipe tobacco smoking on a U.S. college campus: prevalence and predictors	PubMed	744	18–20	48.4%	20.4%	--
2008	Weglicki et al.	Comparison of cigarette and water-pipe smoking by Arab and non-Arab-American youth	PubMed	1,872	High school students	Among Arab Americans: 38.0% Among non-Arab-Americans: 21.3%	Among Arab Americans: 16.7% Among non-Arab-Americans: 11.3%	--
2009	Primack et al.	Waterpipe tobacco smoking among middle and high school students in Arizona	SCI (Expanded)	6,594	Middle school and high school students	Overall: 6.4% (MS: 2.1%, HS: 10.3%)	Overall: 3.5% (MS: 1.4%, HS: 5.4%)	200–300 opening in the United States from 1999–2004
2009	Barnett et al.	Water pipe tobacco smoking among middle and high school students	PubMed	5,037 MS, 4,028 HS	Middle school and high school students	MS: ≈4%, HS: ≈11%	--	--
2010	Jamil et al.	Sociodemographic risk indicators of hookah smoking among white Americans: a pilot study	PubMed	245	18+	25.8%	18.8%	--
2010	Primack et al.	Waterpipe and cigarette smoking among college athletes in the United States	PubMed	8,745	College athletes (18–24, mostly)	29.5%	7.2%	--
2010	Cobb et al.	Waterpipe tobacco smoking: an emerging health crisis in the United States	PubMed	Literature review	NA	--	--	200–300 opening in the United States from 1999–2004

## 4.2 Prevalence of Hookah Use in Florida

### 4.2.1 Results from 2007–2009 FYTS

Figure 4-1 shows the trends for estimated prevalence of ever use of hookah and cigarettes among Florida middle and high school students from 2007 to 2009. Among middle school students, hookah use was significantly lower in 2008 and 2009 than in 2007, whereas among high school students, there was a statistically significant upward trend in the prevalence of hookah ever use ( $p < 0.01$ ). In 2009, 3.1% of middle school students and 15.8% of high school students reported ever use of hookah.

**Figure 4-1. Trends of Ever Use of Hookah and Cigarettes, 2007–2009 FYTS**



\*Statistically significant trend ( $p < 0.05$ ).

\*\*Statistically significant trend ( $p < 0.01$ ).

Figure 4-2 shows the FLYTS 2009 prevalence estimates for ever use of hookah and cigarettes for Florida middle and high school students by grade. With each increase in grade level, the percentages of students who ever used hookah and ever used cigarettes increased. In 6th grade, only 1.3% of the students had ever used hookah, and this percentage rose at each subsequent grade, reaching 25.3% in 12th grade.

**Figure 4-2. Prevalence of Ever Use of Hookah and Cigarettes by School Grade, 2009 FYTS**

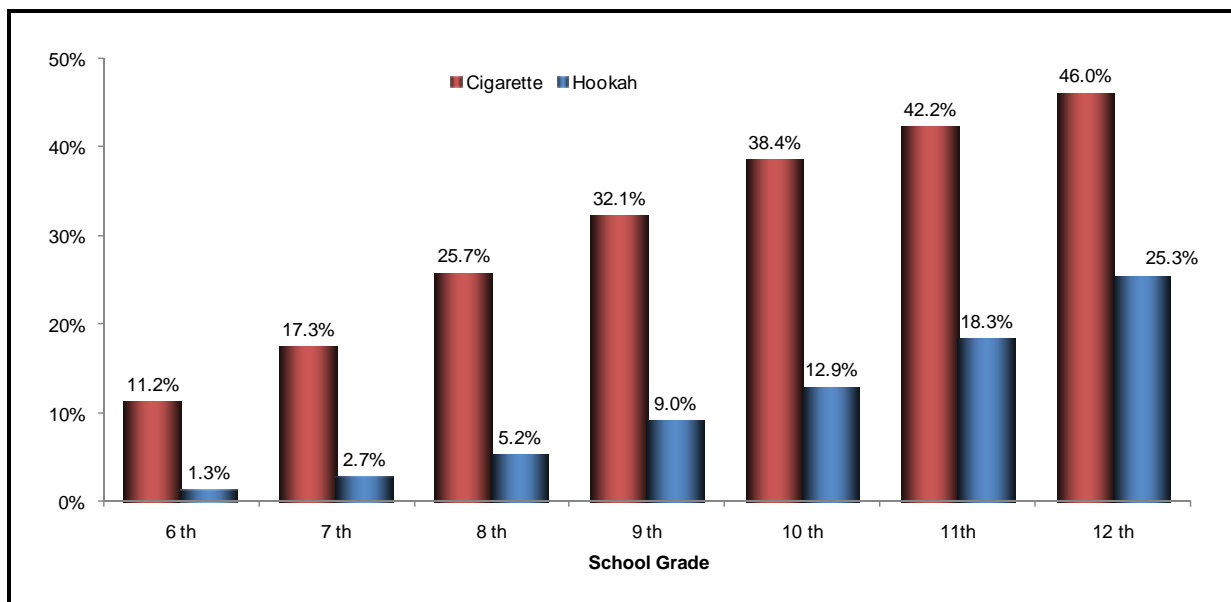


Figure 4-3 shows that smoking tobacco from hookah was the third most prevalent form of tobacco use among Florida high school students in 2009, behind cigarettes and cigars. Among high school students, 7.7% reported current use of hookah, compared with 14.5% for both cigarettes and cigars. Note that the estimates shown in this figure are not mutually exclusive—for example, a student who used two tobacco products would contribute to the prevalence estimate for each of the two products.

**Figure 4-3. Prevalence of Tobacco Product Use among High School Students, 2009 FYTS**

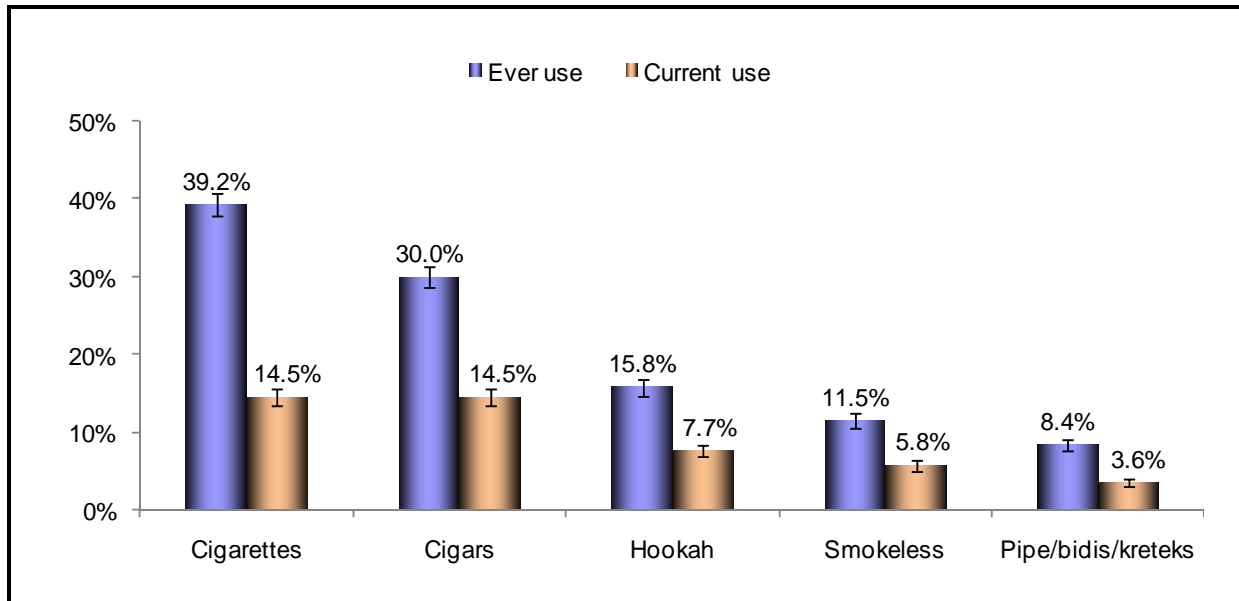
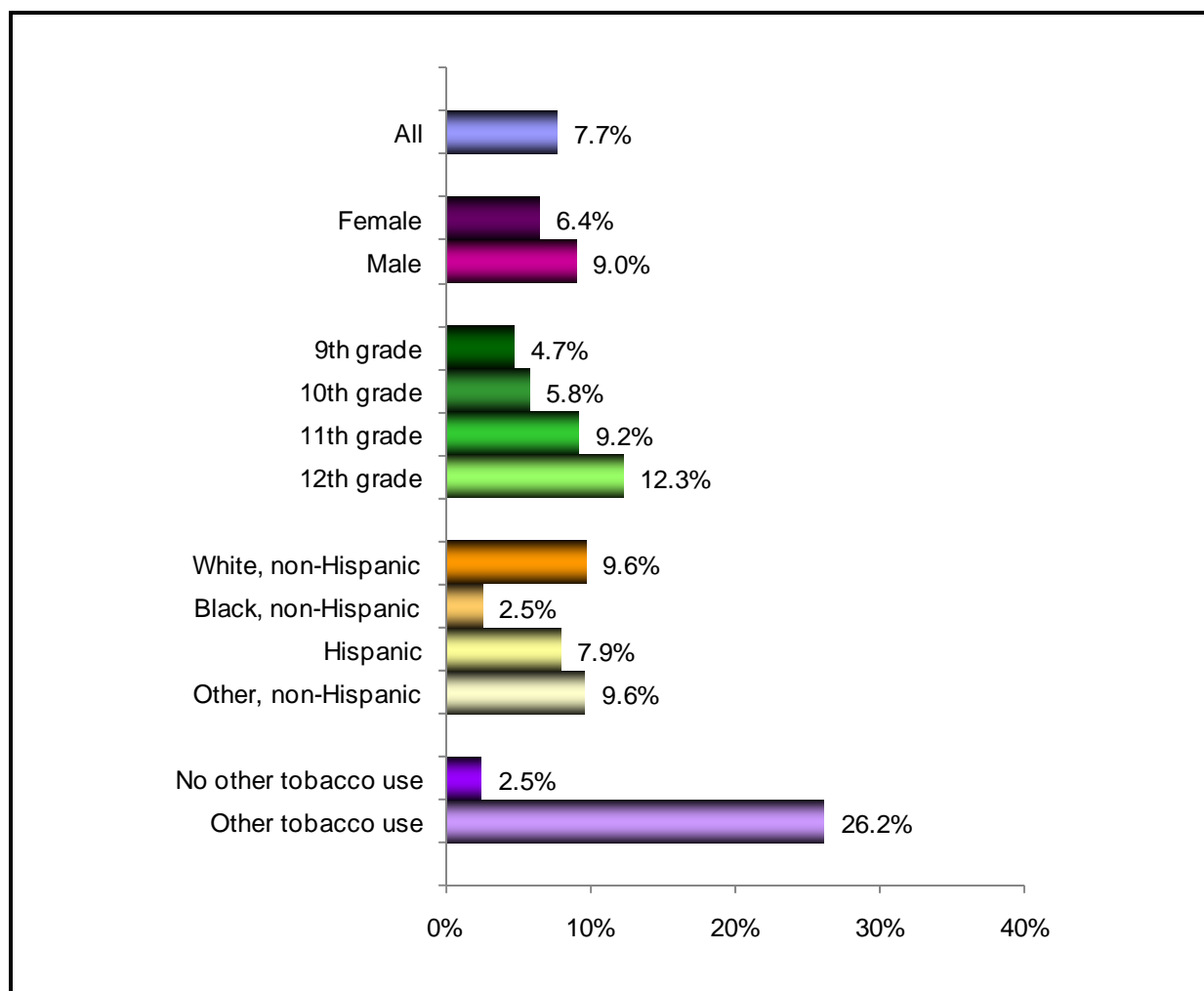


Figure 4-4 shows that in the 2009 FYTS, gender, grade level, and race were each significantly associated with the prevalence of current hookah use among high school students ( $p < 0.01$ ), and the percentage of current hookah use was highest among 12th grade students (12.3%). Additionally, the percentage of current use of other tobacco products was significantly associated with the current use of hookah ( $p < 0.01$ ), with 26.2% of current hookah users being current users of other tobacco products, and only 2.5% being current hookah users only.

**Figure 4-4. Prevalence of Current Hookah Use in Florida by Select Characteristics, 2009 FYTS**

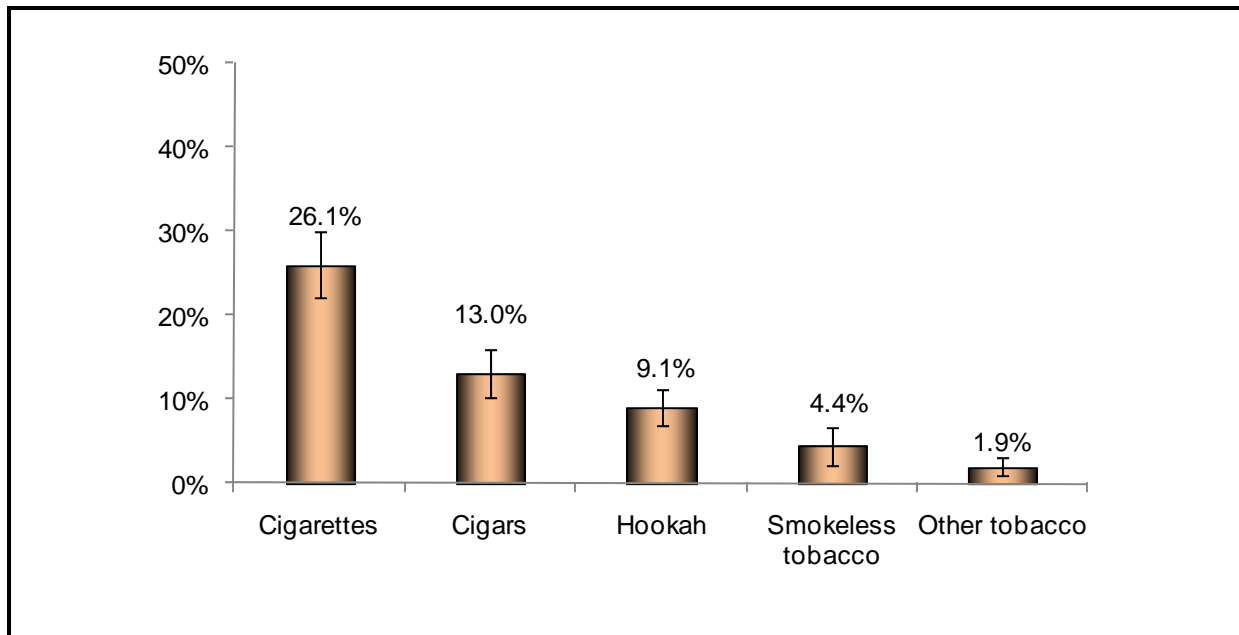


*Note:* Other race includes non-Hispanic respondents who are Asians, Native Hawaiians or Other Pacific Islanders, American Indians, or Alaska Natives, and respondents who identified their race as "other."

### 4.2.2 Results from 2009 FL YATS

Among the 2009 FL YATS respondents, 9.1% reported current use of hookah (Figure 4-5), with the majority of them using hookah on some days (8.6%). Note again that the prevalence estimates of current use of tobacco products in this figure are not mutually exclusive.

**Figure 4-5. Prevalence of Current Use of Tobacco Products, 2009 FL YATS**

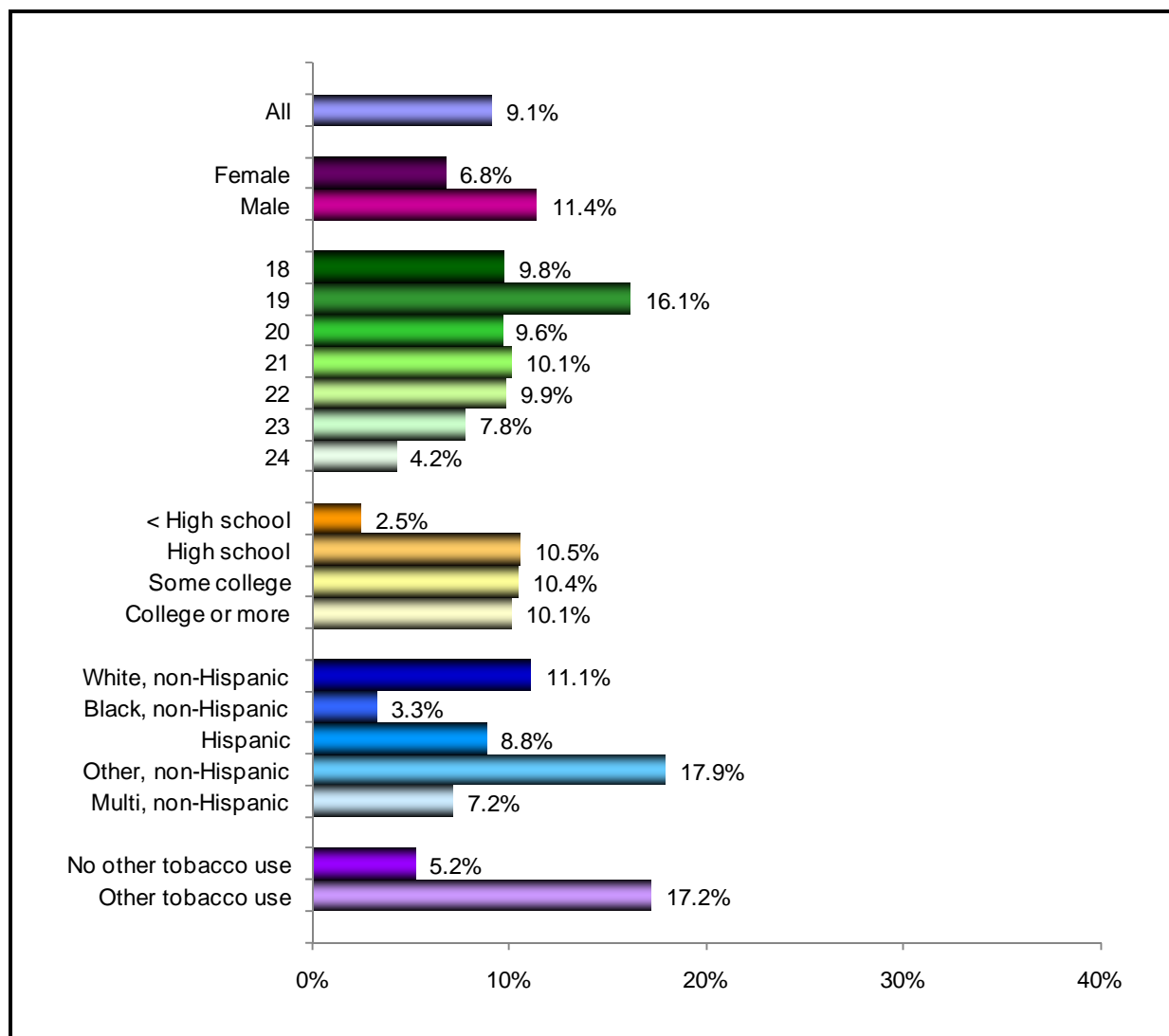


Note: Other tobacco products include snus, tobacco strips, taboka, and electric cigarettes (e-cigarettes).

In the 2009 FL YATS, gender and race were both significantly associated with current hookah use ( $p < 0.05$ ) (Figure 4-6). Prevalence of current hookah use was highest among males (11.4%).

Similarly, the prevalence of current use of other tobacco products was significantly associated with the prevalence of current hookah use ( $p < 0.01$ ). Specifically, 17.2% of young adults were current users of hookah and another tobacco product (e.g., cigarettes, cigars, smokeless tobacco, or snus, taboka, tobacco strips, or electric cigarettes), whereas only 5.2% were current hookah users only.

**Figure 4-6. Prevalence of Current Hookah Use among Florida Young Adults by Select Characteristics, FL YATS 2009**

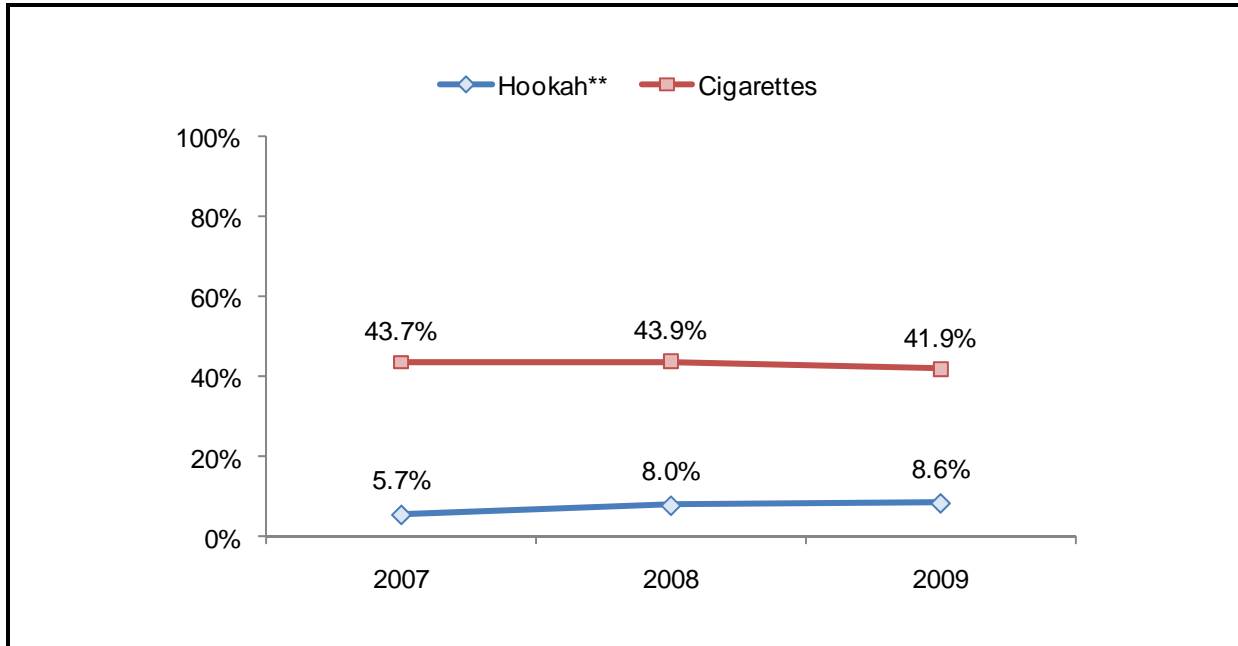


Note: Other race includes non-Hispanic respondents who are Asians, Native Hawaiians or Other Pacific Islanders, American Indians, or Alaska Natives, and respondents who identified their race as "other."

### 4.2.3 Results from 2007–2009 FLATS

Between 2007 and 2009, the trend in the percentage of Florida adults who ever used hookah increased significantly ( $p < 0.01$ ) (Figure 4-7).

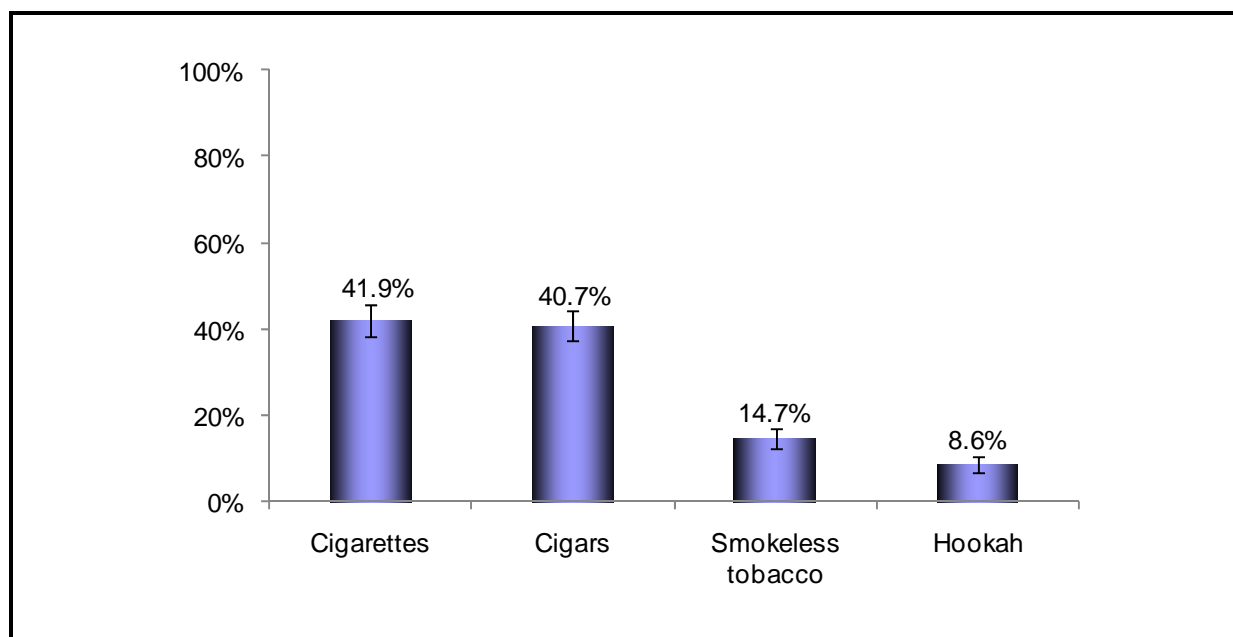
**Figure 4-7. Trends of Ever Use of Hookah and Cigarettes, 2007–2009 FLATS**



\*\*Statistically significant upward trend ( $p < 0.01$ ).

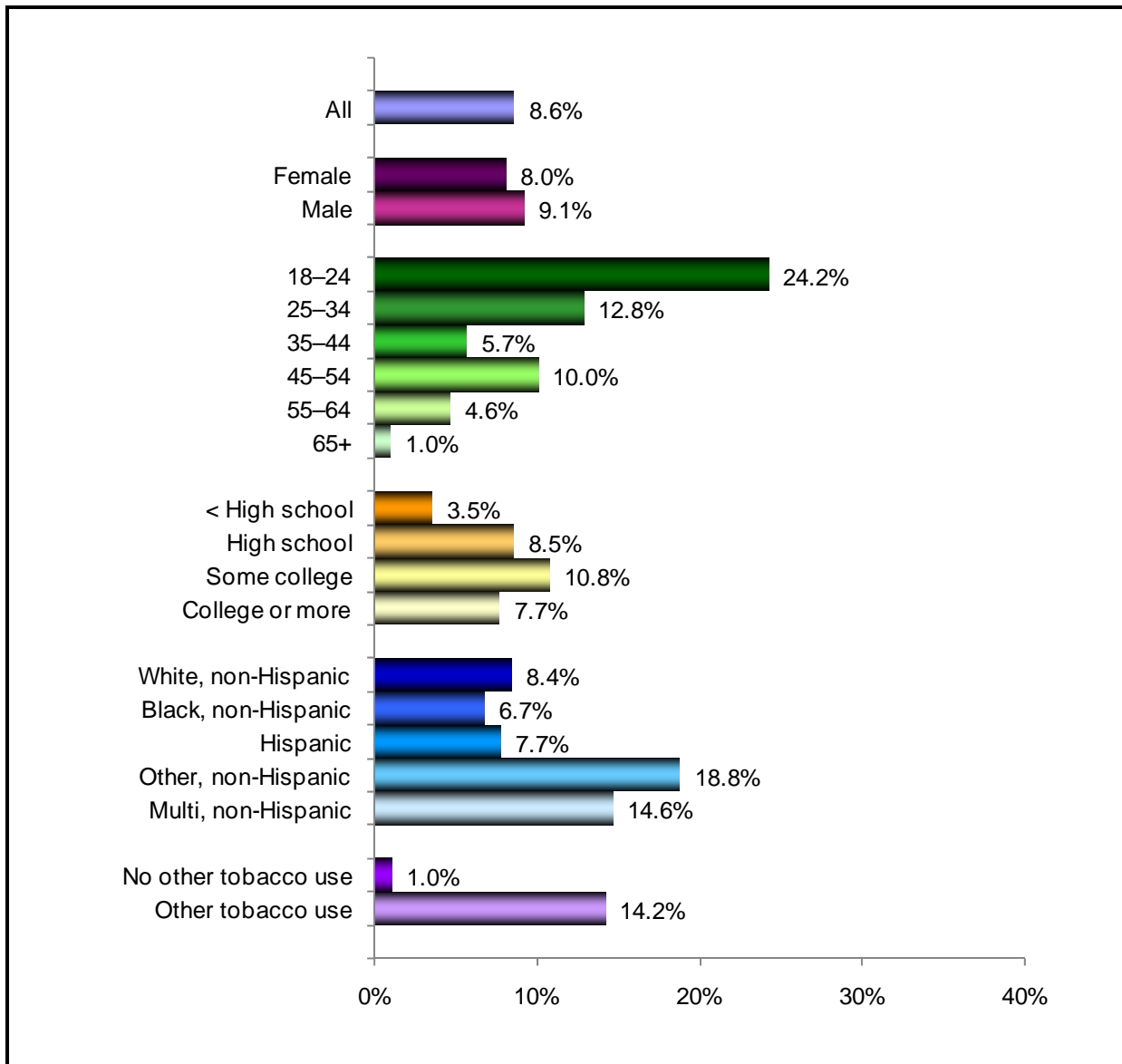
The tobacco product with the highest prevalence of lifetime use among Florida adults was cigarettes, with 41.9% reporting ever use (Figure 4-8). Ever use of hookah was the least prevalent among adults, at just 8.6%. Again, note that the reported percentages in this figure are not mutually exclusive.

**Figure 4-8. Prevalence of Ever Use of Tobacco Products, 2009 FLATS**



In the 2009 FLATS, age was significantly associated with the prevalence of hookah ever use ( $p < 0.01$ ), with young adults having the highest prevalence (24.2%) (Figure 4-9). Furthermore, the use of other tobacco products was significantly associated with the prevalence of hookah ever use ( $p < 0.01$ ); 14.2% of adults who ever used other tobacco products (e.g., cigarettes, smokeless tobacco, cigars, snus, taboka, strips, or electric cigarettes) had also tried hookah, compared to only 1.0% of adults who had only ever used hookah.

**Figure 4-9. Prevalence of Ever Use of Hookah among Florida Adults by Select Characteristics, FLATS 2009**

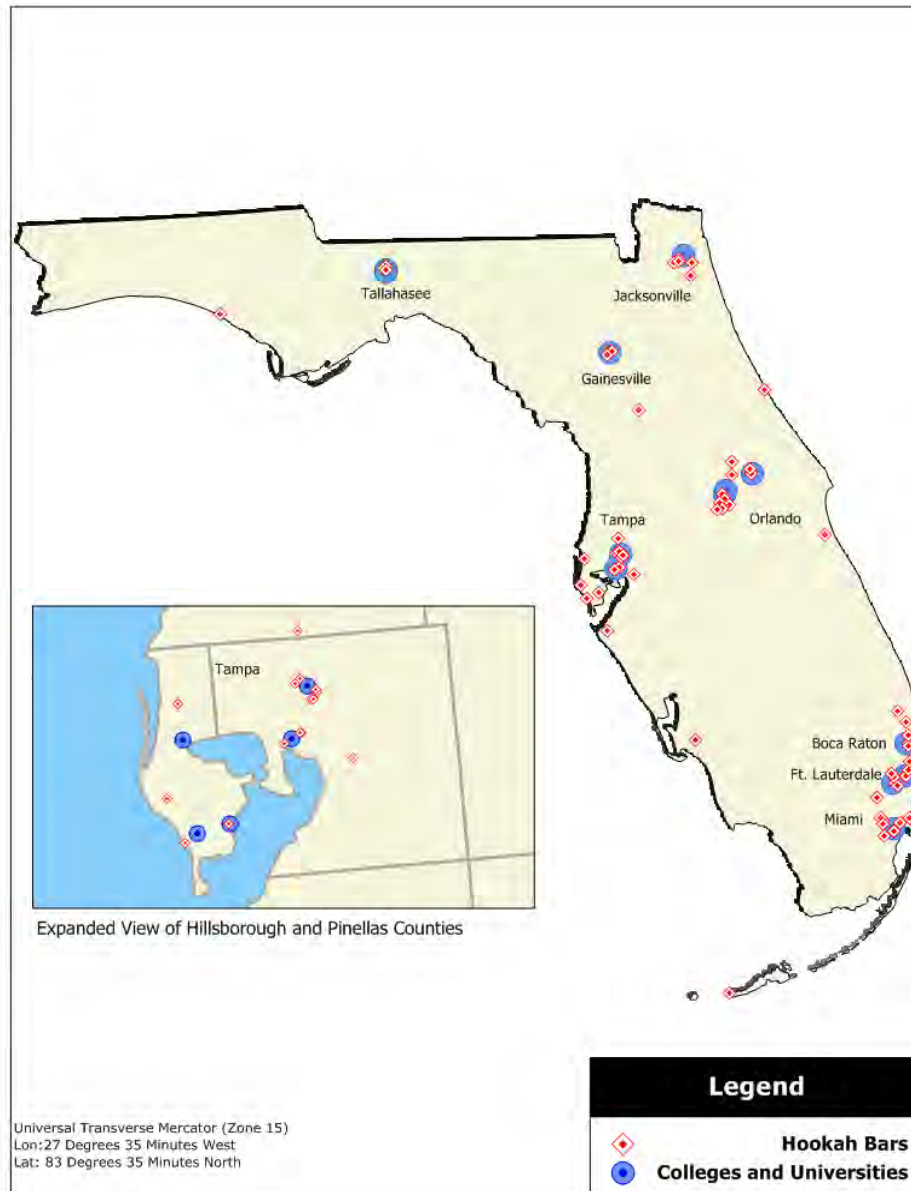


Note: Other race includes non-Hispanic respondents who are Asians, Native Hawaiians or Other Pacific Islanders, American Indians, or Alaska Natives, and respondents who identified their race as “other.”

### 4.3 Number and Location of Hookah Bars in Florida

Figure 4-10 shows a map of Florida with the 74 hookah bars we identified as well as 13 major university campuses. Of the 74 hookah bars, 47 (64%) are located within 10 miles of university campuses. Table 4-2 shows the number of hookah bars that are located within 10 miles of university campuses in six main cities in Florida.

**Figure 4-10. Layout of Hookah Bars and University Campuses in Florida**



**Table 4-2. Number of Hookah Bars within 10 Miles of Universities in Florida**

City	Universities	Number of Hookah Bars
Tampa	University of South Florida University of Tampa	9
Orlando	University of Central Florida Nova Southeastern University—Orlando	8
Fort Lauderdale	Florida Atlantic University—Fort Lauderdale Nova Southeastern University	8
Miami	University of Miami	6
Boca Raton	Florida Atlantic University	5
Jacksonville	University of North Florida Jacksonville University	5
Gainesville	University of Florida	4
Tallahassee	Florida State University Florida A&M	3

Note: One hookah bar is counted twice in the table because it is located 9.7 miles from FAU-Boca Raton and 8.5 miles from FAU-Fort Lauderdale.



## 5. LIMITATIONS

This study had some limitations that should be considered when interpreting the results in this report:

- The 2007 and 2008 FYTS and the 2007–2009 FLATS provide information only for ever use of hookah and not for current use of hookah; hence, we were able to study the time trend between 2007 and 2009 for the prevalence of ever hookah use among youth and adults, but we could not study similar trends for the prevalence of current hookah use.
- FYTS, FL YATS, and FLATS do not include information about key topics that can help in assessing smoking-related behaviors of hookah users. The surveys lacked information about age of initiating hookah use. In addition, questions about interest in quitting and tobacco dependence in the surveys were restricted to cigarette smokers, rather than being generalized to target users of any tobacco product, including using tobacco from hookah.
- FYTS, FL YATS, and FLATS involve cross-sectional data, and thus we could not conduct longitudinal analyses that could have allowed us to monitor the change in hookah use behaviors among the same sample group across time. Therefore, with the available data, we could not determine if hookah use precedes other tobacco use or leads to greater initiation or greater likelihood of escalating.
- Given that FYTS surveys are limited to youth who are enrolled in public schools in Florida, results among youth in this report can only be interpreted to represent Florida public school students.
- Because of the limited sources of information about hookah bars in Florida, we could have underestimated the number of hookah bars in the state. From the tobacco retailer licenses list, we identified hookah bars that do not include any variation of “hookah” in their names by matching the business names to the ones in commercial Web sites, which might not have a complete list of all hookah bars in the state.



## 6. CONCLUSION

A systematic review of the literature related to hookah use suggests that little is known about the extent of hookah use in the United States. However, some findings suggest reason for concern with evidence from several studies indicating that hookah smoking is growing in the United States, especially among young adults (Cobb et al., 2010). Furthermore, a recent study of hookah use among youth in Florida using the 2007 FYTS suggests a nontrivial level of hookah use among middle and high school students (Barnett et al., 2009).

Our analysis of hookah use among youth, young adults, and adults also suggests nontrivial levels of use. Prevalence of ever use rises as youth age, from 1.3% in 6th grade to 25.3% in 12th grade, and remains at a similar level for young adults (prevalence of ever use of 24.2%). We also find evidence that the prevalence of ever hookah use is increasing over time among youth.

The prevalence of ever hookah use among high school students was higher than the prevalence of ever use of smokeless tobacco. Similarly, more young adults are current users of hookah than of smokeless tobacco. In addition, the prevalence of current hookah use among youth and young adults is associated with the current use of other tobacco products. Given concerns about the potential for hookah smoking to lead to greater dependence along with its association with other tobacco products, the levels of hookah use among youth and young adults suggest a potential public health problem that warrants further monitoring.

Consistent with findings from the literature, our analysis of the number and location of hookah bars suggests clustering around college campuses. Given the relatively high prevalence of hookah use among young adults, this may be an area of particular concern and a potential target for program and policy-related activities.



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