

Predictors of Arab American Adolescent Tobacco Use

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This study examined personal, psychosocial, sociocultural, and environmental predictors in tobacco use for 1,671 Arab American adolescents. Cigarette smoking in the past 30 days was 6.9%. This increased from 1% at age 14 to 14% at age 18. Twenty-nine percent of the youths reported having ever smoked cigarettes. Experimentation with narghile was 27%; it increased from 23% at 14 years to 40% at 18 years. All trends were significant ($p < .001$). Logistic regression analyses found 11 predictors for having smoked a cigarette in the past 30 days and 9 and 7 predictors, respectively, for having ever smoked a cigarette or the narghile. Tobacco use by friends and family members was the strongest predictor of cigarette and narghile smoking. Narghile use supported cigarette smoking.

Tobacco use, primarily cigarette smoking, is a major preventable public health risk in most of the world's developing countries (World Health Or-

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ganization [WHO] Tobacco Free Initiative, 2005a), even as rates are slowly declining in developed countries like the United States (U.S. Department of Health and Human Services [USDHHS], 2004). The WHO reports smoking as the second leading cause of death and disability worldwide; it found smoking to be responsible for the death of one in ten adults. There are approximately 1.1 billion smokers in the world—about one-third of the global population age 15 years and over. More than half of the people who smoke today—that is, about 650 million people—will eventually die as a result of smoking-related health problems (WHO Tobacco Free Initiative, 2005a).

Since 1964, numerous U.S. Surgeon Generals' Reports have identified tobacco use as the leading source of preventable morbidity and premature death (U.S. Department of Health, Education, and Welfare, 1964), including *Preventing Tobacco Use Among Young People* (USDHHS, 1994) and *The Health Consequences of Smoking* (USDHHS, 2004). Tobacco use is one of the 10 leading health indicators for the Healthy People 2010 agenda. One of its objectives is to reduce tobacco use among adults and adolescents to less than 12% (Lurie, 2000; USDHHS, 2000).

Treatment of tobacco-related diseases costs the United States more than \$75.5 billion annually in direct medical costs and an additional \$92 billion for smoking-related lost productivity (Armour, Woollery, Malarcher, Pechacek, & Husten, 2005). On average, smokers die 13 to 14 years earlier than nonsmokers (USDHHS, 2004). An estimated 45.8 million American adults (22.5%) are current smokers; approximately 82% smoke every day. Rates of cigarette smoking are somewhat similar for males (25.2%) and females (20.0%) but are inversely related to age. The highest use is among 18- to 24-year-olds (28.5%), and the lowest (9.3%) is among those 65 years and older (Trosclair, Caraballo, Malarcher, Husten, & Pechace, 2005).

Clearly, tobacco use is a risk behavior of the young. Worldwide, more than half of the adolescents 18 years and under have experimented with smoking (WHO Tobacco Free Initiative, 2005a). In the United States, 21.9% of all high school students are current smokers, with equal numbers of boys and girls. More than half of those began before the age of 14. Every day approximately 2,000 young people in the United States experiment with smoking. Twenty-seven percent of 12th graders are current users; one in four is a regular smoker by the time he or she leaves high school (Allen et al., 2003).

Differences in tobacco use have been noted for adults and adolescents in the United States by racial/ethnic identity. Among adults, American Indians/Alaskan Natives (39.9%) and African Americans (22.8%) reported

higher smoking rates than Hispanics (22.3%) and Asian/Pacific Islanders (16.6%) (Centers for Disease Control and Prevention [CDC], 2004). Cigarette-smoking rates among teens declined during the 1970s and 1980s, but they increased in the early to mid-1990s among White, African American, and Hispanic high school students, especially girls (Johnston, O'Malley, Bachman, & Schulenberg, 2004). On the whole, Hispanic high school students were higher tobacco users (18.4%) in the previous month than African American (15.1%) or Asian American youth (12.8%) (Johnston, O'Malley, Bachman, & Schulenberg, 2003).

Differences in racial/ethnic values and beliefs about tobacco use also have been noted. Dornelas et al. (2005) reported that black teens emphasized the familial and social pressures of smoking, higher rates of acceptance of smoking by family members, role modeling by household members, more prevalent beliefs that smoking is a way to achieve belonging, and lack of perceived support for quitting by friends compared to White and Hispanic youth. Few smoking behavior data are available for other ethnic minorities, such as Arab Americans.

Arab Americans number almost 4 million and are one of the fastest-growing immigrant groups, mainly due to the war and political unrest in the Middle East. They live in all 50 states; 66% reside in 10 states. One-third of the total live in Michigan, California, and New York, and approximately 94% live in large metropolitan areas, including Detroit, Los Angeles, New York City, Chicago, Washington, DC, and northeastern New Jersey. Almost 490,000 Arab Americans live in Michigan, and of those more than one-third (36%) identify Lebanon as their country of origin (Abraham & Shryock, 2000; Arab American Institute, 2005).

Many Arab Americans come from Middle Eastern countries where tobacco use is high. On average, 45% of the men and 5% of the women in the Middle East smoke cigarettes. Tobacco use by women in the Middle East was traditionally very low, but it is now on the rise. The Middle Eastern nations with the highest adult cigarette-smoking rates include Iraq (40%), Yemen (45%), Lebanon (58%), and Tunisia (60%) (WHO Tobacco Free Initiative, 2005b).

The Global Youth Tobacco Survey (GYTS) estimated cigarette smoking among 13- to 15-year-old males and females in the eastern Mediterranean region to be 35% and 4%, respectively. As of 2004, 129 countries representing all six WHO regions had participated in at least one annual GYTS. In recent assessments, Lebanon's cigarette-smoking rate was found to be 45.5% for boys and 39.6% for girls. The Jordanian GYTS reported almost 44% of their youth had ever smoked cigarettes, that 21% were current smokers, and that 23% indicated using other smoking products. In

Yemen, 19% of adolescents have ever smoked, 7% currently smoke cigarettes, and almost 18% use other tobacco products (CDC, 2004).

Although there are no data for national or regional tobacco use for Arab Americans as an ethnic group, studies in a predominantly Arab American community in the Midwest provide some information. Rice and Kulwicki (1992) found that 40.6% of the men and 38.2% of the women in their community-based, randomly selected sample of adults were smokers; 97% had been born in the Middle East, and 75% were Lebanese. A survey in the same community years later revealed a similar pattern (Aswad, 2001). In a Midwest health clinic study, Kulwicki and Dervartanian (1995) documented 52% tobacco use among 505 Arab American patients, of whom 67% were men and 33% were women. Approximately 60% had lived in the United States for 10 years or less, and the majority were of Lebanese descent.

The only study found that has looked at tobacco use in Arab American adolescents was a pilot survey conducted by the first author and her colleagues. A 25% cigarette-smoking rate was found in a convenience sample of 119 Arab American high school youth (Rice, Templin, & Kulwicki, 2003). Noted in this pilot study was the number of teens who indicated that they did not smoke cigarettes but did smoke the narghile. The narghile, also known as narghileh, argileh, water pipe, hubble-bubble, hookah, shisha, and goza (with variations in spelling and pronunciation), is a traditional form of tobacco use in the Middle East, southeast Asia, and North Africa. Usually associated with use by older males, it has a 400-year history that has undergone a renaissance in the last few years and is growing in popularity, particularly among the young around the world (Knishkowsky & Amitai, 2005; Maziak, Ward, Soweid, & Eisenberg, 2004). The narghile has four key components: body, bowl, tube(s), and mouthpiece. Tobacco is placed in a bowl or on a tray that is pierced with small holes atop a container half-filled with water and is burned directly using charcoal; smoke passes through the water. The water is used to clean soot belched out of the burning tobacco and to reduce some of the harmful constituents (e.g., acrolein, aldehydes) before it is inhaled through a long, flexible tube (or multiple tubes) with a detachable mouthpiece. The tobacco is often flavored with molasses, honey, or other products (The Sacred Narghile, 2004).

Researchers in the Middle East are just beginning to evaluate narghile smoking among the young. Tamim et al. (2003) reported an overall smoking rate of 40% in almost 2,000 university students in Lebanon; 21.1% reported using only the narghile, and nearly 12% smoked both cigarettes and narghile. In a cross-sectional study of university students in Syria, Maziak,

Fouad, et al. (2004) found 62.6% and 29.8% narghile use, respectively, for young men and women, while rates of cigarette smoking were 25.5% for men and 4.9% for women. Seven percent of the male students reported using the narghile daily. Although the WHO does monitor cigarette smoking, it does not yet monitor narghile use.

No information was found for narghile use among high school students and those younger in the United States. As cigarette and narghile smoking rates for Arab American adults and college-age students appear to be high, it is important to examine these patterns and predictors in adolescents so that effective prevention and/or cessation programs can be initiated early.

The purpose of this study was to examine tobacco use and its predictors in a convenience sample of Arab American adolescents (14 to 18 years). Factors evaluated were those found in the Adolescent Tobacco Use Model (ATUM) adopted by the American Academy of Pediatrics (1997) and supported by the Surgeon General's report on youth smoking (USDHHS, 1994) and, more recently, the findings of Johnson et al. (2002). Predictors are categorized as personal (e.g., age, gender, grade in school); psychosocial (e.g., health perception, depression, stress, self-esteem); sociocultural (e.g., income, education, ethnicity, family/parental/sibling/peer tobacco use); and environmental (e.g., advertising, and availability of tobacco products). Twenty-four model predictors were examined.

Method

Design

This community-based cross-sectional survey examined tobacco use, defined as "smoking a cigarette and/or the narghile within the past 30 days," and experimentation with tobacco, defined as "ever smoking a cigarette, even a few puffs," in 14- to 18-year-old adolescents. It evaluated a number of predictors for tobacco use and compared these with a national database (Brener et al., 2004).

Setting

The setting for this study was a large, suburban community in the Midwest where roughly one-third of the population claims some Arab heritage. The majority were immigrants or first-generation Arab Americans, have low incomes, tend to be undereducated, live in extended families of three to five adults, and speak Arabic as the first language in their home (Abraham

& Shryock, 2000). The majority (36%) of the study sample identified Lebanon as their country of origin. Others reported family roots in Iraq, Yemen, Egypt, Palestine, Syria, and Assyria.

Participants

The participants were 1,671 youths of high school age (14 to 18 years) attending either a teen health clinic or a local community high school that agreed to participate in a study designed to examine tobacco use. Inclusion criteria were (1) between 14 and 18 years old, (2) able to read and write in English or Arabic, (3) willing to participate, and (4) self-identified as Arab American or have one or more parents of Arab origin. In the 2001–2002 school year, when the data were collected, there were almost 2,000 students enrolled in a local high school; 90% were Arab Americans. Based on the class rotation system, 1,325 students were eligible to participate. Information letters describing the study were mailed to parents by the school administration. Parents who did not wish their child to participate were instructed to contact the school; there were no parental refusals. In addition, students were given a choice for participation when the study was described to them in the classroom. All were given an Human Investigative Committee (HIC) approved information sheet describing the study in detail prior to beginning the study questionnaires. Fifty students elected not to participate, leaving a school sample size of 1,275.

During the same time period, 396 teens signed an approved HIC informed consent and completed the study questionnaires in a teen health clinic. Approximately 2,500 Arab American youth visits occur each year at the teen health clinic. Almost 80% of these teens are between 14 and 18 years of age, and more than half of the visits are return visits. The targeted population was approximately 900 “new” clinic attendees that year; 45% agreed to participate. Reasons for refusal included (1) students had already completed the survey in the high school, (2) parental refusals, (3) teen refusals, and (4) youth not having enough time to complete the survey because of the clinic schedule.

Fifty-two percent of the participants were male; the average age was 15.4 years ($SD = 1.27$). Forty-five percent of the sample was in 9th grade, 21% in 10th grade, 17% in 11th grade, and 17% in 12th grade. Fifty-seven percent reported being born in the Middle East, with a mean time in the United States of 6.0 years ($SD = 4.3$). Among the participants’ parents, 98% of the fathers and 95% of the mothers were born in the Middle East. Countries of origin included Lebanon (36%), Iraq (7%), Yemen (3%), Palestine (3%), Arabia (16%), Syria (6%), Assyria/Chaldea (23%), and other (16%). English was the first language spoken in 51% of the homes

and was the first language for 32% of the teens. Mean household income was \$31,500 ($SD = \$17,380$).

Measures/Instruments

Each of the measures described below was carefully selected and examined for prior use with adolescents and for established reliability and validity. Each was translated/back-translated from English to Arabic using conventional procedures (Burns & Grove, 2005) and Arab American youth focus groups (Rice et al., 2003). Ninety-three percent of the students elected to complete the English version of the questionnaires.

Demographic and Cultural Information Survey (DCI) (Rice, 1999). This 20-item instrument is used to collect information about age, gender, school grades, school and community activities, occupation of parent(s), annual income, country of origin, and primary language spoken. In addition, respondents are asked questions about receiving "tobacco mail" and promotional items. Adapted from a tool developed by Entwisle and Astone (1994) for children and adolescents, the DCI has been widely used.

Rosenberg Self-Esteem Scale (RSES) (Rosenberg, 1962). This 10-item scale is used to survey participants about their feelings of self-worth. It has been used widely with ethnic populations, including Arab adolescents (Abu-Saad, 1999), and has well-established reliability and validity. In this study the reliability coefficient for the RSES was .76.

Health Perception Ladder (HPL). This instrument was modified by Norton-Broda (1988) from the Child's Health Assessed by Self-Ladder (CHASL). Students are asked to indicate a point on the ladder that shows how healthy they feel they are and then, in the space below, explain why they chose that step. Face and concurrent validity for the CHASL have been established through expert review and pilot testing with more than 1,000 children (Norton-Broda, 1988).

Center for Epidemiological Studies-Depression Scale (CES-D) (Radloff, 1977). This 20-item self-report scale is widely used in both general and clinical populations to determine frequency and severity of depression symptomatology. Adolescents are asked to rate any depressive symptoms experienced in the past week on a 4-point Likert-type scale ranging from 0 (none of the time) to 3 (most or all of the time). Summative scores ranged from 0 to 60. In this study the CES-D had a reliability coefficient of .85.

Adolescent Hassle Scales (AHS) (Kanner, Feldman, Weinberger, & Ford, 1987). This 28-item measure was developed specifically to assess stress. It includes the stressors of family, school, friends, and leisure. In addition, youth can identify stressors that they are personally experienc-

ing. A reliability coefficient of .91 was determined for the AHS in this study.

Family & Friends Tobacco Use Survey (FF-TUS) (Kaiser & Rice, 1996). This 8-item measure assesses tobacco use of family members and friends and hours of exposure to secondhand smoke both inside and outside the home. In our current study, all items were significantly related to smoking status. Test-retest reliability of the FF-TUS among 55 Arab American youth ranged from .56 to .76.

Modified Fagerstrom Tolerance Questionnaire (mFTQ). This modified version of the Fagerstrom Tolerance Questionnaire (Prokhorov et al., 2000; Prokhorov, Koehly, Pallonen, & Hydmon, 1998) assesses the level of nicotine dependence among adolescents. The instrument uses a 5-point Likert scale for all seven items, except for one item on smoking during the first two hours of the day. It was specifically tailored for adolescents (Prokhorov et al., 1998). Established reliability and validity have been reported (Prokhorov et al., 2000). In this study, the measure had a reliability of .68.

Tobacco Use Questionnaire (TUQ) (Rice et al., 2003). This 21-item questionnaire is used to collect information on smoking history and smokeless tobacco use. The first seven items were adopted from the Youth Risk Behavior Surveillance Survey (Brener et al., 2004). Seven similar questions were asked about narghile use. Four items focus on attempts to quit smoking, one question focuses on the means for getting cigarettes, and another focuses on the desire to quit. Three items assess stage of change (Prochaska & DiClemente, 1982).

Procedure

The surveys were self-administered under the direction of a team of bilingual research members who were available in each of the classrooms and in the clinic to explain the study, ensure proper coding of survey measures, protect the privacy of student participants, answer questions, and collect the completed survey. The average amount of time for study participation was 50 minutes. At the time of study intake, students were informed of the purpose of the study and were given an option to refuse to participate. Students electing not to participate quietly read a book or did their homework. There was no identifying information on any of the survey forms.

Data Analytic Strategy

Descriptive statistics are used to present the sample and logistic regressions in order to determine predictors of tobacco use. Prior to analysis,

data were weighted so that all ages were equally represented. Significance for all analyses was set at $p \leq .05$.

Results

Twenty-nine percent of the youth reported having tried cigarette smoking ("even a few puffs") at some time in the past. Experimentation with cigarette smoking increased with age, from 15% at 14 years to 22% at 15 years, 26% at 16 years, 33% at 17 years, and 44% at 18 years. Current cigarette smoking, defined as having smoked a cigarette in the past 30 days, was reported by 6.9% of youth overall. It increased sharply with age, from 1% at 14 years to 3% at 15 years, 7% at 16 years, 9% at 17 years, and 14% at 18 years. Both of these trends were highly significant ($p < .001$). Overall, 27% of teens reported that they had used the narghile. This percentage increased from 23% at 14 years to 40% at 18 years. Many had first used the narghile before the age of 10.

Cigarette use by any family member was reported by 51% of the adolescents: 34% of fathers, 24% of mothers, 13% of brothers, and 3% of sisters smoked. The mean number of hours youth were exposed to smoking in the home every day was 2.45 ($SD = 4.50$), compared to 2.75 ($SD = 2.20$) hours of daily exposure outside the home. Having one or more friends who smoked varied from 16% for 14-year-olds to 45% for 18-year-olds. More than one-third (36%) of the participants reported that tobacco products were easy to get, and 17% reported having been offered a cigarette by a family member or friend in the previous week. Twelve percent of the teens had received mail from a tobacco company or reported being exposed to tobacco-use advertisement.

Logistic Regressions

Logistic regressions were used to examine the relationships of the 24 ATUM predictors to the criterion outcomes. Preliminary bivariate analysis showed that all predictors except for father smoking and father born in the United States were significantly correlated with the outcomes "smoked a cigarette in the past 30 days" and "ever smoked a cigarette or narghile." A forward stepwise procedure was used to identify a significant set of predictors for each outcome model; variables were entered according to improvement in chi-square reduction. Using this approach, 11 significant predictors were identified for "smoked a cigarette in the past 30 days," 7 for "ever smoked a narghile," and 9 for "ever smoked a cigarette, even a puff."

Table 1. Significant Predictors for Current Cigarette Smoking

Variables	Significance	Odds Ratio	95.0% Confidence Intervals	
			Lower	Upper
Friends smoke	<.01	3.95	2.06	7.58
Mother born in U.S.	<.01	3.19	1.49	6.84
Brother(s) smoke	<.01	2.69	1.57	4.60
Sister(s) smoke	.04	2.61	1.05	6.48
English first language	<.01	2.34	1.44	3.83
Gender (being male)	<.01	2.17	1.28	3.66
Offers of tobacco	<.01	2.05	1.25	3.36
Narghile use	.01	2.00	1.22	3.27
Three or more buddies smoke	.02	1.93	1.12	3.35
School grades of C or lower	.03	1.68	1.05	2.71
Age	<.01	1.46	1.21	1.76

Note: The regression correctly classified 93.8% of participants (Nagelkerke $R^2 = .39$).

Table 2. Significant Predictors for Experimental Cigarette Smoking

Variables	Significance	Odds Ratio	95.0% Confidence Intervals	
			Lower	Upper
Narghile	<.01	8.42	6.32	11.21
Friends smoke	<.01	3.34	2.44	4.57
Offers of tobacco	<.01	1.99	1.39	2.85
Brother(s) smoke	<.01	1.80	1.24	2.60
Received clothing advertisements for tobacco	.03	1.55	1.04	2.33
Tobacco is easy to get	<.01	1.55	1.16	2.08
English spoken in home	.03	1.39	1.04	1.85
School grades of C or lower	.05	1.37	1.00	1.88
Older age	<.01	1.23	1.11	1.37

Note: The regression correctly classified 82% of participants (Nagelkerke $R^2 = .47$).

Table 3. Significant Predictors for Experimental Narghile Smoking

Variables	Significance	Odds Ratio	95.0% Confidence Intervals	
			Lower	Upper
Arab American	.01	5.55	4.92	7.35
Sister(s) smokes	.05	2.04	1.26	5.01
Friends smoke	.05	1.99	1.51	2.52
Gender—male	.05	1.90	1.37	2.54
Mother smokes	.05	1.82	1.14	2.29
Stress	.05	1.73	1.16	2.08
Easy access	.05	1.58	1.15	1.91

Note: The regression correctly classified 65% ever narghile users (Nagelkerke $R^2 = .20$).

The most important predictors of current cigarette smoking were having one or more close friends who smoked, having a mother born in United States, having a brother (or brothers) who smoked, and having a sister (or sisters) who smoked. The regression correctly classified 93.8% of participants (Nagelkerke $R^2 = .39$). Other predictors are presented in Table 1.

As shown in Table 2, the four strongest predictors of experimental cigarette smoking were smoking narghile, having one or more close friends who smoke, receiving offers to smoke, and having a brother or brothers who smoke. This regression correctly classified 82% of participants (Nagelkerke $R^2 = .47$).

Significant predictors for narghile use are presented in Table 3 and include having friends who smoke, having a sister or sisters who smoke, and having easy access to tobacco. This regression correctly classified 65% of participants (Nagelkerke $R^2 = .20$).

In summary, the strongest predictors of smoking were having siblings and friends who smoked. Narghile use was the strongest predictor for experimenting with cigarettes in this Arab American sample; youth were 8.42 times more likely to be smoking cigarettes if they had smoked the narghile. Narghile use was also a significant predictor for experimenting with cigarettes.

Discussion

Many studies have shown that youth in the Middle East as well as those in the United States initiate smoking before the age of 14 and continue smoking throughout their high school years. For Arab American youth 14 to 18

years of age living in a community in the Midwest, current cigarette-smoking rates were found to be 6.9%; the rate for ever having smoked was 29%. These rates are much lower than the overall U.S. rates for youth of this age (21.9% and 50%, respectively) (Allen et al., 2003; Johnston et al., 2003).

The lower prevalence of cigarette smoking among Arab Americans is difficult to account for, but there are several possible explanations. One is related to underreporting. Several events occurred over the course of this study that may have contributed to the underreporting of cigarette smoking, including a statewide debate over the tobacco settlement dollars and the promotion of the American Legacy agenda (Campaign for Tobacco-Free Kids, 2005) on Arab television with an increased focus on not smoking by youth. Another event was the attack on the World Trade Center, which added the possibility that members of the Arab American community were reluctant to report doing anything seen as socially unacceptable. In addition, cigarette taxes went up, making buying cigarettes more difficult for many with low incomes.

The age-specific rates for current cigarette smoking were an interesting and alarming finding. While the overall rates were much lower than expected, the rate of increase was similar across age groups when compared to current U.S. national smoking rates for 8th through 12th graders (Johnston et al., 2003).

This pattern was not found for youth reporting having tried the narghile. The rates for experimental narghile use were higher than rates for cigarette smoking for all age groups in this sample, ranging from 23% to 40% (the highest rates were in the oldest age group). One reason for this may be that narghile use is a cultural form of hospitality among adults of the Middle East, and as youth approach adulthood this behavior becomes more and more acceptable (Kandela, 2000).

The fact that narghile use was a strong predictor of current cigarette smoking raises serious concerns about the role of this commonly accepted cultural practice in the Arab American community. First, it may be that narghile smoking is a gateway tobacco product, leading to higher rates of cigarette use in the long term. It is also possible that narghile smoking may be a substitute for cigarette smoking, but with as-yet-unrecognized and unstudied health risks. These risks may be equal to or greater than those related to cigarette smoking. Clearly, further research is needed into this form of tobacco use.

Finally, tobacco use among friends and family members appeared to have a sustaining effect for current cigarette smoking, while cultural factors, offers of tobacco, and availability of tobacco (in addition to friends'

use) contributed more to experimentation. These findings suggest further exploration and direction for the development of community prevention and cessation programs.

Limitations

Several study limitations can be identified. A major one is the use of convenience sampling. It is not clear that this sample, although it is a very large one, is representative of the Arab American community from which it was drawn. Another concern is the uneven participation of the age groups. A more even distribution of ages may have provided more accurate estimates of overall prevalence by age and rates of initiation in this broad adolescent age group. Another possible limitation is the data-collection process itself. Even though two-thirds of the participants reported Arabic as their first language, 97% elected to complete the English version of the study measures. There may have been difficulties in interpretation.

Conclusions

This survey study provides foundational information on tobacco use (including cigarette smoking and narghile use) for 1,671 Arab American adolescents age 14 to 18 years. Although the overall rate for current cigarette use is lower than that reported in the Youth Risk Behavior Surveillance System data (Allen et al., 2003), the pattern of adoption for cigarette smoking was similar. Noted was the significant use of narghile smoking even in the younger age groups. Eleven predictors were determined for current cigarette smoking, nine for experimental cigarette use, and seven for experimental narghile use. The most significant predictors were tobacco use by friends and family members, which is not surprising given the importance of family and friends to members of the Arab and Arab American communities. Further research is needed to determine the pattern of adoption of narghile use, its health consequences, its relationship to cigarette smoking, and effective culturally based interventions to curb its use.

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