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## Factors Influencing Smokeless Tobacco Use in Rural Ohio Appalachia

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### Abstract

**Background**—The burden of smokeless tobacco (ST) use disproportionately impacts males in rural Ohio Appalachia. The purpose of this study was to describe the cultural factors contributing to this disparity and to articulate the way in which culture, through interpersonal factors (i.e. social norms and social networks) and community factors (i.e. marketing and availability), impacts ST initiation and use of ST among boys and men in Ohio Appalachia.

**Methods**—Fifteen focus groups and twenty-three individual qualitative interviews were conducted with adult (n=63) and adolescent (n=53) residents in Ohio Appalachian counties to ascertain factors associated with ST use and the impact of ST marketing. Transcriptions were independently coded according to questions and themes.

**Results**—ST use appears to be a rite of passage in the development of masculine identity in Ohio Appalachian culture. Interpersonal factors had the greatest influence on initiation and continued use of ST. Ohio Appalachian boys either emulated current ST users or were actively encouraged to use ST through male family and peer networks. Users perceived their acceptance into the male social network as predicated on ST use. Community factors, including ST advertisement and access to ST, reinforced and normalized underlying cultural values.

**Conclusions**—In addition to policy aimed at reducing tobacco marketing and access, interventions designed to reduce ST use in Ohio Appalachia should incorporate efforts to 1) shift

the perception of cultural norms regarding ST use and 2) address male social networks as vehicles in ST initiation.

## Keywords

Appalachia; Men; Smokeless Tobacco; Masculinity; Social Norms

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## Introduction

Smokeless tobacco (ST), including chewing tobacco, dry snuff, and moist snuff (snus), remains a public health concern. It is a known carcinogen and has been associated with nicotine addiction, oral lesions, tooth structure abrasions, dental caries, weight gain, pregnancy complications, coronary vasoconstriction, and cancer [1–9].

ST users are typically white, older adolescents or young adults, of lower socioeconomic status, and residents of small metropolitan or rural areas in the Midwest or South [10, 11]. Moist tobacco use has become increasingly prevalent among men [12] with men using ST at higher rates than women in all 50 states [13]; among adolescents, ST is almost exclusively used by boys [14]. Rural adults continue to be at increased risk for ST use [15, 16]. In 2008, past year ST use among adults aged 18 and older living in rural counties was 10.0% in comparison to 5.4% and 3.1%, respectively, for adults living in small and large metropolitan areas [17]. This pattern holds true for rural youth [18]; highest lifetime ST use (11.0%) is found among rural youth with highest 30-day smokeless use (6.1%) found among farm-dwelling youth [19].

Thirty-two of Ohio's 88 counties are designated Appalachian, containing 17.4% of the state's population [20], and men in these communities are particularly vulnerable to ST use. Appalachian men have the highest prevalence rate for ST use in Ohio at 10.2% compared to men in rural non-Appalachian counties at 6.9%; prevalence of ST use among women in Ohio Appalachia is 0.2% compared to 0.7% for women in non-Appalachian rural counties in Ohio [21]. Poverty and lower education, traits that make other communities at risk for increased ST use, characterize the Ohio Appalachian community. Poverty impacts the region with half of Ohio's Appalachian counties classified by the United States government as distressed or at-risk, ranking them in the bottom quartile of counties, economically, in the US [22]. In addition, economically disadvantaged counties have the lowest college graduation rates in the US [23]. Although poverty and education partially explain usage disparities between men living in Appalachia and those living in Ohio's other rural counties, these factors cannot be exclusively used to explain why there is a usage disparity between men and women in Appalachia.

What characterizes the pathway to initiation and use of ST, in particular, among Appalachian males is not well known. One non-population based study found that tobacco initiation, in general, occurred at an average age of 16.6 years, and that men smoked a significantly higher number of cigarettes per day than women [24]. Another study concluded that residents of Appalachia learn about tobacco use primarily through family [25].

A social-contextual theoretical framework that integrates social and material factors has been proposed by Sorensen and others as a model to examine social disparity regarding tobacco use and control [26]. Within this framework, there is an opportunity to uncover conditions, existing across levels of social influence (i.e. contextual factors including individual, interpersonal, organizational, community, and societal), that contribute to health disparity. These conditions, once understood and articulated within the context of culture, ultimately serve as areas for potential modification in the development of effective cessation interventions [27]. According to Sorensen, cultural understanding of tobacco use, defined as “learned or shared knowledge, beliefs and rules that people use to interpret experience and to generate social behavior,” impact and inform contextual factors at all levels of influence. Enumerating cultural beliefs thus becomes a critical step in the process of understanding initiation into tobacco use behavior and developing effective interventions.

The purpose of this study was to understand cultural factors that influence ST initiation and continued use in Ohio Appalachia. The study team aimed to: 1) describe perceptions of ST use in Ohio Appalachia; and 2) examine how shared culture impacts ST initiation and continued use of ST among boys and men in Ohio Appalachia, with particular emphasis on interpersonal influences (i.e. social networks and social norms) and community influences (i.e. tobacco advertising and availability of tobacco). To accomplish this, the study team addressed two research questions: 1) What are the cultural beliefs regarding ST use in Ohio Appalachia?; and 2) How does culture, along with interpersonal and community factors, influence ST initiation and continued use of ST among males in Ohio Appalachia?

## Methods

### Sample

Fifteen focus groups and twenty-three individual qualitative interviews were conducted with adult and adolescent residents in four Ohio Appalachian counties from February 2009 through May 2010. The study sample consisted of 1) female, adolescent ST non-users; 2) male, adolescent ST non-users; 3) male, adolescent ST users; 4) male, adult ST non-users; and 5) male, adult ST users. Eligibility criteria for all participants included: 1) ages 15–17 (adolescent group) or age 18 and older (adult group); 2) resident of an Ohio Appalachian county; and 3) informed consent. Eligibility for non-users included self-reported non-use of ST. Eligibility criteria for users included self-reported ST use ‘daily’ or ‘most days.’ Participants were recruited by posted flyers at health department clinics, colleges, churches, farm bureau agencies, and vocational and high schools through the assistance of county extension staff.

### Procedures

Separate adult and adolescent focus groups were held for female ST non-users (n=1 adult group, n=2 adolescent groups), male ST non-users (n=3 adult groups, n=2 adolescent groups) and male ST users (n=4 adult groups, n=3 adolescent groups). Focus groups were conducted by a trained moderator and an on-site observer who recorded field notes. Participants were asked about perceptions regarding typical ST users, prevalence of use, first and continued ST use and reactions to ST marketing. Each focus group lasted about one

hour. Individual interviews (n=23) lasted approximately 30 minutes. All sessions were audio-taped. A short quantitative survey was self-administered before the start of the qualitative session. Light refreshments were served. Participants were reimbursed \$25 for their time. The study was approved by the Ohio State University's Institutional Review Board.

## Data Analyses

Group and interview data were transcribed and organized in *QSRNVivo*®. Two research project staff independently conducted content analysis of the data after creating a shared coding structure. Analyses involved the categorization of responses to the interview questions, followed by the extraction of major concepts and synthesis of overall themes and patterns. Overall initial inter-rater agreement was 89.6%. Discrepancies were resolved by a third trained coder.

## Results

### Study Sample

For demographic characteristics of adolescent participants see Table 1; for adult participants see Table 2. Table 3 depicts tobacco use characteristics for adult and adolescent ST users.

### Research Question 1: Cultural Beliefs Supporting Smokeless Tobacco Use in Ohio Appalachia

#### Cultural Belief #1: Smokeless Tobacco Use is Part of Appalachian Identity—

Across all groups, there was a consistent belief that ST use is widespread and is seen as an inevitable part of the rural, Appalachian experience. One adult user stated, "*I think [ST use] is a cultural thing, definitely.*" Adult users consistently spoke of the widespread use of ST in the region: "*Around here [the typical user] is a hillbilly (laughter); that's what I call it. You know we are in Southern Ohio and tobacco use is pretty rampant around here with us farm boys.*" ST use was described as spanning social divisions, "*Out here, just about anybody from people that are preps all the way to the hill jacks. Everybody does it.*" The commonness of ST use was captured in this adult user's statement, "*It's kind of like a redneck breath mint.*" One adult user specifically spoke about cultural identity while describing a typical user as "*a ball cap wearing, truck driving type of guy you know or fellow that exploits his...Appalachian heritage, I guess. You know that's proud of it.*"

Participants frequently spoke about the widespread use of ST use among Appalachian adolescents. One adult user noted, "[I]t's an epidemic truthfully when it comes to the young people. I mean everyone I went to school with. In my old school you would go in the bathrooms and there would be snuff spit all over the floor, in the trashcans, in the sinks. Water fountains in the halls had snuff in them." The inevitability of ST use was captured in this father's sentiment, "I tell my kids not to do it, but they are going to do it anyways when they get older" (user). This youth non-user supported this concern: "It would be easier to make a list of people who don't [use ST] rather than the people who do." Among youth users, there was a tendency to exaggerate the prevalence of ST use in the community. Frequent comments shared included "Anybody does it," "At least 90% of the people or more

smoke or chew,” and “I mean everybody smokes or chews.” One non-using girl reflected, “I didn’t even know there were any boys in the school that didn’t chew.” Culture was cited as the justification. One youth user noted, “hillbillies like it and this school is full of hillbillies.” The second concurred, “That’s pretty much the long and short of it right there. Rednecks chew tobacco a lot.”

ST use was often tied to and associated with Appalachian leisure activities and outdoor and manual occupations. This non-using youth noted, “*there are a lot of farms around here and like most of the farmers, you know, they grow tobacco and stuff like that. Then there is a lot of outdoor work and stuff around here and they use it as something to do while they are working.*” An adult user provided a justification, “*Factory and farm workers, something like that where they don’t allow actual smoking.*” This youth non-user ascribed positive traits to users, “*Yeah, like hard workers or people that work hard, they chew. You see them out there with a big lump in their jaw and they are working hard. So some people think maybe it will help me be badder or something like that.*”

**Cultural Belief #2: Smokeless Tobacco Use is a Masculine Act**—Though spoken by an adult user, “*You know you got to be a man to rub snuff*” was a common sentiment across adolescent and adult users and non-users. Overall, adult and adolescent participants commented that males are the typical ST users and that they know of very few females who use. For this adult user, the very sight of young girls using defied expectations: “*I don’t reckon to see girls chew; it’s kind of a manly thing. I don’t want to say manly or sound sexist, but you know... it really worries me to think that young girls are chewing. I went to a football game and saw several girls walking around with...a big chew in...I don’t know, but it just looked funny to me.*” Gendered thinking regarding use is illustrated by the following exchange among youth non-users:

Boy 1-I have only seen a couple of girls in my lifetime chew. It was gross.

Boy 2-That’s nasty anyway!

Boy 1-A girl chewing-that’s a big turn off. “Turn the other way and walk!”

Boy 3-Yeah, like “leave me alone!”

Boy 2-You nasty! (laughter)

Boy 3-Yeah, because see normally the girls want to have the nice, pretty teeth and be all nice and prepped up and everything. If there was a girl that chews I wouldn’t be able to stand it.

Boy 2-Guys out here don’t really care about what they look like or their personal appearance. They just let everything go to waste so they chew and their teeth get nasty.

Dissolvable and flavored ST products were perceived as weak and not manly. Adult and adolescent users associated dissolvable or flavored ST with women. An adult noted, “*To me if you aren’t man enough to chew tobacco then don’t chew tobacco. You know?*” Adolescent users evoked value laden terms: “*That ain’t the real stuff...That’s for babies.*” Another boy stated, “*That’s for sissys*” and another interjected, “*Pansies.*”

## Research Question 2: Factors Influencing Smokeless Tobacco Initiation in Ohio Appalachia

Interpersonal factors had the greatest influence on initiation and continued use of ST, in particular. A distinct trajectory to ST initiation was identified: Ohio Appalachian boys either emulated or were actively encouraged to use ST through male family and peer networks. Users perceived their acceptance into the social network as predicated on ST use. Community factors (including advertisement, marketing, and access) reflected, reinforced, and normalized the underlying cultural values.

**Male Social Networks and Norms: The Primary Vehicle of Smokeless Tobacco Initiation**—People across the sample asserted the role of social networks and norms in influencing ST use as reflected in this adult user’s statement: *“The best advertisement is just the people around here.”* When asked about first use experiences, participants, even former users, relayed stories of ST initiation through emulation of revered male family members or through peer social pressures.

Fathers, grandfathers, uncles, male cousins and brothers were cited as key influences:

An older family member that I looked up to used smokeless and I got it from him. He never pushed it on me, but I saw it being used and emulated that action.

I started a couple of years ago. It was one of those things dad did so it was one of those things I wanted to do to be like him.

Because my grandfather did it. I just wanted to be like him when I grew up.

For this adult user, the progression to tobacco use seemed *“natural,”* a normal cultural and familial progression:

I think a part of it was just being around it seeing my grandpa chew all the time. It just looked like the right thing to do...All the other guys, my uncles, everybody chewed tobacco and it was just one of those things passed down to us I guess. I mean not one time did they ever offer it to us that I can think of, but we just always saw them do it so I guess it was just a natural kind of thing for us to do at some point.

Negative peer influences were cited as pathways to initiation. There was general agreement in one youth user group that *“everyone else was doing it”* and that *“friends”* and *“older buddies”* played a significant role in the decision to use, though the pressure was passive: *“Really no one really forced anyone to do it. I mean some people may have, but really just like one friend is doing it and you are like, ‘Oh yeah. Give it here; I will do it too!’”* One adult user noted that in high school, *“I think I saw probably five to ten of my closest friends do it probably.”* This adult felt compelled: *“I used to rub snuff, but don’t now, but did because my buddies did it so I had to do it.”* ST initiation was described as *“an endless cycle [that] happens year after year. Your buddies are doing it, ‘Hey, let me try that.’ The next thing you know you are doing it.”* First use experiences often took place in group leisure or sports settings:

I was sitting around a campfire with a couple of friends and I took a dip. (Youth User)

A buddy of mine, we were all riding 4-wheelers and stuff and he pulled out a can...I said, "Hey, let me try one," you know and see what it was like. I tried it and I got sick, but I still liked it. I guess I was cool you know. (Youth User)

I started after varsity football on the ride back home from the games to kind of relax me. (Adult Former User)

A subset of participants spoke of active pressure from male family influences. One youth user noted "*my brother made me.*" An adult user spoke of directives: "*I was eight years old doing my first deer hunt and I talked a lot. My brother handed me a can of Copenhagen fine cut and said, 'Put this in your mouth and shut up.' ...by the time I was 14 or 15 I did it every day. I did it at school; I did it at home. The only person I had to hide it from was my mom.*" A former youth user stated, "*I started because of my cousins; I was kind of peer pressured in.*" One adult user noted "*My grandfather got me using sniffing snuff and then worked my way up to chewing tobacco.*" For this adult user, family socialization led to addiction:

Participant: I was with my grandfather at four years old; it was Iron Man plug tobacco.

Moderator: And he offered it?

Participant: Oh yeah. I had my own carton and I always packed his pipe and we lit it and everything and give it to him. We always went and got his cigarettes for him....

Moderator: Can you talk more about when you started using it regularly?

Participant: Oh I started from that day forward, but then the doctor said it was making me too hyper so I had to quit. They thought I quit, but I didn't.

Others spoke of initiation due to work circumstance. One adult noted: "*I was also a farm boy and knew not to take up smoking because around farm buildings you better not smoke; you weren't allowed to. We had this man sheering sheep, one day, and he chewed and I kept watching him and thought it looked fun. So he gave me a little bit and I chewed and chewed and got the habit.*" Another adult user shared:

When I was younger I used to work in the hay fields and we would always run over... nest of bees and the farmer... would keep a bag of pouch tobacco and every time we would get stung he would give us a strand of it. He would tell us to get it wet with our mouth and lay it over the stinger and it would always draw the stinger out. That seemed to happen more frequent than what we wanted and for some odd reason...I acquired a taste for it. So ever since then I have been chewing. I was about 15.

Several participants relayed the direct connection between the underlying cultural expectations and their process of initiation through interpersonal factors. Despite numerous accounts of physical sickness at first use (i.e. "*I was 12 years old; I was coon hunting and I tried chew, it made my face turn green and I puked;*" "*I was 13 bailing straw, flipping the hay mound, tried it and got sick;*" "*I was probably 14 and I tried chew; I think I was fishing and I puked my guts out.*"), all users that shared similar first experiences felt compelled to use again. Similar to this man's experience, youth and adult users cited an underlying desire to conform to cultural norms as a motive for persevering despite experiencing physical sickness:

Uh, I didn't really like it the first time I tried it, which a lot of people didn't from what I know. Everybody usually throws up or something. I don't know, I guess it is just part of being a young guy around here. Just everybody does it. That's not the reason I did it, but... it's I guess it is kind of the reason I did it. I mean everybody on my football and wrestling team did it. So I just kept doing it.

Social acceptance motivated this adult user, *"I also liked feeling included because everybody I knew that I grew up around was involved with it and using it. So it was a combination of the two things of access and exposure."* This adult user revealed his unspoken understanding that he had to use, *"I have been around smokers all my life and I always thought the smoke was unpleasant and if I had to be doing something like that, I would rather not be around smoke so that more or less kind of pushed me towards, leaned me towards using smokeless tobacco."*

**Access: A Community Factor Facilitating Use**—Participants spoke of easily accessing ST at stores in Ohio Appalachia:

I had an older brother. When I was 12 I think he was 14 and he started using and I started chewing when he chewed. So he would give me dips when we would go out to fish and stuff like that; that's how it started at first. Then after that when I got to be about 16 I started buying it on my own; people didn't really card me so I was able to buy it. I've chewed ever since. (adult user)

These youth users confirmed that ST is easy to obtain. One stated, *"It's so easy to get."* Another responded, *"Especially out here; I am from the city originally, but especially out here I see it more than where I am from in the city."*

**Advertising: A Community Factor Reinforcing Cultural Norms**—Cultural norms are reinforced through ST products and their packaging. Participants perceived advertisements as reflecting masculine cultural standards valued in Appalachia. A male user described ST advertisements as, *"Manly. Very manly."* Another user commented on a Copenhagen advertisement, *"It screams like 'man.'...It's like the definition of... If you are going to be a country boy, rub snuff."* This adult user spoke to why, despite known health implications, men in the region feel compelled to use ST:

When I see these images I think of that...there has always been an idea of the guy or person who uses, who dips or chews, and it is usually a rough man type character and these advertisements they put on there, they just look appealing to that tough guy...that person who decides to take those adventures in life because of the satisfaction benefits, but at the same time it is unhealthy.

Participants noted that roles frequently depicted in print advertisement, in the region, reflected masculine community values. This adult user expressed: *"The picture of the cowboy makes me think of the hard working, outdoor type person again... I think a lot of people in this area kind of hold the old western American image in high regard because the cowboy stands for hard work and a tough individual. So that's what I see."* One adult user spoke of the cowboy historically, *"through all of the years of growing up all the commercials really...you know you weren't a real man unless you dipped Copenhagen."*



*Basically...that's the message I received growing up. You know cowboys riding bulls dipped Copenhagen."* Similarly, another adult user voiced, *"You've got the cowboy! The tough farm boy!...It's, like I said, you've got the guy taken a pinch. He's got the belt buckle and the hat. If you actually look it's a rodeo belt buckle. I mean it's a tough guy; all about toughness!"* Another user noted, *"Cowboys drink whiskey and rub Copenhagen. So you should because you're a country guy."*

The use of animals on ST products denoted a perception of masculinity. This adult user noted, *"I mean you will not pick up a can of snuff that has a little fairy princess on it. You know Timber Wolf has a wolf that's not just howling, but I mean he is snarling. You know its mean; he is a man, he is tough."* When asked, *"Why would they call it 'Wolf'?"* a female youth non-user exclaimed, *"They are not going to call it like 'piglet' or something...Manly!"* This adult user reflected, *"I noticed the outdoor figure, animal. I think it is associated with that type of lifestyle; the outdoor hunter, hunting and gathering instinct. I don't think a lot of people notice it, but I do."* Several participants directly tied advertisement of outdoor images to normalizing ST use among men in the region:

*You know you see it in the magazines. You see the big strong guy putting the snuff in or the guy holding the bass with a big old pinch of snuff in. When you hunt and fish you know, you see it. Especially around here it's everywhere you know. You go talk to the guy with the deer in the back of his truck and he has a big old hog leg in his mouth and you just associate the country culture. You start associating the hunting, the fishing, the country life with snuff. (adult user)*

*They use big lumberjacks out here in the Appalachians to try and portray that very strong people use tobacco or chewing tobacco. (youth non-user)*

An advertisement depicting a firefighter evoked positive sentiments. This adult user noted, *"It is another iconic American image of a firefighter. You think of a tough, brave, upstanding person."* This adult non-user reflected, *"It kind of sounds like if you want to be a real man, a hero then you need to chew that."* In an aside, this adult user shared an underlying assumption, *"Plus, we are guys-we like fire! That's all there is to it!"* This youth non-user was able to see the irony in the use of this image: *"A firefighter... 'a bit braver'? That's a little cheesy though. They've got a hard core fire fighter on there like saving lives and then they're selling their thing that kills people."* Despite this, another youth non-user shared: *"It's, it's out there. You see it all the time. You always see somebody with a big bulge in their jaw. All of my cousins chew and they work for the Fire Department and they all go down through the road and everything and you see them. It's out there."*

#### **Extended Social Networks: Romantic Partner's Influence in ST cessation—**

Participants shared that it was connection to meaningful people in their social networks that had a prevailing influence in countering overarching cultural expectations:

*The most important part to me that always comes, is not really the advertisements because you know you can look at any picture and stare at it as long as you want. It is what you make of the picture and what you choose to get out of it. The biggest part to me is you know I have seen pictures. I have seen my uncle, an actual person that has done it and it didn't go well and I am not willing to let that happen to me.*

Former users explained two predominant reasons for quitting despite prior use: 1) knowledge of smokeless tobacco product content (an individual factor) and 2) influence of intimate relationships upon continued use, illustrated by this youth's statement, "*I did it for about two years. Then my new girlfriend didn't want me doing it so I quit.*" A lack of intimate connection was the justification why another adult user continued to use despite all of his friends quitting: "*We were all one happy group chewing tobacco. So they all gave it up, but I kept going because I never got married or never had many girlfriends and didn't do much so I kept on with it.*"

## Discussion

This is the first study to analyze cultural, community, and interpersonal factors in ST initiation and continued use of ST in a rural tobacco-growing region of the United States, allowing for a greater depth of understanding of factors contributing to the disparity of use for males in the Ohio Appalachian region, in particular. The cultural beliefs of ST use as 1) a masculine act and 2) an inevitable part of Appalachian identity shape the interpersonal and community factors that lead to ST initiation and use in the region. Cultural standards dictated that tobacco use, in general, is a necessary rite of passage in the development of masculine identity in Ohio Appalachia. Gender, itself, is at stake through one's choice and use of tobacco products. A person's male social network was consistently cited as the primary influence on ST initiation and continued use. ST marketers used messages that resonated with the underlying regional and masculine cultural standards and advertisements present in the region functioned to normalize ST use. Despite the known health effects shared by participants in the study [28], the gravity of underlying cultural norms propelled males to share access to ST in order to provide appropriate cultural initiation into manhood.

The primacy of underlying cultural values influencing initiation by male social networks expands current knowledge regarding tobacco use in Ohio Appalachia. Other researchers have cited the role of the construction of masculinity in the enactment of detrimental behaviors associated with adverse health outcomes for men [29, 30] and the role of perceived normative health behaviors among men as a predictor of the enactment of those health behaviors [31]. This study adds to the growing body of research suggesting 1) marginalized men, worldwide, may use tobacco in order to construct an accessible form of masculinity [32–35]; and 2) smokeless tobacco marketers not only use culturally specific images to target vulnerable populations [36, 37] but usurp culturally-specific masculine norms in order to conflate tobacco use, through brand marketing, with masculine enactment itself [38].

The study included some limitations that involved a purposive sampling of males and ST users. As such, the perceptions regarding cultural beliefs captured may be more reflective of this sub-population than of the rural Ohio Appalachian community, in general. However, current findings suggest that interventions targeting interpersonal level factors will be necessary to reduce ST use in Ohio Appalachia. Possible programmatic strategies may include a social norming campaign [39] aimed at changing the cultural perceptions regarding the prevalence of tobacco use among Ohio Appalachian males coupled with interventions geared at reducing cultural initiation of masculinity through ST use by male

social networks. These interpersonal interventions should complement existing community level policy efforts aimed at reducing exposure to tobacco marketing and restricting access to adolescents in Ohio Appalachia [40–42].

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**Table 1**

Adolescent sample characteristics by smokeless tobacco status

Characteristic	Total (n=53)	ST users (n=23)	ST non-users (n=30)
Age in years (mean $\pm$ SD)	17.0 $\pm$ 0.8	17.2 $\pm$ 0.8	17.0 $\pm$ 0.8
Missing (n) <sup>a</sup>	7.0	6.0	1.0
	% (n)	% (n)	% (n)
Gender			
Male	66.0 (35)	100.0 (23)	40.0 (12)
Female	34.0 (18)	0.0	60.0 (18)
Race			
White	84.9 (45)	73.9 (17)	93.3 (28)
African American	3.8 (2)	4.4 (1)	3.3 (1)
Other	7.5 (4)	17.4 (4)	0.0
Missing	3.8 (2)	4.4 (1)	3.3 (1)
Ethnicity			
Not Hispanic	86.8 (46)	78.3 (18)	93.3 (28)
Hispanic	9.4 (5)	17.4 (4)	3.3 (1)
Missing	3.8 (2)	4.4 (1)	3.3 (1)
School grade level			
7 <sup>th</sup>	1.9 (1)	4.4 (1)	0.0
8 <sup>th</sup>	1.9 (1)	4.4 (1)	0.0
9 <sup>th</sup>	7.6 (4)	4.4 (1)	10.0 (3)
10 <sup>th</sup>	32.1 (17)	30.4 (7)	33.3 (10)
11 <sup>th</sup>	20.8 (11)	21.7 (5)	20.0 (6)
Missing <sup>a</sup>	35.9 (19)	34.8 (8)	36.7 (11)
Work for pay			
Yes, Full-time	3.8 (2)	4.4 (1)	3.3 (1)
Yes, Part-time	35.9 (19)	43.5 (10)	30.0 (9)
No	56.6 (30)	47.8 (11)	63.3 (19)
Missing	3.8 (2)	4.4 (1)	3.3 (1)
Place of residence			
Live with both parents	30.2 (16)	21.7 (5)	36.7 (11)
Live with one parent	11.3 (6)	13.0 (3)	10.0 (3)
Live with others	22.6 (12)	30.4 (7)	16.7 (5)
Missing	35.9 (19)	34.8 (8)	36.7 (11)

Note. ST = smokeless tobacco.

<sup>a</sup>Not reported on questionnaire, although participants met eligibility criteria of being at least 15 years old and enrolled in secondary school.

**Table 2**

## Adult sample characteristics by smokeless tobacco status

Characteristic	Total (n=63)	ST users (n=38)	ST non-users (n=25)
Age in years (mean $\pm$ SD)	33.6 $\pm$ 13.8	28.9 $\pm$ 12.9	41.5 $\pm$ 11.6
Missing (n) <sup>a</sup>	2.0	0.0	2.0
	% (n)	% (n)	% (n)
<b>Gender</b>			
Male	79.4 (50)	100.0 (38)	48.0 (12)
Female	20.6 (13)	0.0	52.0 (13)
<b>Race</b>			
White	98.4 (62)	100.0 (38)	96.0 (24)
Other	1.6 (1)	0.0	4.0 (1)
<b>Ethnicity</b>			
Not Hispanic	95.2 (60)	97.4 (37)	92.0 (23)
Hispanic	3.2 (2)	2.6 (1)	4.0 (1)
Missing	1.6 (1)	0.0	4.0 (1)
<b>Marital status</b>			
Single	36.5 (23)	55.3 (21)	8.0 (2)
Married/Partnered	54.0 (34)	36.8 (14)	80.0 (20)
Separated/Divorced	7.9 (5)	5.3 (2)	4.0 (1)
Other	1.6 (1)	2.6 (1)	8.0 (2)
<b>Level of education</b>			
< High school	1.6 (1)	0.0	4.0 (1)
High school or GED	25.4 (16)	26.3 (10)	24.0 (6)
Some college	55.6 (35)	68.4 (26)	36.0 (9)
College	17.5 (11)	5.3 (2)	36.0 (9)
<b>Work for pay</b>			
Yes, Full-time	41.3 (26)	36.8 (14)	48.0 (12)
Yes, Part-time	42.9 (27)	50.0 (19)	32.0 (8)
No	15.9 (10)	13.2 (5)	20.0 (5)
<b>Household income</b>			
<\$15,000	15.9 (10)	15.8 (6)	16.0 (4)
\$15,000–\$24,999	14.3 (9)	15.8 (6)	12.0 (3)
\$25,000–\$34,999	15.9 (10)	21.1 (8)	8.0 (2)
\$35,000–\$49,999	15.9 (10)	5.3 (2)	32.0 (8)
\$50,000	30.2 (19)	31.6 (12)	28.0 (7)
Don't know	6.4 (4)	7.9 (3)	4.0 (1)
Missing	1.6 (1)	2.6 (1)	0.0

Note. ST = smokeless tobacco.

<sup>a</sup>Not reported on questionnaire, although participants met eligibility criteria of being at least 18 years old and not enrolled in secondary school.

**Table 3**

Tobacco use characteristics of adolescent and adult ST users

Characteristic	Adolescents (n=23)	Adults (n=38)
Duration of tobacco use in years (mean ± SD)	5.1 (3.0)	13.0 (13.7)
Age at tobacco initiation in years (mean ± SD)	11.7 (2.9)	15.0 (4.0)
mFTND score (mean ± SD)	4.4 (1.7)	4.5 (1.9)
	% (n)	% (n)
Current ST product used		
Snuff only	17.4 (4)	60.5 (23)
Chew only	34.8 (8)	15.8 (6)
Both snuff and chew	47.8 (11)	23.7 (9)
Tins/pouches per week		
1	13.0 (3)	18.4 (7)
2–4	47.8 (11)	50.0 (19)
5	26.1 (6)	31.6 (12)
Missing	13.0 (3)	0.0
Frequency of ST use		
5 days/week	43.5 (10)	34.2 (13)
6–7 days/week	43.5 (10)	65.8 (25)
Missing	13.0 (3)	0.0
Time to first ST use in morning		
After 30 minutes	73.9 (17)	65.8 (25)
Within 30 minutes	21.7 (5)	34.2 (13)
Missing	4.4 (1)	0.0
Self-reported cigarette smoker		
No	39.1 (9)	68.4 (26)
Yes	56.5 (13)	31.6 (12)
Missing	4.4 (1)	0.0

Note. mFTND = modified Fagerström Test of Nicotine Dependence; ST = smokeless tobacco.