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Demographic Associations of Tobacco Use Among Georgia Secondary Students

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Demographic Associations of Tobacco Use Among Georgia Secondary Students

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ABSTRACT

Michael Cowart

Demographic Associations of Tobacco Use Among Georgia Secondary Students

As in years past, use of tobacco remains the leading cause of preventable death in this country. The risk of developing lung cancer is 23 times higher for male smokers and 13 times higher for female smokers than for non-smokers. Smoking has also been associated with elevated risks of 15 other forms of cancer and implicated in an additional 3 other forms of cancer. In addition to cancer, smoking has also been identified as a major cause of such chronic conditions as cardiovascular disease, cerebrovascular disease, bronchitis and emphysema. In 2008, an estimated 8.6 million people in the U.S. suffered from smoking-related chronic conditions. Smoking has also been associated with gastric ulcers (American Cancer Society, 2010).

As 80% of tobacco use begins in adolescence (Villanti, Boulay & Juon, 2010), this age group has long been the focus of many primary and secondary intervention efforts. Furthermore, animal studies have suggested that the adolescent brain is at higher risk for developing an addiction to nicotine compared to a mature adult brain (Morrell, Song & Halpern-Felsher, 2011). Additional studies have demonstrated that the younger an adolescent begins smoking, the more likely he is to become a regular smoker and less likely to quit smoking (Brown et al., 2010). The public health opportunity for primary and secondary prevention intervention is clear.

In order to track adolescent risk-taking in the state, The Georgia Department of Education administers the Georgia Student Health Survey [GSHS] throughout all school

districts. The purpose of this thesis study was to examine known smoking risk factors using the GSHS data in order to assess associations using an adolescent sample. In total, 265,000+ respondents completed the survey. Findings demonstrated that age, gender, and urbanicity were associated with smoking. Findings from this study provide insights for programming that can be tailored to meet the needs of adolescent subgroups that may be vulnerable to smoking initiation.

INDEX WORDS: smoking, demographic risk, students, Georgia

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Chapter I

INTRODUCTION

1.1 Background

As in years past, use of tobacco remains the leading cause of preventable death in the United States (US). The risk of developing lung cancer is 23 times higher for male smokers and 13 times higher for female smokers than for non-smokers. Smoking has also been associated with elevated risks of 15 other forms of cancer and implicated in an additional 3 other forms of cancer. In addition to cancer, smoking has also been identified as a major cause of such chronic conditions as cardiovascular disease, cerebrovascular disease, bronchitis and emphysema. In 2008, an estimated 8.6 million people in the U.S. suffered from smoking related chronic conditions. Smoking has also been associated with gastric ulcers (American Cancer Society, 2010).

In 2008, tobacco use was responsible for almost 20% of all deaths in the US. Thirty percent of all cancer deaths and 87% of lung cancer deaths have been attributed to smoking. The World Health Organization estimates that tobacco use is responsible for 5.4 million premature deaths annually and that by the year 2025, annual smoking attributable deaths will climb to 10 million across the planet (Talhout et al., 2011). In the U.S., for the period of 2000 to 2004, smoking attributed loss of potential life was estimated at 3.1 million years for male smokers and 2.0 million years for female smokers, with an overall reduction of life expectancy of 14 years per

individual (American Cancer Society, 2010). In the state of Georgia, approximately 10,500 people die annually from smoking attributable causes (Centers for Disease Control, 2010b; Robert Wood Johnson Foundation, 2010). Georgia's smoking-attributable mortality rate has been calculated at 299.4/100,000, which ranks 40th among the states (Centers for Disease Control, 2010b).

The National Center for Health Statistics estimates that in 2009 the percentage of current smokers (those having smoked at least one day in past 30 days) among adults aged 18 and over was 20.6%. This reflects a decline in current smoking prevalence from 24.7% in 1997. The prevalence of current smoking was higher among men (23.4%) than women (17.9%). While a higher percentage of former smokers were men, among people who never smoked women formed a greater percentage. For adult men and women, prevalence of those reporting current smoking status was highest among those aged 18-44 years (23.4%) followed by 45-64 years (21.9%) with 65 years and over reporting a 9.5% prevalence. Among the groups aged 18-44 years and 45-64 years, the prevalence of current smokers was higher among men than women. By ethnicity, prevalence varied markedly among non-Hispanic Caucasians (22.8%), non-Hispanic African-Americans (21.0%) and Hispanics (13.5%) (Centers for Disease Control, 2010a). Reflecting an established inverse association between smoking prevalence and level of education achieved, in 2008 an estimated 41% of GED certificate holders, 28% of High School graduates and 9% of college graduates were active smokers (American Cancer Society, 2010). Among young adults of college age, females and those of low SES were found to be more likely to smoke (Berg et al., 2011). Among Georgia's adult population (aged 18+ years), 19.5% are current cigarette smokers, totaling over 1,393,000. This ranks Georgia 32nd in the nation for smoking prevalence (Centers for Disease Control, 2010b).

Smoking presents an enormous economic burden for individual states as well as the country. For the period of 2000 to 2004, the U.S. experienced an annual average loss of $193 billion in health related costs, consisting of both smoking attributable health care expenses and productivity losses. The average annual smoking attributable health care expense of $96 billion was an increase over the 1998 expenditure of $76 billion. Likewise, the average annual smoking attributable productivity loss of $96.8 billion was an increase over the average annual losses of $92 billion for 1997-2001 (American Cancer Society, 2010). In Georgia, annual health care costs directly attributable to smoking are approximately $2.25 billion. Government expenditures directly attributable to smoking result in a combined federal and state tax burden for residents equivalent to $548 per household (Robert Wood Johnson Foundation, 2010).

In terms of adolescent smoking, researchers often begin with examination of when adults initiate the use of tobacco. Studies of adult smokers reveal that 80% began using tobacco in adolescence (Villanti et al., 2010), making the study of adolescent tobacco use necessary in the effort to reduce overall tobacco use. Among adolescents participating in the 2009 National Youth Tobacco Survey (NYTS), 5.2% of Middle School students and 17.2% of High School students reported current use of cigarettes (Thompson, et al., 2010). Similarly, the 2009 Youth Risk Behavior Survey (YRBS) found a current smoking prevalence among High School students (grades 9-12) of 19.5%. These findings remain a cause of concern for Public Health officials as both surveys show a current smoking prevalence among High School students in excess of the 16.0% target set by both Healthy People 2010 and 2020 (U.S. Department of Health and Human Services, n.d.). In Georgia, according to 2010 estimates, 10.0% of youth aged 12–17 years (Centers for Disease Control, 2010b) and 16.9% among High School students specifically, use tobacco (Robert Wood Johnson Foundation, 2010).

The human and financial costs that result from tobacco use have long made adolescents a logical target audience for anti-tobacco interventions. For 2011, the Georgia legislature allocated $2 million to fund tobacco prevention programs, which is only 1.8% of the $116.5 million funding recommended by The Centers for Disease Control (CDC) for a comprehensive state program. While current smoking prevalence among Georgia adolescents is in line with national averages, the state's allocations rank Georgia 43rd in the nation for funding (Robert Wood Johnson Foundation, 2010). This modest funding, by necessity, suggests a need for identifying those populations most at risk for smoking in order to best inform individual program development and funding. Identifying such high risk groups among Georgia adolescents was the focus of this thesis.

1.2 Purpose of Study

The aim of this study was to examine the impact of known risk factors for adolescent smoking among Georgia Middle and High School students with regards to the prevalence of 'Current Smoking' (smoked ≥ 1 day in past 30 days). According to the tobacco use scientific literature, sociodemographic risk factors including gender and age, along with environmental factors such as urbanicity and local tobacco-production have been linked with adult tobacco use. These associations led to the development of research questions specific to this study.

1.3 Research Questions

1. How is gender associated with 'current smoking' among Georgia students?
2. How is age/grade level associated with 'current smoking' among Georgia students?
3. How is urbanicity associated with 'current smoking' among Georgia students?

4. How is local tobacco production associated with 'current smoking' among Georgia students?

1.4 Hypotheses

Based upon previous research, the following hypotheses were developed for this study:

1. Male students are more likely to be 'Current Smokers' than female students
2. Students of higher Age/Grade Level are more likely to be 'Current Smokers' than those of lower Age/Grade Levels
3. Rural students are more likely to be 'Current Smokers' than urban students
4. Students in Tobacco-Producing areas are more likely to be 'Current Smokers' than students in non-Tobacco-Producing areas

Chapter II

REVIEW OF THE LITERATURE

2.1 Overview

As 80% of tobacco use begins in adolescence (Villanti et al., 2010), this age group has long been the focus of many primary and secondary intervention efforts. Furthermore, animal studies have suggested that the adolescent brain is at higher risk for developing an addiction to nicotine compared to a mature adult brain (Morrell et al., 2011). Additional studies have demonstrated that the younger an adolescent begins smoking, the more likely he is to become a regular smoker and less likely to quit smoking (Brown et al., 2010). Nonnemaker & Farrelly reported that 67% of smokers who began smoking in the 6th grade become regular smokers, compared to only 46% of smokers who didn't began until the 11th grade (2011). In contrast, Morrell, Song and Halpern-Felsher (2011), argue that a subject's age of smoking initiation may not be as strong a predictor of future smoking as motivation for smoking initiation. The authors point out that early initiators who experiment out of curiosity may not become regular smokers while later initiators who begin smoking for the purpose of stress relief or social acceptance are more likely to become regular smokers (Morrell et al., 2011).

2.2 Prevalence

According to the National Youth Tobacco Survey (NYTS), among adolescents in 2009, 5.2% of middle school students and 17.2% of high school students reported current use of cigarettes. During 2000–2009, the prevalence of current cigarette use among middle school students declined (11.0% to 5.2%), as did cigarette smoking experimentation (29.8% to 15.0%). Similar trends were observed for high school student current cigarette use (28.0% to 17.2%) and cigarette smoking experimentation (39.4% to 30.1%). In spite of the significant declines in tobacco use observed in the adolescent population since 2000, overall prevalence did not significantly decrease from 2006 to 2009 for use of any tobacco product among either group, marking a leveling off in the progress of anti-smoking efforts among this population. These findings are consistent with findings from the national Youth Risk Behavior Survey (YRBS) for the same period (Thompson, et al., 2010), including a 2009 current smoking prevalence of 19.5% for High School students (grades 9-12); in excess of the 16.0% target set by both Healthy People 2010 and 2020 (U.S. Department of Health and Human Services, n.d.). Estimates of adolescent smoking rates in Georgia for 2010 include 10.0% among youth aged 12–17 years (Centers for Disease Control, 2010b) and 16.9% among High School students specifically (Robert Wood Johnson Foundation, 2010).

2.3 Theoretical Underpinnings of Risk Factors for Tobacco Use

The risk factors that have been found to influence an adolescent's likelihood to smoke are many and varied. The Theory of Planned Behavior (TPB) can be helpful here as it provides a context for the varied risk factors. Central to the TPB is that intention is the primary predictor of future action. In turn, this intention is influenced by the subject's:

- Attitude toward the behavior (Positive/Negative)
- Perception of social pressure to perform the behavior (Subjective Norms)
- Perceived ability to perform the behavior (Perceived Behavioral Control - PBC)

Risk factors which have been studied and can relate to the TPB include familial norms, perceived social norms, perceived prevalence of smoking, perceived risk of smoking and perceptions of the tobacco industry (Brown et al., 2010; Godin, Connter & Sheeran, 2005).

The Primary Socialization Theory (PST) maintains that children and adolescents learn both normative and deviant behavior largely from family, peers and their schools environment (Villanti, Boulay & Juon, 2010). Additionally, as youth may be influenced by social norms (per TPB), Social Norms Theory (SNT) maintains that such norms may be misperceived in the youth's desire to conform to the social norms observed in their immediate environment and thereby achieve a sense of belonging. This influence can take the form of either a direct influence in the form of active social pressure or an indirect form as the youth model their own behavior to that which they observe around them (Brown et al., 2010).

2.4 Risk Factors

Familial Influences

Consistent with PST, a report by Ma, Shive, Legos, & Tan is one of many that found an association between parents who smoke and youth smoking (2003). On the other hand, there is a growing body of literature suggesting that more than simple behavioral modeling is at work in the home. Mahabee-Gittens, Ding, Gordon, and Huang found that antismoking socialization by parents is associated with lower rates of smoking initiation or intention to smoke among their children, even if one or both parents smoke(2010). Likewise, Andersen, and colleagues found

that parental antismoking practices such as not allowing smoking in the home, requesting to be seated in non-smoking sections of public establishments and asking smokers to not smoke in their presence were significantly associated with lower rates of daily smoking among Washington 12th graders (2004). This association was even found in families where parental figures were active smokers themselves (Andersen, Leroux, Bricker, Rajan & Peterson, 2004). Not surprisingly, adolescents who perceive negative parental attitudes towards smoking were found to be less likely to smoke than those who perceive neutral or permissive attitudes. Furthermore, regardless of parental smoking status, adolescents who expect negative consequences of smoking are less likely to smoke than those who do not expect negative parental consequences (Mahabee-Gittens, Ding, Gordon & Huang, 2010). Parental support has been associated with a significantly lower prevalence of regular smoking among adolescents (Simantov, Schoen & Klein, 2000), suggesting the nature of the child/parent relationship plays a key role in a youth's likelihood to smoke. In fact, lack of parental concern and social support, lack of parent-child closeness, parent-child conflict, weak or excessive controls and inconsistent discipline on the part of parents have all been associated with higher rates of adolescent smoking (Mahabee-Gittens et al., 2010). Ma, et al. (2003) also reported an association between having older siblings who smoke and adolescent smoking initiation, although Brown, et al. (2010) reported contradictory findings on associations between sibling smoking or approval of smoking and adolescent intention to smoke, leaving the reliability of sibling approval/smoking as a predictor of adolescent smoking initiation questionable.

Peer Influences

Among adolescents, having peers who smoke has long been associated with smoking initiation (Ma, et al., 2003). Likewise, peer influence is largely regarded as a consistent predictor

of smoking onset (Villanti et al., 2010). Earlier studies suggest parental influence remains an important constant throughout the duration of adolescence while the influence of peers increases over time, however, more recent studies suggest peer influence peaks and then begins to decline sometime in early or mid- adolescence (Morrell et al., 2011; Villanti et al., 2010). A recurring question in the literature has been whether peers genuinely influence an adolescent's decision to smoke or if an adolescent who is already pre-disposed to smoke selects peers who approve of smoking. A 2009 study examined the 'influence vs. selection' question, finding that both influence and selection play a role in homogeneity among peers regarding smoking with peer influence having a greater effect size in adolescent smoking cessation (Go, Green, Kennedy, Pollard & Tucker, 2010).

Perceived Prevalence of Smoking

Among adolescents, smoking initiation is a prevalence driven behavior (Villanti et al., 2010), in as much as a greater perceived prevalence of smoking can lead youth to believe that such smoking behavior is normative (Brown et al., 2010). A greater belief in the prevalence and normative status of smoking has been associated with a higher risk of either engaging or progressing in smoking behavior (Brown et al., 2010). For example, results of the School Policies and Programs Survey indicated student smoking tends to be higher in schools that permit staff smoking on school grounds and schools that reported a higher percentage of staff who smoked also reported greater tobacco use problems among students (Chaloupka & Johnston, 2007). Research has also shown a tendency among youth to hold an exaggerated sense of smoking prevalence (Brown et al., 2010).

Risk Perception

While risk perception can influence one's decision to smoke, perception of risk among youth may be mitigated by a sense of invulnerability and/or the perception that any possible harm lay only in the far future. This is capitalized upon by the tobacco industry which commissions advertising that projects smoking as desirable, socially normative and safe. However, research has shown that youth are aware of the health risks attributed to smoking, at least to some degree, which may still make them receptive to intervention efforts . For example, a hallmark of the American Legacy Foundation's TRUTH® campaign is to highlight various health risks associated with smoking. As a result of local TRUTH® campaigns executed prior to the roll-out of the national campaign, among Florida and Michigan youth, attitudes toward smoking and the tobacco industry declined as did smoking behavior while attitudes and behavior remained largely unchanged elsewhere, suggesting a degree of receptivity among youth to the campaign's message (Brown et al., 2010). In contrast, exposure to anti-smoking advertising sponsored by tobacco companies has been associated with increases in the prevalence of youth smoking (Chaloupka & Johnston, 2007).

Urbanicity

The identification of how urbanicity relates to tobacco use has been undertaken by a number of scientists; however findings have been inconclusive. A 2002 study found smoking rates among Rural adolescents to exceed that of Urban adolescents (Epstein, Botvin & Spoth, 2003). For example, rates of daily smoking among Rural 8th graders were nearly twice that of their Urban counterparts in one study (Epstein et al., 2003), while another found daily smoking rates among Rural male 7-9th graders to be significantly higher than their Urban counterparts (Noland et al., 1990). These rates would continue to climb in Rural areas in the late 1990s even while rates were dropping in Urban areas (Epstein et al., 2003). Rural youth also begin to smoke

at an earlier age than Urban youth (Epstein et al., 2003; Noland et al., 1990). Ultimately, there exists limited literature available as Rural youth remain an under-researched population.

Local Tobacco Production

As youths experience a greater degree of contact with the tobacco industry and tobacco itself in tobacco producing regions through either community, familial/parental or direct involvement in tobacco production, the hypothesis that such contact could lead to a more normative and favorable attitude toward tobacco in said youth would be a logical avenue for exploration. Indeed, researchers have demonstrated that smoking rates among adolescents in tobacco producing states are generally higher than in other areas (Thrasher et al., 2004). Additionally, research has shown that youth from tobacco producing families reported more favorable attitudes toward smoking and were more likely to smoke than those from tobacco non-producing families or regions (Noland et al., 1990; Thrasher et al., 2004). Furthermore, rates of tobacco use among teens from tobacco producing families are higher than among teens from non-growing families, at times reaching rates that are almost double (Hahn et al., 2005; Noland et al., 1996). On a community level the tobacco industry may contribute to local school districts either through direct funding or through grants to larger organizations, although research suggests that such corporate beneficence is not related to whether a beneficiary school district adopts Tobacco-Free school policies (Hahn et al., 2005). Surprisingly, in spite of the more normative attitudes toward tobacco and the tobacco industry prevalent in tobacco producing regions, a 2004 study found that receptivity to the anti-tobacco industry message of the TRUTH ® campaign among youth in tobacco producing regions was comparable to youth in other areas (Thrasher et al., 2004). Presently, there remains scant literature on adolescent

smoking in tobacco producing regions, much of which was conducted over a decade ago which makes it an underserved subject for future research.

Prior research shows us that the factors contributing to adolescent smoking are many and varied. Conditions unique to the state of Georgia, such as being a mid-level producer of tobacco, call for an analysis of the risks factors of adolescent smoking that are, in turn, unique to Georgia. Only by understanding the risks faced by Georgia youths can stakeholders plan appropriate counter-measures to adolescent smoking and the human/financial costs that they seemingly inevitably bring.

Chapter III

METHODS AND PROCEDURES

3.1 Context of Study

The State of Georgia currently experiences a tobacco attributable mortality rate of an estimated 10,500 deaths per year. In addition, tobacco attributable morbidity costs Georgians $2.25 billion annually. These factors clearly demonstrate the hazard posed by tobacco use as a root cause of substantial human and financial costs. In spite of the challenge to the state posed by tobacco, for 2011 the Georgia legislature limited allocations for anti-tobacco to $2 million. This allocation represents only 1.8% of CDC recommended funding levels of $116.5 million annually.

3.2 Rationale of Study

According to research, 80% of adult smokers began using tobacco in adolescence. Intervention efforts directed at the adolescent population present opportunities to either prevent Georgia youth from beginning to smoke or encourage those who are to currently smoking to cease before the onset of serious tobacco related illness. The modest level of funding available in Georgia for any anti-tobacco intervention efforts only heightens the need to identify those populations at highest risk of smoking. With this knowledge, decisions can be made as to the most effective and efficient deployment of limited intervention resources.

3.3 Study Participants

For this study, the population examined were the participants of the 2009 wave of the Georgia Department of Education's Georgia Student Health Survey II (GSHS II). Although the GSHS II is currently administered to all grade levels in Georgia Middle and High Schools, in 2009 the survey was directed to students in grades 6, 8, 10 and 12 within the window of October 1 to November 30, 2009. The final data set used for this study included 259,908 survey responses from 173 of 186 school districts statewide. Based on October 2009 enrollment data, participation rates ranged from 47.5% to 62.3% with an overall participation rate of 55.3% among the participating grade levels (see Table 3.1.). Viewed more broadly, the GSHS II respondents represented 41.1% of the entire Middle School population, 22.3% of the High School population and 30.7% of the combined Middle and High School populations (see Table 3.2). Sample responses from such a large majority of the state's geographic area and such large participation rates of the subject populations in addition to over a quarter-million survey responses make this a very robust data set which is reasonable to assume is representative of the diversity of beliefs and experiences found among the state's student body.

Table 3.1 Sample Georgia Student Enrollment versus GSHS II 2009 Participation Rates

		N	ENROLLED (as of 6 Oct 2009)	PARTICIPATION
Grade	6	77,107	126,060	61.2%
	8	77,362	124,084	62.3%
	10	57,959	122,022	47.5%
	12	47,480	97,779	48.6%
Overall		259,908	469,945	55.3%

Table 3.2 Total Georgia Student Enrollment versus GSHS II 2009 Participation Rates

	Grade	N	ENROLLED (as of 6 Oct 2009)	PARTICIPATION
Middle School	6	77,107	126,060	61.2%
	7		122,710	
	8	77,362	124,084	62.3%
	Total	154,469	372,854	41.1%
High School	9		144,918	
	10	57,959	122,022	47.5%
	11		108,215	
	12	47,480	97,779	48.6%
	Total	105,439	472,934	22.3%
Overall		259,908	845,788	30.7%

3.4 Instrumentation

The GSHS II is an annual on-line survey administered by the Georgia Department of Education to Georgia Middle and High School students for the purpose of identifying health and safety issues of concern among the student body to aid in the development of prevention and intervention efforts. Students are asked to rate their perceptions of risk related to the school environment, substance use, and peer/adult approval. Additionally, items related to use of substances—including tobacco, alcohol, marijuana, and other illicit drugs are included. Aside from the demographic and frequency of use questions, most items utilize a 3 point Likert scale response set, with the response options being *sometimes*, *always* or *never* (Georgia Department of Education, 2009).

While individual student participation is anonymous, each participating school's data set is maintained discretely from other schools' so as to allow for survey analysis at the individual school level. The surveys were given during regular school hours in the computer lab by school personnel. The participation of any school district or individual school is completely voluntary and the participation of individual students is conducted on the basis of passive permission,

allowing students' parents to submit a written declination of permission to participate (M. Watson, personal communication, November 29, 2011).

A second source of data, mainly to determine the urbanicity of a county, was the United States Census Bureau warehouse. The U.S. Census Bureau classifies urban areas as having a population density greater than 1,000 persons per square mile (U.S. Census, 2010). As described in the literature review, researchers have found adolescent smoking to be significantly correlated with rural settings.

Similarly, another aspect of setting which is applicable to Georgia is tobacco production. Because there is a small percentage of agricultural land dedicated to the cultivation of tobacco, data related to the independent variable 'tobacco producing county' was obtained through the Georgia Agricultural Education Curriculum Office (2011). This study examines whether or not students attending schools in tobacco-producing counties report greater levels of tobacco use.

3.5 Methods

The independent variables utilized in the study are as follows: gender, age/grade level, local tobacco production (county setting) and urbanicity. Gender was a dichotomous variable coded 1 for female, 2 for male. Age was coded as 6 for 6th grade, 8 for 8th grade, 10 for 10th grade, and 12 for 12th grade. Tobacco production was a county-level variable that was coded 1 for designated tobacco-growing county and 0 for non-producing county. Urbanicity was a dichotomous variable, with 1 labeled as urban and 0 designating a rural county.

The outcome variable for all analyses was current smoking—which captured tobacco use. Current smoking responses were captured in a dichotomous response set, with *no* = 0 and *yes* = 1.

Of the original 265,474 survey responses constituting the original 2009 GSHS II data set, 5,565 responses were omitted for having been inexplicably designated as originating from students in the 7th grade. One final entry was omitted as it was the only response from that district and was rejected on the basis of lack of sample size for that district. This resulted in a final response count of 259,908.

After univariate analyses were run for each of the main independent variables of interest, additional tests were run applying stratified variations of the independent variables in order to tease out more granular results from sub-populations of the sample set. Namely, Urbanicity and Tobacco Production were cross-stratified into a new variable labeled "Locale" consisting of Urban Non-Producing, Urban Producing, Rural Non-Producing and Rural Producing. Several tests were also conducted separately based on the variable of "Gender".

3.6 Statistical Analysis

The Statistical Package for Social Science (SPSS, version 18, 2009) was used to analyze study data. Descriptive statistics were run on demographic variables, tobacco use, and county setting (urbanicity and tobacco-production). Chi-square analyses were run to determine whether or not tobacco use was associated with the demographic information and county setting characteristics. Statistical tests were deems significant at the alpha <.05 level. Additional odds-ratios analyses were run to test degree of association.

3.7 Human Subjects Considerations

The appropriate paperwork for an exempt/expedited study using a secondary data was submitted for Institutional Review Board (IRB) approval. The application was processed as an exempt protocol because it is publicly available data (DOE, 2009).

CHAPTER IV

RESULTS

Tobacco use exacts a heavy toll in terms of human and financial losses. As most adult smokers begin using tobacco in adolescence, the public health opportunities for primary and secondary prevention efforts among adolescent populations is clear. To further that aim, this study set out to analyze the results of the 2009 wave of the Georgia Student Health Survey II in an effort to identify which sub-populations of adolescents may be at higher risk of smoking.

4.1 Participants

The study sample was almost evenly divided between males and females with females holding a slight majority. The 6th and 8th grade student groups each comprised approximately 30% of the sample with the 10th and 12th grades comprising the remainder at approximately 22% and 18% respectively. Approximately three-quarters of the surveyed students reside in urban areas with the remaining quarter living in rural areas. The vast majority of survey respondents reside in tobacco non-producing areas (97.3%) with only 2.7% living in areas that cultivate tobacco. When urbanicity is stratified by tobacco production, results show 2.2% of urban dwelling students (or 1.7% of the total sample size) reside in a tobacco producing area while 4.4% of respondents from rural areas (or roughly 1.1% of the total sample size) reside in a tobacco producing area (see Table 4.1).

Table 4.1 Demographic Profile of Study Sample

	N	%
Gender		
Female	131,853	50.7%
Male	128,055	49.3%
Grade		
6	77,107	29.7%
8	77,362	29.8%
10	57,959	22.3%
12	47,480	18.3%
Urbanicity		
Urban	195,336	75.2%
Rural	64,572	24.8%
Tobacco Production		
Non-Producing	252,786	97.3%
Producing	7,122	2.7%
Locale (Urbanicity / Tobacco Production – Stratified)		
Urban Non-Producing	191,043	73.5%
Urban Producing	4,293	1.7%
Rural Non-Producing	61,743	23.8%
Rural Producing	2,829	1.1%

4.2 Findings

The following will describe the findings of this study as they pertain to the original study questions:

Question one – "How is gender associated with 'current smoking' among Georgia students?"

Throughout analysis, males demonstrated significantly higher current smoking prevalence than females in every test. Odds ratios show that in 6th, 8th and 10th grades males were on average half-again as likely to smoke than females. In 12th grade, that likelihood rises to over 85% (see Table 4.2). Higher current smoking rates among male students were found across all aspects of urbanicity and tobacco production (not shown).

Table 4.2: Gender / Gender Stratified by Grade Level

	Prevalence Female	Prevalence Male	X^2	*p*	phi	Odds Ratio	95% C.I.	
							Lower	Upper
Overall	8.0%	11.7%	999.786	.000	.062	1.524	1.484	1.564
6TH	1.7%	2.7%	95.900	.000	.035	1.634	1.480	1.804
8TH	6.3%	8.4%	128.300	.000	.041	1.369	1.296	1.445
10TH	11.9%	17.0%	296.566	.000	.072	1.507	1.438	1.580
12TH	15.6%	25.6%	730.837	.000	.124	1.862	1.779	1.949

Question two – "How is age/grade level associated with 'current smoking' among Georgia students?"

Advancement in age/grade level proved to be significantly associated with higher current smoking prevalence. When independent factors of gender, urbanicity and tobacco production were stratified, this association continued to hold true (see Tables 4.3 and 4.4). Odds ratios varied by urbanicity and tobacco production settings, but remained significant. When comparing the likelihood to smoke between 6th and 12th graders, odds ratios varied from a 7.7 times risk among female students in rural non-tobacco producing areas to a 15.4 times among male urban tobacco producing areas. Unexpected, for running contrary to multiple theories, finds an 8.6 times risk among males from rural tobacco producing areas; the second lowest risk statistic across all stratifications of gender, urbanicity and tobacco production.

Table 4.3: Grade Level / Grade Level stratified by Gender

	Overall				FEMALES				MALES			
	Prevalence	Odds Ratio	95% C.I.		Prevalence	Odds Ratio	95% C.I.		Prevalence	Odds Ratio	95% C.I.	
			Lower	Upper			Lower	Upper			Lower	Upper
6TH	2.2%				1.7%				2.7%			
8TH	7.4%	3.545	3.355	3.746	6.3%	3.942	3.611	4.304	8.4%	3.302	3.075	3.546
10TH	14.4%	7.489	7.099	7.900	11.9%	7.930	7.283	8.635	17.0%	7.315	6.828	7.836
12TH	20.4%	11.403	10.814	12.025	15.6%	10.829	9.949	11.787	25.6%	12.340	11.525	13.213
X^2	12989.300				4847.720				12989.300			
p	.000				.000				.000			
phi	.224				.192				.224			

Table 4.4: Grade Level Stratified by Gender and Locale

Female																
	Urban Non-Producing				Urban Producing				Rural Non-Producing				Rural Producing			
	Prev.	Odds Ratio	95% C.I.		Prev.	Odds Ratio	95% C.I.		Prev.	Odds Ratio	95% C.I.		Prev.	Odds Ratio	95% C.I.	
			Upper	Lower			Upper	Lower			Upper	Lower			Upper	Lower
6th Grade	1.5%				1.7%				2.3%				1.5%			
8th Grade	5.7%	3.959	3.551	4.415	8.7%	5.637	3.691	8.611	7.9%	3.602	3.042	4.266	6.7%	4.545	2.895	7.135
10th Grade	11.1%	8.184	7.364	9.094	11.8%	7.923	5.159	12.167	14.0%	6.852	5.816	8.071	16.0%	12.096	7.815	18.722
12th Grade	15.0%	11.501	10.355	12.773	18.8%	13.766	8.940	21.199	17.1%	8.671	7.360	10.216	16.7%	12.746	8.289	19.600
Pearson's X^2	3423.819				203.616				991.022				256.592			
p	.000				.000				.000				.000			
phi	.190				.202				.191				.220			
Male																
	Urban Non-Producing				Urban Producing				Rural Non-Producing				Rural Producing			
	Prev.	Odds Ratio	95% C.I.		Prev.	Odds Ratio	95% C.I.		Prev.	Odds Ratio	95% C.I.		Prev.	Odds Ratio	95% C.I.	
			Upper	Lower			Upper	Lower			Upper	Lower			Upper	Lower
6th Grade	2.3%				2.8%				3.7%				4.4%			
8th Grade	7.6%	3.483	3.182	3.812	10.3%	4.022	2.853	5.669	10.5%	3.025	2.641	3.464	9.8%	2.368	1.751	3.203
10th Grade	16.1%	8.106	7.430	8.844	17.3%	7.298	5.163	10.318	19.0%	6.038	5.289	6.894	20.4%	5.575	4.194	7.411
12th Grade	24.0%	13.299	12.195	14.502	31.9%	16.400	11.592	23.203	29.0%	10.464	9.180	11.927	30.6%	9.629	7.300	12.700
Pearson's X^2	5818.049				384.440				1853.324				394.027			
p	.000				.000				.000				.000			
phi	.253				.285				.261				.280			

Question three – "How is urbanicity associated with 'current smoking' among Georgia students?

An overall analysis of urbanicity shows a statistically significant association with current smoking prevalence among Georgia adolescents. The association continues to hold when the sample is stratified by tobacco production, with rural youth showing a 30% greater risk of smoking in non-tobacco producing regions and a 70% greater chance of smoking in tobacco producing regions (see Table 4.5). However, when the sample is further stratified by gender and grade, the results become less consistent. Urbanicity remains a statistically significant factor among female and male students of all grade levels in tobacco non-producing districts, but only retains significance in tobacco producing districts among 10th grade students, both female and male (see Table 4.6).

Table 4.5: Urbanicity / Urbanicity stratified by Tobacco Production

	Overall				TOBACCO NON-PRODUCING				TOBACCO PRODUCING			
	Prevalence	Odds Ratio	95% C.I.		Prevalence	Odds Ratio	95% C.I.		Prevalence	Odds Ratio	95% C.I.	
			Lower	Upper			Lower	Upper			Lower	Upper
Urban	9.1%				9.1%				9.0%			
Rural	11.7%	1.318	1.281	1.356	11.6%	1.301	1.264	1.340	14.5%	1.701	1.467	1.972
Pearson's X^2	361.651				314.682				49.851			
p	.000				.000				.000			
phi	.037				.035				.084			

Table 4.6: Urbanicity stratified by Grade and Gender

	Urban	Rural	X^2	*p*	phi	Odds Ratio	95% C.I.	
							Lower	Upper
FEMALE – NON-TOBACCO PRODUCING								
6TH	1.5%	2.2%	19.687	.000	.023	1.464	1.236	1.734
8TH	5.8%	7.8%	42.986	.000	.034	1.360	1.240	1.491
10TH	11.2%	14.0%	40.269	.000	.037	1.295	1.195	1.402
12TH	15.1%	16.8%	10.317	.001	.021	1.137	1.051	1.230
Overall	7.5%	9.3%	110.899	.000	.029	1.274	1.218	1.333
MALE – NON-TOBACCO PRODUCING								
6TH	2.3%	3.8%	58.811	.000	.040	1.669	1.462	1.905
8TH	7.8%	10.5%	66.396	.000	.042	1.390	1.284	1.505
10TH	16.2%	18.9%	27.002	.000	.031	1.207	1.124	1.296
12TH	24.2%	28.9%	49.836	.000	.047	1.274	1.191	1.362
Overall	10.9%	13.8%	197.193	.000	.040	1.315	1.266	1.366
FEMALE – TOBACCO PRODUCING								
6TH	1.1%	1.5%	.280	.597	.016	1.332	.459	3.866
8TH	8.1%	5.5%	2.459	.117	.046	.658	.389	1.114
10TH	12.4%	20.0%	8.297	.004	.103	1.759	1.194	2.591
12TH	18.6%	20.1%	.174	.676	.017	1.095	.714	1.680
Overall	7.8%	11.3%	13.094	.000	.060	1.514	1.208	1.897
MALE – TOBACCO PRODUCING								
6TH	3.0%	4.4%	1.639	.200	.038	1.510	.800	2.850
8TH	8.3%	8.8%	.062	.804	.008	1.061	.665	1.694
10TH	16.7%	25.7%	9.289	.002	.110	1.721	1.211	2.445
12TH	31.2%	34.9%	.764	.382	.038	1.182	.812	1.721
Overall	10.3%	17.7%	39.135	.000	.106	1.862	1.529	2.267

Question four – "How is local tobacco production associated with 'current smoking' among Georgia students?

While an overall analysis of tobacco production shows a statistically significant association between tobacco production and current smoking prevalence, when the sample set is stratified by urbanicity, a degree of inconsistency in that association becomes apparent. Among urban school districts, current smoking prevalence is actually higher in non-tobacco producing

regions than in those that produce tobacco, although the difference does not rise to a level of statistical significance (see Table 4.7). When the sample is further stratified by gender and grade, the results become even more inconsistent. At this level of analysis, tobacco production only achieves a level of statistical significance among 8th grade urban females, 10th grade rural females and 10 and 12th grade rural males (see Table 4.8).

Table 4.7: Tobacco Production / Tobacco Production stratified by Urbanicity

	Overall				Urban				Rural			
	Prevalence	Odds Ratio	95% C.I.		Prevalence	Odds Ratio	95% C.I.		Prevalence	Odds Ratio	95% C.I.	
			Lower	Upper			Lower	Upper			Lower	Upper
Non-Producing	9.7%				9.1%	1.013	.912	1.126	11.6%			
Producing	11.2%	1.167	1.083	1.258	9.0%				14.5%	1.290	1.158	1.436
Pearson's X^2	16.265				.049				21.307			
p	.000				.824				.000			
phi	.008				.001				.018			

Table 4.8 Tobacco Production stratified by Gender, Grade and Urbanicity

	Non-Producing	Producing	X^2	*p*	phi	Odds Ratio	95% C.I.	
							Lower	Upper
URBAN FEMALE								
6TH	1.5%	1.1%	.519	.471	.005	.731	.362	1.478
8TH	5.8%	8.1%	7.202	.007	.016	1.432	1.108	1.851
10TH	11.2%	12.4%	.616	.432	.006	1.132	.853	1.503
12TH	15.1%	18.6%	1.859	.173	.011	1.289	.916	1.814
Overall	7.5%	7.8%	.253	.615	.002	1.045	.892	1.224
URBAN MALE								
6TH	2.3%	3.0%	1.041	.308	.007	1.285	.835	1.978
8TH	7.8%	8.3%	.195	.659	.003	1.072	.822	1.398
10TH	16.2%	16.7%	.057	.810	.002	1.041	.804	1.350
12TH	24.2%	31.2%	5.020	.025	.018	1.420	1.055	1.913
Overall	10.9%	10.3%	.561	.454	.003	.945	.820	1.089
RURAL FEMALE								
6TH	2.2%	1.5%	.653	.419	.010	.665	.294	1.508
8TH	7.8%	5.5%	2.066	.151	.016	.693	.434	1.108
10TH	14.0%	20.0%	8.992	.003	.036	1.538	1.167	2.028
12TH	16.8%	20.1%	2.275	.131	.020	1.242	.949	1.624
Overall	9.3%	11.3%	6.197	.013	.014	1.241	1.050	1.468
RURAL MALE								
6TH	3.8%	4.4%	.229	.632	.006	1.163	.716	1.888
8TH	10.5%	8.8%	.826	.363	.010	.818	.552	1.212
10TH	18.9%	25.7%	9.494	.002	.037	1.485	1.159	1.901
12TH	28.9%	34.9%	4.898	.027	.029	1.318	1.039	1.673
Overall	13.8%	17.7%	16.022	.000	.023	1.338	1.161	1.541

CHAPTER V

DISCUSSION AND CONCLUSION

The objective of the Demographic Associations of Tobacco Use Among Georgia Secondary Students was to examine the impact of known risk factors for adolescent smoking among Georgia Middle and High School students with regards to the prevalence of "Current Smoking" (smoked ≥ 1 day in past 30 days). As mentioned in earlier chapters, the purpose of this study was to determine the answers to the following questions.

1. How is gender associated with 'current smoking' among Georgia students?
2. How is age/grade level associated with 'current smoking' among Georgia students?
3. How is urbanicity associated with 'current smoking' among Georgia students?
4. How is local tobacco production associated with 'current smoking' among Georgia students?

5.1 Study Strengths and Limitations

A main strength of the study was that participants came from both urban and rural areas, which can provide a better representation of the state of Georgia as a whole. Another study strength is the large sample size (in excess of one-quarter million) which can result in decreased sampling error.

A main study limitation was the reliance of the accuracy of self-reporting. Self-report in adolescent surveys can suffer from social-desirability and recall bias. Another limitation of the

study is that the sample size dropped 38.5% percent between 6th and 12th grade. A significant decrease in sample size can decrease the statistical significance of the results. Finally, GSHS II sample ethnicity data was not available for analysis. Ethnicity data can be especially helpful in addressing disparities in development and behavior across minority groups. Additionally, a clear and comprehensive picture of the population at risk can ensure that program planners and educators are targeting appropriate groups.

5.2 Implications of Findings

The findings from the analyses of Gender, Age/Grade Level, Urbanicity and Tobacco Production indicate that male students and older students exhibit a higher prevalence of smoking compared to females and younger students, respectively. When analysis was stratified by Gender, Grade and Tobacco Production, Urbanicity proved to be a significant predictor of smoking among students of all grade levels in non-tobacco producing areas and 10th grade students of both genders in tobacco producing areas, but not for 6th, 8th or 12th grade students. This lack of consistency regarding statistical relevance among students from tobacco producing areas suggests a lack of applicability of Urbanicity in studies with this population, although subjects from tobacco producing districts compromise such a small proportion of the overall sample that the possibility of confounding factors unique to those districts should be considered. Similarly, Tobacco Production showed a lack of consistency when analysis was stratified by Gender, Grade and Urbanicity. Statistical significance was only found among 8th grade urban females, 12th grade urban males, 10th grade rural females and 10th and 12th grade rural males. As with Urbanicity, this inconsistency in results may be indicative of confounding factors not revealed in this study. Adolescent smoking behaviors are predictive of adult smoking behaviors, so clearly, adolescence is the time to focus efforts on preventing and reducing smoking initiation.

The more numerous correlates that are apparent among smoking behaviors, the better able adolescent educators will be able to inform program development and funding.

5.3 Recommendations / Future Areas of Research

As research has demonstrated that the progression of tobacco use varies among different ethnic populations, the need for inclusion of ethnicity data in secondary student smoking prevalence is clear. With this in mind, an appropriate study of smoking prevalence by the ethnicity distribution unique to Georgia would be appropriate to further the efficient allocations of limited public health resources. Additionally, as the age of smoking initiation has been associated with levels of current smoking prevalence, this presents an opportunity to gain insight into smoking initiation patterns through GSHS II data, as such information is recorded by the existing instrument. While this particular study focused on the use of tobacco through cigarette smoking, one cannot ignore the other potential uses of tobacco by Georgia youth, be it either by snuff or chewing tobacco. An examination of the parallel or concurrent use of "smoke-less" tobacco with "smoked" tobacco should provide a clearer picture of the exposure of Georgia students to the hazards of tobacco.

As adolescent smoking trends may change over time, as seen in the YRBS (Centers for Disease Control, 2010c), the maturation of the GSHS II collective data set presents the opportunity to examine adolescent smoking trends in Georgia through a longitudinal study of subsequently collected data for a fuller understanding of local adolescent smoking trends, which could better inform local intervention efforts. Beginning in 2011, the GSHS II will be available to students of all grades throughout Georgia which has the potential of nearly doubling the size of sample available for study. Revisiting the study questions utilized here with such a larger

sample set may offer insight into relatively small sub-populations such as rural students or those from tobacco producing districts that were unavailable using the 2009 data set. In addition future survey instruments might consider measuring smoking quantity along with smoking frequency as well as the degree of youth personal involvement with tobacco cultivation in order to discern more granular associations with adolescent smoking.

5.4 Conclusion

As with adult smoking, adolescent smoking does not occur in a vacuum, and a variety of individual and situational factors influence adolescent smoking behavior. As a result of the analysis of demographic associations of tobacco use among Georgia secondary students**,** risk factors associated with smoking among adolescents have been identified. While contextual factors impact smoking rates, the relationship is neither clear nor consistent. Although the application of theory to explain key variables has provided insight into the dynamics of smoking among students, many fundamental questions remain unanswered. For example, why some youth initiate but stop smoking, whereas others experiment and later become adult smokers, or how contexts such as social environment, family processes, and physiological characteristics may influence longitudinal patterns of smoking. Although certain variables such as age, gender, and urbanicity are associated with smoking patterns, the interrelation among social and demographic variables is likely to be of greater importance for understanding the progression of smoking behaviors than any single variable in isolation.

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Appendix

2009 GSHS II Results – School District Current Smoker Prevalence / Sample Size by Grade Displayed by District of Community Health (DCH)

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
1.1	Bartow County	7.60%	2,316	2.12%	1,037	9.09%	902	16.32%	190	21.93%	187
1.1	Bremen City	12.07%	522	2.08%	144	3.73%	134	15.25%	118	29.37%	126
1.1	Calhoun City	8.66%	797	2.11%	237	2.05%	195	10.84%	203	23.46%	162
1.1	Cartersville City	9.80%	765	0.37%	273	6.83%	161	15.64%	211	25.00%	120
1.1	Catoosa County	16.68%	917	0.93%	107	8.33%	84	19.77%	430	20.27%	296
1.1	Chattooga County	11.92%	537	6.53%	199	10.53%	190	20.41%	147	100.00%	1
1.1	Chickamauga City	5.60%	357	0.00%	118	0.00%	109	2.04%	49	23.46%	81
1.1	Dade County	9.82%	448	1.84%	163	9.15%	164	15.63%	64	28.07%	57
1.1	Floyd County	12.04%	2,142	3.20%	687	8.82%	669	20.90%	421	24.38%	365
1.1	Gordon County	11.87%	1,104	2.52%	317	12.43%	362	17.13%	216	19.62%	209
1.1	Haralson County	10.24%	1,162	1.18%	339	7.37%	339	18.47%	249	18.72%	235
1.1	Paulding County	8.72%	5,450	0.88%	1,828	7.29%	1,742	14.26%	1,094	22.39%	786
1.1	Polk County	15.41%	1,324	2.65%	378	17.62%	420	22.04%	304	23.87%	222
1.1	Rome City	13.42%	1,654	3.02%	431	11.40%	456	22.29%	489	17.27%	278
1.1	Trion City	11.42%	324	4.71%	85	12.35%	81	9.20%	87	21.13%	71
1.1	Walker County	15.34%	2,158	4.97%	563	11.82%	516	22.12%	624	22.86%	455
1.2	Cherokee County	10.73%	8,519	1.10%	2,454	5.69%	2,338	16.20%	2,234	26.26%	1,493
1.2	Dalton City	8.24%	1,056	0.97%	103	6.49%	154	8.87%	485	10.51%	314
1.2	Fannin County	9.80%	663	5.22%	230	8.45%	213	12.12%	132	21.59%	88
1.2	Gilmer County	8.46%	827	2.90%	310	5.88%	289	15.32%	111	23.08%	117
1.2	Murray County	12.98%	1,965	0.38%	526	12.83%	538	17.98%	495	23.40%	406
1.2	Pickens County	12.35%	947	2.69%	372	8.68%	311	27.74%	155	33.94%	109
1.2	Whitfield County	9.73%	2,426	1.59%	690	5.87%	647	16.18%	649	18.64%	440

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
2	Banks County	15.81%	677	2.23%	179	10.11%	188	25.15%	171	29.50%	139
2	Dawson County	17.71%	864	0.83%	242	7.09%	254	34.58%	214	38.31%	154
2	Forsyth County	7.01%	6,006	0.85%	2,111	3.92%	1,556	10.87%	1,224	18.74%	1,115
2	Franklin County	9.92%	847	2.01%	298	7.18%	209	13.86%	166	22.99%	174
2	Gainesville City	9.29%	936	5.54%	343	9.38%	405	7.29%	96	25.00%	92
2	Habersham County	7.69%	988	2.05%	487	10.00%	380	18.00%	50	26.76%	71
2	Hall County	7.52%	4,639	1.53%	1,375	5.20%	1,288	11.63%	929	14.61%	1,047
2	Hart County	13.50%	563	0.00%	1	9.47%	264	15.38%	195	20.39%	103
2	Lumpkin County	8.65%	497	1.88%	160	10.14%	217	15.09%	106	14.29%	14
2	Rabun County	12.03%	1,164	0.57%	348	3.76%	266	16.33%	294	31.25%	256
2	Stephens County	9.18%	1,546	2.32%	604	9.77%	532	14.29%	196	22.43%	214
2	Towns County	11.29%	496	1.20%	166	13.95%	172	18.00%	100	20.69%	58
2	Union County	14.77%	501	1.65%	121	3.96%	101	22.88%	153	26.19%	126
2	White County	12.69%	922	1.75%	285	4.38%	274	24.38%	242	33.88%	121

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
3.1	Cobb County	7.76%	4,487	0.88%	1,138	3.45%	1,160	11.23%	1,113	16.08%	1,076
3.1	Douglas County	7.69%	4,904	1.33%	1,280	4.89%	1,471	10.74%	1,164	16.48%	989
3.1	Marietta City	6.65%	1,413	0.63%	477	8.52%	458	9.76%	287	12.57%	191
3.2	Atlanta Public Schools	4.77%	4,297	1.36%	1,398	5.21%	1,460	7.33%	791	8.02%	648
3.2	Fulton County	7.86%	11,513	1.48%	3,382	4.44%	3,806	12.22%	2,259	19.85%	2,066
3.3	Clayton County	6.66%	7,909	2.23%	2,731	4.68%	2,545	10.21%	1,479	16.98%	1,154
3.4	Buford City	7.98%	764	0.00%	210	5.83%	206	10.55%	199	18.79%	149
3.4	Gwinnett County										
3.4	Newton County	15.38%	130					11.58%	95	25.71%	35
3.4	Rockdale County	8.32%	7,140	1.96%	2,144	4.70%	2,128	11.32%	1,290	19.39%	1,578
3.5	Decatur City	9.69%	516	0.55%	183	8.70%	115	14.84%	155	25.40%	63
3.5	DeKalb County	6.51%	12,408	2.14%	3,981	5.81%	4,271	9.46%	2,168	13.58%	1,988

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
4	Butts County	14.78%	345	0.00%	44	4.88%	123	30.00%	90	20.45%	88
4	Carroll County	11.52%	2,474	1.96%	765	7.28%	852	19.05%	483	31.02%	374
4	Carrollton City	9.96%	1,004	3.30%	303	9.76%	297	12.68%	205	17.59%	199
4	Coweta County	12.18%	4,164	1.77%	1,297	6.71%	1,192	21.93%	1,067	27.96%	608
4	Fayette County	10.63%	3,885	0.91%	993	2.80%	857	15.41%	1,103	22.53%	932
4	Heard County	10.04%	548	2.68%	149	10.81%	148	15.33%	150	11.88%	101
4	Henry County	8.41%	1,511	4.41%	272	9.47%	243	5.62%	516	13.13%	480
4	Lamar County	13.20%	553	2.96%	169	9.16%	131	21.48%	149	23.08%	104
4	Meriwether County	11.97%	710	2.47%	162	7.65%	196	19.27%	192	18.13%	160
4	Pike County	15.00%	940	5.36%	261	13.28%	271	18.22%	214	26.80%	194
4	Spalding County	5.79%	1,934	3.71%	970	7.78%	848	9.09%	66	8.00%	50
4	Thomaston-Upson County	18.88%	466	1.08%	93	20.00%	70	26.62%	139	21.95%	164
4	Troup County	11.16%	4,138	2.13%	1,128	9.24%	1,320	13.96%	874	23.77%	816

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
5.1	Bibb County	9.85%	4,996	3.38%	1,540	9.05%	1,625	13.73%	1,020	18.87%	811
5.1	Bleckley County	14.10%	553	1.96%	153	10.24%	127	21.53%	144	24.03%	129
5.1	Dodge County	12.24%	735	3.76%	186	11.16%	215	11.46%	192	26.06%	142
5.1	Dublin City	7.47%	442	4.17%	168	5.04%	119	13.58%	81	12.16%	74
5.1	Johnson County	7.69%	247	3.66%	82	7.84%	51	12.31%	65	8.16%	49
5.1	Laurens County	14.21%	1,154	3.81%	236	9.62%	260	17.24%	319	22.12%	339
5.1	Montgomery County	13.49%	289	5.19%	77	9.88%	81	14.10%	78	30.19%	53
5.1	Pulaski County	13.41%	410	5.61%	107	8.91%	101	17.17%	99	22.33%	103
5.1	Putnam County	3.51%	57					4.44%	45	0.00%	12
5.1	Telfair County	17.22%	662	10.71%	168	14.14%	198	18.84%	138	26.58%	158
5.1	Treutlen County	12.98%	570	3.19%	188	15.56%	180	12.50%	96	26.42%	106
5.1	Wheeler County	13.43%	216	0.00%	52	13.33%	60	21.43%	56	18.75%	48
5.1	Wilcox County	21.98%	323	3.80%	79	21.69%	83	28.57%	91	34.29%	70
5.2	Baldwin County	7.62%	748	2.51%	319	10.96%	301	12.20%	41	12.64%	87
5.2	Crawford County	17.86%	168			16.67%	78	20.24%	84	0.00%	6
5.2	Hancock County	4.35%	138	3.13%	64	5.41%	74				
5.2	Houston County	9.68%	5,384	0.66%	1,357	4.12%	1,482	14.34%	1,597	23.42%	948
5.2	Jasper County	9.07%	529	0.00%	141	6.21%	161	15.91%	132	17.89%	95
5.2	Jones County	8.71%	953	1.27%	395	8.29%	362	15.48%	84	31.25%	112
5.2	Monroe County	7.69%	637	1.11%	180	10.24%	205	10.32%	252		
5.2	Peach County	5.90%	271	2.22%	135	9.56%	136				
5.2	Twiggs County	9.26%	108	1.79%	56	18.37%	49			0.00%	3
5.2	Washington County	8.86%	779	2.15%	186	7.65%	183	9.68%	217	15.54%	193
5.2	Wilkinson County	13.50%	326	9.30%	86	9.38%	64	19.28%	83	15.05%	93

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
6	Burke County	14.49%	849	5.97%	201	13.67%	278	14.95%	194	25.00%	176
6	Columbia County	11.53%	5,952	2.16%	1,618	8.60%	1,535	15.09%	1,590	23.08%	1,209
6	Emanuel County	9.28%	1,164	3.14%	287	7.58%	330	13.95%	294	13.04%	253
6	Glascock County	15.32%	124	0.00%	27	2.44%	41	20.69%	29	44.44%	27
6	Jefferson County	8.71%	459	7.65%	183	8.42%	190	14.58%	48	7.89%	38
6	Jenkins County	10.42%	336	4.55%	88	2.08%	96	10.71%	84	29.41%	68
6	Lincoln County										
6	McDuffie County	12.86%	1,003	1.34%	149	8.64%	220	14.55%	323	19.61%	311
6	Richmond County	9.15%	11,344	2.38%	3,284	7.15%	3,330	13.92%	2,730	17.10%	2,000
6	Screven County	12.14%	1,334	3.61%	332	3.61%	388	16.34%	306	27.92%	308
6	Taliaferro County	0.00%	24	0.00%	6	0.00%	18				
6	Warren County	6.18%	178	6.52%	46	2.38%	42	8.33%	48	7.14%	42
6	Wilkes County	9.69%	413	4.42%	113	8.62%	116	11.71%	111	16.44%	73

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
7	Chattahoochee County	6.74%	89	1.92%	52	13.51%	37				
7	Clay County	9.09%	44	0.00%	23	19.05%	21				
7	Crisp County	5.93%	573	3.13%	288	8.77%	285				
7	Dooly County	3.25%	246	1.12%	89	4.17%	96	3.57%	28	6.06%	33
7	Harris County	13.42%	1,237	1.85%	324	5.31%	320	17.28%	243	28.86%	350
7	Macon County	4.63%	367	5.36%	112	4.17%	120	3.57%	56	5.06%	79
7	Marion County	11.82%	330	10.53%	76	8.57%	105	14.47%	76	15.07%	73
7	Muscogee County	9.07%	6,420	1.17%	1,535	6.77%	1,699	12.23%	1,741	16.33%	1,445
7	Quitman County	5.97%	67	3.70%	27	3.70%	27	100.00%	1	8.33%	12
7	Randolph County	10.91%	660	2.27%	176	10.87%	184	22.58%	124	11.36%	176
7	Schley County										
7	Stewart County	8.06%	248	2.63%	76	10.26%	78	3.70%	54	20.00%	40
7	Sumter County	10.71%	2,204	3.68%	706	14.49%	552	12.01%	566	16.32%	380
7	Talbot County	20.71%	338	2.44%	82	32.56%	86	15.38%	78	30.43%	92
7	Taylor County	11.73%	1,142	1.44%	278	11.26%	302	14.38%	320	20.66%	242
7	Webster County										

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
8.1	Ben Hill County	12.89%	613	5.71%	70	13.16%	190	13.44%	186	14.97%	167
8.1	Berrien County	15.83%	739	4.95%	202	10.50%	219	26.32%	171	26.53%	147
8.1	Brooks County	9.71%	515	5.07%	138	6.04%	149	15.27%	131	14.43%	97
8.1	Cook County	15.60%	686	5.17%	116	6.99%	229	19.17%	193	32.43%	148
8.1	Echols County	3.83%	183	0.00%	55	0.00%	46	2.56%	39	13.95%	43
8.1	Irwin County	11.81%	432	3.97%	126	5.05%	99	20.00%	110	19.59%	97
8.1	Lanier County	14.95%	408	5.04%	119	10.38%	106	24.07%	108	24.00%	75
8.1	Lowndes County	9.34%	2,195	2.58%	737	11.23%	775	9.50%	400	21.55%	283
8.1	Tift County	9.64%	3,112	1.82%	1,100	8.73%	1,008	15.77%	710	27.21%	294
8.1	Turner County	11.73%	375	2.68%	112	7.50%	80	12.77%	94	25.84%	89
8.1	Valdosta City	8.01%	1,573	1.81%	443	6.68%	419	13.40%	403	11.69%	308
8.2	Baker County	8.60%	93	0.00%	27	11.54%	26	5.88%	17	17.39%	23
8.2	Calhoun County										
8.2	Colquitt County	11.44%	1,469	2.58%	466	11.34%	538	22.38%	210	18.82%	255
8.2	Decatur County	11.24%	427	3.29%	213			16.39%	122	22.83%	92
8.2	Dougherty County	6.38%	3,760	1.54%	844	5.02%	1,435	9.35%	856	12.00%	625
8.2	Early County	13.63%	587	7.28%	151	16.09%	174	13.04%	138	18.55%	124
8.2	Grady County	14.70%	898	7.21%	305	15.75%	292	18.44%	141	23.75%	160
8.2	Lee County	11.00%	1,218	3.07%	456	12.62%	404	17.65%	170	20.74%	188
8.2	Miller County										
8.2	Mitchell County	7.94%	340	6.06%	132	9.63%	135	20.00%	5	7.35%	68
8.2	Pelham City	9.01%	222	9.17%	109	8.85%	113				
8.2	Seminole County	15.01%	906	13.71%	248	4.80%	250	16.83%	202	27.18%	206
8.2	Terrell County	15.20%	250					20.00%	150	8.00%	100
8.2	Thomas County	10.56%	1,894	2.65%	680	9.76%	676	19.51%	82	21.93%	456
8.2	Thomasville City	7.82%	499	5.03%	179	9.46%	148	8.54%	82	10.00%	90
8.2	Worth County	18.01%	805	2.98%	168	14.86%	249	22.43%	214	31.61%	174

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
9.1	Bryan County	11.13%	1,474	0.60%	504	6.00%	400	19.06%	278	28.77%	292
9.1	Camden County	4.65%	1,355	1.02%	591	4.53%	640	7.69%	26	26.53%	98
9.1	Chatham County	7.63%	3,290	2.96%	1,082	9.14%	1,028	8.89%	709	13.16%	471
9.1	Effingham County	11.97%	2,549	2.60%	846	9.40%	702	17.35%	582	27.68%	419
9.1	Glynn County	7.93%	2,170	1.52%	792	6.83%	776	16.86%	261	18.48%	341
9.1	Liberty County	12.57%	1,726	2.88%	208	9.82%	275	12.01%	666	18.02%	577
9.1	Long County	17.15%	239	8.93%	56	10.20%	49	16.25%	80	33.33%	54
9.1	McIntosh County	13.03%	445	1.02%	98	7.38%	122	16.26%	123	27.45%	102
9.2	Appling County	21.18%	491	2.22%	135	12.50%	40	28.91%	128	31.38%	188
9.2	Atkinson County	8.43%	332	2.88%	104	2.88%	104	19.64%	56	16.18%	68
9.2	Bacon County	7.89%	393	1.29%	155	7.21%	111	16.67%	96	16.13%	31
9.2	Brantley County	11.99%	834	2.94%	238	8.47%	236	17.50%	200	23.75%	160
9.2	Bulloch County	12.92%	2,035	1.26%	633	11.30%	584	18.47%	471	29.39%	347
9.2	Candler County	14.81%	459	2.31%	130	19.44%	108	19.09%	110	20.72%	111
9.2	Charlton County	10.71%	336			13.49%	126	9.62%	104	8.49%	106
9.2	Clinch County	5.74%	209	6.38%	94	7.50%	40	3.85%	52	4.35%	23
9.2	Coffee County	7.45%	1,181	2.83%	353	7.24%	539	8.86%	158	19.08%	131
9.2	Evans County	10.10%	386	0.87%	115	5.10%	98	16.83%	101	22.22%	72
9.2	Jeff Davis County	9.77%	645	3.65%	192	6.36%	173	16.78%	149	15.27%	131
9.2	Pierce County	13.05%	835	1.23%	243	5.42%	203	19.09%	220	31.36%	169
9.2	Tattnall County	10.63%	1,486	2.96%	406	6.02%	332	13.08%	428	21.88%	320
9.2	Toombs County	10.17%	1,396	1.80%	444	6.57%	396	16.30%	270	22.38%	286
9.2	Vidalia City	9.08%	595	1.18%	170	3.64%	165	18.95%	153	15.89%	107
9.2	Ware County	12.00%	1,217	4.14%	290	8.26%	351	13.92%	316	23.46%	260
9.2	Wayne County	13.72%	1,144	2.15%	325	12.01%	333	17.56%	262	28.57%	224

DCH	School District Name	Overall Current Smoker Prevalence	Overall Study N	6th Grade Current Smoker Prevalence	6th Grade Study N	8th Grade Current Smoker Prevalence	8th Grade Study N	10th Grade Current Smoker Prevalence	10th Grade Study N	12th Grade Current Smoker Prevalence	12th Grade Study N
10	Barrow County	11.12%	2,481	1.97%	861	7.89%	837	19.85%	408	29.87%	375
10	Clarke County	11.55%	952	4.11%	146	8.75%	160	10.68%	337	17.48%	309
10	Commerce City	3.02%	828	0.00%	98	2.27%	88	2.64%	569	10.96%	73
10	Elbert County	10.45%	708	1.23%	162	7.30%	233	8.07%	161	27.63%	152
10	Greene County										
10	Jackson County	9.20%	1,467	1.68%	535	3.70%	405	21.18%	288	20.92%	239
10	Jefferson City	6.97%	703	0.55%	182	4.46%	202	10.23%	176	14.69%	143
10	Madison County	16.71%	1,047	1.97%	254	10.27%	224	18.53%	313	34.77%	256
10	Morgan County										
10	Oconee County	7.15%	1,328	0.46%	432	4.30%	442	9.68%	186	20.90%	268
10	Oglethorpe County	10.31%	640	2.12%	189	7.78%	167	16.34%	153	18.32%	131
10	Social Circle City	17.12%	333	3.90%	77	9.33%	75	19.64%	112	36.23%	69
10	Walton County	12.11%	2,981	1.63%	797	10.01%	859	16.50%	824	25.15%	501