Sexual behaviors and substance use behaviors among North Carolina's high school students: Implications for health care providers wanting to reach teens at risk.

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Abstract:

Parents of adolescents, health care professionals, teachers, school administrators, and community organizations are all concerned about health risk behaviors among adolescents. Use of alcohol, tobacco, and other drugs, lack of physical activity, sexual risk-taking, and behaviors that put students at risk for injuries have been identified by the Centers for Disease Control and Prevention (CDC) as priority areas for surveillance and intervention for adolescents. These behaviors represent significant preventable causes of morbidity and mortality for adolescents [1]. In addition to compromising the current health status of young people, risk behaviors initiated during adolescence result in adverse health consequences in adulthood and in significant social and financial costs [2]

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Article:

Parents of adolescents, health care professionals, teachers, school administrators, and community organizations are all concerned about health risk behaviors among adolescents. Use of alcohol, tobacco, and other drugs, lack of physical activity, sexual risk-taking, and behaviors that put students at risk for injuries have been identified by the Centers for Disease Control and Prevention (CDC) as priority areas for surveillance and intervention for adolescents. These behaviors represent significant preventable causes of morbidity and mortality for adolescents [1]. In addition to compromising the current health status of young people, risk behaviors initiated during adolescence result in adverse health consequences in adulthood and in significant social and financial costs [2]

As we come into a new age of health care reform, it is essential that improvements in the health of children continue. Collecting data on issues that have a significant impact on students and families is critical to understanding the health needs of students. Healthy children learn better, and as data continue to show correlations between youth risk behaviors and academic performance [3-5], it becomes imperative that we develop prevention strategies that minimize these risks and create healthy environments for youth. Identification of health risk behaviors among youth is integral to guiding our efforts to reduce these behaviors and to improve the health of adolescents and young adults, in part by identifying health care needs in this population.

In North Carolina, population-based surveys of high school students suggest that during their high school years, most students engage in multiple behaviors that put their health and safety at risk [1, 6, 7]. In 2009, 74% of all deaths among North Carolinians aged 15-24 years resulted from only 4 causes: motor vehicle injuries, other intentional injuries, homicide, and suicide [8]. These leading causes of death are linked to risk behaviors including use of alcohol or drugs, the carrying of weapons, and failure to wear a seatbelt [9].

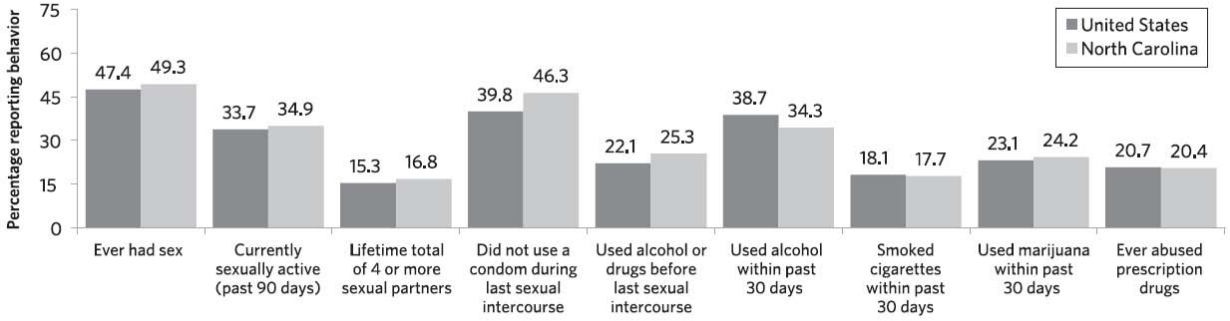
The CDC conducts a biennial Youth Risk Behavior Survey (YRBS) to monitor trends in key health risk behaviors among our nation's youth. In addition to this national survey, there are also local surveys conducted by states and other entities. The North Carolina YRBS is conducted with oversight and coordination by the North Carolina Department of Public Instruction in collaboration with the Division of Public Health, North Carolina Department of Health and Human Services. This survey has been conducted in the state since 1993 and provides statewide data on a variety of mental and physical health and academic outcomes for high school students. The state data can be compared with national YRBS data to give a picture of how North Carolina high school students are behaving in relation to their peers throughout the United States.

We first present data on sexual and substance-use risk behaviors in North Carolina and in the nation as a whole, and then we present results showing associations of these risk behaviors with students' demographic and academic characteristics. Finally, we conclude with a discussion of the implications of these results for health care providers in North Carolina who have opportunities to identify and assist teens engaging in these risk behaviors.

Figure 1, which depicts results of the 2011 YRBS nationwide [10] and in North Carolina [11], shows the prevalence of sexual behaviors and substance use behaviors among high school students. The first 5 sets of bars in the figure show the prevalence of sexual risk behaviors in the United States and in North Carolina. For most of the sexual risk behaviors, North Carolina adolescents report behavior similar to that seen in the nation as a whole. In North Carolina in 2011, 49.3% (95% CI, 44.6-53.9) of high school students reported ever having had sexual intercourse. A smaller proportion, 34.9% (95% CI, 31.4-38.6), reported having had sex in the 3 months before the survey. About 1 in 6 students (16.8% [95% CI, 13.8-20.3]) had had 4 or more sexual partners in their lifetime. Strikingly, in both the country as a whole and in North Carolina,

about 1 in 4 sexually active high school students (in North Carolina, 25.3% [95% CI, 22.2-28.8]) reported having using alcohol or another drug before their most recent sexual encounter. Condom use was the only behavior in which North Carolina high school students differed significantly from teens nationally. Among high school students in North Carolina who were currently sexually active, 46.3% (95% CI, 42.1-50.6) did not use a condom the last time they had intercourse. This proportion is significantly (P = 0.01) greater than that found among high school students nationally, only 39.8% (95% CI, 37.1-42.5) of whom failed to use a condom.

FIGURE 1.
Selected Risk Behaviors Among High School Students in North Carolina and Nationwide in 2011.



Note. Data are from the 2011 United States and North Carolina Youth Risk Behavior Surveys [10, 11]. Percentages are weighted to account for the complex sampling design of the survey.

The right-hand portion of Figure 1 shows the prevalence of substance use behaviors, both in North Carolina and in the United States as a whole. These results show that although most high school students are not engaging in substance use, sizable proportions are using alcohol (in North Carolina, 34.3% [95% CI, 31.5-37.3] reported having done so in the past 30 days), and to a lesser extent, using marijuana (in North Carolina, 24.2% [95% CI, 21.7-26.9]) reported having done so in the past 30 days), abusing prescription drugs (in North Carolina, 20.4% [95% CI, 17.3-23.9] reported ever having done so), and smoking cigarettes (in North Carolina, 17.7% [95% CI, 14.9-20.9] had smoked within the past 30 days). The relatively low prevalence of current cigarette use is of importance, as it reflects a continuation of the decline in overall tobacco use among high school students in North Carolina and nationally.

Among North Carolina's high school students, what groups of students are most at risk of engaging in these behaviors? We performed logistic regression analyses to assess the associations of each of the health risk behavior outcomes with student demographic and academic characteristics. The results for sexual risk behaviors are shown in Table 1, and the results for substance use are shown in Table 2. First, with regard to sexual risk behaviors, girls are more likely than boys to be currently sexually active and are less likely to report that a condom was used during their most recent sexual encounter. However, girls are less likely than boys to report having used alcohol or drugs before their most recent sexual encounter. For most of the sexual risk behaviors (ie, ever had sex, currently sexually active, and lifetime total of 4 or more sexual partners), older students are more likely than younger students to have engaged in

the behavior. With regard to race or ethnicity, African Americans are more likely than their white peers to report having had sex in their lifetime. Students in all nonwhite racial or ethnic groups are more likely to report having had a total of 4 or more sexual partners in their lifetime than are white students. Finally, in assessing the associations of risk behaviors with academic achievement, we found that self-reported grades were highly associated with each of the sexual risk behaviors. Compared with students who reported receiving grades that were mostly As, students who reported receiving grades that were mostly Bs, Cs, Ds, or Fs were 2-6 times as likely to report that they have ever had sex, were currently sexually active, had had a total of 4 or more sexual partners in their lifetime, or used alcohol or drugs before their most recent sexual encounter. They were also less likely to report having used a condom the last time they had sex.

TABLE 1.
Associations Between Demographic and Academic Characteristics and Sexual Risk Behaviors Reported by North Carolina High School Students on the 2011 Youth Risk Behavior Survey

	Health Risk Behaviors				
Demographic and Academic Characteristics	Ever had sex AOR (95% CI)	Currently sexually active (past 90 days) AOR (95% CI)	Lifetime total of 4 or more sexual partners AOR (95% CI)	Condom use during last intercourse AOR (95% CI)	Alcohol/drug use before last intercourse AOR (95% CI)
Sex					
Male (Ref)	1.0	1.0	1.0	1.0	Ref
Female	0.915 (0.790-1.059)	1.303** (1.088-1.562)	0.751 (0.510-1.107)	0.654* (0.460-0.930)	0.581** (0.414-0.816)
Grade level					
Grade 9 (Ref)	1.0	1.0	1.0	1.0	1.0
Grade 10	1.431** (1.048-1.956)	1.561** (1.137-2.141)	1.173 (0.671-2.050)	1.183 (0.655-2.134)	1.090 (0.589-2.015)
Grade 11	2.700** (1.955-3.728)	2.721** (2.059-3.595)	2.380** (1.509-3.754)	0.761 (0.447-1.294)	1.123 (0.671-1.879)
Grade 12	4.096** (3.027-5.541)	4.015** (3.129-5.151)	3.198** (1.887-5.421)	0.783 (0.445-1.378)	1.266 (0.772-2.075)
Race/ethnicity					
White (Ref)	1.0	1.0	1.0	1.0	1.0
Black/African American	1.588** (1.148-2.198)	1.156 (0.899-1.488)	2.193** (1.405-3.423)	0.870 (0.564-1.342)	0.710 (0.431-1.172)
Hispanic/Latino	0.788 (0.548-1.132)	0.817 (0.534-1.249)	1.575* (1.022-2.425)	0.645 (0.346-1.201)	1.563 (0.745-3.279)
Other/multiple race/ethnicity	1.132 (0.697-1.838)	1.231 (0.753-2.012)	1.511** (0.897-2.546)	0.661 (0.394-1.109)	0.893 (0.443-1.798)
Self-reported grades					
Mostly As (Ref)	1.0	1.0	1.0	1.0	1.0
Mostly Bs	2.382** (1.789-3.170)	2.294** (1.764-2.984)	2.007* (1.170-3.445)	0.735 (0.503-1.072)	1.600 (0.842-3.036)
Mostly Cs	3.884** (2.945-5.117)	3.379** (2.662-4.290)	4.515** (2.465-8.270)	0.604* (0.406-0.899)	2.785* (1.290-6.012)
Mostly Ds/Fs	5.921** (3.569-9.823)	4.632** (2.791-7.688)	6.421** (3.616-11.402)	0.830 (0.410-1.680)	5.000** (1.895-13.192)

Note. AOR, adjusted odds ratio; CI, confidence interval; Ref, reference group. Values > 1 indicate increased likelihood (odds) of behavior; values < 1 indicate reduced likelihood. Values significantly different from the reference group value are marked with a single asterisk if P is less than 0.05 and with 2 asterisks if P is less than 0.01. All variables are self-reported by respondents. Adjusted odds ratios adjust for sex, grade level, race/ethnicity, and grades, and include survey weights to account for the complex sampling design of the survey. Data were from the North Carolina Youth Risk Behavior Survey for 2011 [11].

TABLE 2.
Associations Between Demographic and Academic Characteristics and Substance Use Risk Behaviors Reported by North Carolina High School Students on the 2011 Youth Risk Behavior Survey

Demographic and Academic Characteristics	Health Risk Behaviors			
	Alcohol use (past 30 days) AOR (95% CI)	Cigarette smoking (past 30 days) AOR (95% CI)	Marijuana use (past 30 days) AOR (95% CI)	Prescription drug abuse (lifetime) AOR (95% CI)
Sex				
Male (Ref)	1.0	1.0	1.0	1.0
Female	1.069 (0.814-1.405)	0.854 (0.607-1.200)	0.593** (0.437-0.805)	0.770* (0.616-0.963)
Grade level				
Grade 9 (Ref)	1.0	1.0	1.0	1.0
Grade 10	1.246 (0.841-1.848)	1.094 (0.736-1.624)	1.455 (0.933-2.271)	1.097 (0.752-1.601)
Grade 11	1.893** (1.333-2.688)	1.335 (0.858-2.079)	1.857** (1.295-2.664)	1.217 (0.803-1.844)
Grade 12	2.034** (1.460-2.834)	2.272** (1.406-3.669)	1.598** (1.183-2.160)	1.739* (1.149-2.631)
Race/ethnicity				
White (Ref)	1.0	1.0	1.0	1.0
Black/African American	0.447** (0.337-0.593)	0.386** (0.260-0.572)	1.108 (0.817-1.503)	0.354** (0.254-0.493)
Hispanic/Latino	1.038 (0.775-1.392)	0.883 (0.594-1.314)	0.840 (0.562-1.256)	0.648* (0.459-0.914)
Other/multiple race/ethnicity	0.807 (0.775-1.392)	1.020 (0.525-1.981)	1.249 (0.789-1.977)	0.944 (0.678-1.313)
Self-reported grades				
Mostly As (Ref)	1.0.	1.0	1.0	1.0
Mostly Bs	1.848** (1.341-2.546)	2.120** (1.444-3.112)	1.570** (1.202-2.050)	1.448** (1.118-1.876)
Mostly Cs	4.127** (2.749-6.198)	5.111** (3.201-8.158)	3.758** (2.295-6.154)	2.975** (2.143-4.131)
Mostly Ds/Fs	7.287** (3.729-14.238)	10.189** (5.721-18.148)	7.040** (3.647-13.590)	4.401** (2.345-8.260)

Note. AOR, adjusted odds ratio; CI, confidence interval; Ref, reference group. Values > 1 indicate increased likelihood (odds) of behavior; values < 1 indicate reduced likelihood. Values significantly different from the reference group value are marked with a single asterisk if P is less than 0.05 and with 2 asterisks if P is less than 0.01. All variables are self-reported by respondents. Adjusted odds ratios adjust for sex, grade level, race/ethnicity, and grades, and include survey weights to account for the complex sampling design of the survey. Data were from the North Carolina Youth Risk Behavior Survey for 2011 [11].

When we look at substance use, there are some similarities and differences between substances in the characteristics of students more likely to use them. For alcohol use and cigarette use, there is no significant difference between girls and boys in likelihood of use. However, girls are less likely than boys to use marijuana or to abuse prescription drugs. In contrast to the pattern observed for sexual risk behaviors, our results show that nonwhite racial or ethnic groups were generally less likely to engage in substance use: African-American students were significantly less likely to engage in alcohol use, cigarette smoking, and prescription drug abuse than were their white peers. Hispanic students were also less likely to abuse prescription drugs than were white students. Each of the substance-use behaviors examined was more likely to be found among students in higher grades, particularly among 12th-grade students as compared with 9th graders. Finally, for each of these substance-use behaviors, students who reported lower grades were more likely to engage in the behavior than were students who reported receiving mostly As in school.

Discussion

Data from the 2011 North Carolina YRBS [11] were examined to establish the prevalence of key sexual and substance use behaviors among North Carolina's high school students, and to investigate associations of those behaviors with influential demographic characteristics (gender, race or ethnicity, and grade level) and academic achievement. Our results showed that these characteristics are frequently associated with the likelihood of engaging in these serious risks behaviors. In general, male students are more likely to engage in the selected health risk behaviors than are female students. Grade level also is important for many of the behaviors, with risk behaviors being engaged in by a greater proportion of students in higher grades. Race or ethnicity is also associated with risk, but not in a uniform way. Sexual risk behaviors appear to be more likely among some nonwhite groups of students, but substance use is generally more likely among white students. Finally, our results underscore the critical associations between health behaviors and academic achievement: For each of the risk behaviors examined, students with poor grades in school were more likely to have engaged in the risk behavior.

This brief analysis provides important insights into adolescent risk behavior among high school students and should be helpful to professionals needing to conceptualize such risk behavior as they work to improve the health and well-being of youth. Our results on the prevalence of sexual risk behaviors, for example, highlight the importance of screening adolescents for sexually transmitted infections in primary care settings, as is recommended by the Bright Futures guidelines of the American Academy of Pediatrics. Also consistent with the Bright Futures guidelines are our findings suggesting that psychosocial/behavioral and drug and alcohol assessment are needed within the school-age populations. There is no single clear "risk profile" that health care providers can use to identify youth potentially engaging in these risk behaviors, but there are signs including academic problems, that may put health care providers on the alert. Health care providers, teachers, school administrators, and parents should be aware of the potential for adolescents to engage in these risk behaviors and should work together to prevent that.

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