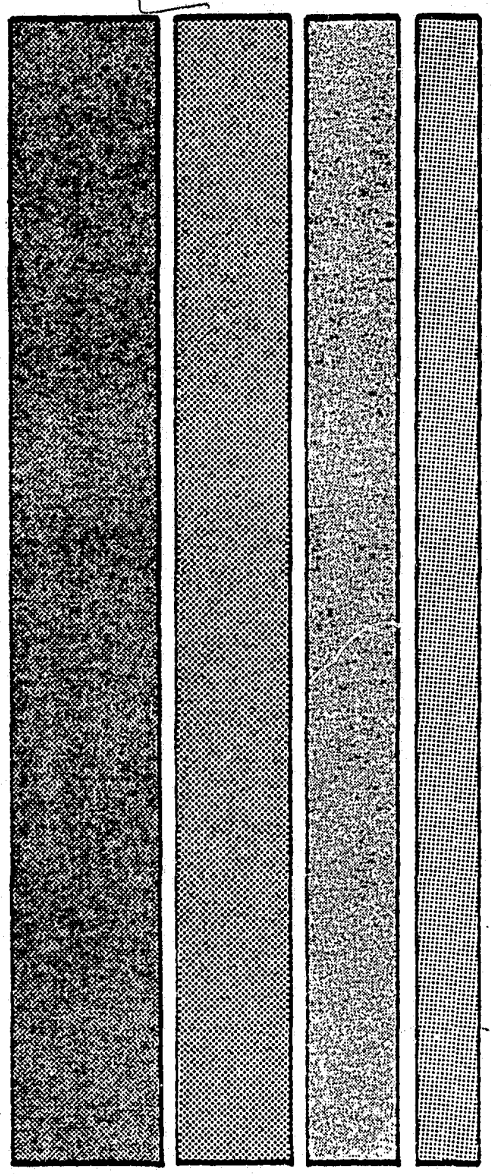
RP 0402

FACTS FOR PLANNING

Alcohol And Youth



NO. 1 Prevalence

NO. 2 Psychoactive Drug Use

NO. 3 Drinking Contexts

NO. 4 Alcohol Misuse

NO. 5 Marijuana and Alcohol

NO. 6 Parental Influence

NO. 7 Drinking and Driving

NO. 8 Alcohol Use Among Black Senior High School Students

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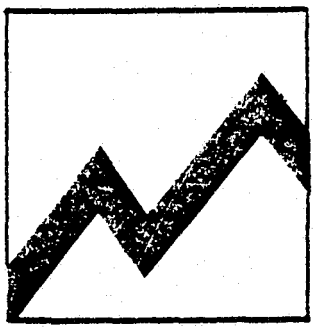

FACTS FOR PLANNING NO. 1

Prevalence of Alcohol Use Among U.S. Senior High School Students

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This regular feature reports National Institute on Alcohol Abuse and Alcoholism research findings useful to planners in developing policies and programs to prevent, reduce, or treat alcohol-related problems.

Editor's Note: The following article on the prevalence of alcohol use among senior high school students is the first in a series of *Facts for Planning* articles on youthful drinking practices. The series presents findings from national surveys conducted by the Research Triangle Institute, under contract to NIAAA's Laboratory of Epidemiology and Population Studies. Subsequent topics will include "Polydrug Use Among Senior High School Students," "Social Contexts of Drinking Among Senior High School Students," and "Driving While Intoxicated Among Senior High School Students."

Research findings are an important, but often scarce ingredient in the potpourri of factors that help shape program and policy planning. This article is the first in a series of *Facts for Planning* reports that provide local and State groups with research information to aid them in developing initiatives for addressing teenage drinking and its consequences.

Each article in the series is based on the Research Triangle Institute's (RTI) 1978 national probability survey of alcohol use among senior high school students in Grades 10, 11, and 12. Sampling was done by county nationwide (the 48 contiguous States) and is highly representative of the 11,180,409 senior high school students attending more than 20,000 public and parochial schools in the continental United States in the spring of 1978.

The RTI survey furnishes information both on the extent of alcohol use among the Nation's youth and on the consequences and psychosocial correlates of such use. This initial article concentrates on demographic variations in the extent of alcohol use among senior high school students. Findings on the consequences and psychological correlates will be examined in later articles.

Knowledge of extent, or prevalence, is basic to planning strategies to prevent or reduce problems that arise from alcohol use. Technically, prevalence is a statistic that represents an estimate of the number or proportion of individuals in a community, region, or nation who are affected by or exposed to a particular health-related condition, or who manifest a behavior or characteristic believed to be an indicator or precursor of the condition. Prevalence in this report is used in the second sense. It measures a social behavior—alcohol use—that for some teenagers is a precursor of a variety of problems (see Blane and Chafetz 1979 for discussions on the etiology and characteristics of alcohol-related problems among youth and on approaches to solving them).

The 1978 survey provides prevalence data based on reported frequency of drinking and quantity of alcohol consumed. Comparison of 1978

1978 RTI Survey: Highlights of Findings on Prevalence

- Most senior high school boys and girls have used alcohol by the time they reach the 10th grade.
- The frequency of alcohol use increases significantly between the 10th and 12th grades.
- The sharpest increase in heavy drinking among senior high school boys occurs between the 10th and 11th grades.
- More senior high school boys than girls use alcohol, but the gap is narrowing.
- The heaviest alcohol use among senior high school students occurs in the Northeast and North Central sections of the country.
- There is more alcohol use among suburban senior high school students than among those in big cities.
- Alcohol use among senior high school students nationwide has changed little in recent years, but has stabilized at a fairly high level since 1974.

findings with those from a similar survey conducted by RTI in 1974 show that levels of alcohol use among senior high school students were stable during this interval, albeit at fairly high levels (Rachal et al. 1980a).

This conclusion is consistent with findings from other studies (for example, Blane and Hewitt 1977). Results of one survey conducted as recently as 1980 disclose continuing stability in patterns of use (Johnston et al. 1981). Mounting evidence suggests that alcohol use among senior high school students reached a plateau in the 1970s —an indication that the RTI findings of 1978 also represent current use patterns in 1981.

National findings reported in this article can be used to support a number of general planning objectives. The findings provide information that can help identify potential local planning needs, assess characteristics of the target group, sensitize constituents to problems, or justify the need for new programs to funding agencies. The same set of findings are expected to have different implications for different planners, depending on local problems, priorities, and resources (see Conclusions).

In the sections that follow, findings are presented on demographic variations in the prevalence of alcohol use among the Nation's teenagers. Four measures of prevalence have been selected in order to provide planners with a wide range of estimates for assessing a variety of problems. Facts are reported on variations in the four measures related to basic planning units—social groups based on age and sex, regions, and communities. The racial/ethnic composition of geographic areas are shown to explain some unexpected findings by the RTI survey—the low prevalence of alcohol use in the West and in big cities and the high prevalence of weekly heavy drinking in "small places." At the end of this report, "Technical Notes" provide additional information on technical aspects of the RTI study and on the application of prevalence findings.

Measures of Alcohol Use

Variations in the extent of drinking among senior high school students are related in part to the particular measure used to estimate prevalence. For example, the number of students who have ever had a drink will always be greater than the number who drink weekly. Awareness of variations in prevalence produced by different measures enables planners to identify those measures most relevant to their needs, to make decisions about measures to include in local surveys on alcohol use, and to critically evaluate findings from other studies.

Findings presented here are based on four measures of prevalence provided by the RTI data. These are:

- *Weekly heavy drinking:* students who drink at least once a week and a large amount on each occasion (5 to 12 drinks or more than 2.7 oz. of ethanol)
- *Weekly drinking:* students who drink once a week or more often
- *Monthly drinking:* students who drink once a month or more often
- *Lifetime use:* students who have ever had a drink of wine, beer, or liquor—not just a sip or taste—at any time in their lives

The first three measures estimate the extent of alcohol use at the time of a study; the last measure estimates lifetime exposure to alcohol use. (The Technical Notes discuss the questions used to gather information by which respondents were classified on these measures.)

The four measures represent a hierarchy of alcohol use: *lifetime users* include students identified by the other three measures; *monthly drinkers* include students identified by weekly measures; *weekly drinkers* include *weekly heavy drinkers*. The inclusiveness of the measures and the extremes in prevalence estimates they produce are illustrated by the following estimated national numbers in 1978 and by figure 1:

- Over 1.6 million or nearly 15 percent of senior high school students are estimated to have been *weekly heavy drinkers*.
- Over 3 million or about 27 percent or senior high school students are estimated to have been *weekly drinkers*.
- More than 6.8 million or 62 percent of senior high school students are estimated to have been *monthly drinkers*.
- More than 9.6 million or 87 percent of senior high school students are estimated to have had at least one drink of beverage alcohol in their lifetimes.

These four measures have been selected to provide planners with estimates of sizes of teenage target groups that represent a range of levels of alcohol use. The more inclusive measures, such as *monthly*

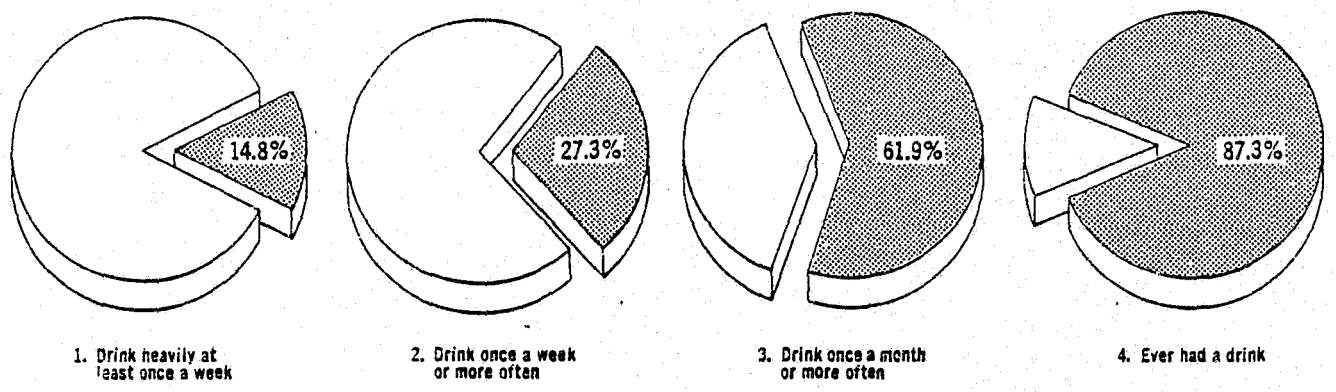


Figure 1. Prevalence of drinking among U.S. senior high school students, based on four measures of alcohol use, 1978

drinking, are useful for planning prevention programs and policies. The more exclusive measures, such as *weekly heavy drinking*, are needed to identify groups at risk for alcohol-related consequences. In addition, most of these measures can be easily replicated in local surveys and are similar to measures used in other studies, facilitating comparison of the RTI national findings with local data as well as with findings reported in other studies.

Each measure has its limitations and advantages. *Weekly heavy drinking* is a measure constructed from responses to nine different questions on the frequency and quantity with which beer, wine, and/or liquor are currently used. *Weekly heavy drinking* is therefore a measure the wide replication of which is limited by its complexity. However, its specificity makes *weekly heavy drinking* an important measure for narrowing the planning focus on students who are most likely to experience alcohol-related problems.

The frequency measures of *weekly* and *monthly drinking* are sensitive to differences in drinking behavior related to age and sex and thus are useful for estimating the number of current teenage alcohol users among programmatically meaningful subgroups. *Weekly drinking* in particular identifies a subgroup that has used beverage alcohol extensively, if not intensively. However, caution must be exercised not to exaggerate potential risks associated with *weekly drinking*. Analyses of the 1974 RTI survey data reveal that teenagers who reported *weekly drinking* at that time drank "small amounts relatively frequently" (Rachal et al. 1980*a*, p. C-21).

An easy statistic to collect, *lifetime use* is the broadest and most commonly applied measure of teenage alcohol use. In fact, *lifetime use* is often referred to as "prevalence" in alcohol studies, as if it were the only measure of prevalence. Findings on *lifetime prevalence* are especially useful in identifying periods in development when young people are most likely to experiment with alcohol use, and for evaluating changing levels of exposure to use over time. Studies of trends in alcohol use are often based on lifetime prevalence data owing to its widespread availability. The magnitude of teenage *lifetime use* of alcohol can be misleading, however, because it supplies no information about the frequency or quantity of use. To be most useful for planning purposes, estimates of lifetime prevalence must be qualified by other measures of alcohol use that reflect current teenage drinking practices.

Prevalence by Grade and Sex

Answers to questions about how drinking patterns differ between boys and girls at various ages are necessary for planning effective programs. The answers help guide the tailoring of information and intervention to meet the varying experiences and needs of different groups of teenagers.

In the absence of local statistics, national findings on the prevalence of teenage alcohol use can be used to suggest rough estimates of local prevalence. Because prevalence of teenage alcohol use is known to vary with age and sex, esti-

mates based on these units are more likely to approximate the actual extent of alcohol use in a particular locality than are general estimates for senior high school students as a whole. However, even specific age-sex estimates should be used with caution because other factors also affect prevalence. For example, racial or ethnic identity is known to relate to variations in the prevalence of teenage alcohol use (see discussion below under Prevalence by Region and Community Size) as are attitudes of parents and peers toward alcohol use (discussed in a future report in this series).

The safest estimates of local prevalence based on national findings will require statistical manipulation to calculate a prevalence range within which "true" prevalence is likely to fall (Rachal et al. 1980a; Rice and Kleinman 1980). Planners lacking statistical skills or assistance, however, should not attempt to use national findings to do more than question and develop assumptions about the local prevalence of teenage alcohol use. (See Technical Notes on estimating prevalence range.)

Grade has been selected as a proxy for age in this article because it better represents social groups than does age. Information on the prevalence of alcohol use by grade is particularly useful in developing educational programs and policies. Findings on prevalence by age can be found in the RTI report (Rachal et al. 1980a). Findings on variations in the national prevalence of alcohol use by senior high school students are broken down by grade and sex in tables 1 through 4. Findings based on measures of current use are presented in tables 1 through 3; lifetime use findings are given in table 4.

Highlights of findings on variations in alcohol use related to grade are summarized first, followed by highlights on variations related to sex. Finally, notable findings on patterns of increase among boys and girls in each of the three grades are considered. Indications of a narrowing of the gap in alcohol use by boys and girls from 1974 to 1978 are also discussed.

Prevalence rates broken down by age and sex are based on RTI sample data "weighted" to represent the geographic and demographic composition of the total population of senior high school students in the United States in 1978. (See Technical Note on weighted samples.)

Prevalence by Grade. The 1978 survey shows that student drinking increases steadily throughout the three grades of high school, with the prevalence of those who report drinking *weekly* and *monthly* increasing by about *10 percent* over the 3 years. The most marked increase in reported *weekly heavy drinking* occurs between grades 10 and 11 (tables 1 through 3).

The 1978 RTI prevalence data on lifetime use of beverage alcohol show that experience with alcohol is widespread among students by the time they attend senior high school. Approximately *87 percent* of the Nation's senior high school students report having had at least one drink (table 4). The 1974 RTI survey, which sampled 7th to 9th graders as well as 10th to 12th graders, disclosed that exposure to alcohol is extensive even among the Nation's junior high school students. In 1974, 60 percent of 7th graders and 78 percent of 8th graders reported having *ever had a drink.*

Variations in drinking prevalence by grade, presented in tables 1 through 4, can be summarized as follows:

- *Weekly heavy drinking increases markedly from the 10th to the 11th grades* (table 1). The number of students who report *weekly heavy drinking* increases by almost 5 percent between the two grades, from nearly 12 percent of 10th graders to 16 percent of 11th graders.
- *Weekly drinking rises sharply between the 10th and the 12th grades of senior high school, with the greatest increase occurring between the 11th and 12th grades* (table 2). Approximately 10 percent more 12th graders than 10th graders are *weekly drinkers.* Weekly drinking rises about 4 percent between the 10th and 11th grades, from 23 to 27 percent, and about 6 percent between the 11th and 12th grades, from 27 to 33 percent.
- *Monthly drinking increases by about 10 percent between the 10th and 12th grades of senior high school* (table 3). Approximately 67 percent of 12th grade students are *monthly drinkers* as compared with nearly 58 percent of 10th grade students.

Prevalence by Sex. Regardless of the prevalence measure used, more senior high school boys

report current alcohol use than do girls. This does not mean that drinking among girls is insignificant. Although only 9 percent of all 10th to 12th grade girls in 1978 are estimated to have been *weekly heavy drinkers* as compared with 21 percent of boys in these grades (table 1), this still represents nearly half-a-million girls.

The data presented in tables 1 through 4 show that the differences in drinking between boys and girls are greatest among senior high school students who drink frequently:

- *Weekly heavy drinking among senior high school boys is more than twice as common as among senior high school girls.* Among 10th to 12th grade boys, 21 percent are *weekly heavy drinkers* as compared with only about 9 percent of 10th to 12th grade girls.
- *Approximately 12 percent more senior high school boys than girls are weekly drinkers.* About 33 percent of 10th to 12th grade boys are *weekly drinkers* as compared with 21 percent of 10th to 12th grade girls who are.
- *About 8 percent more 10th to 12th grade boys than 10th to 12th grade girls are monthly drinkers.* About 66 percent of 10th to 12th grade boys *drink monthly* as compared with 58 percent of 10th to 12th grade girls.
- *About 5 percent more 10th to 12th grade boys have used alcohol at least once than have girls in these grades.* Approximately 90 percent of 10th to 12th grade boys as compared with 85 percent of girls in these grades *have had at least one drink.*
- *Exposure to alcohol use is ubiquitous among students who attend senior high school* (table 4). Approximately 85 percent of all 10th graders have used alcohol at least once, and 90 per-

Variations in national prevalence by grade and sex, 1978

Table 1. Weekly heavy drinkers

Grade	Sex		
	% Boys	% Girls	% All students
10th grade	15.8	7.2	11.5
11th grade	22.8	9.2	16.2
12th grade	24.3	9.6	17.1
10th-12th grades	20.9	8.6	14.8

Table 2. Weekly drinkers

Grade	Sex		
	% Boys	% Girls	% All students
10th grade	25.5	19.8	22.6
11th grade	33.6	19.9	26.9
12th grade	40.9	24.4	32.3
10th-12th grades	33.2	21.3	27.3

Table 3. Monthly drinkers

Grade	Sex		
	% Boys	% Girls	% All students
10th grade	62.0	53.3	57.6
11th grade	65.2	57.3	61.3
12th grade	70.7	63.4	67.1
10th-12th grades	65.9	57.8	61.9

Table 4. Lifetime users

Grade	Sex		
	% Boys	% Girls	% All students
10th grade	89.6	80.7	85.1
11th grade	88.9	84.9	86.9
12th grade	90.1	90.3	90.2
10th-12th grades	89.5	85.1	87.3

cent of all students *have used alcohol* by the time they attend the 12th grade.

Prevalence by Grade and Sex. The RTI data indicate that drinking among boys remains significantly more prevalent than does drinking among girls in each of the three grades of senior high school. Further, differences between boys and girls in weekly (although not monthly) drinking increase with each ascending grade. These findings suggest that longitudinal data, were it available, would disclose more rapid rates of increase in alcohol use among boys than among girls.

Lifetime use patterns differ from weekly alcohol use paterns. The number of boys who have taken at least one drink in their lifetime remains constant in senior high school. However, the number of girls who have had at least one drink steadily increases during these years, suggesting many are still being exposed to alcohol for the first time.

Several generalizations can be drawn about age and sex variations based on the data:

- *Weekly heavy drinking among senior high school boys increases from the 10th to 12th grades more than three times as much as it does among girls* (table 1). The prevalence of *weekly heavy drinking* among boys rises 8 percent, from 16 percent in the 10th grade to 24 percent in the 12th grade. *Weekly heavy drinking* rises less than 3 percent among girls in the three grades, from 7 percent in the 10th grade to about 10 percent in the 12th grade. In the 10th grade, the prevalence of *weekly heavy drinking* among boys is twice as great as among girls. In the 11th grade, it is more than twice as great. By the 12th grade, it is nearly three times as great.

- *Weekly drinking among senior high school boys increases from the 10th to 12th grade three times as much as it does among girls* (Table 2). The prevalence of *weekly drinking* rises 15 percent, from about 26 percent of 10th grade boys to 41 percent of 12th grade boys. *Weekly drinking* rises only about 5 percent among girls, from 20 percent of girls in the 10th grade to 24 percent of those in the 12th grade. In the 10th grade, 6 percent more boys than girls *drink weekly*. In the 11th grade, 14 percent more boys than girls are *weekly drinkers*. By the 12th grade, 15 percent more boys than girls are *weekly drinkers*.

- *The increase in the prevalence of monthly drinkers between the 10th and 12th grades is comparable among high school boys and girls* (table 3). The prevalence of *monthly drinking* rises 9 percent among boys, from 62 percent in the 10th grade to 71 percent in the 12th grade. The prevalence of *monthly drinking* among girls rises about 10 percent, from 53 percent in the 10th grade to 63 percent in the 12th. In the 10th grade, there are 9 percent more boys than girls who are *monthly drinkers*. In the 11th grade, there are 8 percent more boys than girls who are *monthly drinkers*. In the 12th grade, there are 13 percent more boys who are *monthly drinkers* than there are girls.

- *The number of boys who have ever had a drink remains stable in the three grades of senior high school but increases 10 percent among girls* (table 4). From 89 to 90 percent of boys in the 10th to 12th grades have *had at least one drink*. Among 10th to 12th grade girls, lifetime prevalence rises from about 81 percent in the 10th grade to 90 percent in the 12th grade. In the 10th grade, there are 9 percent more boys than girls who have *had a drink*. In the 11th grade, there are only 4 percent more boys than girls who have *had at least one drink*. By the 12th grade, the gap in lifetime prevalence has completely closed: 90 percent of both 12th grade boys and girls have had a drink.

Overall, teenage drinking patterns and levels remained stable between 1974 and 1978, according to RTI analyses (Rachal et al. 1980a). Variations in drinking patterns from the 10th to 12th grades and between boys and girls are consistent in the 2 years. Data from the two surveys indicate, however, that differences historically noted to occur in the drinking habits of boys and girls may be narrowing.

A comparison of the 1974 and 1978 findings on current use reveals that the closing of the gap between senior high school boys and girls is the product of minor decreases in drinking by boys as well as of minor increases in alcohol use by girls.

(See Technical Notes for further discussion and illustration of this point.)

Prevalence by Region and Community Size

In the absence of specific information about the age, sex, and social composition of local teenage target groups, planners may find national estimates of prevalence for different regions or types of communities especially helpful. This information is useful for identifying unmet needs in particular areas. For example, the RTI data indicate that teenage drinking in suburban areas ("urban fringe," table 6) is more extensive than in big cities. In a region where prevention programs are targeted mainly to inner city youth, this information can be used to suggest that there may be an additional need to develop prevention programs in suburban areas.

When using estimates for geographic areas, however, it is important to bear in mind that prevalence rates reflect a number of underlying factors such as the local availability of alcohol, the age and sex composition of the local population, and—of major significance—the social composition of the target population. Many areas and localities are mosaics of social groups whose attitudes toward and social use of alcohol may vary significantly.

An analysis of the 1978 RTI sample population shows geographic variations in the extent of alcohol use to be highly related to the "racial/ethnic" composition of the samples representing particular areas. Details on some of these relationships are offered here so that planners can make adjustments in estimates based on knowledge about the "racial" or "ethnic" composition of the target group.

The prevalence rates presented in this article for "racial/ethnic" groups are not "weighted" to represent the geographic and demographic composition of the Nation's senior high school students as have been prevalence rates broken down by age and sex, region, and community size. Instead, sample prevalence is reported in order to clearly indicate the relation between the "racial/ethnic" composition of the RTI sample and geographic variations in estimated national prevalence.

In 1978, 95 percent of the senior high school students surveyed by RTI responded to the question "What is your racial/ethnic background?" Choices provided on the questionnaire were "American Indian or Alaskan Native," "Asian or Pacific Islander," "black, not of Hispanic origin," "Hispanic," "white, not of Hispanic origin," and "other, explain." About 76 percent of students who did respond to the question classified themselves as "white," and 11 percent as "black." The remaining 13 percent of respondents classified themselves as follows: nearly 6 percent as Hispanic, 3 percent as American Indian/Alaskan native, 1 percent as Asian, and nearly 4 percent as other.

These categories may represent considerable internal ethnic diversity; for example, German or Italian "white," or Haitian or Cape Verdean "black." The RTI findings nonethless reveal consistent, patterned differences in the levels of alcohol use among students who classify themselves as members of these very general categories.

Prevalence of alcohol use was highest among students who classified themselves as "white" or "American Indian/Alaskan native," and lowest among those who classified themselves as "black" or "Asian." Prevalence ranged from high to low points on different measures among students who reported themselves to be "Hispanic" or "other."

The range in the extent of alcohol use is exemplified by comparing prevalence among self-reported "white" and "black" students. The narrower the definition of alcohol use, the more dramatic the reported difference between the two groups. The prevalence of *weekly heavy drinking* is nearly four times as great among "white" students as among "black" ones. Based on the unweighted sample percentages, the following differences in drinking practices were reported.

- Eighty-nine percent of "white" students surveyed reported they *ever had a drink* as compared with 83 percent of "black" students.
- Sixty-six percent of "white" students surveyed reported they *drink once a month* or more often as compared with 49 percent of "black" students.
- Thirty percent of "white" students surveyed reported they drink *once a week* or more often as compared with 19 percent of "black" students.

- Sixteen percent of "white" students surveyed reported *weekly heavy drinking* as compared with 4 percent of "black" students.

Differences in the prevalence of alcohol use among students who categorize themselves as members of different racial or ethnic groups explain three otherwise unexpected geographic variations in the extent of alcohol use.

- *The prevalence of alcohol use, in all four measures, is lower among senior high school students who reside in big cities than among those who reside in suburban areas.* This is not surprising given that 54 percent of respondents in big cities were "white" and 29 percent "black," as compared with suburban composition in which 79 percent of respondents were "white" and 6 percent were "black."
- *The prevalence of weekly heavy drinking is highest among senior high school students who attend schools in small places (open country, or places with less than 25,000 residents) as compared with students who attend school in other types of communities.* About 86 percent of respondents in small places classified themselves as "white"; only 4 percent classified themselves as "black."
- *The prevalence of alcohol use is lower in the West than in the South (an area found in other surveys to have fewer alcohol users than elsewhere in the Nation).* Only 70 percent of respondents who in 1978 resided in the West classified themselves as "white." The remaining 30 percent reported themselves to be members of the other five categories: 9 percent "Hispanic," 7 percent "black," 4 percent "American Indian/Alaskan native," 3 percent "Asian," and 7 percent "other." The 1978 sample of Western respondents is exceptionally diverse ethnically as compared with other regions. Respondents in the South also were ethnically diverse but less so than the respondents in the West: 65 percent classified themselves as "white," 20 percent as "black," and 15 percent as members of the remaining four categories (as compared with 23 percent in the West). Respondents who resided in the Northeast and North Central regions were less diverse; about 81 percent and 86 percent, respectively, classified themselves as "white."

Table 5. Variations in national prevalence by region, 1978

Percentage of students who use alcohol	Region			
	Northeast	North Central	South	West
Weekly heavy drinkers	18.4	17.8	12.2	10.4
Weekly drinkers	32.1	28.5	26.9	20.3
Monthly drinkers	65.9	66.9	59.5	54.1
Lifetime users	90.6	88.9	85.9	83.2

Analysis of the "racial/ethnic" composition of the 1978 RTI sample indicates that localities manifest the relatively high drinking levels characteristic of the Nation as a whole where 80 percent or more of the senior high school students report themselves to be "white." However, the planning implications of the 1978 findings are unclear. No research has yet been conducted that answers the complex question of why prevalence of alcohol use is so low among some subgroups of the population, such as "black" and "Asian" students. Are "black" students who are *weekly heavy drinkers* more likely to drop out of school than their "white" counterparts? Do "black" or "Asian" students consistently underreport drinking experience as compared with "white" or "American Indian" students? Or are levels of alcohol use really lower among "black" and "Asian" senior high school students? And if they are, what accounts for the sudden onset of heavy drinking among young adults who classify themselves as "black?" These are the kinds of questions that must be addressed if the needs of America's minority groups are to be adequately met.

Prevalence by Region. Student drinking patterns are similar in the Northeast and North Central sections of the country, where teenage alcohol use is more extensive than in the South or West. Alcohol use is less extensive, by all measures

(table 5), among senior high school students who reside in the West than it is among students elsewhere in the country. It has been suggested above that the unexpectedly low prevalence of alcohol use in the West is related to the high proportion of students (30 percent) who reported themselves to be members of groups other than "white." (The States that constitute each region are listed in the Technical Notes.)

- *Weekly heavy drinking is most common in the Northeast and North Central sections of the country.* Approximately 18 percent of senior high school students who reside in the Northeast and North Central United States are *weekly heavy drinkers.* The prevalence of *weekly heavy drinking* is 8 to 10 percent less in the South and West, where prevalence is 12 and 10 percent respectively.
- *Weekly drinking is most common among senior high school students who reside in the Northeast and lowest among those who live in the West.* Approximately 12 percent more senior high school students who reside in the Northeast *drink weekly* than do those who reside in the West—32 percent as compared with 20 percent. The prevalence of *weekly drinking* is comparable among senior high school students who live in the North Central region and in the South, 29 and 27 percent respectively.
- *More senior high school students in the Northeast and North Central regions drink monthly than do those who live in the South and West.* Approximately 66 to 67 percent of senior high school students who reside in the Northeast and North Central regions are *monthly drinkers* as compared with 60 percent of those who live in the South and 54 percent of those who live in the West.
- *Lifetime prevalence of drinking among senior high school students is lowest among those who live in the West and highest among those who live in the Northeast.* About 91 percent of senior high school students who reside in the Northeast have *used alcohol* as compared with 89 percent of those who reside in the North Central region, 86 percent of those who reside in the South, and 83 percent of senior high school students living in the West.

Table 6. Variations in national prevalence by community size, 1978

Percentage of students who use alcohol	Community Size			
	Big city	Urban fringe	Medium city	Small place
Weekly heavy drinkers	6.6	15.6	15.1	17.5
Weekly drinkers	21.8	30.0	31.9	26.7
Monthly drinkers	55.3	65.6	67.5	60.8
Lifetime users	86.3	91.1	92.1	84.2

Prevalence by Community Size. Data collected in the RTI survey have been broken down by the types of community in which students attend school, based on observations by RTI personnel on the community context of schools surveyed. The following definitions are provided in the RTI final report (Rachal et al. 1980a, p. 60):

- *Big city:* students attend a school situated within the limits of a city or urbanized area of 200,000 or more residents.
- *Urban fringe:* students attend a school located in the urban area of a big city but outside the city's limits.
- *Medium city:* students attend a school situated within the limits of a city with a population of 25,000 to 200,000 and not in the urban area of a big city.
- *Small place:* students attend a school located in open country, or in a place with less than 25,000 residents that is not in the urban area of a big city.

Findings displayed in table 6 disclose that the prevalence of alcohol use is comparable among senior high school students who attend schools situated in suburban areas or medium cities, and is notably higher than among students who attend big city schools. The prevalence of alcohol use among students attending senior high schools in small places falls between the alcohol use reported by big city students on the one

hand and suburban or medium city students on the other. These findings are contrary to the more general conclusion based on other surveys that teenage alcohol use is higher in urban than in rural areas, and in large than in small areas (Rachal et al. 1980a, p. 60). It has been suggested above that the high proportion (29 percent) of students residing in big cities who classify themselves as "black" may account for the low prevalence of alcohol use in big cities.

- *The highest prevalence of weekly heavy drinking—18 percent—occurs in small places where 86 percent of students sampled reported themselves to be "white."* *Weekly heavy drinking* is more than 2½ times as common among senior high school students who attend schools in suburban areas or medium cities as it is among those attending big city schools. Between 15 and 16 percent of senior high school students who attend schools in suburban areas or medium cities are *weekly heavy drinkers* as compared with 7 percent of students who attend big city schools.

- *Weekly drinking is most extensive among students who attend senior high schools located in suburban areas or medium cities.* From 30 to 32 percent of students who attend senior high schools situated in suburban areas or medium cities are *weekly drinkers* as compared with 22 percent of students who attend big city schools and 27 percent of those who attend schools in small places.

- *Monthly drinking is most common among students who attend senior high schools in suburban areas or medium cities.* From 66 to 68 percent of students who attend senior high schools located in suburban areas or medium cities are *monthly drinkers* as compared with 55 percent of big city students and 61 percent of students who attend schools in small places.

- *Lifetime use is highest among students who attend senior high schools situated in surburban areas or medium cities and lowest among those who attend schools in small places.* From 91 to 92 percent of students who attend schools in suburban areas or medium cities have *had at least one drink* as compared with 84 percent of students in small places and 86 percent of those in big city schools.

Framework for Planning

Survey findings on alcohol use can be used to support a variety of program and policy decisions. The same set of findings may suggest different solutions to different planners, depending on the nature of the problem and on the planner's priorities, interests, goals, and available resources.

For example, the finding that more boys than girls are *weekly heavy drinkers* suggests not one but a number of potential program directions. Among the implications for prevention would be that senior high school boys need direct help in dealing with high-risk situations for self and male friends, while girls could benefit from practical suggestions for handling drinking by boyfriends and mixed-sex groups. The fact that 21 percent of 10th to 12th grade girls are *weekly drinkers* also argues for increased attention and priority to educating girls about high-risk factors in women's drinking.

Survey findings on youth alcohol use also are valuable for planning the timing of prevention/intervention initiatives. Educators who believe that, to be most effective, prevention efforts should precede actual adolescent drinking may want to target education before 10th grade when 62 percent of boys and 53 percent of girls are already monthly drinkers. Compared with boys, girls' first exposure to drinking and their frequency of drinking increases more gradually over time, which suggests that prevention efforts for girls might be somewhat differently spaced than those for boys. Those concerned with intervention in high-risk drinking behavior may want to focus on the 11th grade, when *weekly drinking* by boys jumps from 26 to 34 percent simultaneously with the time (age 16) when many teenagers begin to drive cars.

The important point to keep in mind is that research findings can be interpreted and applied at regional and local levels in a variety of ways, depending on analysis of local problems, priorities, resources, and a realistic sense of what is possible for the given locality. Desirable policies and programs need to evolve within the framework of local factors—the political climate, economic realities, community social and religious attitudes, and local health-risk conditions.

Technical Notes

Definition of Prevalence

Two types of prevalence rates, defined by the following formulae, are:

- *Point prevalence:* $\frac{\text{The number of cases at a given point in time}}{\text{The total population at that time}} \times 100$ (or 1,000, 10,000 or 100,000)
- *Period prevalence:* $\frac{\text{The number of cases during a specified period of time}}{\text{The population at mid-period}} \times 100$ (or 1,000, 10,000 or 100,000)

Large factors (such as 100,000) are used as the constant for studies of prevalence of statistically rare attributes. Because alcohol consumption is a common behavior, even among adolescents for whom its use is illegal, the constant 100 is used. Thus, prevalence here is reported as a percentage.

Point prevalence, as a measure of what prevails or exists at a specific time, is a useful statistic for assessing the extent or magnitude of a given condition. Point prevalence data derived from National, State, or local probability surveys also provides a basis for the study of trends in the occurrence of a health-related behavior or condition.

Although the RTI surveys on adolescent drinking took place over several weeks in the spring of 1974 and 1978, each of these national probability samples can be regarded as sources of point prevalence data. While some RTI survey questions refer to behavior occurring 1 year or more in the past, responses to them represent the number or proportion of individuals at a specific point who report a particular past behavior, trait, history, experience, or condition. For example, in the spring of 1978, 90 percent of senior high school seniors reported they had had at least one drink in their lifetimes. In 1974, the reported lifetime prevalence rate among high school seniors was also 90 percent, indicating that reported lifetime use has not changed among seniors.

RTI Survey Methodology and Procedure

National probability surveys of adolescent drinking practices were conducted by the Research Triangle Institute (RTI) in 1974 and 1978, the former under contract to NIAAA and the latter under joint contract to NIAAA and the National Institute on Drug Abuse (NIDA).

Methods and Trend Data. Similar sampling methodologies and questionnaires were used in both surveys to provide information on trends in drinking practices as related to demographic, attitudinal, and personality characteristics; the frequency, quantity, contexts, and consequences of drinking; the perceived or reported influence of friends and peers; deviant or antisocial behavior; and the usage of drugs in addition to alcohol. However, only senior high school students (10th to 12th grades) were sampled in 1978; both junior and senior high school students (7th to 12th grades) were sampled in 1974.

Sampling Strategy. In 1978, RTI employed a three-stage stratified sampling strategy. The first stage involved selecting a probability sample of all counties in the 48 contiguous States and the District of Columbia, stratified by geographic region and community size. A second stage probability sample was taken of all high schools in each county selected. At least one high school was chosen from each county and more than one from large counties. Finally, a probability sample of homerooms, one for each grade in school, was taken from the sample of high schools selected in the second stage. In 1974, the second and third stages were combined in a one-stage probability sample of homerooms stratified by three grade ranges (7-8, 9-10, 11-12). In both years, questionnaires were self-administered by students grouped in homerooms or classes. Instructed and supervised by RTI-trained staff, students were assured that their responses would be anonymous and confidential. Using these procedures, 13,112 useable questionnaires were obtained from junior and senior high school students in 1974 and 4,918 from senior high school students in 1978. There were 839 students surveyed in 1974 when they were in the 7th and 8th grades who were surveyed again in 1978 (a panel study).

Validity. In the 1978 study, some of the original, randomly selected sampling units were replaced, using probability measures. If the assumption is valid that replacement units are equivalent to the original ones, the final sample in 1974 represents a 72.7 percent "overall response rate" (i.e., the homeroom response rate multiplied by the within-classroom response rate). In 1978, the "overall participation rate" in the final adjusted sample is 85 percent (i.e., the proportion of schools participating multiplied by the proportion of students participating). In the panel study, 56 percent of the 1974 7th and 8th grade sample were selected randomly to participate in the 1978 panel.

The RTI samples were not representative of all the Nation's adolescents. Neither high school dropouts nor absentees were sampled. Both of these subgroups may manifest different drinking patterns from those that characterize the in-school high school students. Further, inner city students and members of the ethnic groups other than "white" or "black" were probably undersampled in 1978. Nonetheless, the sample is representative of the majority of the Nation's senior high school students at that time. More detailed discussions on sampling procedures and evaluations of sample validity are contained in the RTI final reports and in other references listed at the end of this section.

Questions Underlying Measures of Prevalence

Weekly and Monthly Drinking. Measures of *weekly* and *monthly drinking* are based on a recode by RTI of three questions on the frequency of alcohol use. Preceded by the introductory comment to a group of questions on current use, "Now we would like to ask you a few questions about your current drinking habits," the three questions are "Let's take beer first. How often do you usually have beer?" "Now, we want to ask you about wine. How often do you usually have wine?" "Now, we want to ask you about liquor (whiskey, vodka, gin, mixed drinks, etc.) How often do you usually have a drink?"

The following frequency choices were provided for each of the three questions: (1) do not drink beer (wine, liquor) at all, (2) every day, (3) three or four days a week, (4) one or two days a week, (5) three or four days a month, (6) about once a month, (7) less than once a month, but at least once a year, and (8) less than once a year. Elsewhere, the units "can(s) of beer," "glass(es) of wine," or "drink" of liquor are specified. On the basis of responses (2) through (4) to at least one of the three questions, respondents were classified as *weekly drinkers*. *Monthly drinkers* include those whose responses fell into the categories in (2)

through (6) for at least one of the three questions.

Weekly Heavy Drinking. Weekly heavy drinkers are equivalent to the "heavier drinker" category of the RTI "Drinking Level (DL) Types." DL types is a complex variable based on a recode of responses to nine questions on reported quantity of consumption as well as frequency of consumption for the three types of alcoholic beverages. The three questions used to categorize respondents as *weekly* and *monthly drinkers* are among those used to construct "drinking levels." For further details on the DL variable, see the RTI final reports on the 1974 and 1978 surveys.

Lifetime Use. This measure of prevalence is based on the following question: "Have you ever had a drink of wine, beer, or liquor—not just a sip or taste?" Students responded yes or no.

National Estimates Based on Weighted Samples

National estimated prevalence (numbers and percentages) reported here is based on "weighted" observations, so that the sample accurately represents the geographic and demographic structure of the general population of high school students from which it was drawn. Excluded from the sample for some measures are the few students (never more than 1 to 2 percent) who failed to answer the question(s) on which they are based. For this reason, a sample may slightly underestimate the number of people manifesting a particular pattern of alcohol use.

In general, percentages based on the weighted and unweighted RTI national probability samples (1974 and 1978) are comparable, indicating that the RTI samples are highly representative of the national population of high school students on which they are based (Rachal et al. 1980*b*).

Percentages presented in this series of reports on teenage drinking do not always replicate precisely the percentages reported in other documents that present findings based on RTI 1974 and 1978 survey data. This is because percentages reported elsewhere usually are based on the unweighted samples rather than on the weighted ones. The use of data from unweighted samples facilitates theory testing that utilizes multivariate methods (for example, linear regression).

Estimates of Prevalence Range

Findings presented in the tables in this article are mean, or average, percentages. Estimates of standard error produced by national probability sampling can be used to establish 95 percent "confidence intervals" for mean percentages, low and high points of a percentage range within which estimates of national prevalence based on a sample are likely to be "true" 95 percent of the time. The use of national estimates to make rough estimates of local prevalence should be based on a confidence interval, in order to establish a maximum and minimum limit within which the possible number of cases may fall. For information on how to calculate confidence intervals for RTI's prevalence rates, see Appendix B in RTI's report on the 1978 survey (Rachal et al. 1980a). Tables that report sampling percentages and sample numbers for tables 1-6 above (as opposed to the weighted percentages presented in tables 1-6 in this *Facts for Planning* article) are available on request from *Department FFP, National Clearinghouse for Alcohol Information, P.O. Box 2345, Rockville, Maryland 20852.*

Differences in Alcohol Use Among Boys and Girls

Because sample sizes in both 1974 and 1978 are relatively small in each of the six grade-sex categories, changes in prevalence between the 2 years are not generally statistically significant. Nonetheless the pattern of decrease among boys and increase among girls during the 1974-1978 interval is usually consistent for the three measures of current drinking, and thus may represent a real trend. The pattern is only slightly perceptible using the two *weekly drinking* measures. It is pronounced in the *monthly drinking* measure.

The source of the 1974-1978 decrease in the difference in drinking patterns between boys and girls is clarified by an example provided by high school seniors. The prevalence of monthly drinking decreased among 12th grade boys by 5 percent, from 76 percent in 1974 to 71 percent in 1978. The prevalence of monthly drinking increased 3 percent among 12th grade girls, from 60 percent in 1974 to 63 percent in 1978. In 1974, 16 percent more 12th grade boys than 12th grade girls were monthly drinkers. By 1978, only 8 percent more 12th grade boys than girls were monthly drinkers.

States in the Four Regions

The RTI study classifies States by region as follows. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *North Central:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

References

Blane, H. T., and Chafetz, M. E., eds. *Youth, Alcohol, and Social Policy.* New York: Plenum Press, 1979.

*Blane, H. T., and Hewitt, L. E. *Alcohol and Youth: An Analysis of the Literature, 1960-75.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1977. NTIS No. PB268698/AS.

Jessor, R.; Donovan, J. E., and Widmer, K. "Psychosocial Factors in Adolescent Alcohol and Drug Use: The 1978 National Sample Study and the 1974-78 Panel Study." Adolescent Drinking Behavior, Vol. 2. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980.

Johnston, L. D.; Bachman, J. G.; and O'Malley, P. M. *Highlights from Student Drug Use in America, 1975-1980.* Rockville, MD: National Institute on Drug Abuse, 1981.

*Rachal, J. V.; Guess, L. L.; Hubbard, R. L.; Maisto, S. A.; Cavanaugh, E. R.; Waddell, R.; and Benrud, C. H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior, Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980*a*. NTIS No. PB81199267.

Rachal, J. V.; Guess, L. L.; Hubbard, R. L.; Maisto, S. A.; Cavanaugh, E. R.; Waddell, R.; and Benrud, C. H. "Appendix to Vol. 1, The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies." Adolescent Drinking Behavior. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980*b*.

*Rachal, J. V.; Williams, J. R.; Brehm, M. L.; Cavanaugh, E.; Moore, R. P.; and Eckerman, W. C. *A National Study of Adolescent Drinking Behavior Attitudes and Correlates: Final Report Summary.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1975. NTIS No. PB246002/AS.

Rice, D. P., and Kleinman, J. C. National health data for policy and planning. *Health, Policy and Education* 1:129-141, 1980.

These publications are available for purchase from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

FACTS FOR PLANNING NO. 2 Alcohol Use As An Indicator Of Psychoactive Drug Use Among The Nation's Senior High School Students

Cherry Lowman, Ph.D., NCALI Staff

There is a remarkable correspondence between the degree of alcohol use and extent of experience with other psychoactive drugs among senior high school students, based on recent findings from a national probability survey of students in grades 10 through 12. The survey was conducted in 1978 by the Research Triangle Institute (RTI), under contract to the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA).

In a self-administered questionnaire, students were asked about their drinking practices and their use of eight additional types of psychoactive drugs. According to these data, a linear relationship exists between prevalence of use for each type of psychoactive drug and drinking levels. Prevalence of drug use rises with each increase in students' drinking level (See figure 1 and table 1).

Highlights of Findings

- **More senior high school students use alcohol than use any other psychoactive drug.** In 1978, an estimated 75 percent of senior high school students used alcohol during the previous year—as compared with 44 percent who used some other type of psychoactive drug during the same period.

RTI Definitions of Students' Drinking Levels

Abstainers—Don't drink, *or* drink less than once a year.

Infrequent drinkers—Drink once a month at most and drink small amounts per typical drinking occasion. Mean ounces of ethanol consumed per day by students in this category equals 0.02 oz.

Light drinkers—Drink once a month at most and drink medium amounts per typical drinking occasion, *or* drink no more than 3 to 4 times a month and drink small amounts per typical drinking occasion. Mean ounces of ethanol consumed per day by students in this category equal 0.07 oz.

Moderate drinkers—Drink at least once a week and small amounts per typical drinking occasion, *or* drink 3 to 4 times a month and medium amounts per typical drinking occasion, *or* drink no more than once a month and large amounts per typical drinking occasion. Mean ounces of ethanol consumed per day by students in this category equal 0.23 oz.

Moderate/heavier drinkers—Drink at least once a week and medium amounts per typical drinking occasion, *or* drink 3 to 4 times a month and large amounts per typical drinking occasion. Mean ounces of ethanol consumed per day by students in this category equal 0.72 oz.

Heavier drinkers—Drink at least once a week and large amounts per typical drinking occasion. Mean ounces of ethanol consumed per day by students in this category equal 2.32 oz.

- **In addition to alcohol, the psychoactive drugs most frequently used by senior high school students are marijuana, stimulants, cocaine, hallucinogens, and inhalants.** During the month preceding the survey, an estimated 30 percent of senior high school students used marijuana, 5 percent used stimulants, 3 percent used cocaine, 3 percent used hallucinogens, and 3 percent used inhalants (table 1).
- **Marijuana is second only to alcohol in popularity among senior high school students who reported psychoactive drug use.** Approximately 87 percent of senior high school students reported having ever used alcohol, as compared with 66 percent who reported they have ever used marijuana. An estimated 36 percent of senior high school students used alcohol in the week prior to the survey, as compared with 21 percent who used marijuana during the same period (Rachal et al. 1980*b*).
- **Most marijuana users are also alcohol users.** Only 6 percent of senior high school students who used marijuana in the year prior to the survey reported that they abstain from alcohol.
- **Marijuana use increases in extent and frequency among senior high school students who are heavier users of alcohol.** An estimated 63 per-

cent of heavier drinkers used marijuana within the previous month, compared with only 4 percent of alcohol abstainers, .9 percent of infrequent drinkers, 21 percent of light drinkers, 36 percent of moderate drinkers, and 53 percent of moderate to heavy drinkers (table 1).

- **Use of each of seven types of psychoactive drugs other than alcohol or marijuana is more extensive and more frequent among senior high school students who are heavier users of alcohol.** An estimated 16 percent of senior high school students who are heavier drinkers used stimulants in the month before the survey, in contrast to 1 percent of the students who are infrequent drinkers (table 1). An estimated 10 percent of senior high school students who are heavier drinkers used cocaine during the same 1-month period, in contrast to .3 percent of infrequent drinkers.
- **Polydrug use—the use of two or more psychoactive drugs other than alcohol—is more extensive and more frequent among senior high school students who drink more heavily.** The same strong association found between drinking levels and marijuana use also occurs between drinking levels and polydrug use. Of the heavier drinkers, 46 percent said that at some time they have used two or more psychoactive drugs other than alcohol, as compared with 5 percent of infrequent drinkers. During the month preceding the survey, 24 percent of heavier drinkers used two or more other types of psychoactive drugs, whereas only 1 percent of infrequent drinkers did.
- **From a planning perspective, awareness of alcohol use patterns among senior high school students also identifies possible use patterns of other types of psychoactive drugs. Senior high school**

Figure 1. Percentage of senior high school students who have ever used marijuana, stimulants, or cocaine by drinking level

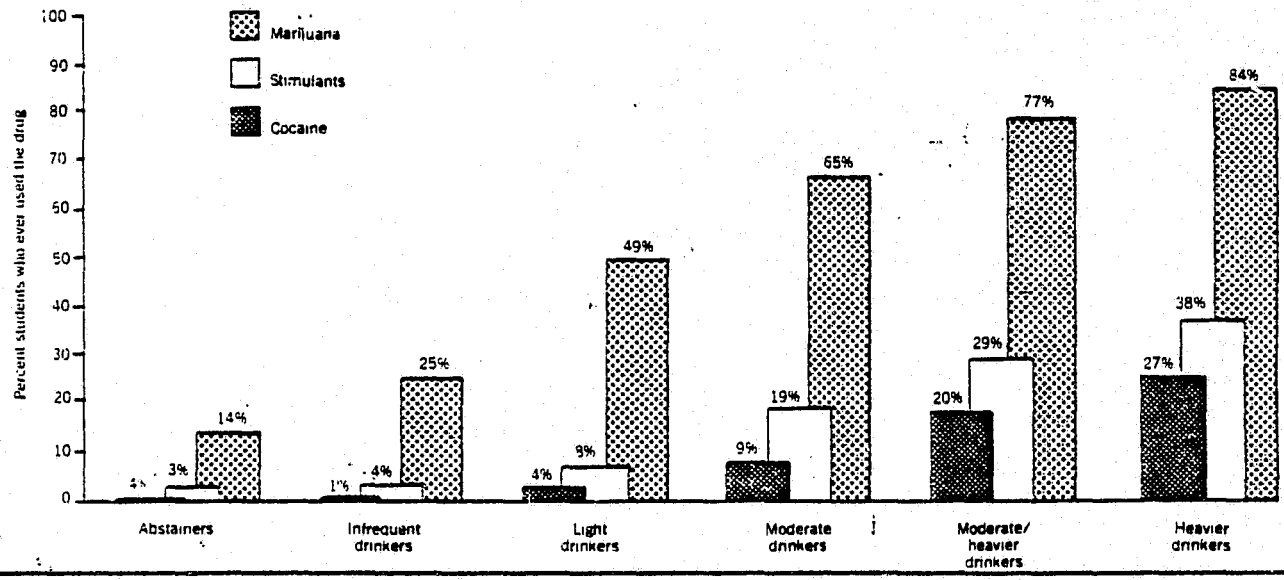


Table 1. Use of eight psychoactive drugs within the last month by drinking level (Percentage distribution)*

Drug type	Drinking level						
	Abstainers	Infrequent drinkers	Light drinkers	Moderate drinkers	Moderate/ heavier drinkers	Heavier drinkers	All students
Barbiturates	0.3	1.0	1.0	1.2	3.2	5.6	1.9
Cocaine	0.0	0.3	0.7	2.6	6.6	10.1	3.1
Hallucinogens	0.5	0.8	1.3	1.2	4.7	10.2	2.9
Heroin	0.1	0.0	0.2	0.3	0.4	1.6	0.5
Inhalants	0.7	1.3	0.9	3.5	4.2	6.5	2.7
Marijuana	3.6	8.5	20.8	35.9	52.5	62.7	29.6
Stimulants	0.3	0.7	2.3	4.5	9.4	16.1	5.1
Tranquilizers	0.3	0.5	0.7	3.2	6.0	8.4	3.0

*Percentages represent the prevalence rate for each category; for example, 5.6 percent of senior high school students who were heavier drinkers used barbiturates during the previous month.

students who are moderate to heavier drinkers are also at high risk for polydrug use. Only 7 percent of senior high school students who said they had never used alcohol had ever tried one or more of eight other types of psychoactive drugs. Approximately 74 percent of senior high school students who reported using marijuana during the year prior to the survey are moderate to heavier drinkers: 20 percent are infrequent or light drinkers; only 6 percent are alcohol abstainers. As many as 30 percent of senior high school students classified as moderate to heavier drinkers used two or more psychoactive drugs within the previous year, as compared with 7 percent of infrequent or light drinkers and 2 percent of alcohol abstainers.

Implications

Although the statistics presented in this report offer no explanation for the interdependence of alcohol and polydrug use, they do indicate that alcohol policies and programs aimed at senior high school students address a broad group, one that includes most users of other psychoactive drugs. Consequently, school- or community-based alcohol policies and programs can also reach a broad group of youth at higher risk for problems associated with the use of marijuana and other psychoactive drugs.

Theoretical analyses of the data conducted by Richard Jessor and his associates at the Institute of Behavioral Science of the University of Colorado disclose a proneness for problem behavior among alcohol "misusers" (Donovan and Jessor 1978) and analogous behaviors and attitudes among "problem drinkers" and heavy marijuana users (Jessor, Chase, and Donovan 1980; Jessor, Donovan, and Widmer 1980). Their findings suggest that strategies effective in reducing problems related to alcohol use may also serve to diminish problems related to the use of other psychoactive drugs.

In 1978, an estimated 51 percent of the Nation's senior high school students were abstainers, infrequent drinkers, or light drinkers. About 10 percent of these students had used marijuana within the last month. The remaining 49 percent of senior high school students were moderate, moderate/heavier, or heavier users of alcohol. Approximately half of these students also had used marijuana within the last month—nearly five times as many as those who were abstainers or light users (figure 2). These findings indicate a need for widespread efforts to minimize levels of use, especially the development of heavy alcohol use and the polydrug use that attends it, and to develop intervention strategies and policies to reduce problems arising from heavier alcohol and polydrug use.

Technical Notes

The technical notes provide background information on the survey and the variables on which the statistics in this report are based.

Background Information on the Research Triangle Institute Surveys

Two national probability surveys of adolescent drinking practices were conducted by the Research Triangle Institute (RTI), one in 1974 under contract to the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and one in 1978 under joint contract to NIAAA and the National Institute on Drug Abuse (NIDA).

Similar sampling methodologies and questionnaires were used in the 1974

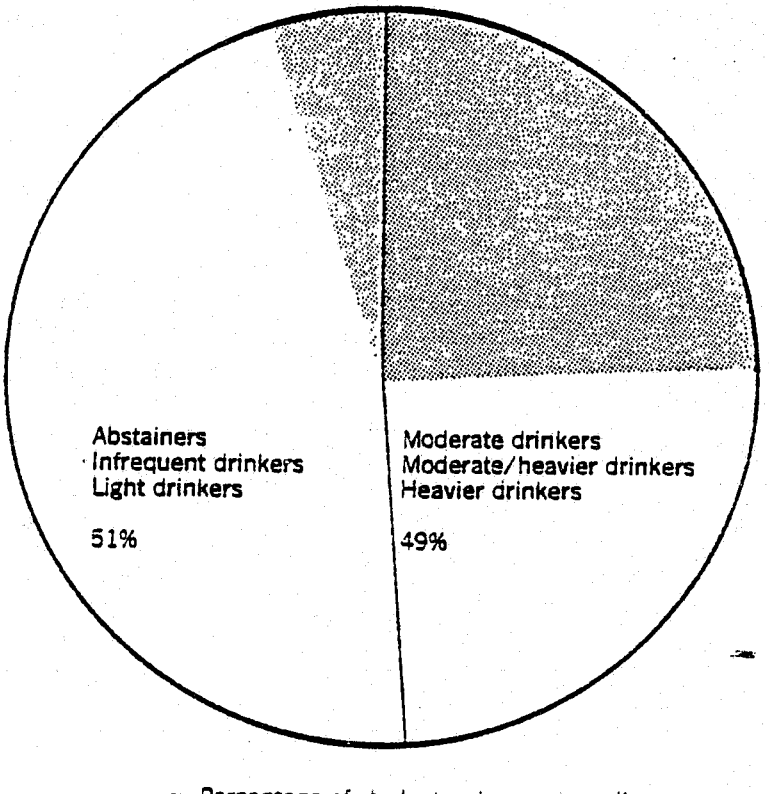


Figure 2. Marijuana use within the last month by two categories of student alcohol users —light or nonusers and heavier users.

and 1978 surveys in order that findings on adolescent drinking practices could be compared, providing information on trends in drinking practices during the 4-year interval. However, only senior high school students (10th to 12th grades) were sampled in 1978; junior high school students (7th to 9th grades) were also sampled in 1974. A further distinction in the two surveys is that more questions about the use of psychoactive drugs other than alcohol were asked in 1978 than were asked in 1974.

In both years, questionnaires were self-administered by students grouped in homerooms or classes. Instructed and supervised by RTI-trained staff, students were assured their responses would be anonymous and confidential. Using these procedures, 13,112 usable questionnaires were obtained from junior and senior high school students in 1974, and 4,918 from senior high school students in 1978.

In the spring of 1978, sampling was done by county in the 48 contiguous States of the United States and is highly representative of the 11,180,409 senior high school students at that time attending more than 20,000 public and parochial senior high schools.

For more detailed information on the methods used, types of questions asked, sampling strategy, and validity of the 1974 and 1978 survey data, readers may refer to articles by Rachal and associates (1975, 1980a, 1980*b*) and the technical notes in "Facts for Planning No. 1" (*Alcohol Health and Research World*, Vol. 6, No. 1, 1981).

The Drinking Levels (DL) Variable

The 1978 survey data reveal a strong association between the degree of beverage alcohol use and the extent to which other psychoactive drugs are used. The correspondence indicates that information on senior high school students' use of a licit, culturally prescribed drug—alcohol—can help identify those students likely to be using illicit drugs.

RTI researchers developed a classification of "drinking levels" (DL) used to assign the high school students surveyed to categories based on the reported frequency of consumption of alcoholic beverages and the average amount consumed on each occasion. Although the DL variable masks the distinction between the quantity and frequency of beverage alcohol use, it does represent variations in the degree of alcohol use and thereby facilitates the search for factors influencing drinking behavior.

Because analyses of the survey data reveal a strong association between students' drinking levels and their use of other psychoactive drugs, the 1978 data on polydrug use are presented in this report in tables and graphs broken down by drinking levels.

The drinking levels classification is based on responses to an array of six questions. Two questions are asked about each of the three types of alcoholic beverage ordinarily consumed by Americans—beer, wine, and liquor (whiskey, vodka, gin, mixed drinks, etc.). The six questions from which the DL variable is derived are part of a set of questions about the respondent's "current" drinking practices. This set of questions is preceded by the statement, "Now we would like to ask you a few questions about your current drinking habits."

One of the DL questions requests information about the usual frequency of consumption for each alcoholic beverage type; the other asks about the average amount consumed for each type of alcoholic beverage. For example, the following two questions about beer drinking practices are asked about wine and liquor drinking as well:

Q. 24. Let's take beer first. How often do you usually have beer?

___ Do not drink beer at all
___ Every day
___ Three of four days a week
___ One or two days a week
___ Three of four days a month
___ About once a month
___ Less than once a month, but at least once a year
___ Less than once a year

Q. 25. Think of all the times you have had beer recently. When you drink beer, how much do you usually have at one time, *on the average?*

___ Do not drink beer at all
___ Twelve or more cans of beer (two six-packs or more)
___ About nine cans of beer
___ Six cans of beer
___ Five cans of beer
___ Four cans of beer
___ Three cans of beer
___ Two cans of beer
___ One can of beer
___ Less than one can of beer

The question in the wine and liquor series about the amount consumed provides response categories assumed to be comparable in absolute alcohol to response categories in question 25 in the beer series. For example, "12 or more wine glasses" and "12 or more drinks" of liquor are considered equivalent to "12 cans of beer" in absolute alcohol content.

Responses to questions on the amount of alcoholic beverage consumed were converted to ounces of absolute alcohol. Three categories of amount were used to develop the drinking levels variable:

Small/light amounts: One or less can of beer, drink of liquor, or glass of wine on each drinking occasion (0.68 oz absolute alcohol/ethanol)

Medium/moderate amounts: Two to four cans of beer, drinks of liquor, or glasses of wine on each drinking occasion (0.68-2.70 oz absolute alcohol/ethanol)

Large/heavy amounts: Five to twelve cans of beer, drinks of liquor, and/or glasses of wine on each occasion (2.70 oz absolute alcohol/ethanol)

Information on the average amount of absolute alcohol consumed on each occasion and the frequency of consumption initially was used by the researchers to construct a 10-level classification of drinking level (Rachal et al. 1980a, p. 42). The 10 levels were further collapsed to create a more manageable and useful set of drinking types among senior high school students. A six-level classification of drinking practices is employed in most analyses (Rachal et al. 1975; Rachal et al. 1980a). Definitions presented earlier in this report are based on information in RTI's final report to NIAAA and NIDA (Rachal et al. 1980a, pp. 43, 48).

Further information on the history of the drinking levels variable and its construction and validity, and on the demographic characteristics of students in each drinking level as well as comparisons with similar findings can be found in a number of RTI studies for NIAAA (Rachal et al. 1975; Rachal et al. 1980a, 1980*b*).

Questions on Eight Types of Psychoactive Drugs

In addition to questions on alcohol use, the RTI questionnaire asked a series of questions about use of eight other types of psychoactive drugs. The statistics presented in this report are based on responses to a question about recency of use asked about each type of psychoactive drug use. The following question about recency of marijuana or hashish use was also asked about the other seven types of drugs:

Q. 61. When was the *most recent time* you used marijuana or hashish?

___ Within the last week
___ Within the last month
___ Within the last 2 months
___ Within the last 6 months
___ More than 6 months but less than a year ago
___ More than a year ago
___ I have never used marijuana or hashish

Following are descriptions of the eight types of psychoactive drugs about which questions on use were asked in the 1978 questionnaire:

Table 2. Prevalence of polydrug use within the last year by drinking level (Percentage distribution)*

Number of psychoactive drugs used within last year	Drinking level						
	Alcohol Abstainers	Infrequent drinkers	Light drinkers	Moderate drinkers	Moderate/ heavier drinkers	Heavier drinkers	All students
None	89.7	78.5	60.1	43.0	31.4	22.5	55.5
1 drug	8.5	19.2	31.3	37.6	38.4	35.8	27.6
2 drugs	0.7	1.0	4.2	9.4	10.4	10.8	6.0
3 drugs	0.5	0.5	2.1	3.9	5.2	9.1	3.5
4 drugs	0.1	0.6	1.0	2.0	4.9	10.5	3.0
5 drugs	0.2	0.2	0.6	2.2	4.4	4.1	1.9
6 drugs	0.1	0.0	0.3	1.0	2.9	4.1	1.4
7 drugs	0.2	0.0	0.4	0.8	1.9	2.3	0.9
8 drugs	0.0	0.0	0.0	0.1	0.5	0.8	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

*Percentages should be interpreted as follows: Only 22.5 percent of heavier drinkers used no psychoactive drugs other than alcohol during the past year; 89.7 percent of alcohol abstainers used no psychoative drugs during the same period.

- **Marijuana or hashish** (grass, hash, weed, hemp, joints, pot, or reefers)
- **Inhalants**—substances that people sniff or inhale (glue, aerosol, gasoline, lighter fluid, nail polish remover, paint thinner, poppers, snappers, or paint)
- **Heroin** (smack, horse, junk, or H)
- **Cocaine** (coke, crystals, or snow)
- **Hallucinogens** (LSD, mescaline, peyote, acid, angel dust, hog, magic mushrooms, or peace pills)
- **Stimulants** (uppers, bennies, bombitas, dexies, diet pills, greenies, pep pills, speed, splash, or whites)
- **Tranquilizers** (downers, Valium, Librium, Equanil, or Serax)
- **Barbiturates** (sedatives, downers, barbs, blues, cibas, goofballs, quads, rainbows, red devils, soapers, or yellow jackets)

Presented in table 1 are statistics on the prevalence of use in the month preceding the survey for each of these eight types of psychoactive drugs distributed by drinking level. The distributions show a high correspondence between increases in prevalence of psychoactive drug use and the level of alcohol use. For each psychoactive drug considered, there is a consistent increase in prevalence with each drinking level.

Polydrug Use

Polydrug use refers both to multiple psychoactive drug use—use of more than one psychoactive drug at different points in time—and simultaneous use—use of two or more psychoactive drugs at the same time. In this article, only multiple drug use is considered. Findings on the simultaneous use of alcohol and marijuana are the subject of "Facts for Planning No. 5."

The questions on recency of use of eight types of psychoactive drugs (discussed above) do not distinguish between multiple and simultaneous drug use. Responses can nonetheless be used to estimate the extent of multiple drug use as a general measure of number of drugs used rather than a specific measure of the number of drugs used individually.

The operational definition of polydrug use adopted here is the use of two or more psychoactive drugs other than alcohol over a specified period of time. Statistics on polydrug use presented in this report are based on a count of the number of psychoactive drugs that students report using during a specified time interval. For example, a student who responded that he or she had used marijuana or hashish within the last week, inhalants within the last month, heroin never, cocaine and hallucinogens more than 6 months ago but less than a year ago, stimulants more than a year ago, tranquilizers within the last 2 months, and barbiturates within the last month would be assigned the following values on several interval-specific scales of polydrug use:

- **Lifetime prevalence of polydrug use:** A total of seven types of psychoactive drugs were ever used (all types except heroin).
- **Polydrug use within the last month:** A total of three types of psychoactive drugs were used within the last month (marijuana or hashish, inhalants, and barbiturates).
- **Polydrug use within the last year:** A total of six types of psychoactive drugs were used within the last year (all types considered except heroin and stimulants).

In table 2, the prevalence of polydrug use among students in each of the drinking levels is distributed by the extent of multiple drug use within the last year, that is the number of different drugs used. Statistics are also provided on the percentage of nonusers within each drinking level.

Note that the distributions in table 2 show the same remarkable correspondence between the prevalence of polydrug use and drinking levels as exists for the prevalence of each of the eight types of drugs independently distributed (table 1 above).

Types of Statistics Reported

Prevalence rates. Expressed as percentages, prevalence rates represent the extent of marijuana and polydrug use among students within six different drinking levels. Technical definitions of prevalence and discussion of sources of variation in prevalence rates related to the measure used can be found in "Facts for Planning No. 1" (*Alcohol Health and Research World*, Vol. 6, No. 1, 1981).

Weighted data. The reported numbers or percentages are based on "weighted" observations, that is, the sample expanded to a national basis. "Weights" assigned individual cases are adjusted so that the sample represents the geographic and demographic structure of the general population of high school students from which it was drawn. Students who fail to provide answers to specific questions are excluded from the sample for that question. The number of missing cases never exceeds 2 percent of all cases for any given question.

In general, percentages based on the weighted and unweighted RTI national probability samples (1974 and 1978) are comparable (Rachal et al. 1980b). This indicates that the RTI samples are highly

representative of the national population of high school students.

Mean percentages. Percentages cited in the text, tables and figures are mean or average percentages. Mean percentages represent the midpoint of a percentage range within which there is a 95 percent chance that the true national average will fall. The use of national prevalence data in local planning should be based on an estimated percentage range rather than on an estimated mean percentage. Further discussion of this point can be found in the technical notes in *Facts for Planning No. 1*. Guidelines for estimating the standard error and for calculating the percentage range for statistics based on the 1978 sample of 4,918 respondents are provided by Rachal and associates (1980a).

References

Donovan, J.E., and Jessor, R. Adolescent problem drinking: Psychosocial correlates in a national sample study. *Journal of Studies on Alcohol* 39(9):1506-1524, 1978.

Jessor, R.; Chase, J.A.; and Donovan, J.E. Psychosocial correlates of marijuana use and problem drinking in a national sample of adolescents. *American Journal of Public Health* 70(6):604-613, 1980.

Jessor, R.; Donovan, J.E.; and Widmer, K. "Psychosocial Factors in Adolescent Alcohol and Drug Use: The 1978 National Sample Study and the 1974-78 Panel Study." Adolescent Drinking Behavior, Vol. 2. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980.

*Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior, Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alconolism, 1980a. NTIS No. PB81199267.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. "Appendix to Vol. 1, The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies." Adolescent Drinking Behavior. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980*b*.

*Rachal, J.V.; Williams, J.R.; Brenm, M.L.; Cavanaugh, E.R.; Moore, R.P.; and Eckerman, W.C. *A National Study of Adolescent Drinking Behavior Attitudes and Correlates: Final Report Summary.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1975. NTIS No. PB246002 AS.

*These publications are available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

FACTS FOR PLANNING NO. 3

U.S. Teenage Alcohol Use In Unsupervised Social Settings

Cherry Lowman, Ph.D., NCALI Staff

Survey research shows that alcohol use is widespread and routine among U.S. teenagers several years before they reach the age at which public purchase and consumption of alcoholic beverages become legal. Viewed by teens as a symbol of maturity, drinking plays a ubiquitous role in adolescent social development (Harford, in press; Jessor and Jessor 1977). By the time students reach the 12th grade, alcohol abstainers are in the minority (*Facts for Planning No. 1*).

When, where, and with whom teenagers drink—the social contexts of teenage alcohol use—is a subject of interest to researchers, program planners, and policymakers. Recent research on teenage drinking contexts reveals that the earliest exposure of most youth to alcohol occurs on special occasions at home, under parental supervision (Harford in press; Harford and Spiegler, in press a, in press *b*). The research also indicates that teenage drinking in social contexts where adults are present is moderate. Heavier and more frequent drinking occurs among teenagers who use alcohol in unsupervised settings with peers (Harford in press; Rachal et al. 1975).

Drinking in unsupervised peer settings increases with age and parallels increasing independence and disengagement from parents. Drinking in unsupervised contexts can lead to negative social, health, or legal problems—such as driving while intoxicated and traffic accidents. Consequently, information on the prevalence of drinking in different types of unsupervised peer settings can be valuable to planners in designing, evaluating, or prioritizing strategies to prevent or reduce problems arising from teenage alcohol use.

Data on the social contexts of drinking were collected as part of a national probability survey of drinking practices among U.S. students in grades 10 to 12, conducted in the spring of 1978 for the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National In-

Social Contexts Question
From 1974 and 1978 RTI Surveys

Findings on drinking patterns in different social contexts are based on the responses of senior high school students to the following questions that appeared on both the 1974 and 1978 Research Triangle Institute questionnaires.

Please indicate how often you drink beer, wine, or liquor in each of the following settings, places, or occasions. *Mark X on one blank line in each row.*

Never drink or don't drink in this setting	Sometimes	Frequently*	Most of the time*	
____	____	____	____	At teenage parties when others are drinking and your parents or other adults *are not* present
____	____	____	____	At home on special occasions such as birthdays, or holidays such as Thanksgiving, etc.
____	____	____	____	Driving around or sitting in a car at night
____	____	____	____	At dinner at home with the family
____	____	____	____	At places where teenagers hang around when their parents or other adults *are not* present
____	____	____	____	At a teenage party when others are drinking and when your parents or other adults *are* present
____	____	____	____	During or after a school activity such as a dance or football game when your parents or other adults you know *are not* present or can't see you
____	____	____	____	Alone—when no one else is around

*For purposes of this report, percentages of students who "often" drink in a particular setting combines the percentages of students who responded "frequently", or "most of the time."

stitute on Drug Abuse (NIDA) by the Research Triangle Institute (RTI). The 1978 survey replicates an RTI national survey of youthful drinking practices conducted for NIAAA in 1974 among students in grades 7 to 9 as well as those in grades 10 to 12. The survey instruments were questionnaires filled out by students in homerooms or classes, under the supervision of RTI staff. (See technical notes at the end of *Facts For Planning No. 2*, page 43, for background information on the two surveys.)

In both 1974 and 1978, students were asked the same question about the frequency of alcohol use in eight contexts—three contexts under adult supervision (dinner at home, special occasions at home, and teenage parties) and five contexts unsupervised by adults (teenage parties, teenage hangouts, in cars at night, at school-related activities, and alone). The drinking context questions and choices of responses are reproduced in the box below.

Findings are reported on the number of students who "often" use alcohol in a specific context, a measure based on the total number or percentage of students who selected the responses "frequently" or "most of the time." Estimated percentages and numbers are derived from weighted observations in order to approximate the nationwide extent of alcohol use in different social contexts. (See technical notes for information on previous analyses of data on social contexts, and for details on the use of weighted data.)

The summary of highlights focuses on the most current findings, those from the 1978 survey of senior high school students. Results from the 1974 survey that show similarities in patterns of alcohol use between junior high school and senior high school students also are discussed.

Highlights of Findings

- **Nearly six times as many senior high school students often drink alcoholic beverages on special occasions at home as do those who often drink alcoholic beverages at dinner at home.** In 1978, an estimated 3.7 million or 34 percent of senior high school students often drank at home on special occasions as compared with 700,000 or 6 percent of senior high school students who often drank alcoholic beverages at dinner at home with the family. The levels of routine and festive alcohol use at home were relatively constant over the three grades of senior high school (table 1).
- **More senior high school students often drink when at teenage parties unsupervised by adults than at teenage parties where adults are present.** In 1978, an estimated 5 million or 45 percent of senior high school students often drank at teenage parties unsupervised by adults as compared with the 2 million or 19 percent who often drank at teenage parties where adults were present.
- **More senior high school boys than girls often drink at unsupervised teenage parties.** In 1978, nearly 5 percent more senior high school boys often drank at unsupervised parties than did girls. The difference was most marked among seniors. An estimated 53 percent of 12th grade boys often drank at unsupervised teenage parties as compared with 45 percent of 12th grade girls. Differences between the number of boys and girls who drank at supervised teenage parties was less marked. Only 2 percent more 11th and 12th grade boys than girls often drank at teenage parties supervised by adults. Only in the 10th grade did more girls than boys drink at supervised parties, 19 percent as compared with 16 percent (table 1).
- **One in four senior high school students often drinks during or after a school activity when adults they know are not present or can not see them.** In 1978, an estimated 2.8 million or 26 percent of senior high school students often drank alcoholic beverages during or after school functions they attended, such as dances or football games. Notably more boys than girls often drank on these occasions in the 11th and 12th grades—32 to 30 percent of boys in the two grades as compared with 23 to 24 percent of girls (table 1).
- **Nearly one-third of senior high school students often drink when they are in unsupervised settings where teenagers "hang around."** In 1978, an estimated 3.3 million or 30 percent of senior high school students often drank when they were in teenage hangouts where no adults were present. The number of senior high school boys who often drank in these types of settings increased from 30 percent in the 10th grade to 35 percent in the 11th grade. Twenty-eight percent of 12th grade girls often drank in these settings—only 2 percent more than 10th or 11th grade girls did.
- **Drinking in unsupervised contexts among junior high**

Table 1. Percentage of senior high school students who often drink alcoholic beverages reported by grade and sex for eight settings or occasions, 1978*

Drinking setting or occasion	10th grade		11th grade		12th grade		All grades	
	% Boys	% Girls	% Boys	% Girls	% Boys	% Girls	% Boys	% Girls
Teenage parties, peers only	40.6	39.3	48.3	43.5	52.6	44.8	47.1	42.4
Teenage parties, adults present	15.8	19.4	20.7	18.6	18.1	16.4	23.6	19.4
Hangouts, peers only	30.0	26.4	34.9	26.0	35.8	27.7	33.5	26.7
School activity, peers only	24.1	22.3	31.7	23.4	30.2	23.5	28.6	23.0
In cars at night, peers only	20.0	19.0	26.9	19.2	28.0	18.3	24.9	18.8
At home, dinner with family	5.9	7.2	5.2	5.4	5.3	8.7	5.5	7.1
At home, special occasions	33.8	35.2	33.1	32.6	30.0	37.4	32.3	35.1
Alone	9.4	5.9	6.9	4.6	8.3	2.1	8.2	4.2

*Interpret percentages as follows: "In 1978, an estimated 41 percent of 10th grade boys often drank alcoholic beverages when at teenage parties where no adults were present."

school students follows a pattern similar to that among senior high school students, but on a smaller scale. Among both groups, the number of students who often drink at unsupervised parties is more than double the number who often drink at teenage parties where adults are present. In 1974, 24 percent of junior high school students often drank at unsupervised teenage parties as compared with 13 percent who often drank at supervised parties. Similarly, 46 percent of senior high school students in 1974 often drank at unsupervised parties, but only 20 percent often drank at supervised ones. (See figure 1 for other similarities in drinking patterns between junior and senior high school students.)

- **Nearly a quarter of senior high school students often drink while sitting or driving around in cars at night** (table 1). In 1978, an estimated 2.4 million or 22 percent of senior high school students reported they often drank in cars at night. More senior high school boys reported this activity than did girls—25 percent of 10th to 12 grade boys as compared with 19 percent of girls in these grades. High school students in most States begin to drive at 16 years of age, usually in the 11th grade. Among boys, the number who drank in cars at night increased at the time many began to drive, in the 11th grade. About 20 percent of 10th grade boys drank in cars at night as compared with 27 to 28 percent of 11th and 12th grade boys. The number of girls who reported they often drank in cars at night remained stable, at 18 to 19 percent, in each of the tree grades of senior high school.
- **About twice as many senior high school students who attended schools in small towns often drink when sitting or driving around in cars at night as do those who attend schools in larger communities.** Approximately 26 percent of small town students often drank when sitting or driving around in cars at night as compared with 12 percent of big city students whose access to cars as settings in which adults are not present may be more limited.
- **More students in suburban areas or medium cities often drink when at unsupervised parties than do students who go to school in big cities or small towns.** In 1978, an estimated 51 percent of senior high school students who attended suburban schools ("urban fringe" in table 2) often drank when at unsupervised parties as compared with 37 percent of students who attended big city schools.
- **Fewer senior high school students in big cities often drink in unsupervised settings than those in smaller communities** (table 2; see technical notes for definitions of community size). For example, only 37 percent of senior high school students in big cities often drank at unsupervised teenage parties as compared with 51 percent of suburban senior high school students who did.
- **More senior high school students who reside in the Northeast and North Central regions of the Nation often drink in unsupervised settings than do those who reside in the South or West.** Consistently more senior high school students who reside in the North Central region often drank alcoholic beverages in all types of unsupervised settings than did students elsewhere in the Nation (table 2). About 50 percent of senior high school stu-

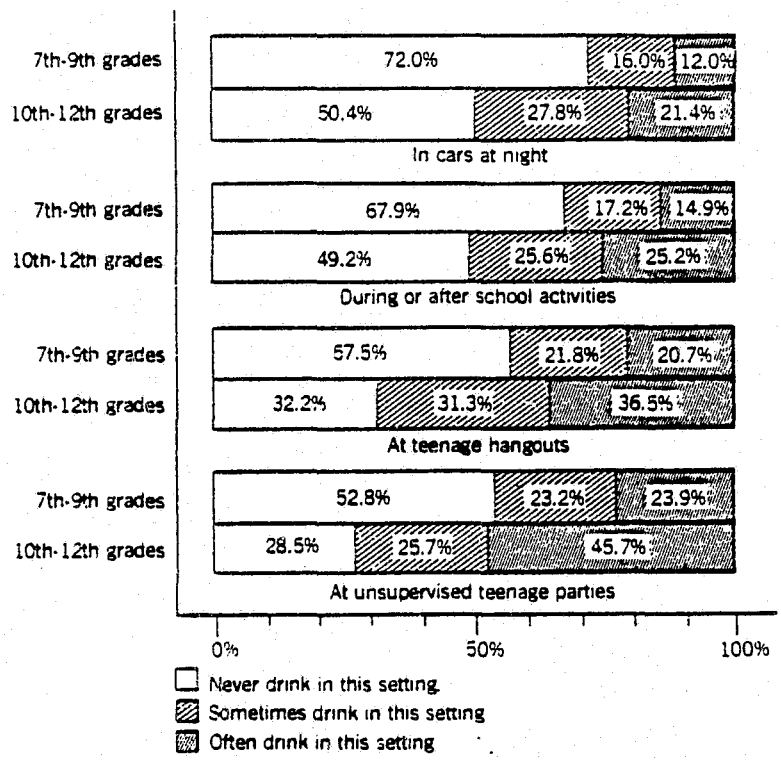


Figure 1. Frequency with which junior and senior high school students drink alcoholic beverages in unsupervised settings, 1974*

*Interpret percentages as follows: "In 1974, an estimated 24 percent of junior high school students often drank at unsupervised teenage parties as compared with 46 percent of senior high school students who did."

Table 2. Geographic variations in the percentage of senior high school students who often drank alcoholic beverages when in four unsupervised settings, 1978*

	Social context			
	Teenage parties	Teenage hangouts	School activity	In cars at night
Region				
Northeast	49.4	32.6	27.0	23.2
North Central	50.0	33.2	29.6	27.3
South	37.8	28.5	24.5	20.5
West	42.4	25.5	21.6	15.5
Community Size				
Big city	37.4	22.5	18.5	12.0
Urban fringe	51.3	33.0	26.8	20.5
Medium city	47.7	31.5	28.7	23.5
Small town	42.9	31.0	27.4	26.2

*Interpret percentages as follows: "In 1978, an estimated 49 percent of senior high school students in the Northeast often drank alcoholic beverages when at unsupervised teenage parties."

dents who reside in the Northeast and North Central regions often drank at unsupervised teenage parties as compared with 42 percent in the West and 39 percent in the South. Regional differences in the use of alcohol by youth in various contexts mirror general differences in the prevalence of alcohol use (*Facts for Planning #2*).

- **Less than 10 percent of senior high school students often drink when alone although their numbers decline from the 10th to 12th grades.** In 1978, nearly 700,000 or 6 percent of senior high school students often drank when alone. Twice as many senior high school boys as girls often drank when alone—8 percent of boys as compared with 4 percent of girls. The percentage of students who often drank when alone decreased from 8 percent in the 10th grade to 5 percent by the 12th grade.

Implications

The extent of unsupervised teenage drinking disclosed by the RTI surveys indicate a need for efforts to prevent or reduce problems arising from the heavier drinking known to occur under these circumstances. Findings on variations in the frequency of teenage drinking in five unsupervised contexts imply the need for a range of prevention and intervention strategies.

In *Facts for Planning #1*, it was shown that geographic variations in the prevalence of teenage drinking can be attributed in part to the racial or ethnic composition of the student population. The TRI findings on drinking contexts suggest that geographic variations also reflect conditions that influence access to unsupervised settings.

For example, the relatively low levels of unsupervised drinking reported by senior high school students who attend school in big cities as compared with those who attend schools in smaller communities (table 2) may reflect more limited access in big cities to relatively isolated areas for use as hangouts or to cars in which to drink at night. Further, more teenagers in big cities can select among a wider range of alternative activities to social drinking than can teenagers in smaller communities.

A variety of stragegies—indirect and direct—are needed to reduce or minimize teenage drinking and associated negative consequences. Indirect strategies modify conditions believed or observed to be antecedent to alcohol problems. For example, indirect stragegies to reduce unsupervised teenage drinking could focus on environmental modification of popular settings; provision of social alternatives to unsupervised drinking; or educational programs to help students develop decisionmaking and other social skills useful in dealing with high risk situations. Indirect strategies can reduce the extent of unsupervised teenage drinking by enriching and diversifying the personal skills of youth, their social environments, and their social alternatives. Many indirect strategies thus can serve broad mental health goals as well as objectives specific to alcohol problem prevention.

There are two especially dangerous types of unsupervised teenage drinking—solitary drinking and driving while intoxicated—that justify the implementation of direct as well as indirect strategies. Examples of direct strategies include public policies that regulate access to beverage alcohol; treatment services for teenagers with existing alcohol problems; and public awareness campaigns or driving safety and health education programs that furnish information on the potential dangers of alcohol use.

The decrease between the 10th and 12th grades in number of students who often drink when alone indicates that this type of unsupervised drinking is largely experimental. However, most alcohol-dependent students in need of treatment are included in the 6 percent of all senior high school students who engage in solitary drinking. The extent of nonsocial, isolated drinking among teenagers warrants a number of direct strategies; for example, increasing the awareness of health planners; educating students about the potential dependence on alcohol and other dangers known to be associated with solitary drinking; and seeking out lone drinkers in need of treatment.

Students who often drink in unsupervised peer settings are more likely to drive while intoxicated or ride in cars with intoxicated drivers than are students who drink under adult supervision. Teenage drivers and passengers returning from parties, hangouts, or school activities or who drink in cars are at high risk for automobile accidents. Direct intervention is justified in places where such drinking patterns are common. Strategies to address this serious problem might include driving safety programs, organized parental chauffeuring, transportation by school bus to and from extracurricular school activities, intensification of police patrols in areas known to be frequented by driving-drinking teenagers, and revision of public policies regulating access to alcohol.

The best mix of strategies for a given community depends on characteristics of the local environment, the nature and extent of problems related to teenage drinking, the degree of public awareness of these problems, and the social and economic resources available to solve them. For example, to improve lighting on schools grounds and hangouts is a more cost-effective prevention strategy in big cities than in most suburbs or small towns where many isolated settings for unsupervised drinking exist. The development of driving safety programs and a range of alternative social activities, on the other hand, represent an appropriate mix of strategies for suburban areas and small towns.

Although context-specific strategies may be effective in preventing or reducing teenage problems related to alcohol use, the widespread occurrence of unsupervised drinking in a variety of social contexts argues for broadbased community programs and policies, as well. Community-wide consensus, cooperation, and planning—involving interagency efforts and involvement by parents and teenagers—may be required to alleviate problems related to unsupervised teenage drinking.

Technical Notes

The technical notes provide background information on the RTI survey and the variables on which the statistics in this report are based.

Background Information on the Research Triangle Institute Surveys

See Facts for Planning No. 2, this issue, page 43.

Types of Statistics Reported

See Facts for Planning No. 2, this issue, page 45.

Recent analyses of the 1974 and 1978 RTI data on the use of alcohol by teenagers in various social contexts have been carried out by Thomas C. Harford and his associates in NIAAA's Laboratory of Epidemiology and Population Studies (Harford, in press; Harford and Spiegler, in press *a*, in press *b*). The percentages of students who drink in various contexts reported in their articles differ from those reported in this article. The differences derive from variations in analytic decisions.

One source of methodological variation is that sample percentages, rather than weighted percentages, were analyzed in the studies conducted by Harford and his associates. Sample percentages are better suited for hypothesis testing by linear regression.

The weighted percentages reported here are useful for planning purposes since they have been adjusted to represent the Nation's high school students rather than the sample (see discussion below on the use of weighted percentages).

A second source of variation between percentages reported here and those reported by Harford and associates is that *all* respondents to the 1974 and 1978 surveys are the base for percentages discussed in this report. Previous analyses are based on student drinkers only. Alcohol abstainers, former users, and inconsistent respondents, 28 percent of all respondents, were excluded from analysis. Thus, percentages on context-specific drinking reported here are lower than ones that apply to teenage drinkers only. The percentages based on all students are useful for assessing the extent of unsupervised drinking nationwide.

A final source of methodological variation is the data base selected for analysis. The 1974 RTI data base can be manipulated to include or exclude junior high school students. Percentages of students who drink in specific contexts based on responses from students in the 7th through 12th grades are lower than those based on the responses of students in the 10th through 12th grades only (see figure 1).

Percentages presented in tables 1 and 2 are weighted and are based on answers from all respondents to the question on social contexts in the 1978 sample.

Definitions of Region and Community Size

Definition of region. The 48 contiguous States and the District of Columbia are grouped in four regions as follows. *Northeast:* Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. *North Central:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. *West:* Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Definition of community size. These appear in *Facts for Planning #1*. They were developed by RTI staff (Rachal et al. 1980:60) who define the four types of community as follows. *Big city:* students attend a school situated within the limits of a city or urbanized area of 200,000 or more residents. *Urban fringe:* students attend a school located in the urban area of a big city but outside the city's limits. *Medium city:* students attend a school situated within the limits of a city with a population of 25,000 to 200,000 and not in the urban area of a big city. *Small place:* students attend a school located in open country, or in a place with less than 25,000 residents that is not in the urban area of a big city.

References

Harford, T.C. Situational factors in drinking: A developmental perspective on drinking contexts. In: Nirenberg, T.D., and Miller, T.M., eds. *Prevention of Alcohol Abuse*. New York: Plenum Press, in press.

Harford, T.C., and Spiegler, D.L. Developmental trends of adolescent drinking. *Journal of Studies on Alcohol*, in press *a*.

Harford, T.C., and Spiegler, D.L. Environmental influences in adolescent drinking. In: National Institute on Alcohol Abuse and Alcoholism. *Alcohol and Health*. Monograph No. ____ . Rockville, MD: NIAAA, in press *b*.

Jessor, R., and Jessor, S.L. *Problem Behavior and Psychological Development: A Longitudinal Study of Youth*. New York: Academic Press, 1977.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies*. Adolescent Drinking Behavior, Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980*a*. NTIS No. PB81199267.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. "Appendix to Vol. 1, The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies." Adolescent Drinking Behavior. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980*b*.

Rachal, J.V.; Williams, J.R.; Brehm, M.L.; Cavanaugh, E.; Moore, R.P.; and Eckerman, W.C. *A National Study of Adolescent Drinking Behavior Attitudes and Correlates: Final Report Summary*. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1975. NTIS No. PB246002/AS.

*These publications are available for purchase from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

FACTS FOR PLANNING NO. 4 Alcohol Misuse by Adolescents

J. Valley Rachal, L. Lyn Guess, Robert L. Hubbard, and Stephen A. Maisto

1974 and 1978 RTI Surveys: Highlights of Findings on Alcohol Misuse

- The prevalence of alcohol misuse among senior high school students increased slightly, rising 4 percent over a 4-year period; 27 percent of 10th to 12th grade students were misusers in 1974, but 31 percent were alcohol misusers in 1978.
- The prevalence of alcohol misuse was higher among 10th to 12th grade boys than among girls; in 1978, 38 percent of boys were misusers as compared with 26 percent of girls.
- For 10th to 12th grade girls in 1978, the extent of alcohol misuse did not increase significantly with age, contrary to the pattern of misuse among boys in these grades. Among girls, 24.2 percent of 15-year-olds and 24.7 percent of 18-year-olds were alcohol misusers; however, 31.3 percent of 15-year-olds were alcohol misusers while 43.5 percent of 18-year-olds were misusers.
- Students in the 10th to 12th grades who were alcohol misusers drank larger quantities of alcohol and began drinking at earlier ages than did alcohol users. In 1978, more than half of all misusers had their first drink by age 13, compared with one-third of users. Male alcohol misusers in 1978 reported they consumed, on the average, 1.25 oz of alcohol per drinking occasion, compared with 0.26 oz reported by users; among girls, misusers reported average consumption of 0.91 oz per occasion, while users said they drank only 0.17 oz on the average.
- Among 10th to 12th grade students, alcohol misusers more often used marijuana than did abstainers and alcohol users. Nearly all abstainers and the majority of alcohol users did not use marijuana, either in 1974 or in 1978. Among misusers, the vast majority in both 1974 and 1978 reported having used marijuana at least once, and in 1978, over 60 percent of both boys and girls who were alcohol misusers reported using marijuana 11 or more times.
- The extent and frequency of marijuana use among 10th to 12th grade alcohol misusers increased between 1974 and 1978.
- Boys in the 10th to 12th grades classified as misusers reported a greater frequency of negative consequences related to drinking than did girls. However, alcohol misusers—both male and female—were more likely to report negative consequences related to drinking than were users.

Misuse of alcohol by youths 12 to 17 years old has come to be considered a major social problem in the last 10 years or so. Researchers and many other segments of society are concerned not only about the social consequences of adolescent alcohol misuse but also about its effects upon adolescent psychosocial development (Mayer and Filstead 1980a). Moreover, adolescent alcohol misuse has been seen as an important research area because of the possible relationship between drinking behavior in youth and drinking behavior and alcohol problems later in life.

Despite the wide interest in and concern about adolescent alcohol misuse, it is still difficult to integrate much of the available research into statements that are either theoretically useful or applicable to prevention and treatment programs. One basic and critical problem with research on adolescent alcohol misuse is the failure to define consistently what is being investigated.

In some definitions of alcohol misuse or problem drinking among adolescents, any drinking is referred to as a problem. At the other end of the spectrum, there are definitions that equate alcohol misuse with alcoholism. Marden and Kolodner (1977) noted that, to some researchers, any adolescent drinking is misuse because it is illegal for minors to purchase alcohol. Other researchers have attempted to apply definitions of adult alcoholism to adolescents. However, as Blane and Hewitt (1977) and Schuckit (1978) concluded, the chronic physical and social problems that are part of the generally accepted criteria for establishing adult alcoholism rarely pertain to the behavioral and social correlates of drinking by youths. Young people who misuse alcohol rarely experience the same kinds of severely debilitating problems. (See the technical notes at the end of this article for further discussion of problems in definition.)

Defining the Extent of Alcohol Misuse

This article discusses alcohol misuse based on data furnished by two probability surveys of the Nation's high school students conducted by the Research Tri-

angle Institute (RTI)—the first in 1974 under contract to the National Institute on Alcohol Abuse and Alcoholism (NIAAA), and the second in 1978 under joint contract to NIAAA and the National Institute on Drug Abuse (NIDA). The survey instrument was a self-report questionnaire, administered by RTI-trained staff to classrooms of students selected through a three-stage stratified nationwide sample of 7th to 12th grade students in 1974 and 10th to 12th grade students in 1978. Findings reported here are limited, for comparative purposes, to 10th to 12th grade students only. (See the technical notes for further information on the survey methodology) .

In order to provide information that can serve as a guide to program and policy planning, a consistent and explicit definition of youthful alcohol misuse is needed to clarify its extent. To meet this need, an explicit definition is used throughout this report as a basis for presenting and comparing survey data on the prevalence and correlates of drinking among the Nation's senior high school students.

The definition of alcohol misuse used here was developed by Donovan and Jessor (1978) to distinguish adolescent "problem drinkers" from those who are nonproblem drinkers or abstainers. Two criteria were selected to distinguish types of youthful drinkers -- frequency of drunkenness and frequency and extent of negative consequences resulting from drinking. In order to gauge alcohol misuse, survey respondents were asked how many times during the previous year they experienced negative consequences from drinking in five areas: trouble with teachers or principal, difficulties of any kind with friends, driving "when you've had a good bit to drink," criticism by a date, or trouble with the police. In the 1978 study, a sixth negative consequence area was added: trouble with family members because of drinking. Respondents were also asked how many times in the past year they had been "drunk or very, very high."

Problem drinkers, termed in this report **alcohol misusers**, are students who reported drunkenness at least six times in the past year, or negative consequences two or more times in the past year in at least three of the five areas considered, or both. Although this definition, like the vast majority of other alcohol misuse definitions, is arbitrary, it is explicit and based on objective criteria. It can thus be examined empirically. (See the technical notes for a discussion of the specific questions underlying this definition.)

On the basis of the Donovan and Jessor definition of problem drinking, the 10th to 12th graders in the 1974 and 1978 RTI surveys were classified as abstainers, alcohol users, or alcohol misusers. **Abstainers** were individuals who reported *never* having had more than one or two drinks and drinking no alcohol during the last year. **Alcohol users** were individuals who drank during the past year but who were not defined as misusers of alcohol. (See the technical notes for further details on the classification.)

The overall prevalence rates for abstainers, alcohol users, and alcohol misusers in the 1974 and 1978 samples were similar (table 1). In 1974, 27.1 percent of 10th to 12th graders fell into the misuser category. By 1978, this proportion had risen to 31.2 percent, an increase of 4 percent. The percentage of abstainers varied no more than 1 percent; 17.2 percent of senior high school students reported abstention in 1978, a decrease of 1.4 percent from 1974, when 18.6 percent reported abstention.

An important question con-

Table 1. Abstainers, alcohol users, and alcohol misusers along 10th to 12th graders, 1974 and 1978

Drinker classification	1974	1978
Abstainer	18.6%	17.2%
Alcohol user	54.3%	51.7%
Alcohol misuser	27.1%	31.2%
Sample (*n*)	5,428	4,473

Table 2. 10th to 12th graders classified as misusers because of drunkenness, negative consequences, or both, 1974 and 1978

Misuser criterion	1974	1978
Drunkenness only*	87.4%	93.3%
Negative consequences only	2.4%	1.2%
Drunkenness and negative consequences	10.2%	5.5%

*"Drunkenness only" does not imply that the respondents did not experience "negative consequences," but rather, that they did not meet the negative consequences criterion of "two or more times in the past year in at least three of the five areas."

cerns what proportions of the alcohol misusers were so classified based on the drunkenness criterion, the negative consequences criterion, or the drunkenness and negative consequences criteria combined. In both surveys, most respondents defined as misusers were so classified because of their reports of frequency of drunkenness during the past year. Did those individuals also report some alcohol-related negative consequence in any of the five areas? As table 2 shows, in 1974, the majority (77.6 percent) of individuals classified as misusers because of frequency of drunkenness experienced at least one occurrence of negative consequences in one problem area. In 1978, the comparable figure was slightly lower (69 percent).

Overall rates of alcohol misuse by adolescents mask possible differences associated with various sociodemographic factors, including age, ethnicity, religious affiliation, and socioeconomic status (SES). There were slightly higher proportions of both male and female misusers in 1978 than in 1974. And, as expected, there were more male than female misusers across all sociodemographic variables. In 1978, 37.8 percent of senior high school boys were classified as alcohol misusers as compared with 25.5 percent of the girls.

Table 3 shows the distributions of male and female alcohol misusers as a function of various sociodemographic variables, for the 1978 RTI sample. Misuser status was generally related to age among males. Surprisingly, however, drinking status did not appear to be related to age among females. There were no significant differences in the proportions of female misusers as age increased. Differences in misuser status as a function of ethnicity, religious affiliation, and SES are generally consistent with the literature (Blane and Hewitt 1977). However, extreme caution should be exercised in

Table 3. Male and female alcohol misusers[1] by ethnicity, religious affiliation and socioeconomic status (SES), 1978

	Age[2]									
	15		16		17		18		Total	
	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)
Males	31.3	(100)	35.9	(242)	39.6	(373)	43.5	(158)	37.8	(873)
Females	24.2	(124)	23.8	(197)	28.6	(217)	24.7	(77)	25.5	(615)

	Ethnicity[3]							
	Spanish American		White and other		Black		Total	
	%	(n)	%	(n)	%	(n)	%	(n)
Males	29.3	(34)	39.7	(703)	23.6	(39)	37.8	(776)
Females	14.8	(18)	27.9	(576)	10.3	(24)	25.5	(618)

	Religious Affiliation											
	Catholic		Baptist		Other Protestant		Jewish		No religion		Total	
	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)
Males	43.6	(263)	37.4	(141)	31.6	(196)	31.4	(16)	40.1	(66)	37.6	(682)
Females	29.3	(276)	18.1	(73)	22.4	(157)	36.4	(16)	31.7	(46)	25.5	(571)

	Socioeconomic status[4]									
	1 (Low)		2		3		4 (High)		Total	
	%	(n)	%	(n)	%	(n)	%	(n)	%	(n)
Males	39.5	(34)	35.9	(145)	37.9	(275)	38.5	(322)	37.8	(776)
Females	17.3	(19)	24.9	(149)	26.3	(227)	26.0	(267)	25.5	(618)

[1]Misusers are defined as those experiencing drunkenness at least six times in the past year, negative consequences two or more times in the past year in at least three of the five areas, or both. Several of the cells in the table have a small number of observations; these should be interpreted with extreme caution.

[2]First and last age categories are collapsed: "15" includes respondents 12 to 15 years old, and "18" includes respondents 18 to 24 years old.

[3]Ethnicity variable for 1978 includes American Indians and Orientals in "white" category. Values of this category are thus primarily due to white respondents.

[4]SES is a 10-category variable based on parents' education and occupation; it was collapsed to four categories for this purpose.

interpreting percentages based on small sample sizes, for example, the 16 boys and 16 girls who represent Jewish students.

Correlates of Adolescent Alcohol Misuse

Although descriptive data about alcohol misuse among adolescents are of interest, they do not address the critical questions of how much alcohol misusers drink, where they drink, and the behavioral, social, psychological, and environmental correlates of such drinking. The correlates of adolescent alcohol misuse are a major research area. Clearly, definitions are merely a communication convenience; what is central is how the people who are defined in a particular way behave and the correlates of that behavior. The research to date has been poorly integrated, with some notable exceptions (Akers 1977; Jessor and Jessor 1977; Maddox 1962; Maddox and McCall 1964; Mayer and Filstead 1980*b*; Zucker 1976, 1979; Zucker and Barron 1973; Zucker and Devoe 1975).

The adolescent alcohol misuse literature does catalog correlates of the various definitions of misuse that have been used. These include drinking behaviors, other drug use, sociodemographic factors, attitudes and knowledge, environmental factors, and parent and peer influence (Barnes 1980; Marden and Kolodner 1977; Mayer and Filstead 1980*a*; Walker et al. 1978). Data from the 1978 study has been used to investigate selected correlates of the misuse of alcohol among adolescents and, where appropriate, to compare the findings with the 1974 RTI study and with other research. This approach takes advantage of a major source of new data. Our hope is that the descriptive information and basic data will form a foundation for more intensive analyses that can contribute to the development of theory and to policy decisions about adolescent alcohol misuse.

Behavioral and Psychological Correlates of Drinking. One aspect of any definition of alcohol misuse is the consistency of the researcher's or clinician's definition with the labeled person's perception of his or her behavior. In the RTI studies, respondents who were drinkers were asked how much of a problem drinking had been for them in the past year. In both years, more misusers—both girls and boys—perceived their drinking to be at least a mild problem the past year than did users. However, the vast majority of misusers felt that drinking had not been a problem.

Alcohol misusers appear to begin drinking at an earlier age than users, and males generally begin drinking earlier than females. In both 1974 and 1978, misusers reported that they had had their first drink at younger ages than did users. Over half of the misusers said they had had their first drink by the time they were 13 years old, compared with about one-third of the users. The 1978 data for age at first drink did not show significant variation from the 1974 findings for males or females.

There are considerable differences in current drinking between alcohol users and misusers. Table 4 shows the means of daily ethanol consumption of beer, wine, distilled spirits, and all beverages combined for both groups. The finding that misusers drank substantially more than alcohol users was consistent across sex and for the 2 study years.

The drinking levels of those in the alcohol user and misuser classifications in the 1978 study are examined in table 5. A clear relationship between higher levels of alcohol consumption and misuser classification emerges. "Heavier" drinkers are students who reported they drank at least once a week and large amounts on each occasion. Refer to *Facts for Planning* No. 2 for further information on "RTI's Drinking Level" typology (Lowman 1981/82). For males, about 85 percent of those classified as "heavier" drinkers were classified as misusers. For females, about 88 percent of the "heavier" drinkers were classified as misusers. It thus appears that alcohol misuse is directly and strongly related to levels of alcohol consumption.

The RTI data also showed that alcohol misusers reported relatively heavy marijuana use. Virtually all abstainers reported that they had not used marijuana during the past 6 months. The majorities of male and female alcohol

Table 4. Ethanol consumption by beverage, male and female users and misusers, 1978

Sex and drinker classification	*Mean daily ethanol consumption (in ounces)**			
	Beer	Wine	Distilled spirits	Total consumption
Male alcohol user (n = 969)	0.13	0.05	0.07	0.26
Male alcohol misuser (n = 776)	0.76	0.14	0.35	1.25
Female alcohol user (n = 1342)	0.05	0.05	0.08	0.17
Female alcohol misuser (n = 618)	0.35	0.21	0.35	0.91

*Mean daily ethanol consumption is based on reports of the frequency with which a beverage is consumed and the amount typically drunk on those occasions.

Table 5. Male and female alcohol users and misusers by drinking levels, 1978

Sex and drinker classification	Drinking level					
	Infrequent	Light	Moderate	Moderate/ Heavier	Heavier	Total
Male alcohol user	96.7%	91.6%	68.5%	41.0%	14.8%	53.0%
Male alcohol misuser	3.3%	8.4%	31.5%	59.0%	85.2%	47.0%
Male sample (n)	122	310	340	420	458	1650
Female alcohol user	97.4%	91.7%	73.4%	39.3%	12.3%	66.2%
Female alcohol misuser	2.6%	8.3%	26.6%	60.7%	87.7%	33.8%
Female sample (n)	228	503	458	422	219	1830

users in 1974 and 1978 reported that they had not used marijuana during this time; among males, 67 percent in 1974 and 65.8 percent in 1978 did not use marijuana, while among females, nonusers of marijuana amounted to 65.4 percent in 1974 and 67.1 percent in 1978. In contrast, in 1974, 74.7 percent of the male misusers reported using marijuana at least once in the past 6 months, with 44.5 percent using this drug at least 11 times. In 1978, these percentages were 78.8 percent and 62.4 percent, respectively. Similarly, in 1974, 81.9 percent of the female misusers reported using marijuana at least once, and 44.5 percent reported using it 11 or more times. In 1978, the data showed that 86.6 percent of the female misusers used marijuana at least once, and 67.2 percent reported using it at least 11 times.

Alcohol-Related Consequences. A common criticism of the definitions of problem drinking or alcohol misuse is that the alcohol-related problems on which these definitions are based are poorly defined and measured. It has been argued, for example, that frequently an adolescent is labeled a problem drinker as a result of few alcohol-related negative events (O'Gorman et al. 1977).

To further examine this, the five problem areas assessed in the 1974 and 1978 studies were analyzed to compare male and female alcohol users and misusers. The percentages of respondents who reported at least one occurrence of a problem during the past year were computed. Among respondents reporting at least one occurrence of a given problem, the percentage who reported only one occurrence was also computed. These analyses are summarized in table 6 for male and female users and misusers in 1974 and 1978 for each of the five problem areas.

The proportion of *misusers* who reported at least one occurrence of any of the five problem areas was substantially higher than the proportion of *users* who

Table 6. Male and female alcohol users and misusers and the occurrence of problems in the five problem areas, 1978 [1]

Sex and drinker classification	Problem area related to drinking				
	Trouble with teachers or principal	Difficulties with friends	Driving after having a "good bit" to drink	Criticism from a date	Trouble with the police
Male alcohol user	1.2%	12.3%	20.6%	8.2%	4.1%
Male alcohol misuser	9.5%	34.2%	59.4%	20.8%	25.4%
Male sample (n)	1,739	1,738	1,737	1,730	1,739
Female alcohol user	0.97%	12.8%	11.9%	9.1%	2.4%
Female alcohol misuser	4.9%	36.2%	41.7%	18.0%	11.5%
Female sample (n)	1,956	1,955	1,955	1,946	1,956

[1]Numbers represent the percentage of alcohol users (or misusers) in the sample reporting at least one occurrence of alcohol-related trouble during the past year.

did. This, in part, is to be expected because one way a respondent could be defined as a misuser was through reports of alcohol-related problems. However, these data show much more clearly than the definition would suggest that misusers have disproportionately experienced alcohol-related negative consequences. Second, there are differences in proportions as a function of the problem area, which held true for both users and misusers. For some problem areas, only a small minority of misusers reported at least one occurrence; but for others, more than half reported such problems. These conclusions pertain to both years and both sexes.

There also was a wide range in the proportions of one-time-only events in the problem areas. In 1974, of the 12.9 percent of the male misusers who reported at least one occurrence of trouble in school, more than half reported only one such occurrence. Data for females in 1974 and for males and females in 1978 were similar. However, among the 68 percent who reported that they drank and drove at least once, 91.1 percent drank while driving more than once. The data also show that, for both users and misusers in 1974 and 1978, males generally reported a higher frequency of problem occurrence.

Environmental Correlates. Thus far, we have concentrated on drinker status and the alcohol-related behaviors, perceptions, and consequences for individuals classified as a particular type of drinker. Another question concerns the environment in which drinking (or abstinence) occurs. This is a particularly critical area of investigation for policy decisions because of the potential utility of modifying the environment to prevent problem drinking. Accordingly, a considerable portion of the research on the correlates of adolescent alcohol use and misuse has focused on environmental factors.

Two key variables stand out: peer and parental influences. There seems to be an unusual degree of agreement in the research literature about the importance of these two factors. Walker and colleagues (1978) argued that parental attitudes toward drinking are the best predictors of adolescent drinking. In summarizing his extensive review of peer influences on adolescent alcohol use, Barnes (1980) stated that all of the studies that have investigated peer influence and alcohol use have found a relationship between them. The 1974 and 1978 RTI studies were consistent with the literature and across sex and year divisions, because adolescent drinker status was directly related to parents' and peers' attitudes toward drinking and drinking practices.

Another important variable is the setting in which drinking occurs. Although some reviewers (Marden and Kolodner 1977) have alluded to the contribution of the setting to adolescent drinking behavior, there has been little systematic investigation of the setting to match studies done with older drinkers (Harford 1979). Several drinking settings were examined, using the 1974 and 1978 study data, and contexts of drinking were found to be related to drinker status. Again, the data were consistent across sex and year divisions. Investigation of adolescent alcohol misuse as a function of drinking context is certainly warranted.

Implications

The results of the 1974 and 1978 studies are generally consistent and in agreement with the literature in showing differences between users and misusers in a variety of factors, including drinking behavior and personal and environmental correlates of drinking. The stability of the data suggests that the descriptive, univariate findings discussed here have validity.

It is clear that substantial numbers of adolescents drink and many of these adolescents engage in high-risk behaviors when they consume alcohol. This information is critical for the policymaker because it identifies current and potential intervention targets. In order to expedite the development of effective intervention programs, further attempts at integrating these correlational data into theory are required. Substantial progress in this direction has been made through use of the RTI study data by Jessor and his colleagues (Donovan and Jessor 1978; Jessor et al. 1980). More progress will be made as Jessor's problem-behavior theory and other theories are tested further, and developed and refined. More work in these areas is needed—work that may ultimately result in effective prevention and treatment efforts through a fuller understanding of adolescent drinking.

Technical Notes

RTI Survey Methodology and Procedure

National probability surveys of adolescent drinking practices were conducted by the Research Triangle Institute (RTI) in 1974 and 1978, the former under contract to NIAAA and the latter under joint contract to NIAAA and the National Institute on Drug Abuse (NIDA).

Methods and Trend Data. Similar sampling methodologies and questionnaires were used in both surveys to provide information on trends in drinking practices as related to demographic, attitudinal, and personality characteristics; the frequency, quantity, contexts, and consequences of drinking; the perceived or reported influence of friends and peers; deviant or antisocial behavior; and the use of drugs in addition to alcohol. However, only senior high school students (10th to 12th grades) were sampled in

1978; both junior and senior high school students (7th to 12th grades) were sampled in 1974.

Sampling Strategy. In 1978, RTI employed a three-stage stratified sampling strategy. The first stage involved selecting a probability sample of all counties in the 48 contiguous States and the District of Columbia, stratified by geographic region and community size. A second-stage probability sample was taken of all high schools in each county selected. At least one high school was chosen from each county and more than one from large counties. Finally, a probability sample of homerooms, one for each grade in school, was taken from the sample of high schools selected in the second stage. In 1974, the second and third stages were combined in a one-stage probability sample of homerooms stratified by three grade ranges (7-8, 9-10, 11-12). In both years, questionnaires were self-administered by students grouped in homerooms or classes. Instructed and supervised by RTI-trained staff, students were assured that their responses would be anonymous and confidential. Using these procedures, 13,112 usable questionnaires were obtained from junior and senior high school students in 1974 and 4,918 from senior high school students in 1978. There were 839 students surveyed in 1974 when they were in the 7th and 8th grades who were surveyed again in 1978 (a panel study).

Representativeness. In the 1978 study, some of the original, randomly selected sampling units were replaced, using probability measures. If the assumption is valid that replacement units are equivalent to the original ones, the final sample in 1974 represents a 72.7 percent "overall response rate" (the homeroom response rate multipled by the within-classroom response rate). In 1978, the "overall participation rate" in the final adjusted sample is 85 percent (the proportion of schools participating multiplied by the proportion of students participating). In the panel study, 56 percent of the 1974 7th and 8th grade sample were selected randomly to participate in the 1978 panel.

The RTI samples were not representative of all the Nation's adolescents. Neither high school dropouts nor absentees were sampled. Both of these subgroups may manifest different drinking patterns from those that characterize the in-school high school students. Further, inner city students and members of the ethnic groups other than "white" or "black" were probably undersampled in 1978. Nonetheless, the sample is representative of the majority of the Nation's senior high school students at that time. More detailed discussions of sampling procedures and evaluations of sample validity are contained in the RTI final reports and in other references listed at the end of this section.

Statistics: Unweighted Data and Percentages

In the first three *Facts For Planning* reports of RTI findings on adolescent drinking practices, weighted percentages were used in order to estimate the number of youths in the Nation who in 1978 were drinkers, by various criteria (Lowman 1981, 1981/82*a*, 1981/82*b*). For convenience in analytical procedures, all analyses herein are based on *unweighted* sample values. The distributions of weighted and unweighted values are not significantly different (Rachal et al. 1980*b*).

Percentages are based on all cases that have analyzable data, not the total samples.

Findings presented in the tables in this article are mean, or average, percentages. Estimates of standard error produced by national probability sampling can be used to establish 95 percent "confidence intervals" for mean percentages, low and high points of a percentage range within which estimates of national prevalence based on a sample are likely to be "true" 95 percent of the time. The use of national estimates to make rough estimates of local prevalence should be based on a confidence interval, in order to establish a maximum and minimum limit within which the possible number of cases may fall. For information on how to calculate confidence intervals, see Appendix B in RTI's report on the 1978 survey (Rachal et al. 1980*a*).

Problems in Defining Alcohol Misuse in Youth

According to Bacon (1976), the failure to adequately define alcohol misuse in youth is a result of several factors: the assumption that drinking per se is a problem; failure to recognize the complex social factors involved in defining behavior problems; failure to remember that the relationship between current and later alcohol problems cannot be assumed, but is a subject for empirical investigation; failure to remember that problems are specific and time related; the assumption that problem areas are interchangeable; and the failure to define empirically what alcohol-related problems are, i.e., how directly alcohol is associated with the experience of a particular event that is defined negativeiy.

Mayer and Filstead (1979) argued that many difficulties might be overcome by empirically defining adolescent alcohol misuse. Their approach was to construct a 14-item scale based on previous investigations of adolescent alcohol misuse, choosing variables that had been shown empirically to be the best discriminators between users and misusers of alcohol. The 14 items included information on frequency and recency of drinking alcohol; motivations for drinking; and the environmental, social, and psychological correlates of drinking. Validation of this scale (called the Adolescent Alcohol Involvement Scale, or AAIS) suggests that it could be used productively to arrive at some consistency in definition across investigations.

Questions Underlying the Definition of Alcohol Misuse

The definition of problem drinking developed by Jessor and Donovan (1978) is the definition adopted here for alcohol misuse; that is, youth who report drunkenness at least six times in the past year, negative consequences two or more times in the past year in at least three of five areas considered, or both.

Donovan and Jessor (1978) used two sets of criteria to define problem drinking. The first criterion set involved frequency of drunkenness during the last year. In both the 1974 and the 1978 studies, respondents were asked, "During the last year, about how many times have you gotten drunk or very, very high?" The response categories were none, once, 2 or 3 times, 4 or 5 times, 6 to 10 times, once a month, twice a month, and once a week or more.

The second criterion set concerned the experience over the last year of alcohol-related negative consequences in areas that are relevant to adolescents in the United States. In both surveys respondents were asked, "During the past year, how many times have the following happened to you?" Negative consequences items were "You've gotten into trouble with your teachers or principal because of your drinking," "You've gotten into difficulties of any kind with your friends because of your drinking," "You've driven when you've had a good bit to drink," "You've been criticized by someone you were dating because of your drinking," and "You've gotten into trouble with the police because of your drinking."

In the 1978 study, a sixth negative consequence area was added—"You've gotten into trouble with your family because of your drinking." For the first five problem area items, frequency of occurrence responses included none, once, 2 or 3 times, 4 or 5 times, 6 to 9 times, and 10 or more times. The criteria of the responses to the drunkenness and five negative consequences questions (available for both

the 1974 and 1978 studies) were used to define alcohol misusers. (Findings on problems with family related to drinking will be reported in a future *Facts For Planning* article.)

In using this definition in their analyses of the 1974 data, Donovan and Jessor (1978) compared it with two other definitions of alcohol misuse. One definition emphasized drunkenness and the other emphasized the occurrence of negative consequences. Analyses showed that all three definitions similarly distinguished alcohol users from misusers on a variety of psychosocial factors.

In RTI's final report to NIAAA and NIDA (Rachal et al. 1980a), the relationship of various misuse measures is examined in Appendix C, which evaluates the reliability and validity of the survey data and measures.

Missing Data

Students who could not be classified due to missing or inconsistent information and individuals who were former drinkers but current abstainers were treated as missing data and were excluded from the analyses. The "former drinkers" reported having more than one or two drinks in their lifetimes but consuming no alcohol during the past year. In 1974, the number of such missing cases was 507 (9.5 percent), and in 1978, the number of missing cases was 445 (9 percent).

In the analyses of alcohol misuse, any total sample size listed as fewer than 5,935 in 1974 or fewer than 4,918 in 1978 results from cases missing in the drinker classification variables and from missing data in the other variables in the analysis.

References

Akers, R.L. *Deviant Behavior: A Social Learning Approach.* 2d ed. Belmont, CA: Wadsworth, 1977.

Bacon, S.C. "Defining Adolescent Alcohol Use: Implications for a Definition of Adolescent Alcoholism." Paper presented at the annual conference of the National Council on Alcoholism, Washington, DC, 1976.

Barnes, G.E. "A Current Perspective on Teenage Drinking." Unpublished manuscript, Department of Psychiatry, University of Manitoba, 1980.

*Blane, H.T., and Hewitt, L.E. *Alcohol and Youth: An Analysis of the Literature, 1960-75.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1977. NTIS No. PB268698/AS.

Donovan, J.E., and Jessor, R. Adolescent problem drinking: Psychosocial correlates in a national sample study. *Journal of Studies on Alcohol* 39(9):1506-1524, 1978.

Harford, T.C. Ecological factors in drinking. In: Blane, H.T., and Chafetz, M.E., eds. *Youth, Alcohol, and Social Policy.* New York: Plenum Press, 1979.

Jessor, R.; Chase, J.A.; and Donovan, J.E. Psychosocial correlates of marijuana use and problem drinking in a national sample of adolescents. *American Journal of Public Health* 70:604-613, 1980.

Jessor, R., and Jessor, S.L. Problem drinking in youth: Personality, social and behavioral antecedents and correlates. In: NIAAA. *Psychological and Social Factors in Drinking and Treatment and Treatment Evaluation.* Proceedings of the Second Annual Alcoholism Conference, 1972. DHEW Pub. No. (NIH) 74-676. Washington, DC: Supt. of Docs., U.S. Gov. Print. Off., 1973, pp. 3-23.

Jessor, R., and Jessor, S.L. *Problem Behavior and Psychosocial Development: A Longitudinal Study of Youth.* New York: Academic Press, 1977.

Lowman, C. Facts for Planning No. 1: Prevalence of alcohol use among U.S. senior high school students. *Alcohol Health & Research World* 6(1):29-40, 1981.

Lowman, C. Facts for Planning No. 2: Alcohol use as an indicator of psychoactive drug use among the nation's senior high school students. *Alcohol Health & Research World* 6(2):1981/82a.

Lowman, C. Facts for Planning No. 3: U.S. teenage alcohol use in unsupervised social settings. *Alcohol Health & Research World* 6(2):1981/82b.

Maddox, G.L. Teenage drinking in the United States. In: Pittman, D., and Snyder, C., eds. *Society, Culture and Drinking Patterns.* New York: Wiley and Sons, 1962, pp. 230-245.

Maddox, G.L., and McCall, B.C. *Drinking Among Teenagers: A Sociological Interpretation of Alcohol Use by High School Students.* New Brunswick, NJ: Rutgers Center of Alcohol Studies, 1964.

Marden, P.G., and Kolodner, K. "Alcohol Use and Abuse Among Adolescents." Unpublished paper, 1977.

Mayer, J.E., and Filstead, W.J. The Adolescent Alcohol Involvement Scale: An instrument for measuring adolescents' use and misuse of alcohol. *Journal of Studies on Alcohol* 40:291-300, 1979.

Mayer, J.E., and Filstead, W.J. In: Mayer, J.E., and Filstead, W.J., eds. *Adolescence and Alcohol.* Cambridge, MA: Ballinger, 1980.

O'Gorman, P.A.; Stringfield, S.; and Smith, I., eds. *Defining Adolescent Alcohol Use: Implications Toward a Definition of Adolescent Alcoholism.* Proceedings of the National Council on Alcoholism 1976 Conference. Washington, DC. New York: National Council on Alcoholism, 1977.

Schuckit, M.A. "Alcohol Patterns and Problems in Youth." Paper prepared for the National Council on Alcoholism annual meeting, St. Louis, 1978.

*Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior. Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980a. NTIS No. PB81199267.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. "Appendix to Vol. 1, The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies." Adolescent Drinking Behavior. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980b.

Walker, B.A.; Jasinska, M.D.; and Carnes, E.F. Adolescent alcohol abuse: A review of the literature. *Journal of Alcohol and Drug Education* 23:51-65, 1978.

Zucker, R.A. Parental influences upon drinking patterns of their children. In: Greenblatt, M., and Schuckit, M.A., eds. *Alcohol Problems in Women and Children.* New York: Grune and Stratton, 1976. pp. 211-238.

Zucker, R.A. Developmental aspects of drinking through the young adult years. In: Blane, H.T., and Chafetz, M.E., eds. *Youth, Alcohol and Social Policy.* New York: Plenum Press, 1979. pp. 91-146.

Zucker, R.A., and Barron, F.H. Parental behaviors associated with problem drinking and antisocial behavior among adolescent males. In: NIAAA. *Research on Alcoholism. I. Clinical Problems and Special Regulations.* Proceedings of the First Annual Alcoholism Conference. DHEW Pub. No. (NIH) 74-675. Washington, DC: Supt. of Docs., U.S. Gov. Print. Off., 1973. pp. 276-296.

Zucker, R.A., and Devoe, C.I. Life history characteristics associated with problem drinking and anti-social behavior in adolescent girls: A comparison with male findings. In: Roff, M.; Wirt, R.; and Winoker, G., eds. *Life History Research in Psychopathology. Volume 4.* Minneapolis: University of Minnesota Press, 1975.

*These publications are available for purchase from the National Technical Information Service, 5285 Port Royal Rd., Springfield, VA 22161.

This article is excerpted from Chapter VII of *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies,* the final report of the Research Triangle Institute (RTI) on the results of a 1978 survey conducted under contract to the National Institute on Alcohol Abuse and Alcoholism and the National Institute on Drug Abuse. J. Valley Rachal, L. Lyn Guess, and Robert L. Hubbard are on the staff of Research Triangle Institute, Research Triangle Park, North Carolina. Stephen A. Maisto is on the staff of the Department of Psychology, Vanderbilt University, Nashville, Tennessee.

FACTS FOR PLANNING NO. 5 Adolescent Marijuana and Alcohol Use

Cherry Lowman, Robert L. Hubbard, J. Valley Rachal, and Elizabeth R. Cavanaugh

Alcohol is the psychoactive substance used by the largest number of youth in the United States. Its use has been found to be correlated with many problem behaviors; however, the use of other psychoactive drugs, especially marijuana, also is extensive among youth and poses problems of considerable concern.

A strong association has been demonstrated to exist between levels of alcohol use and the extent to which other psychoactive drugs are used (Lowman 1981/1982a). A survey conducted by the Research Triangle Institute (RTI) also shows an especially marked correspondence between the prevalence of two of the most popular drugs among American youth—marijuana and alcohol. For instance, 36 percent of moderate drinkers and 63 percent of heavier drinkers reported using marijuana during the previous month as compared with 9 percent of infrequent drinkers who did so (Lowman 1981/1982a).

The RTI national probability survey of adolescent alcohol use and its correlates was conducted in the spring of 1978 under contract to the National Institute on Alcohol Abuse and Alcoholism (NIAAA) with additional funding from the National Institute on Drug Abuse (NIDA). Self-report data were collected through questionnaires administered to a representative sample of 10th to 12th grade students. Conclusions of this study are consistent with the results of other national surveys conducted at about the same time (for example, Fishburne et al. 1980 and Johnston et al. 1979). The 1978 survey is similar to one conducted by RTI in 1974 (See the technical notes in *Facts for Planning No. 4 page* 66 for background information on the 1974 and 1978 surveys).

This article presents RTI data that show how patterns of marijuana use are generally compara-

Highlights of the 1978 RTI Survey

- Half of all senior high school students had used marijuana at least once.
- One of five senior high school students had used marijuana at least once a week in the previous 6 months.
- About 17 percent of senior high school students reported having used marijuana 100 times or more.
- One of 25 senior high school students reported they used marijuana daily.
- Eighteen percent of senior high school students reported they had given up marijuana use entirely.
- Almost 30 percent of senior high school students reported they sometimes used marijuana and alcohol together; 7 percent used them together "all the time."
- Seventy-one percent of senior high school students who were heavier drinkers sometimes used marijuana and alcohol together; only 5 percent of infrequent drinkers reported such combined use.
- The national prevalence of marijuana use among senior high school students appears to have leveled off, with no dramatic increase from 1974 to 1978.
- Alcohol and marijuana use followed similar patterns among senior high school students in 1978 in the following areas:
  - —Senior high school students in suburban areas were more likely to use both alcohol and marijuana than were students in other areas..
  - —More 10th through 12th grade boys than girls used both alcohol and marijuana.
  - —The prevalence of both alcohol and marijuana use among senior high school students decreased as religiosity increased.
  - —The prevalence of both alcohol and marijuana use was higher among senior high school students with more spending money.
  - —Senior high school users of both alcohol and marijuana were more likely than nonusers to report lower grades.
  - —The number of both alcohol- and marijuana-related problems reported by senior high school students increased with frequency of use.
  - —Reported first use of both marijuana and alcohol peaked between the ages of 13 and 15 years.
- Patterns of use for marijuana differed from alcohol use patterns among senior high school students in 1978 in the following areas:
  - —The prevalence of weekly marijuana use was the same for students 15 years old as for those up to 18 years of age. In contrast, the number of students who reported weekly alcohol use increased with age.
  - —Weekly use of marijuana was least prevalent among students who attended senior high schools in rural areas, while weekly use of alcohol was most prevalent among students in these same rural areas.

Author's Note: Throughout this report, the term marijuana is used generically to refer to hashish as well as marijuana, both products of the common hemp plant Cannabis sativa. *(See the technical notes for information on the two cannabis products.)*

ble to those of alcohol use. Findings also reveal the extent of combined marijuana and alcohol use, pointing to potentially serious problems that face youth who are simultaneous users.

Patterns of Marijuana Use

Kandel (1980) reviewed the considerable literature on drug use among youth and concluded that regular daily marijuana use among adolescents is now more prevalent than daily drinking, the use of marijuana and other drugs has increased dramatically over the past decade, research emphases and concepts have changed to view drug and alcohol use as part of complex social processes rather than as extremely deviant or abnormal behavior, and longitudinal research on the developmental process of use is needed.

While analyses of longitudinal data can provide meaningful predictors of potential alcohol and drug problems, prevalence data collected at a single point in time provide information on the extent of use and the problems related to it that is essential for planning purposes. Of immediate utility to planners and policymakers is information on the prevalence of alcohol and marijuana use among different subgroups of the population. Such information can be used in assessing program and policy needs, as well as in estimating the resources required to address these needs.

Trends. An analysis of 1975 to 1980 trends in the prevalence of drug use among the Nation's high school seniors was conducted by the University of Michigan's Institute for Social Research (ISR). The ISR study, based on a series of annual surveys, revealed a rapid rise in the annual and past-month prevalence of marijuana use between 1975 and 1978. The study also showed a recent, dramatic leveling off in the prevalence of marijuana use among 12th grade students. The RTI data on 10th to 12th grade students reveal a slight increase (4 percent) in reported marijuana use between 1974 and 1978. Consistent with the ISR findings, the 1978 RTI survey showed no evidence of an increase in use during the 6 months prior to the survey.

Table 1. Patterns of marijuana use in the past six months for 15-18 year olds, 1978

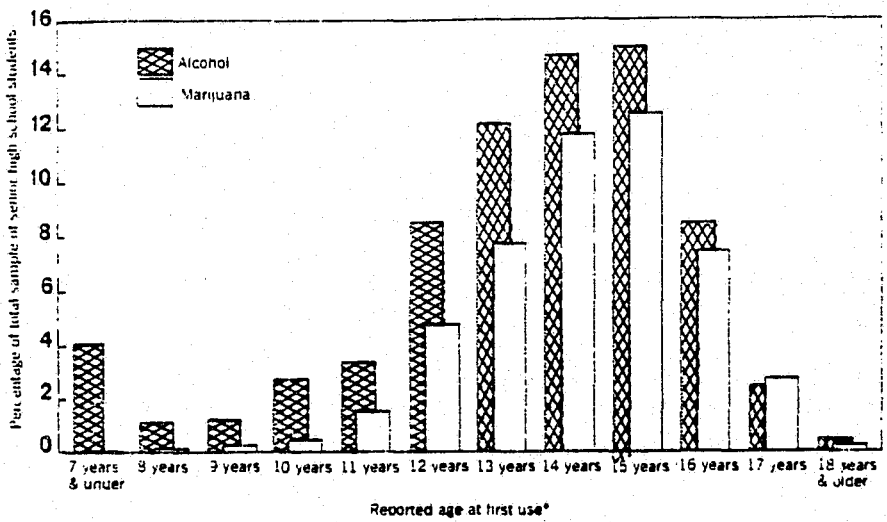
Six-month pattern of marijuana use	Age				
	15	16	17	18	Total
Never used	53.7%	51.4%	45.9%	46.3%	49.3%
Used but not in past six months	8.2	9.6	12.0	11.0	10.3
Used less than once a month	6.6	9.7	11.0	10.2	9.6
Used one to three times a month	9.6	8.8	8.3	9.6	8.9
Used at least once a week	21.9	20.5	22.9	22.9	21.9
Total	100.0	100.0	100.0	100.0	100.0
Sample (n)	889	1560	1507	705	4661

Note: Table 1 reproduces table VI.8 in the RTI final report (Rachal et al. 1980a).

RTI findings about potential use of marijuana reinforce the ISR findings. Potential users of a drug were defined by RTI researchers as students who reported they had already tried it, who reported they had not tried it but would like to, or who expressed uncertainty about whether or not they would like to try the drug. Using this definition, there were only 5 percent more potential than actual users of marijuana among 10th to 12th graders in 1978; 56 percent were identified as potential users; 51 percent had tried marijuana at least once (Rachal et al. 1980a). This was not the case for other psychoactive drugs about which RTI survey participants were questioned. For example, there were twice as many who were potential users of cocaine (23 percent) as there were youths who had ever used cocaine (10 percent).

Frequency. Information on the frequency of marijuana use within the 6 months prior to the survey was used to assess patterns of marijuana use (table 1). Of those senior high school students who provided information about their marijuana use in that 6-month period, over half (51 percent) reported having used marijuana at least once, and one in five (22 percent) reported having used marijuana at least once a week. Nine percent reported using marijuana at least once a month, and 10 percent said they used it less than once a month. About 10 percent had used marijuana at one time but not in the past 6 months.

In reporting on lifetime use, 16 percent of the senior high schoolers reported they had used marijuana 100 times or more; 7 percent said they had used it 1,000 times or more. Four percent of the senior high school students surveyed reported daily marijuana use during the previous month; 16 percent reported they had used it at least 7 days during the previous month. Approximately 18 percent of the 1978 respondents reported they usually kept their own equipment,



*Each bar in figure 1 represents the percentage of the total 4,918 respondents who reported first use of the drug at the age indicated. The twelve bars that represent age categories for each drug do not sum to 100 percent because respondents who had never tried the drug, couldn't remember when they did, or who did not answer the question are excluded from the percentage distribution for each drug in figure 1. (Twenty-five percent of the respondents are excluded from the alcohol distribution; 50 percent from the marijuana distribution.)

Figure 1. Age at which alcohol and marijuana were first used, as reported by senior high school students, 1978

such as marijuana papers or "hash" pipes.

The RTI data indicate that exposure to marijuana use does not necessarily initiate an irreversible process of increasing drug involvement. Despite evidence of widespread prevalence, 17 percent of the senior high school students sampled in 1978 reported they had given up marijuana use entirely. About 21 percent responded "yes" to a question that asked if they found themselves making new friends "because old friends were using too much marijuana or hashish."

Correlates

As with alcohol use, marijuana use varies for different subgroups of the senior high school population. In most cases, these variations follow the same pattern as for alcohol use; in some instances, they differ.

Age. As expected, higher prevalence of lifetime marijuana use occurs among older students. However, about the same percentage of each age group reported weekly marijuana use (table 1). This contrasts with weekly alcohol use, which increases with age among both sexes (Lowman 1981).

Ethnicity. Other than lower prevalence among Hispanic youth, no ethnic differences were found in marijuana use. Only 43 percent of Hispanic senior high school students had ever used marijuana as compared with 54 percent of non-Hispanic white students (Rachal et al. 1980a). Prevalence of marijuana use was comparable among black and white students. In contrast, the prevalence of alcohol use consistently was found to be lower among black than white students (Lowman 1981).

Sex. About 54 percent of senior high school boys and 48 percent of girls reported they had ever used marijuana; 26 percent of boys and 18 percent of girls used marijuana weekly (Rachal et al. 1980a). This pattern parallels the pattern of greater and more frequent alcohol use among 10th to 12th grade boys than girls (Lowman 1981).

Age at onset. In the 1978 survey, senior high school students were asked to report the age at which they first used marijuana and alcohol. Their responses (figure 1) show that initial use of both alcohol and marijuana peaked at 14 and 15 years of age. At these ages, 29 percent had their first drink (not just a "sip or taste") and 23 percent tried marijuana for the first time.

Only 3 percent of the students surveyed in 1978 reported using marijuana before they were 12 years of age; 14 percent said they had their first drink before age 12. A major surge in reported first use both of alcohol and marijuana occurred at 12 years of age; 8 percent of students sampled used alcohol for the first time and 5 percent used marijuana at the age at which most students enter junior high school.

Community size. Both lifetime prevalence and weekly marijuana use were lowest among senior high students in rural areas and highest among students in suburban areas. Approximately 42 percent of students who went to schools in rural areas had used marijuana at least once; 18 percent used it weekly. In suburban areas, 60 percent of the students had ever used marijuana, and 27 percent reported weekly use (Rachal et al. 1980a).

Findings on variations in alcohol use related to community size indicated that students who attended schools in suburban areas were at high risk for alcohol use on a number of measures. Surprisingly, reported weekly heavy alcohol use was highest among students who attended senior high school in small communities (Lowman 1981). However, lifetime prevalence of alcohol use was lowest in rural areas, as was the lifetime prevalence of marijuana use.

School size. The larger the school, the more common were experiences with and weekly use of marijuana. Only 43 percent of senior high school students who attended schools with enrollments of 500 or fewer students had ever used marijuana and only 15 percent used it weekly. In senior high schools with enrol-

lments of 2,500 or more students, 60 percent of students had ever used marijuana and 30 percent used it weekly (Rachal et al. 1980a). No comparable relationship exists between the prevalence of alcohol use and school size. Although the relationships between community and school size and the extent of marijuana use are strong, the generality of these findings may be limited because of some school systems' nonparticipation, particularly in large urban areas. (See the technical notes in *Facts for Planning No. 4*, page 67, for a discussion of the representativeness of the sample.)

Socioeconomic status and religiosity. Both alcohol and marijuana use decreased with increasing religiosity, measures of which were based on responses to questions about the importance of religious beliefs and activities (Rachal et al. 1980a). Socioeconomic status, as represented by parents' reported education and occupation, was not related to prevalence of either alcohol or marijuana use.

Weekly spending money. Some factors may be viewed either as causes or consequences of marijuana use. The more money students had to spend, the more likely they were to report experience with marijuana and to report weekly use. Twenty-seven percent with more than ten dollars available reported weekly use compared to less than 12 percent of those who had less than three dollars available (Rachal et al 1980a). This suggests that more discretionary income increases the risk that marijuana will be used. On the other hand, students who use marijuana may have obtained their higher amounts of money by stealing or by selling some of their marijuana. There is a similar relationship between drinking levels and discretionary income. About 57 percent of heavier drinkers, as compared with 41 percent of the total sample, had more than $10 a week to spend. Only 9 percent of heavier drinkers had $3 or less in weekly spending money.

Grades in school. Experience with and frequency of both marijuana use and alcohol use are related to lower grades (Rachal et al. 1980a). Only two of five students who reported getting mostly As or Bs had ever used marijuana, while two of three students who reported getting mostly Cs, Ds, and Fs reported at least 1 use. Weekly marijuana use was reported more often by students who reported lower grades (38 percent) than by students reporting higher grades (13 percent). Similarly, only 8 percent of senior high school students who usually got As and Bs were heavier drinkers; 25 percent of students who usually got Cs, Ds, and Fs were heavier drinkers.

Heavier marijuana users reported that their grades got worse because of marijuana use. However, it may also be the case that students who are doing badly in school use marijuana and/or alcohol to cope with stress and the consequences of poor academic performance. (See technical notes on the pharmacology and hazards of marijuana use.)

Problems related to marijuana use. As the level of marijuana use increased, more marijuana-related problems were reported by students in the 1978 RTI survey (Rachal et al. 1980a). Fifteen percent of all students reported problems in controlling moods, and 17 percent had problems in concentrating when using marijuana. Among monthly and weekly marijuana users, about two in five reported a problem with concentration and about a third reported an inability to control moods when using marijuana. Weekly users were far more likely than nonusers and less heavy users to report absenteeism (32 percent), worsening grades (21 percent), police contacts (11 percent), and trouble with parents (34 percent) attributed to marijuana use. In addition, more types of problems

Table 2. Patterns of marijuana use in the past six months in each drinking level among senior high school students, 1978[1] (Percentage distribution)

Six-month pattern of marijuana use	Drinking level[2]						
	Abstainers	Infrequent	Light	Moderate	Moderate/heavier	Heavier	All students
Never used	86.8	75.5	52.0	35.3	23.4	16.1	49.3
Used but not in past six months	7.3	10.2	14.0	13.1	10.3	7.2	10.3
Used less than once a month	1.5	6.7	14.6	13.8	10.3	12.0	9.6
Used one to three times a month	1.3	4.3	8.6	13.7	15.1	11.5	8.9
Used at least once a week	3.1	3.4	10.8	24.1	40.9	53.2	21.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Sample (n)	936	538	868	804	835	680	4661

Interpret the statistic in the upper left-hand corner as follows: About 87 percent of senior high school students who abstain from alcohol use have never used marijuana.

[1]Table 2 reproduces table VI. 18 in the RTI final report (Rachal et al. 1980a: 120).

[2]See the technical notes for definitions of the drinking levels.

were reported by weekly marijuana users. Over half of the weekly users reported problems in two or more areas because of their marijuana use.

A comparable pattern of relatively more drinking-related negative consequences has been observed to occur among students who reported higher levels of alcohol use in the RTI surveys (Lowman 1981/1982a, Jessor, Chase, and Donovan 1980).

Simultaneous Alcohol and Marijuana Use

One of the reasons that patterns of alcohol and marijuana use are comparable among students in the RTI surveys is that the use of both of these two drugs is highly associated. Many of the heavier alcohol users were also heavier marijuana users. About half of the students who were moderate to heavier drinkers reported use of marijuana within the last month as compared with 10 percent of abstainers, infrequent, and light drinkers (Lowman 1981/82a). It should not be surprising, therefore, that similar attributes and behavior patterns characterize these two overlapping subgroups.

In *Facts for Planning No. 2* (Lowman 1981/82a), the extent and frequency of marijuana use was shown to rise dramatically at each of six levels of increasing alcohol consumption. (See the technical notes for definitions of the six drinking levels.) Table 2 shows that in 1978 over half of the senior high school students who were heavier drinkers reported they used marijuana at least once a week, compared with only 3 percent of alcohol abstainers who did so. While only 16 percent of heavier drinkers had never used marijuana, 76 percent of infrequent drinkers and 87 percent of alcohol abstainers never had.

Although it is common knowledge that marijuana and alcohol are often used together, the nature, extent, and consequences of these use patterns have not been thoroughly explored. Research on the effects of combined marijuana and alcohol use indicates that the duration and magnitude of effects vary widely, depending on the strength of both substances, the amount consumed, the time interval during which they are consumed, and the type of effects measured, as well as large individual differences in physiological response to combined use (NIDA 1980a). Some people, for instance, have been reported to experience intense nausea or a radical drop in heart rate (NIDA 1980b). Research among human subjects, while limited, does indicate that combined use, when alcohol is consumed at socially typical levels, results in a greater reduction in "reaction time, cognitive performance, standing steadiness, and psychomotor coordination" than occurs in response to use of either drug alone (NIDA 1980b).

Table 3 shows that approximately 29 percent of the senior high school students surveyed by RTI in 1978 reported they sometimes used marijuana and alcohol together. Ten percent of 10th to 12th grade students reported using the two drugs together about half the time, 7 percent nearly all the time. Rates of simultaneous use were markedly higher for heavier drinkers. For example, 71 percent of students classified as heavier drinkers reported they had ever used the two drugs together as compared with 5 percent of students classified as infrequent drinkers. Twenty five percent of heavier drinkers used marijuana and alcohol nearly all the time, as compared with fewer than 1 percent of infrequent drinkers (table 3).

Table 3. Combined marijuana and alcohol use patterns in each drinking level among senior high school students, 1978 (Percentage distribution)[1]

Pattern of combined use	Drinking level[2]					
	Infrequent	Light	Moderate	Moderate/ heavier	Heavier	All students
Never use marijuana	76.7	55.1	37.2	24.9	14.8	50.4
Never use marijuana with alcohol	18.8	28.3	30.3	20.7	13.9	20.2
Use together less than half the time	3.2	10.6	16.7	21.9	19.7	12.0
Use together about half the time	0.5	3.5	8.8	21.3	26.5	9.9
Use together nearly all the time	0.8	2.5	7.0	11.2	25.1	7.4
Total	100.0	100.0	100.0	100.0	100.0	100.0
Sample (n)	373	851	791	818	660	4572*

The statistic at the intersection of the "Use together nearly all the time" row and the "heavier" column is interpreted as follows: Approximately 25 percent of senior high school students who are heavier drinkers use marijuana together with alcohol nearly all the time.

[1]Table 3 reproduces table VI. 19 in the RTI final report (Rachal et al. 1980a: 120).

[2]See the technical notes for definitions of the drinking levels.

*Includes 1079 respondents who were classified as abstainers in the drinking level classification.

In 1978, an estimated 1.6 million senior high school students were heavier drinkers (Lowman 1981). About one-fourth, an estimated 400,000 students, used marijuana and alcohol together at least once a week, and as many as 3.2 million sometimes combined marijuana and alcohol use (29 percent of the 11,180,409 students in grades 10 to 12 in the spring of 1978 when the RTI survey was conducted).

Implications

The extent of marijuana use among senior high school students is widespread, and patterns of marijuana use among the Nation's senior high school students are similar to patterns of alcohol use. There is clearly a strong association between use of the two drugs.

Specific findings from the 1978 survey have several implications for policy and program planning:

Programs developed to prevent or curb alcohol problems can profitably integrate efforts to also prevent marijuana use. Alcohol and marijuana use are extensive. The patterns and correlates of their use are similar, and many students who are heavier alcohol users are also frequent marijuana users. Efforts that simultaneously address problems related to use of both drugs often can be more cost effective than independent, drug-specific efforts. See *Facts for Planning No. 3* (Lowman 1981/82*b*) for information on the interdependence of alcohol use and seven types of psychoactive drugs in addition to marijuana.

Prevention efforts directed to both marijuana and alcohol use need to be initiated in primary school. Although 4 times as many students first tried alcohol when they were under 12 years of age than first tried marijuana (13 percent as compared with 3 percent), the number of students exposed to use of both drugs at early ages justifies the initiation of major prevention efforts by the third grade when marijuana is first used (figure 1).

Programs designed to prevent or reduce accidents arising from driving while intoxicated should focus on problems related to intoxication with marijuana as well as with alcohol. The RTI data show that senior high school students who are heavier drinkers are also more likely to be frequent marijuana users, and are more likely to use the two drugs together. Thus, students at greatest risk for driving when intoxicated with alcohol are among those at greatest risk for driving when intoxicated with marijuana.

Marijuana, like alcohol, impairs driving ability and increasingly has been found a factor in fatalities (U.S. DHEW 1979; NIDA 1980a, 1980b). Further, research shows that combined alcohol and marijuana use can have a potentiating effect; that is, the effect is even greater than occurs in response to use of either drug alone (NIDA 1980a, 1980b). Thus, students who combine alcohol and marijuana use are even more prone to have serious driving accidents than students who use only one drug or the other.

Technical Notes

RTI Survey Methodology and Procedures

Details on RTI survey methods, sampling strategy, and sample validity are presented in the technical notes of *Facts for Planning No. 4* (page 66). As in *Facts for Planning Nos. 1, 2, and 3*, reported percentages in FFP No. 5 are based on the 1978 sample weighted to represent the sociodemographic characteristics of the total population of 10th to 12th grade students in the United States at that time.

Five percent of the students sampled in 1978 did not answer the question on recency of marijuana use. This nonresponse was considerably greater than in a comparable survey conducted by RTI in 1974 among both junior high (7th to 9th grade) and senior high (10th to 12th grade) students. It is also higher than the nonresponse rate for high school seniors reported by Johnston and associates (1979). These differences may be attributable to the question format, the method of recording answers, and the perceived confidentiality of the data, although no one explanation is completely satisfactory. However, the patterns of nonresponse in the RTI, ISR (Johnston et al. 1979), and NIDA studies (Fishburne et al. 1980) may explain apparent discrepancies in prevalence estimates among the three studies.

Prevalence and recency data from the 1978 RTI study were compared with these other two major national studies conducted at about the same time (Rachal et al. 1980a). The RTI study showed somewhat lower rates than the other two studies, both for prevalence and recency of use of most drugs. However, these differences are generally not statistically significant, and overall patterns of use are generally the same. Marijuana use by 16- to 17-year olds in the RTI and NIDA studies is essentially the same despite RTI's use of a school sample and NIDA's use of a household sample.

A comparable survey conducted by RTI in 1974 included a limited set of items on drug use. Because of the increasing interest in drug use and its relationship to alcohol use and problems, a more comprehensive assessment of drug use, especially marijuana use, was included in the 1978 RTI questionnaire. The technical notes in *Facts for Planning No. 4* (page 66) provide background information on the 1974 and 1978 survey.

Marijuana and Hashish

Marijuana and hashish are products of the plant *Cannabis sativa*, commonly known as hemp. All RTI questions on cannabis use specified marijuana *or* hashish. For example, "If you had the chance to try marijuana or hashish, would you like to do so?"

Marijuana is composed of the cut and dried leaves, tops, and stems of the hemp plant. It is generally considered lower than hashish in the percentage of delta-9 tetrahydrocannibinol (delta-9-THC), the major psychoactive ingredient in cannabis. Hashish is a concentrated product, formed from the resinous secretions of the hemp plant. Both marijuana and hashish range widely in strength. Domestic hemp is psychoactively weak, usually less than 0.5 percent of delta-9-THC (Wilford 1981) as compared with imported Colombian marijuana, confiscated samples of which averaged over 4 percent in 1979 (NIDA 1980b). The range of strength in hashish appears to be even greater, varying from trace amounts of delta-9-THC up to 10 percent (Wilford 1981).

Two factors make the social use of marijuana potentially more hazardous than

the social use of alcohol: (1) lack of knowledge about marijuana's relative purity and strength, depriving users of control over its short- and long-term effects, and (2) the fat solubility of delta-9-THC.

Marijuana of unknown origin may be laced with contaminants to increase its volume and the seller's profit, or with other psychoactive drugs to improve its effect and strength (and thus chances for future sales). Levels of delta-9-THC appear to be higher in currently available samples than was the case 5 to 10 years ago. Concentrated hashish oil, available on the street only within the last few years, ranges in delta-9-THC content from 11 to 28 percent (NIDA 1980a).

Because delta-9-THC is fat soluble, it remains only briefly in the bloodstream before it is stored in the fat cells of a number of organs, including the brain. THC has a half-life of 8 days (Wilford 1981); that is, only half of the amount stored in tissue is eliminated after 8 days. This means a single dose of marijuana is not completely eliminated from the body for over 4 weeks. This contrasts with water-soluble alcohol, eliminated within hours after consumption.

Marijuana is chemically more complex than alcohol; its metabolism is only partially understood. Delta-9-THC is only one ingredient in cannabis. The plant contains 419 individual compounds, 61 of which are cannabinoids—chemicals specific to cannabis. Thus, components in addition to the principal psychoactive ingredient may modify the drug's effects and explain the "common street belief that different types of marijuana have different effects not wholly related to their THC content" (NIDA 1980a).

Heavy, frequent marijuana use also is believed to have a greater potential for impairing the structure of brain tissue than have opium products because cannibanoids accumulate in tissue and are not readily metabolized, thus serving as a "foreign body" in the brain (Wilford 1981). For recent summaries of the effects of cannabis use on the reproductive, immune, pulmonary, cardiovascular, cerebral, and neuroregulatory systems, see NIDA (1980a, 1980b) and Wilford (1981).

Acute marijuana intoxication is known to impair skills necessary for learning such as recent memory, verbal facility, and attentiveness (NIDA 1980a, 1980b; Wilford 1981). It is believed by many clinicians that regular marijuana use in childhood and adolescence endangers learning and psychological development. Studies (Wilford 1981) have shown that long-term psychological impairment can result from chronic marijuana abuse. The psychological effects of moderate use are less clear, although psychomotor functions are definitely impaired, even at moderate social levels of use.

Definitions of Students' Drinking Levels

The RTI survey used the following definitions of drinking levels: *abstainers* don't drink, or drink less than once a year; *infrequent drinkers* drink once a month at most and drink small amounts per typical drinking occasion; *light drinkers* drink once a month at most and drink medium amounts per typical drinking occasion, or drink no more than 3 to 4 times a month and drink small amounts per typical drinking occasion; *moderate drinkers* drink at least once a week and small amounts per typical drinking occasion, or drink 3 to 4 times a month and medium amounts per typical drinking occasion, or drink no more than once a month and large amounts per typical drinking occasion; *moderate/heavier drinkers* drink at least once a week and medium amounts per typical drinking occasion, or drink 3 to 4 times a month and large amounts per typical drinking occasion; and *heavier drinkers* drink at least once a week and large amounts per typical drinking occasion. *Facts for Planning No. 2* (Lowman 1981/82a) provides more detailed definitions of these six drinking levels, and discusses the question underlying them and the procedures used to construct the drinking level classification.

References

Fishburne, P.M.; Abelson, H.I.; and Cisin, I. *National Survey on Drug Abuse: Main Findings, 1979.* Rockville, MD: National Institute on Drug Abuse, 1980.

Jessor, R.; Chase, J.A.; and Donovan, J.E. Psychosocial correlates of marijuana use and problem drinking in a national sample of adolescents. *American Journal of Public Health* 70(6): 604-613, 1980.

Jessor, R.; Donovan, J.E.; and Widmer, K. "Psychological Factors in Adolescent Alcohol and Drug Use: The 1978 National Sample Study and the 1974-78 Panel Study." Adolescent Drinking Behavior, Vol. 2. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980.

Johnston, L.D.; Bachman, J.G.; and O'Malley, P.M. *Drugs and the Class of '78: Behaviors, Attitudes, and Recent National Trends.* DHEW Pub. No. (ADM) 79-878. Rockville, MD: Alcohol, Drug Abuse, and Mental Health Administration, 1979.

Johnston, L.D.; Bachman, J.G.; and O'Malley, P.M. *Highlights From Student Drug Use in America 1975-1980.* DHHS Pub. No. (ADM) 81-1066. Rockville, MD: Alcohol, Drug Abuse, and Mental Health Administration, National Institute on Drug Abuse, 1980.

Kandel, D.B. Drug and drinking behavior among youth. *Annual Review Sociology* 6:235-285, 1980.

Lowman, C. Facts for planning no. 1: Prevalence of alcohol use among U.S. senior high school students. *Alcohol Health and Research World* 6(1):29-40, 1981.

Lowman, C. Facts for planning no. 2: Alcohol use as an indicator of psychoactive drug use among the nation's senior high school students. *Alcohol Health and Research World* 6(2): 1981/82a.

Lowman, C. Facts for planning no. 3: U.S. teenage alcohol use in unsupervised social settings. *Alcohol Health and Research World* 6(2): 1981/82b.

National Institute on Drug Abuse. *Marijuana and Health.* Eighth Annual Report to the U.S. Congress From the Secretary of Health, Education, and Welfare, by Petersen, R.C., DHEW Pub. No. (ADM) 80-945. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1980a.

National Institute on Drug Abuse. *Marijuana Research Findings:* 1980. NIDA Monograph No. 31. DHHS Pub. No. (ADM) 80-2002. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1980b.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; and Maisto, S.A. Facts for planning no. 4: Alcohol misuse by adolescents. *Alcohol Health and Research World* 6(3): 1982.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior, Vo. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980a. NTIS No. PB81 199267.

Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Benrud, C.H. "Appendix to Vol. 1, The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies." Adolescent Drinking Behavior. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980b.

Wilford, B.B. *Drug Abuse: A Guide for the Primary Care Physician.* Chicago: American Medical Association, 1981.

U.S. Department of Health, Education, and Welfare. *Drug Abuse, Prevention, Treatment, and Rehabilitation.* Second Annual Report From the Secretary of the Department of Health, Education, and Welfare to the President and Congress of the United States. Washington, DC: U.S. Department of Health, Education, and Welfare. 1979.

*These publications are available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

This article was developed largely from data presented in The Extent and Nature of Adolescent Alcohol and Drug Use: the 1974 and 1978 National Sample Studies, *the final report of the Research Triangle Institute on the results of a 1978 survey of adolescent drinking practices. Robert L. Hubbard, J. Valley Rachal, and Elizabeth R. Cavanaugh were on the staff of the Research Triangle Institute and among authors of the final report. Cherry Lowman is a staff member of the National Clearinghouse for Alcohol Information, and adapted parts of the RTI final report for this article.*

FACTS FOR PLANNING NO. 6

Parental Dimensions In Teenage Drinking

Cherry Lowman, Ph.D.

Highlights of 1978 RTI Findings

- Eighty-five percent of senior high school students had at least one parent who they believed drank alcoholic beverages; an estimated 9 percent said both parents drank regularly.
- Students' drinking levels were associated with their perceptions of their parents' drinking behavior. An estimated 59 percent of all students with at least one parent who they believed drank regularly were themselves moderate to heavier drinkers, compared with 29 percent of students who believed their parents were abstainers.
- Levels of teenage alcohol use were related to teenagers' perceptions of parental attitudes toward teenage drinking. Of boys who said their parents disapproved of boys' drinking, only 17 percent were heavier drinkers, compared with 35 percent who believed their parents approved. Similar patterns were observed among girls.
- The more senior high school students drank, the more likely they were to report getting into trouble with their families because of their drinking. Over 2 million students—20 percent—were estimated to have gotten into trouble with their families over drinking during the previous year, based on self-report data.
- Students who often drank when they participated in peer activities unsupervised by adults were more likely to report getting into trouble with their families because of their drinking than were students who reported they often drank in supervised settings.
- The highest levels of reported drinking-related family problems occurred among senior high school students who said they often drank when they were alone or when they drove around in cars at night.
- An estimated 74 percent of senior high school students who reported driving while intoxicated six or more times during the previous year reported they got into trouble with their families because of their drinking, in contrast with only 18 percent who said they had not driven while intoxicated.

Do parents' drinking practices—as perceived by their youngsters—influence teenagers' drinking? And how about parental attitudes toward teenage drinking? Are teenagers' drinking practices affected by their perceptions of parental attitudes? And finally, does teenagers' drinking lead to problems with their families? Self-report national survey data collected in 1978 suggest the answers to these questions is yes. The survey of drinking practices among 10th to 12th-grade students was conducted by the Research Triangle Institute (RTI) with funding from the National Institute on Alcohol Abuse and Alcoholism and the National Institute on Drug Abuse (see technical notes for details).

Parental drinking. More alcohol-using senior high school students were found in homes where alcohol was present. Parents' and teenagers' drinking behavior was found to be generally similar. RTI researchers noted, however, that there has been "wide variety in the strength of this association." They also noted that it is strongest between fathers and sons, between mothers and daughters, and for girls in general (Rachal et al. 1980).

According to the 1978 survey, an estimated 85 percent of the Nation's 11,180,409 senior high school students believed they had at least one parent who drank alcoholic beverages. An estimated 33 percent had fathers they believed were regular alcohol users, 12 percent had mothers believed to use alcohol regularly, and 9 percent believed both parents to be regular drinkers. Approximately half (49 percent) of the students had fathers who they reported used alcohol at least sometimes and 52 percent had mothers who they reported sometimes used alcohol; 33 percent of students believed both parents sometimes used alcohol.

(See the technical notes for the questions upon which these responses are based.)

On the basis of answers to a series of questions about the quantity and frequency of respondents' own alcohol use, researchers assigned students to one of six drinking levels. (See the technical notes for definitions of the six levels.) Table 1 shows the relationship between perceived parental drinking practices and students' drinking levels. Of students who reported that one or both parents drank regularly, an estimated 19 percent were themselves heavier drinkers, as compared with 15 percent of students who reported their parents were alcohol abstainers. Of students who reported their parents were abstainers, over 50 percent were themselves abstainers; only 17 percent of students who reported their parents sometimes drank were themselves abstainers. And among those whose parents were believed to be regular drinkers, only 12 percent were abstainers.

It should be noted that it is primarily the high level of abstinence that distinguishes children of abstainers from other teenagers. When children of abstainers do drink, their patterns of use are more similar to those of other teenage drinkers. For example, among children of abstainers who do drink, 16 percent are heavier drinkers, 6 percent less than the 22 percent of student drinkers whose parents are regular users of alcohol.

Parental Attitudes Toward Teenage Drinking. Among family correlates, the strongest relationship was between students' drinking levels on the one hand and parents' perceived attitudes toward teenage drinking on the other.

An estimated 70 percent of senior high school students in 1978 believed their parents disapproved of boys' drinking, while 73 percent believed their parents disapproved of girls' drinking. However, parental disapproval of teenage drinking was ameliorated in part by parental alcohol use. Parents who were reported to be regular drinkers were less often perceived as disapproving of their sons' and daughters' drinking. For example, only 58 percent of boys who reported their fathers drank regularly believed their parents disapproved of boys' drinking. In contrast, 84 percent of boys who said their fathers were abstainers reported parental disapproval of boys' drinking. Similarly, 54 percent of girls whose mothers were perceived to be regular drinkers said their parents disapproved of girls' drinking; 85 percent of girls who classified their mothers as abstainers reported parental disapproval of girls' drinking.

In general, the relationship between perceived parental attitudes and actual student drinking was clear and direct. Of boys who reported that their parents disapproved of boys' drinking, 17 percent were heavier drinkers and 29 percent were abstainers. Contrast this with boys whose parents were perceived to approve of boys' drinking; 35 percent of these boys were heavier drinkers and 9 percent were abstainers. The pattern was the same for girls. Of girls who believed their parents approved of girls' drinking, 18 percent were heavier drinkers and 14 percent were abstainers. Only 7 percent of girls who reported parental disapproval of girls' drinking were heavier drinkers, while 31 percent were alcohol abstainers.

Table 2 reveals a strong association between parental attitudes toward student drinking and student drinking levels. The extent of perceived approval of drinking was progressively greater as drinking level increased among both boys and girls. The same pattern was seen among those who believed their parents didn't care whether or not they drank, a parental attitude apparently serving as passive approval. Conversely, the percentage of boys and girls who perceived their parents to disapprove of drinking decreased progressively as each drinking level increased. Only among boys and girls who could not or did not identify an explicit

Table 1. Perception of parents' alcohol use by drinking levels, 10th-12th grade[1]

Students' drinking level	Perception of parents' alcohol use		
	One or both parents drink regularly	One or both parents drink sometimes	Neither parent drinks
Abstainer	12.4%	17.1%	51.1%
Infrequent	9.9	14.3	5.7
Light	19.2	19.5	13.8
Moderate	18.4	17.6	10.0
Moderate/ heavy	21.5	16.6	11.4
Heavier	18.6	14.9	8.0
Total	100.0%	100.0%	100.0%

[1]Excerpted from Table V.1 in the RTI final report to NIAAA (Rachal et al. 1980).

Table 2. Percentage of senior high school students in each drinking level distributed by parental attitudes toward drinking by sex, 1978

Parents' attitudes	Students' drinking levels						
	Abstainers	Infrequent	Light	Moderate	Moderate/ heavier	Heavier	Total
Parental attitudes toward boys' drinking				*Boys*			
Approve	2.6%	4.0%	4.7%	7.6%	8.8%	11.4%	6.8%
Don't care	5.9	12.9	8.0	13.0	17.9	22.4	13.5
Disapprove	84.3	68.2	73.9	71.0	61.2	58.0	69.7
Don't know	7.2	15.0	13.4	8.4	12.1	8.3	10.0
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Parental attitudes toward girls' drinking				*Girls*			
Approve	2.4%	2.3%	3.7%	7.2%	7.2%	9.8%	4.9%
Don't care	5.3	8.3	8.0	15.7	15.8	21.9	11.1
Disapprove	81.7	78.7	74.7	66.4	67.8	56.5	72.8
Don't know	10.5	10.7	13.6	10.7	9.2	11.9	11.1
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Interpret the percentages as follows: In 1978, an estimated 84 percent of boys who were alcohol abstainers had parents they perceived to disapprove of boys' drinking; in comparison, 58 percent of boys who were heavier drinkers had parents they believed disapproved of boys' drinking.

parental attitude (the "don't know" category in table 2) was there no clear relationship between parental attitudes and student drinking levels.

Although the prevalence of alcohol use was considerably higher among senior high school boys than among girls at all drinking levels (Lowman 1981), patterns of alcohol use related to perceived parental attitudes is remarkably similar for both sexes.

Problems with family related to student alcohol use. The 1978 RTI survey data reveal that the more frequently and heavily students drank, the more likely they were to report problems with their families related to their drinking. This suggests that a large number of parents attempt to monitor and intervene in their teenage sons' and daughters' drinking practices.

Over 2.2 million senior high school students—20 percent—were estimated to have gotten into trouble with their families because of their drinking at least once during the year prior to the survey. (See the technical notes for the question underlying this statistic.) Eleven percent reported they got into trouble with their families only once during this interval; 8 percent experienced such problems two to five times; and 1 percent had family-related problems six times or more.

The patterns of reported alcohol-related problems with family mirror the demography of adolescent drinking in the Nation. The number of students who said they had problems with their families was greater among boys (23 percent) than among girls (17 percent), in small towns (23 percent) and suburbs (20 percent) than in big cities (14 percent), in the Northeast (22 percent) and North Central (24 percent) regions than in the South (17 percent), and West (17 percent), and among whites (22 percent) and American Indians (25 percent) than among blacks (8 percent) and Asians/Pacific Islanders (14 percent). *Facts for Planning No. 1* discusses the demography of adolescent drinking (Lowman 1981).

Drinking contexts are also related to frequency of troubles with family because of drinking. *Facts for Planning No. 3* (Lowman 1981/82) discusses RTI findings on teenage alcohol use in unsupervised settings and explores questions underlying drinking context variables. In general, students who often reported they drank in unsupervised settings also were more likely to report alcohol-related family problems than were students who said they often drank in supervised settings.

Thirty-four percent of students who often drank at unsupervised teenage parties reported problems with their families related to drinking at least once during

the year prior to the survey. Thirty-eight percent of students who often drank during or after a school activity, 40 percent who often drank alone, and 41 percent who often drank alcoholic beverages while driving around or sitting in a car at night reported troubles with their families. Only 22 percent of students who often drank at home at dinner, and only 15 percent of students who often drank at home on special occasions reported alcohol-related problems with their families.

An exception to this pattern linking unsupervised drinking with greater incidence of drinking-related family problems is among students who often drank at teenage parties with adults present. Of this group, 33 percent said they had problems with their families at least once, a figure comparable to those students who often drank in unsupervised settings. It is not clear if senior high school students drink more heavily at parties with peers present than in other social contexts where adults are present, or whether they are simply more likely to engage in unacceptable behavior in this context than in adult-supervised situations where peers are not present. It may be that,because of the party setting, driving is involved, causing parents to raise concerns about drinking and driving even though there may be adult supervision during the party.

The highest level of drinking-related familial problems occurred among students who said they often drank when they were alone or when they drove around or sat in cars at night. An estimated 16 percent of students who often drank alone reported they got into trouble with their families because of drinking two to five times during the previous year; 8 percent, six times or more. Correspondingly, 20 percent of students who often drank in cars at night reported problems with family related to drinking two to five times; 5 percent, six times or more.

The most striking association exists between the number of times students reported they drove a car while intoxicated during the year prior to the survey and the number of times they said they experienced family problems related to their drinking during the same period. As shown in figure 1, only 18 percent of students who had not driven while intoxicated during the previous year reported drinking-related problems with their families; in comparison, 38 percent of students who had driven once while intoxicated, 58 percent of those who had driven two to five times while intoxicated, and 74 percent of those who had driven six or more times while intoxicated reported at least one drinking-related family problem. Forty-eight percent of the last group experienced problems with their family six times or more during the previous year, compared with only 4 percent of those who had not driven while intoxicated.

The high correspondence between the reported frequency of students' driving while intoxicated and the reported frequency of troubles with family because of drinking probably reflects the fact that most parents are highly concerned about teenage drinking and driving because of the potentially serious consequences. It is also possible that young people who are driving while intoxicated are also engaging in other noticeable alcohol-related negative behaviors.

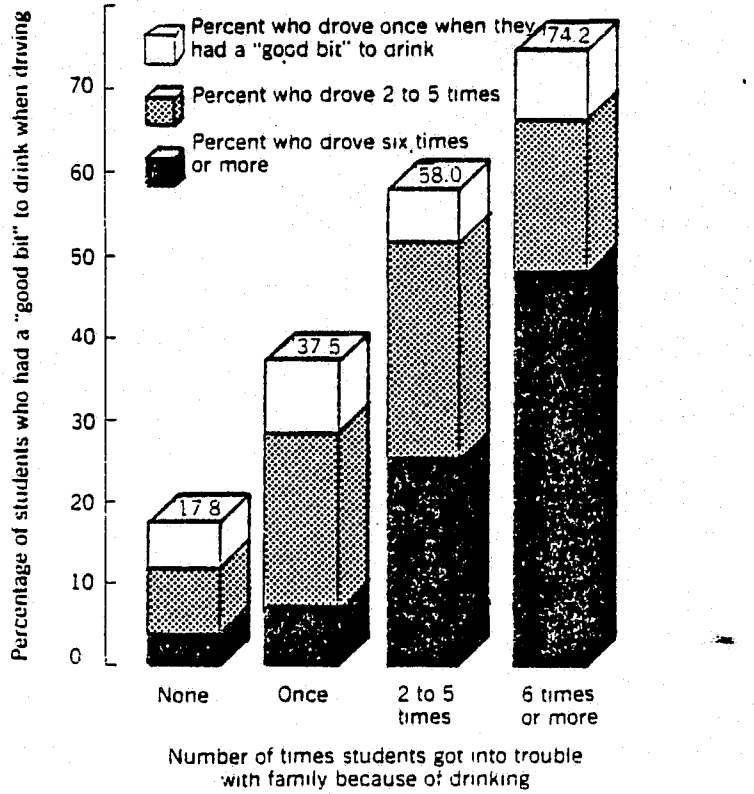


Figure 1. Percentage of senior high school students who drove once when they had a "good bit" to drink distributed by number of times they got into trouble with family because of their drinking[1]

[1]Both measures refer to the time interval, "during the past year."

Implications

The 1978 RTI survey data indicate that teenagers' perceptions of parental drinking behavior and attitudes toward teenage drinking do influence teenage drinking, at least among adolescents who live at home. Although teenage drinking has been shown to be highly related to the number of friends who drink and the degree of consensus among friends about drinking (Rachal et al. 1980), students' perceptions of parental drinking behavior and attitudes remain important. This suggests that informed parents can be effective in reducing or preventing teenage alcohol abuse.

The fact that 20 percent of senior high school students got into trouble with their families at least once because of their drinking indicates that many family members, especially parents, may be receptive to suggestions on how to deal with problems and risks posed by teenage drinking. The occurrence of trouble with families was most notable among teenagers who most needed protection from the consequences of drinking—those who often drank alone and those who often drove cars while intoxicated. The RTI data thus suggest a need for and potential benefit to be gained from targeting parents of teenagers at risk in prevention efforts.

Technical Notes

RTI Survey Methodology and Procedure

A national probability survey of drinking practices among 10th to 12th graders was conducted by the Research Triangle Institute (RTI) in 1978, under contract to NIAAA with additional funding from the National Institute on Drug Abuse (NIDA).

Sampling strategy. RTI employed a three-stage stratified sampling strategy. The first stage involved selecting a probability sample of all counties in the 48 contiguous States and the District of Columbia, stratified by geographic region and community size. A second-stage probability sample was taken of all high schools in each county selected. At least one high school was chosen from each county and more than one from large counties. Finally, a probability sample of homerooms, one for each grade in school, was taken from the sample of high schools selected in the second stage. Questionnaires were self-administered by students grouped in homerooms or classes. Instructed and supervised by RTI-trained staff, students were assured that their responses would be anonymous and confidential.

Representativeness. In the 1978 study, some of the original, randomly selected sampling units were replaced, using probability measures. The "overall participation rate" in the final adjusted sample was 85 percent (the proportion of schools participating multiplied by the proportion of students participating).

The RTI sample was not representative of all the Nation's adolescents. Neither high school dropouts nor absentees were sampled. Both of these subgroups may manifest different drinking patterns from those that characterize the high school students. Further, inner city students and members of the ethnic groups other than "white" or "black" were probably undersampled. Nonetheless, the sample was representative of the majority of the Nation's senior high school students at that time. More detailed discussions on sampling procedures and evaluations of sampling validity are contained in the RTI final report (Rachal et al. 1980). Information on an earlier 1974 survey and panel study can be found in the Technical Notes for *Facts for Planning Nos. 1-5.*

Weighted percentages. As in *Facts for Planning* Nos. 1, 2, 3, and 5, reported percentages in *Facts for Planning No. 6* are based on a sample weighted to represent the sociodemographic characteristics of the total population of 10th to 12th grade students in the continental United States in 1978.

Definitions of Students' Drinking Levels

The RTI survey used the following definitions of drinking levels: **abstainers** don't drink or drink less than once a year: **infrequent drinkers** drink once a month at most and drink small amounts per typical drinking occasion; **light drinkers** drink once a month at most and drink medium amounts per typical drinking occasion, or drink no more than three to four times a month and drink small amounts per typical drinking occasion; **moderate drinkers** drink at least once a week and small amounts per typical drinking occasion, or drink three to four times a month and medium amounts per typical drinking occasion, or drink no more than once a month and large amounts per typical drinking occasion; **moderate/heavier** drinkers drink at least once a week and medium amounts per typical drinking occasion, or drink three to four times a month and large amounts per typical drinking occasion; and **heavier drinkers** drink at least once a week and large amounts per typical drinking occasion. *Facts for Planning* No. 2. provides more detailed definitions of these six drinking levels, and discusses the questions underlying them and the procedures used to construct the drinking level classification.

Variables Measuring Parental Attitudes and Drinking Practices

Students' perceptions of parental drinking practices were elicited by the following two questions:

> Q. Do you think that your father (or person who served as your father in raising you) ever takes a drink of beer, wine, or liquor?
>
> Q. Do you think that your mother (or person who served as your mother in raising you) ever takes a drink of beer, wine, or liquor?

The choice of responses included "Yes, fairly regularly," "Yes, sometimes," "No," "I don't know," and "Does not apply." Statistics reported here are based on distributions that exclude students who did not respond "yes" or "no"—8 percent of respondents to the question about father's drinking and 5 percent of the respondents to the question about mother's drinking.

Students' perceptions of parental approval of teenage drinking were measured by the following two questions:

> Q. How do you think your parents (or your family) feel about boys your age drinking?
>
> Q. How do you think your parents (or your family) feel about girls your age drinking?

Choice of responses included "Strongly approve," "Approve," "Don't care one way or the other," "Disapprove," "Strongly disapprove," and "I don't know." The distributions in table 2 are based on aggregated responses to these two questions. "Strongly approve" and "Approve" are reported as a single percentage, "Approved." The responses "Disapprove" and "Strongly disapprove" are also reported as one percentage, "Disapprove."

Questions Underlying Problems With Family and Driving While Intoxicated

An earlier 1974 survey asked a series of five questions about negative consequences of drinking experienced by respondents. Responses to these five questions were used to develop a definition of "problem drinkers" or "alcohol misusers." Statistics on the negative consequences of drinking and on alcohol

misuse in 1978 are reported in *Facts for Planning No. 4.*

In 1978, a sixth question was added to the negative consequences series: "During the past year, how many times have you gotten into trouble with your family because of your drinking?" Findings on the extent of problems with family related to drinking are presented for the first time in *Facts for Planning No. 6.*

Figure 2 is based on two questions in the negative consequences series, one about trouble with family and the other about the number of times "you've driven when you've had a good bit to drink."

Distributions for both measures are based on an aggregation of "2-3 times" and "4-5 times" into a single category "2-5 times." Likewise, the "6-9 times" and "10 or more times" responses have been combined into a single category, "6 times or more."

The negative consequences series of questions is presented below as it appears on the 1978 questionnaire.

During the past year, how many times have each of the following happened to you? Mark X on one black line in each row.

References

**Lowman, C. *Facts for planning no. 1:* Prevalence of alcohol use among U.S. senior high school students. *Alcohol Health and Research World* 6(1):29–40, 1981.

**Lowman, C. *Facts for planning no. 2:* Alcohol use as an indicator of psychoactive drug use among the Nation's senior high school students. *Alcohol Health and Research World* 6(2):1981/82a.

**Lowman, C. *Facts for planning no. 3:* U.S. teenage alcohol use in unsupervised social settings. *Alcohol Health and Research World* 6(2):1981/82b.

**Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; and Maisto, S.A. *Facts for planning no. 4:* Alcohol misuse by adolescents. *Alcohol Health and Research World* 6(3):1982.

*Rachal, J.V.; Guess, L.L.; Hubbard, R.L.; Maisto, S.A.; Cavanaugh, E.R.; Waddell, R.; and Bentrud, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior, Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980. NTIS No. PB81 199267.

*This report is available for purchase from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

**Single copies of the *Facts for Planning* reports are available upon request from the National Clearinghouse for Alcohol Information, P.O. Box 2345, Rockville, MD 20852.

None	Once	2-3 times	4-5 times	6-9 times	10 or more times	
—	—	—	—	—	—	You've gotten into trouble with your teachers or principal because of your drinking.
—	—	—	—	—	—	You've gotten into difficulties of any kind with your friends because of your drinking.
—	—	—	—	—	—	You've driven when you've had a good bit to drink.
—	—	—	—	—	—	You've been criticized by someone you were dating because of your drinking.
—	—	—	—	—	—	You've gotten into trouble with the police because of your drinking.
—	—	—	—	—	—	You've gotten into trouble with your family because of your drinking.

FactsForPlanning 7

Drinking And Driving Among Youth

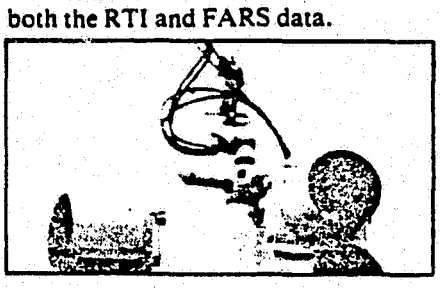
Cherry Lowman, Ph.D.
Clearinghouse Staff

National data on alcohol use, health, and motor vehicle accidents show that alcohol consumption, driving under the influence of alcohol, and involvement in alcohol-related accidents are extensive among youth, many of whom are under the legal drinking age.

More people between 15 and 34 years of age die from motor vehicle accidents than from any other cause (table 1). Many fatal motor vehicle accidents appear to involve drivers who are under the influence of alcohol; adolescents and young adult drivers are no exception. Clearly, the development of measures to reduce alcohol-related motor vehicle fatalities, particularly among youth, is an important challenge facing health planners, policy makers, and concerned citizens.

This report examines two types of facts useful to program planners. One type is based on standardized records of events—death records and fatal motor vehicle accident statistics. Age-specific death rates from motor vehicle accidents are provided in table 1, and the number of youth involved in fatal motoricle accidents is reported in table 2. Age-specific rates of involvement in fatal motor vehicle accidents come from standardized nationwide reports collected by the National Highway Traffic Safety Administration's (NHTSA) Fatal Accident Reporting System (FARS). These are reported in figure 1.

The second type of facts examined are those based on self-report data about the drinking practices of 10th to 12th grade students. The data are drawn from a national probability survey of senior high school students conducted in 1978 by the Research Triangle Institute (RTI) under contract to the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA). This is the same data base as was reported on in *Facts for Planning* Nos. 1 through 6 (Lowman 1981, 1981/82*a*, 1981/82*b*, 1982; Lowman et al. 1982; Rachal et al. 1982). See the technical notes for further details on both the RTI and FARS data.



Standardized National Records of Fatal Motor Vehicle Accidents, 1980

National data on motor vehicle accidents show that youths—especially males—are at high risk for involvement in fatal motor vehicle accidents, and that many teenage drivers in fatal crashes have been drinking.

Young people appear to be at greater risk for death in motor vehicle accidents than do older drivers because of combined inexperience in both drinking and driving. One study in Michigan (Borkenstein et al. 1964) showed that sober adolescents were two to three times more likely to be involved in motor vehicle accidents than were drivers in their forties, and that even low amounts of alcohol consumption exaggerated the difference (Voas and Moulden 1981).

Motor vehicle accidents in 1980 were the leading cause of death among persons 15 to 24 years of age—45 deaths per 100,000 persons (table 1). Thirty-six percent of all 1980 motor vehicle fatalities were persons 15 to 24 years of age, an age group that represented only 19 percent of the general U.S. population (NHTSA 1981).

Highlights

Statistical Sources: *NCHS,* National Center for Health Statistics, estimate based on 10 percent sample of deaths in 1980; *FARS,* Fatal Accident Reporting System, National Highway Traffic Safety Administration, census of fatal accidents in 1978 and in 1980; and *RTI,* Research Triangle Institute, national probability survey of senior high school students' drinking behavior in 1978.

☐ Motor vehicle accidents are the leading cause of death among persons 15 to 24 years of age; 45 per 100,000 died in fatal crashes in 1980 (NCHS).

☐ More than 16,500 youths 15 to 24 years of age died in 1980 as a result of motor vehicle accidents (FARS).

☐ More motor vehicle fatalities occurred among 15- to 21-year-olds on weekend evenings between 11 p.m. and 3 a.m. than occurred any other time (FARS 1978).

☐ One out of every four senior high school students was at risk for alcohol-related accidents at least once during the previous year. Over half a million 10th to 12th grade students are estimated to have driven after they had a "good bit" to drink 10 or more times during the previous year (RTI 1978).

☐ In States with a 21-year minimum drinking age law, senior high school students consumed less alcohol than did students in States with other types of drinking age laws. Nonetheless, levels of alcohol use remained high in 21-year States. For example, 24 percent of senior high students in 21-year States drank as often as once a week, only 9 percent fewer than the students in States where the minimum age was 18, 19, or 20 years (RTI 1978).

☐ The majority of persons involved in fatal motor vehicle accidents are males. In 1980, 77 percent of all youths 15 to 24 years old killed in motor vehicle accidents were males, as were 83 percent of all drivers these ages who were involved in fatal crashes (FARS).

☐ The involvement of drivers in fatal motor vehicle accidents was highest (142 per 100,000 licensed drivers) among males 19 years of age (FARS 1980).

☐ Senior high school students who frequently drove cars while under the influence of alcohol were more likely than other students to be male, to be in the 12th grade, to get lower grades, to have had their first drink before 12 years of age, to get drunk at least once a week, to drink hard liquor, to drink in unsupervised settings such as cars at night and teenage hangouts, to get into trouble with their families over their drinking, and to believe they had some kind of problem with drinking. They also tended to be more tolerant of problem behavior and to be less religious than other students (RTI 1978).

Moreover, twice as many youths 15 to 24 years of age were drivers in fatal crashes than actually died in motor vehicle accidents (table 2).

Males at highest risk. The majority of young drivers and victims in fatal motor vehicle accidents were males. Males under 25 years of age in 1980 comprised only 11 percent of all licensed drivers (Federal Highway Commission 1981: table DL-20), but were involved in 31 percent of all fatal motor vehicle accidents and in 47 percent of single vehicle fatal accidents occuring at night (Cerelli 1982: tables 23-26). Of the 23,620 drivers 15 to 24 years of age involved in accidents in 1980 in which a fatality occurred, 83 percent were males (table 2). There were 16,589 motor vehicle fatalities (drivers and other victims) in this age group, and over 75 percent were males. Most of those killed were drivers; of the 10,720 drivers who died in fatal accidents in this age group, 85 percent were males (table 2).

The magnitude of involvement in fatal accidents is considerably greater for young males than for young females, as shown in figure 1. In 1980, the number of 16-year-old male drivers involved in fatal motor vehicle accidents was nearly three times that of females the same age. This difference between adolescent boys and girls steadily increased. By 20 years of age, male drivers were involved in fatal crashes five times more often than were females in the same age group.

Male and female involvement in fatal crashes also differs markedly in pattern. For males, fatal accident driver-involvement rates rose steadily from age 16, peaking at age 19 and then gradually dropping. For young females, the fatal accident driver involvement rate steadily declined from age 16, with only a slight rise at 19 years of age.

These 1980 age-specific rates show that young males are at a much greater risk of involvement in fatal motor vehicle accidents than are young females and that the risk increases with age up to 19 years. Young females, on the other hand, appear to become increasingly safe behind the wheel as they approach 24 years of age. However, females at age 19 appear to be at slightly increased risk, despite their overall lower and decreasing rate of fatal accident involvement.[1]

Reasons for the substantial differences in male and female involvement in fatal motor vehicle accidents are unclear. The number of hours spent driving no doubt increases with age for both sexes; at the same time, however, they are gaining more experience as

Table 1. Death rates from motor vehicle accidents distributed by 10-year age groups, 1980

Age groups	Deaths per 100,000
Under 1 year	7.6
1-14 years	8.7
15-24 years	45.0
25-34 years	30.9
35-44 years	19.6
45-54 years	21.3
55-64 years	18.1
65-74 years	21.7
75-84 years	33.0
85 years and over	24.8
All ages	24.4

Note: Data is from a 10 percent national sample of deaths collected by the National Center for Health Statistics, and presented in table 8, "Age-Specific and Age-Adjusted Death Rates for 15 Leading Causes and Selected Components: United States, 1979 and 1980." (National Center for Health Statistics 1981).

Table 2. Number of 15- to 24-year-olds in fatal motor vehicle accidents and percentage of males involved, 1980[1]

	A		B		C	
	Total drivers involved in fatal crashes		Total motor vehicle fatalities		Total driver fatalities	
Age	N	Percent Males	N	Percent Males	N	Percent Males
15	282	74.8	581	60.4	151	83.4
16	1,485	76.7	1,266	67.2	652	76.1
17	2,218	79.5	1,677	70.4	946	81.2
18	2,883	83.4	2,175	75.7	1,324	85.1
19	3,216	83.7	2,186	79.4	1,416	86.2
20	2,963	84.4	1,922	80.2	1,331	86.9
21	2,806	83.3	1,884	78.3	1,306	84.8
22	2,774	84.4	1,796	80.5	1,317	86.0
23	2,624	85.0	1,666	80.7	1,228	85.7
24	2,369	83.5	1,436	79.2	1,049	83.5
15-24 years	23,620	83.0	16,589	76.6	10,720	84.5

[1]The numbers of drivers and fatalities reported above were provided by the National Highway Traffic Safety Administration (NHTSA 1981) from the Fatal Accident Reporting System for 1980. Motor vehicle accidents refer to all accidents on public roads involving any type of motor vehicle including trucks, motorcycles, passenger cars, ambulances, buses, etc.

Notes:

Column A. All drivers of motor vehicles involved in crashes in which at least one fatality resulted, including fatalities to pedestrians or pedicyclists (see NHTSA 1981 for details).

Column B. All persons killed as a result of motor vehicle accidents who were passengers or drivers; excludes pedestrains and pedicyclists killed by motor vehicles.

Column C. All drivers in motor vehicle accidents who themselves died within 30 days as a result of the accident.

drivers. Previous analyses of data from the Research Triangle Institute's national probability survey suggest that differences in patterns of alcohol consumption may explain some of the differences in fatal accident involvement. Senior high school boys were found more likely to consume large amounts of alcohol more frequently than girls. For example, 24 percent of 12th grade boys reported they drank at least five drinks on each occasion at least once at week, while 10 percent of senior girls reported comparable levels of weekly heavy drinking (Lowman 1981: table 1). The discrepancy between boys' and girls' levels of alcohol consumption characterized students in all grades of senior high school, but increased with each ascending year, in a manner analogous to the discrepancy between boys' and girls' involvement in fatal motor vehicle accidents.

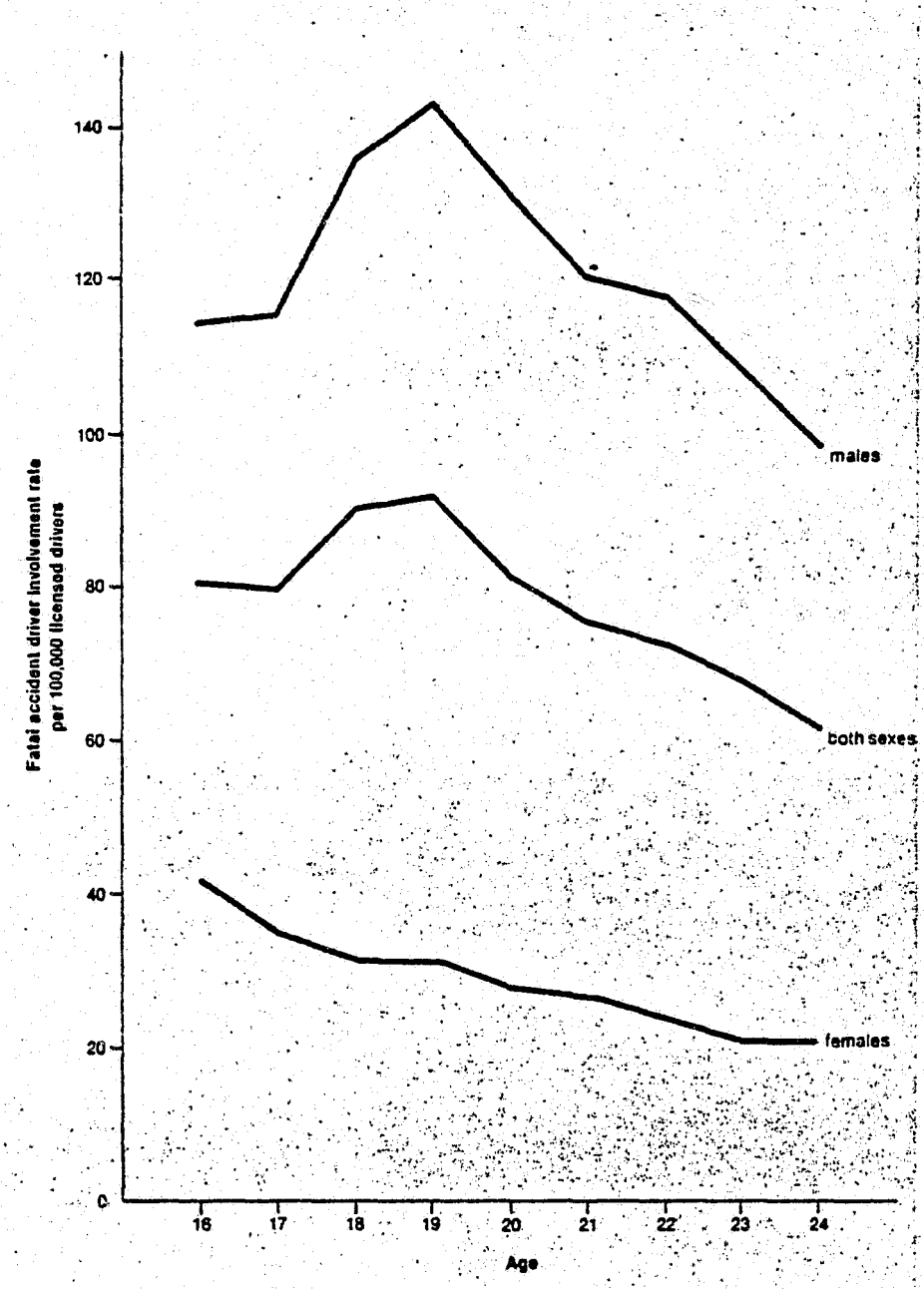
Blood alcohol concentration (BAC). Unfortunately, measures of blood alcohol concentration (BAC), or percentage by weight of alcohol in the blood, are not available for all drivers involved in fatal motor vehicle accidents. BAC test results are known for only 29 percent of the drivers in 1980 fatal crashes (NHTSA 1980: figure 43). Young drivers were neither over- nor under-represented in BAC testing. Approximately 40 percent of drivers with known BAC test results were 15 to 24 years of age, a proportion comparable to the 38 percent of drivers these ages who were involved in fatal crashes (NHTSA 1980: figures 39 and 43).

Among the 7,454 drivers 15 to 24 years of age who were involved in fatal motor vehicle accidents and whose BAC levels were known, *54 percent* had BACs of 0.10 percent or more (NHTSA 1980: figure 43), the legal level designating intoxication in most States. This finding is difficult to evaluate. If BAC testing occurred primarily when alcohol involvement was suspected or known, then the resulting statistics would disclose very high levels of alcohol involvement. However, BAC reporting requirements and practices vary from State to State and from locality to locality. Consequently, the national FARS data on blood alcohol are difficult to interpret because they are subject to a number of sources of bias (NHTSA 1978).

Estimates based on FARS data

[1] For males, fatal accident driver involvement rates rose from 114 per 100,000 among 16-year-old licensed drivers, to peak at 142 per 100,000 among 19-year-old licensed drivers. The rate then gradually dropped to 97 per 100,000 among 24-year-old licensed drivers. For females, the rate steadily declined from 42 per 100,000 licensed drivers at age 16, to 21 per 100,000 licensed drivers at age 24. (See technical notes on FARS for data sources used to calculate the rates.)

Figure 1. Sex and age-specific fatal accident driver involvement rates, 1980



Note: The fatal accident driver involvement rate equals the number of drivers involved in fatal motor vehicle accidents per 100,000 licensed drivers. Drivers include the 55 percent of 16- to 24-year-olds who were survivors of motor vehicle accidents in which at least one fatality occurred as well as the 45 percent who were themselves fatalities (Fatal Accident Reporting System 1980; see technical notes for details on data sources used to compute the rates).

drawn from 29 States in which BAC testing was most complete indicate less extensive heavy alcohol use than do the national data. Nonetheless, heavy alcohol involvement among many drivers in fatal crashes was still evident. Based on the 29-State 1980 FARS data, it is estimated that *29 percent* of 15- to 19-year-old drivers and *37 percent* of 20- to 24-year-old ones had BACs of 0.10 percent or more (Cerelli 1982: table 30).

More accidents on weekends. Self-report data collected in a household survey in Boston during 1974 showed that persons 18 to 25 years of age drank significantly more alcohol on Fridays and Saturdays than did persons of any other ages. However, on other days this was not the case (Harford and Gerstel 1981). Extensive weekend social activities involving alcoholic beverage consumption probably account for the distinctive temporal pattern of fatal crashes observed among young people (see Voas and Moulden 1980, figures 4-5 to 4-7). FARS data from 1978 disclosed a sharp peak in motor vehicle fatalities among 15- to 21-year-olds at about seven per hour at 1 a.m. on weekends. The fatality rate in this age group was highest between 10 p.m. and 3 a.m. on weekends. Weekday fatalities peaked at slightly over two per hour at 11 p.m. on weekdays. This distinctive pattern became even more pronounced in the 22- to 44-year age group, in which motor fatalities peaked at eight per hour at about 2 a.m. on weekends and occurred at a rate of three per hour between 9 and 11 p.m. on weekdays. Among persons 45 years of age and older, however, while there was a weekend swell in fatalities, there was no steep peak as there was among younger age groups.

Estimates of BAC levels based on the 29-State 1980 FARS data support the assumption that the majority of drivers involved in nighttime single vehicle fatal accidents have been drinking. In 1980, an estimated 64 percent of drivers involved in nighttime single vehicle fatal crashes had BAC levels of 0.10 percent or greater, twice that of drivers involved in daytime single vehicle fatal crashes (Cerelli 1982: table 15). The level of alcohol involvement among young drivers in fatal accidents at night on weekends was comparable. An estimated 62 percent of males 24 or younger had BAC levels of 0.10 percent or greater and 79 percent showed some evidence of alcohol use (Cerelli 1982: table 25).

Self-Report Data on Drinking by Senior High Students, 1978

Records of death provide vital statistics on causes of death, the magnitude of fatalities, and changes over time. These direct our attention to the groups most likely to be affected by lethal conditions. Complementary information on the degree of adolescent *exposure to risk* of involvement in alcohol-related crashes is provided by self-report data collected in 1978 by the Research Triangle Institute (RTI) in a national probability survey of 10th to 12th grade students. The RTI data furnish answers to two important questions. Are minimum drinking age laws related to teenage alcohol use? and What are the characteristics of senior high school students who frequently drive under the influence of alcohol?

Minimum drinking age laws. Recent research on drinking age laws has focused on the short-term effects of changing the minimum drinking age. Maisto and Rachal (1980) used the nationally representative RTI data base to examine the "longer-term relationship between (minimum drinking age) laws and the behavior patterns they are designed to control." They classified students from the 29 States surveyed by RTI in 1978 according to the minimum drinking age in their State of residence. Minimum drinking age laws were divided into three categories: (1) *21-year States,* those with a 21-year minimum drinking age for all alcoholic beverages; (2) *18- to 20-year States,* those specifying an 18- to 20-year minimum drinking age for all alcoholic beverages; and (3) *mixed States,* those with different minimum drinking ages for different types of alcoholic beverages, usually 21 years for hard liquor and 18, 19, or 20 years for beer and wine. (See technical notes for further details.)

Maisto and Rachal found that 10th to 12th grade students who resided in States with a minimum drinking age of 21 years used less alcohol than did students in other States. However, their analysis also shows that a conservative drinking age law does not eliminate illegal drinking by senior high school students. Alcohol use was found to be extensive nationwide. (Tests showing that the 1980 Maisto and Rachal findings are statistically significant, as well as evaluations of their validity, can be found in the original study.)

According to Maisto and Rachal, 30 percent of students who lived in States with a 21-year minimum drinking age law were alcohol abstainers—10 to 11 percent more than in States with other types of minimum drinking ages. On the other end of the spectrum, 24 percent of students in 21-year minimum drinking age States drank once a week or more often. This was 9 percent fewer than in 18- to 20-year States and 5 percent fewer than in mixed States. Ten percent of students in 21-year States reported they had gotten drunk as often as once a week during the previous year—only 5 percent fewer than in 18- to 20-year States and 4 percent fewer than in mixed States.

The percentage of students who combined drinking and driving did not vary greatly. Nineteen percent of 10th to 12th graders in 21-year States reported they often drank when they drove around or sat in cars at night; this was only 4 percent fewer than in 18- to 20-year States and 5 percent fewer than in States with mixed drinking ages.

It is interesting to note that 14 percent of students who lived in 21-year States reported that they disapproved of alcohol use, twice as many as in States with less restrictive drinking age laws.

Characteristics of students at risk for driving under the influence (DUI). Five percent of students in the RTI survey reported that they drove cars after they had had a "good bit" to drink at least 10 times or more during the previous year. Extrapolated to the Nation, this means an estimated half-million senior high school students in 1978 were probably at high risk for involvement in fatal motor vehicle accidents. This may be a conservative estimate, since students reporting less frequent DUI incidents were also at risk.

Who were these 10th to 12th grade students at recurring risk for alcohol-related motor vehicle accidents? Did

Table 3. Characteristics of students who frequently drove under the influence of alcohol, 1978

Characteristics	Frequent DUI students (percent)	Other students (percent)
Sex		
Male	78.8	44.5
Female	21.2	55.5
Grade		
10th	11.3	34.2
11th	36.2	34.3
12th	52.5	31.4
School grades		
Excellent (As and Bs)	20.3	38.7
Good (Bs and Cs)	62.1	54.0
Below average (Cs, Ds, and Fs)	17.6	7.3
Age at first drink		
Never had a drink	0.0	11.6
Under 12 years	33.1	14.2
12 to 14 years	48.3	41.9
15 years and over	17.6	32.3
Number of times students got drunk during the previous year		
None	0.9	43.1
1 to 5 times	5.9	30.2
6 times to twice a month	27.9	16.4
Once a week or more often	65.3	10.3
How often students drink beer, wine, or liquor when driving around or sitting in cars at night		
Never	1.4	53.1
Sometimes	17.9	27.7
*Often	80.7	19.2
How often students drink beer, wine, or liquor when at places where teenagers hang around and their parents or other adults are not present		
Never	4.2	43.9
Sometimes	14.9	27.8
*Often	80.9	28.3
Number of times students got into trouble with family because of their drinking during the past year		
None	49.5	81.1
Once	12.6	11.4
2 to 3 times	18.9	5.4
4 times or more	19.0	2.1
Students perceive their drinking to have been a problem during the past year		
Don't drink or not a problem	76.6	94.0
A mild problem	16.4	5.1
More than a mild problem	7.0	0.8

*Percentages of students who "often" drink when in a setting combine students reporting they "frequently" drank there with those who reported they drank there "most of the time."

Note: The "frequent DUI students" refer to 222 students who responded that they had driven when they had a "good bit" to drink 10 or more times during the previous year. "Other students" refer to the remaining 4,523 students in the 1978 RTI national probability sample of 10th to 12th grade students who responded to the question (Rachal et al. 1980*a* or 1980*b*). Although the statistics are useful for bringing into sharp relief contrasts between the two groups, the small sample size for the "frequent DUI" category means those percentages should not be used to make estimates.

they differ from other students? The distributions in table 3 compare those teenagers who were frequent drinking-drivers with other students along a number of dimensions. Students who responded "10 times or more" to a question asking how often in the previous year they had driven after having a "good bit" to drink are referred to in table 3 as those who frequently drive under the influence (DUI).

"Good bit" to drink is a relative concept with no objective measure for degree of intoxication. It cannot be assumed therefore, that a "good bit" to drink means drunk. The fact that 65 percent of students in the frequent DUI group also reported they got drunk at least once a week, however, makes it probable that a "good bit" to drink was interpreted to mean a substantial amount of alcohol.

As table 3 shows, the majority of students who frequently drove under the influence were males and seniors. More than twice as many in the frequent DUI category got below average grades (Cs, Ds, and Fs) than did other students. One out of three students who were in the frequent DUI category had his or her first drink, not just a sip or taste, of alcohol before the age of 12 years, as compared with one out of seven of the other students surveyed.

Six times as many of the students who reported frequent DUI also reported a high frequency of drunkenness, compared with other students. Sixty-five percent of the frequent DUI group got drunk at least once a week. This suggests that the estimated half-million students who frequently drank and drove in 1978 may have driven under the influence of alcohol many more than 10 weekends during the preceding year.

Eighty percent of the 222 senior high school students who frequently drove under the influence of alcohol reported they often drank when they drove around or sat in cars at night, while only 20 percent of other students did. Over 80 percent of the frequent DUI group also reported they often drank beer, wine, or liquor in other unsupervised teenage hangouts, as compared with 28 percent of all other students.

Although few students perceived

their drinking to have been a problem during the previous year, nearly four times as many students who frequently drove under the influence of alcohol reported their drinking to be some kind of problem as did other students (23 percent as compared with 6 percent). Over one-third of the frequent DUI group reported they had gotten into trouble with their families about their drinking at least two times during the previous year, nearly four times as often as the other students did.

There were no marked differences in the socioeconomic status of students who frequently drove under the influence of alcohol at least 10 times during the previous year as compared with all other students. However, they did tend to be less religious than other respondents and to be more tolerant of problem behavior.

More extensive reports of the RTI findings based on these dimensions can be found in *Facts for Planning* No. 3 (Lowman 1980/81*b*), No. 4 (Rachal et al. 1982), and No. 6 (Lowman 1982).

Implications

National alcohol, health, and motor vehicle accident statistics have been used to show that alcohol consumption, driving under the influence of alcohol, and involvement in alcohol-related accidents are extensive among youth (especially males), many of whom are under the legal drinking age.

The RTI study on the relationship between the State minimum drinking age laws and the drinking practices of 10th to 12th graders indicates that a 21-year minimum legal drinking age is related to less alcohol use by teenagers. However, the data also show that teenage drinking is extensive even in States with 21-year laws, although less so than in ones with lower drinking age laws. Further, the nature of the relationship between legal drinking age and levels of teenage alcohol use is unclear. Laws may be artifacts of social customs and values rather than shapers of them.

The RTI study suggests that raising the legal drinking age to 21 years will not eliminate underage alcohol consumption. Although the prevalence of alcohol use appears somewhat lower in 21-year States, there remains in all States an urgent need to develop prevention programs on the local level as well as through State-level control policies that impact alcohol use among youth.

The FARS and RTI data show that among youth it is the older adolescent males who are at higher risk for alcohol-related involvement in motor vehicle accidents. Among both boys and girls, 19 appears to be a particularly vulnerable age. For most youth, this is the first year out of high school and also the first year as legal adults. Increased freedom and experimentation accompanied by increased alcohol use—regardless of State drinking age—may explain the peak involvement in fatal crashes at 19 years.

RTI findings on the social characteristics of senior high school students who reported that they frequently drove under the influence of alcohol suggest that intervention and control measures may be needed in addition to preventive efforts. Comparison of the subgroup of students at high risk for DUI with all other students sampled suggests they were less likely to be receptive to rational, preventive educational approaches. Indeed the data considered here suggest that youth at high risk for DUI—particularly high school seniors and 19-year-old males—may be a hard-to-reach group for control and intervention as well as prevention measures.

Most studies of drinking among youth are confined either to high school students or to college students. The drinking-driving data on youth considered here confirm the serious need for a single population study of 16- to 24-year olds—both students and nonstudents—in order to determine the nature of transformations in drinking practices that take place between late adolescence and early maturity. Such knowledge will aid the development of effective policies and programs to modify the social context, behavior, and values that lead to the high involvement of young drivers in fatal motor vehicle accidents.

Technical Notes

Fatal Accident Reporting System. The Fatal Accident Reporting System of the National Highway Traffic Safety Administration (NHTSA) has collected data annually since 1975 on all fatalities that occurred within 30 days after involvement in motor vehicle accidents on roads open to the public. The data are collected by FARS analysts in State agencies from a number of State sources (for example, police accident reports, death certificates, and emergency medical service

reports). The State analysts enter data directly into NHTSA's computerized central data file, using a standardized format for registering information on over 90 different attributes of fatal accidents, of the drivers and vehicles involved, and of persons fatally injured in them.

States vary with respect to laws and procedures for collecting information on fatal accidents. About half of the States legally require that tests of blood alcohol concentration (BAC) be administered to fatally injured drivers. Surviving drivers were tested only 19 percent of the time (NHTSA 1981). In 1980, BAC tests were administered to only 37 percent of the drivers involved in fatal motor vehicle accidents and were actually reported for only 29 percent of them. Since BAC data are based on neither a random sample nor a census, it is unclear how representative they are.

The fatal accident driver involvement rate (figure 1) represents the total number of drivers involved in fatal accidents per 100,000 licensed drivers. Two data sources were used by the author to develop the rate and figure 1, showing its national distribution among youth by sex and year of age. One source was the 1980 FARS census of all drivers involved in fatal motor vehicle accidents (NHTSA); the other was the Department of Transportation's (DOT) national census of drivers' licenses in 1980 as reported in the table entitled "Distribution of licensed drivers by sex and percentage in each age group and relation to population, 1980" (NHTSA 1980).

Research Triangle Institute (RTI) 1978 National Probability Survey of Adolescent Drinking Practices. RTI used a questionnaire to collect nationally representative information on trends in drinking practices among 10th to 12th grade students related to demographic, attitudinal, and personality characteristics; the frequency, quantity, contexts, and consequences of drinking; the perceived or reported influence of friends and peers; deviant or antisocial behavior; and the use of drugs in addition to alcohol.

Methodology. A three-stage stratified sampling strategy was employed. The first stage involved selecting a probability sample of all counties in the 48 contiguous States and the District of Columbia, stratified by geographic region and community size. A second-stage probability sample was taken of all high schools in each county selected. At least one high school was chosen from each county and more than one from large counties. Finally, a probability sample of homerooms in each grade in school, was taken from the sample of high schools selected in the second stage. Questionnaires were self-administered by student groups in homerooms or classes. Instructed and supervised by RTI-trained staff, students were assured that their responses would be anonymous and confidential.

Some of the original, randomly selected sampling units were replaced, using probability measures. The "overall participation rate" in the final adjusted sample is 85 percent (the proportion of schools participating multiplied by the proportion of students participating).

The RTI sample was not representative of all adolescents in the Nation. Neither high school dropouts nor absentees were sampled. Both of these subgroups may manifest different drinking patterns from those that characterize the in-school high school students. Further, inner city students and members of the ethnic groups other than "white" or "black" were probably undersampled. Nonetheless, the sample is representative of the majority of the Nation's senior high school students. More detailed discussions of sampling validity are contained in the RTI final report (Rachal et al. 1980*a*, 1980*b*).

Statistics. In *Facts for Planning* Nos. 1, 2, 3, 5, and 6, weighted percentages were used in order to estimate the number of youths in the Nation in 1978 who were drinkers. For convenience in analytical procedures, analyses in *Facts for Planning* No. 5 were based on unweighted sample values.

The statistics reported in this article from the Maisto and Rachal 1980 study are based on sample values. Sample percentages are used to describe characteristics of students who frequently drove under the influence of alcohol because the subset is too small (222 persons) to represent the Nation with the same accuracy that weighted percentages based on the larger RTI sample does.

In general, percentages based on the weighted and unweighted RTI national probability samples (1974 and 1978) are comparable, indicating that the RTI samples are highly representative of the national population of high school students on which they are based (Rachal et al. 1980*b*). Percentages are based on all cases that have analyzable data, not the total samples.

States in the 1978 RTI sample. In the spring of 1978, RTI sampled senior high school students in 30 States randomly selected from the 48 contiguous States in the continental United States. Twenty-nine of these were included in the Maisto and Rachal (1980) minimum drinking age law study. Michigan was excluded because it lowered

its minimum drinking age shortly after the RTI survey was conducted. The 29 States in the study were classified on the basis of State minimum drinking age laws as of May 1, 1979 (Maisto and Rachal 1980: p. 164); *21-year States* (21 years for all alcoholic beverages) included California, Kentucky, Missouri, Oklahoma, Oregon, Pennsylvania, Utah, and Washington; *18- to 20-year States* (18 to 20 for all alcoholic beverages) included Alabama, Connecticut, Florida, Louisiana, Maine, Massachusetts, Minnesota, Nebraska, New Hampshire, New Jersey, New York, Tennessee, Texas, and Vermont; *mixed States* (different ages for different alcoholic beverages, and usually 21 for hard liquor and 18 to 20 for beer and wine) included Colorado, Illinois, Mississippi, North Carolina, Ohio, South Carolina, and Virginia.

References

BORKENSTEIN, R.F.; CROWTHER, R.F.; SHUMATI, R.P.; ZIEL, W.B.; and AYLMAN, R. *The Role of the Drinking Driver in Traffic Accidents.* Bloomington: Indiana University, 1964.

CERELLI, E.C. "Alcohol in Fatal Accidents: National Estimates—U.S.A." Draft of NHTSA Technical Note, National Highway Traffic Safety Administration, Research and Development, Washington, D.C., August 1982.

FEDERAL HIGHWAY ADMINISTRATION. *Drivers Licenses—1980.* Pub. No. (HHP-41). Washington, D.C.: U.S. Department of Transportation, September 1981.

HARFORD, T.C., and GERSTEL, E.K. Age-related patterns of daily consumption in metropolitan Boston. *Journal of Studies on Alcohol* 42(11): 1062-1066, 1981.

LOWMAN, C. Facts for planning no. 1: Prevalence of alcohol use among U.S. senior high school students. *Alcohol Health and Research World* 6(2):41-46, 1981/82*a*.

LOWMAN, C. Facts for planning no. 2: Alcohol use as an indicator of psychoactive drug use among the nation's senior high school students. *Alcohol Health and Research World* 6(2): 41-46, 1981/82*a*.

LOWMAN, C. Facts for planning no. 3: U.S. teenage alcohol use in unsupervised settings. *Alcohol Health and Research World* 6(2):46-52, 1981/82*b*.

LOWMAN, C. Facts for planning no. 6: Parental dimensions in teenage alcohol use. *Alcohol Health and Research World* 6(3):58-63, 1982.

LOWMAN, C.; HUBBARD, R.L.; RACHAL, J.V.; CAVANAUGH, E.R. Facts for planning no. 5: Adolescent marijuana and alcohol use. *Alcohol Health and Research World* 6(3):69-75, 1982.

MAISTO, S.W., and RACHAL, J.V. Indications of the relationship among adolescent drinking practices, related behaviors, and drinking-age laws. In: Wechsler, H., ed. *Minimum-Drinking-Age Laws: An Evaluation.* Lexington, MA: Lexington Books, 1980. pp. 155-176.

NATIONAL CENTER FOR HEALTH STATISTICS. Annual summary of births, deaths, marriages, and divorces: United States, 1980. *Monthly Vital Statistics Report* 29 (13), September 17, 1981.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION. *Alcohol and Highway Safety: A Review of the State of the Knowledge, Summary Volume, 1978.* Washington, D.C.: U.S. Department of Transportation, 1978.

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION. *Fatal Accident Reporting System 1980: An Overview of U.S. Traffic Fatal Accident and Fatality Data Collected in FARS for the Year 1980.* Pub. No. DOT HS 805 953. Washington, D.C.: U.S. Department of Transportation, 1981.

RACHAL, J.V.; GUESS, L.L.; HUBBARD, R.L.; MAISTO, S.A. Facts for planning no. 4: Alcohol misuse by adolescents. *Alcohol Health and Research World* 6(3):61-68, 1982.

*RACHAL, J.V.; GUESS, L.L.; HUBBARD, R.L.; MAISTO, S.A.; CAVANAUGH, E.R.; WADDELL, R.; and BENRUD, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use. The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior, Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980*a*. NTIS No. PB81199267.

RACHAL, J.V.; GUESS, L.L.; HUBBARD, R.L.; MAISTO, S.A.; CAVANAUGH, E.R.; WADDELL, R.; and BENRUD, C.H. "Appendix to Vol. 1. The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies." Adolescent Drinking Behavior. Unpublished report to National Institute on Alcohol Abuse and Alcoholism, 1980*b*.

VOAS, R.B., and MOULDEN, J. Historical trends in alcohol use and driving by young Americans. In: Wechsler, H., ed. *Minimum-Drinking-Age Laws: An Evaluation.* Lexington, MA: Lexington Books, 1980. pp. 59-72.□

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FactsForPlanning 8

Alcohol Use Among Black Senior High School Students

Cherry Lowman, Ph.D., Thomas C. Harford, Ph.D., and Charles T. Kaelber, M.D., D.P.H.

Alcohol abuse is considered a major problem among blacks as well as whites in America. Recent reviews of research conducted over the past 35 years on alcohol use among blacks conclude that adverse consequences of alcohol use are at least as great for blacks as for whites in this country (Harper 1977; Harper and Dawkins 1976; King 1982). Yet for black senior high school students, alcohol use and alcohol-related problems appear to be less extensive among black students than among white students. The latter finding is based on data collected in 1978 by the Research Triangle Institute (RTI) as part of a national probability survey of drinking practices among American senior high school students (Rachal et al. 1980), funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the National Institute on Drug Abuse (NIDA). The RTI study probably provides a relatively conservative estimate of levels of alcohol use since it did not survey absentees or dropouts who have been known to report higher levels of use than the typical student (Blane and Hewitt 1975; Kandel 1975).

More research is needed to obtain a definitive picture of drinking patterns among blacks. However, the available data do suggest that alcohol use begins later among blacks than among whites. On the other hand, the onset of alcohol-related problems, such as cirrhosis of the liver and alcohol-related homicides, appears earlier for blacks than whites. The risk of developing alcohol-related clinical and social problems appears to be highly concentrated among blacks between 18 and 30 years of age. Black high school students are therefore important targets for programs that warn them about problems related to alcohol use that may arise in their peer groups not long after leaving high school.

Two recent reviews of studies on black alcohol use and alcoholism (Harper 1977; King 1982) found extensive evidence of cultural differences between blacks and whites in the etiology and epidemiology of alcohol use. As Harper suggests (1977, pp. 363-364), "it cannot be assumed" that alcohol policies and treatment guidelines "based on the needs of whites" are "equally applicable to blacks."

The major objective of this article is to summarize findings from the RTI survey on stylistic differences in the use of alcohol among black and among white senior high school students. This information can be helpful in developing culturally sensitive programs. First, however, background information on alcohol problems among black adults is given in order to provide a matrix within which findings on black senior high school students may be evaluated.

Alcohol-Related Problems Among Black Adults

The relative magnitude of alcohol problems among blacks, as in any population, varies in part depending on the type of study and on the measures used. Self-report data collected in a 1979 national probability survey of persons 18 years of age and over indicated that heavy drinkers and problem drinkers were as common among blacks as among whites who drank. However, a higher number of blacks than whites—especially females—reported alcohol abstention (Clark and Midanik 1982)—a finding characteristic of other surveys as well.

Objective measures of the consequences of alcohol use, on the other hand, suggest that some alcohol-related problems may be more severe

Highlights

Data bases: *AEDS*, 1978, NIAAA's Alcohol Epidemiologic Data System—cirrhosis rates; *BC*, 1977 and 1980, Bureau of the Census—high school dropout rates; *NAPIS*, 1980, NIAAA's National Alcoholism Program Information System—alcoholics in treatment; *RTI*, 1978, Research Triangle Institute—school-based national probability survey of 10th to 12th grade students.

□Different styles of alcohol use distinguish between black and white 10th to 12th grade students:

There were twice as many alcohol abstainers among black students as among white students (RTI 1978).

Among those who drank, black students consumed smaller amounts of alcohol less frequently than did their white counterparts (RTI 1978).

Four times as many white students as black ones drank heavily—a minimum of five drinks on each occasion at least once a week (RTI 1978).

Among students who used marijuana, black students were less likely than white ones to use marijuana and alcohol simultaneously (RTI 1978).

Markedly fewer black students than white ones reported they often drank with their peers, unsupervised by adults. For example, 51 percent of the white students reported they often drank at teenage parties where only their peers were present, compared with 24 percent of black students who reported this behavior (RTI 1978).

□Most black students do not appear to be at high risk for alcohol abuse in senior high school; however, there is clinical evidence that suggests the risk for black youth increases as they reach early maturity. In 1978, cirrhosis rates began a steep ascent among blacks in their twenties; overall black cirrhosis rates were double white rates (AEDS 1978).

□Unemployment is associated with high risk for alcohol problems, and black youth are at higher risk for unemployment than are their white counterparts.

Among clients in 18 NIAAA treatment programs aimed at blacks, the unemployment rate was unusually high: 69 percent as compared with 51 percent among all clients in the total 460 treatment programs funded by NIAAA in 1980 (NAPIS 1980).

The risks of unemployment and dropping out of high school were greater for black youth in 1977 than for white ones (BC 1977, 1980).

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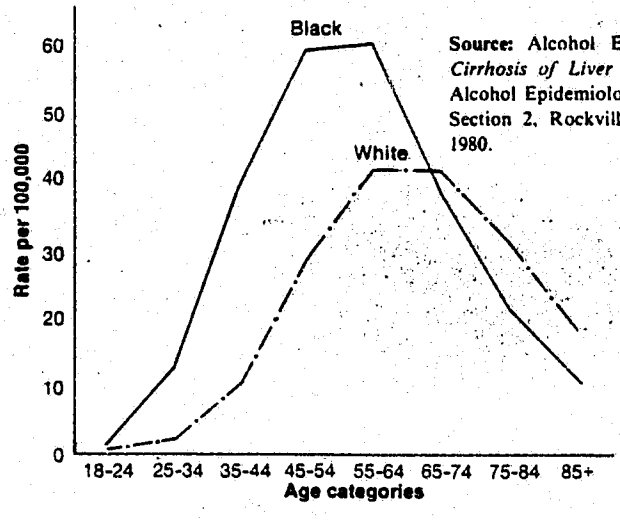
among blacks than among whites, particularly among young black males. For example, alcohol-related homicide rates are higher for black males under 30 years old than for whites the same ages (Harper 1977). Even more striking are the figures on deaths from cirrhosis of the liver, generally caused by prolonged heavy drinking. In 1978, cirrhosis death rates rose steeply among blacks in their twenties, whereas a parallel ascent did not occur among whites until after the age of 35 (figure 1). Among black males 25 to 34 years of age, cirrhotic death rates were several times higher than for white males the same age. For all ages, the cirrhotic death rate for black Americans was nearly twice that for white Americans (AEDS 1980).

With one notable exception, the alcoholics who entered 18 NIAAA-funded programs aimed at black clients in 1980 were comparable to alcoholics entering all 460 programs funded by NIAAA that year. The exception was that markedly higher levels of unemployment were reported by intakes in the 18 black programs. Of intakes in the black treatment programs, 69 percent were unemployed—nearly 20 percent more than the 51 percent of intakes in the total 460 programs who reported they were unemployed. (Note that 65 percent of clients in the 18 programs aimed at blacks were actually black; 18 percent of clients in all 460 programs, including the 18 black programs, were black).

It is difficult to interpret data on clients in NIAAA treatment programs since there is no way to determine the extent to which the data reflect alcohol problems in the general population. Program policies and outreach strategies may bias the selection of

Figure 1. Death rates from Cirrhosis of the liver, U.S. 1978



Source: Alcohol Epidemiologic Data System. *Cirrhosis of Liver Mortality in the U.S.* U.S. Alcohol Epidemiologic Data Reference Manual, Section 2, Rockville, MD: NIAAA, December 1980.

clients in particular types of programs, just as underreporting of cases biases data on characteristics of clients in treatment.

Despite the limitations, the NIAAA-funded treatment program data do suggest a possible relationship between the economic/social status of black Americans and the level of alcohol problems among young adult blacks. At least one study based on general population surveys found such a relationship (Cahalan and Room 1974). Analyses of data collected on men in three general population surveys—two national and one metropolitan conducted in the late 1960s—showed that drinking problems correlated with a number of factors including race ("black") and "work-role instability."

Low or uncertain social status and work-role instability are common conditions among young adults, black or white, which is probably one reason that general population surveys show adults in their twenties to be at especially high risk for heavy drinking and for problems related to drinking (Cahalan and Room 1974; Clark and Midanik 1982). Cahalan and Room (1974) concluded that indicators of heavy alcohol use begin to diminish among older age groups as social and economic stability increases.

Many young people—black and white—may mature out of heavy drinking as they move into relatively stable occupations and households. However, the study finding suggests that young adults who lack access to employment opportunities may continue heavy alcohol use well into adulthood.

More older black than white teenagers appear to be at risk for problems arising from educational and vocational inequities. More black than white youth 18 to 19 years of age are high school dropouts (Bureau of the Census 1979, 1981; also see the technical notes). Economic disadvantage occurs even earlier than age 18. In 1977, nearly three times as many black youth were unemployed as were white youth—35 percent as compared with 13 percent. This was attributed in part to the movement of jobs from largely black central cities to predominantly white suburbs as well as to the adverse effects of discrimination and ghetto environment and education (Messolonghites 1979). By 1982, the unemployment rate among black youth reached 53 percent (Wrather 1982). These findings indicate a need to prepare black youths—both students and their out-of-school peers—for the period of high risk for alcohol problems that begins not long after the high school years. However, stylistic differences that distinguish alcohol use among black youth from alcohol use among whites, as disclosed by the 1978 RTI survey, suggest the need for prevention efforts tailored to the special needs and experience of black youth.

Alcohol Use Among Black Senior High School Students

The finding that black students report lower levels of alcohol use than do white students is not peculiar to the RTI data; it is consistent with surveys of alcohol use among high school students conducted throughout the 1970s (Blane and Hewitt 1975). As yet, no adequate explanation has been provided to account for these differences. However, several stylistic differences in alcohol use are proposed to be among the important sources of variation.

Prevalence. The 1978 RTI survey indicated that alcohol use was less extensive among black than white 10th to 12th grade students, and that this relationship did not vary for any level of drinking. (See the technical notes for background information on survey methodology and for a discussion of the representativeness of the 1978 sample.) Black students reported not only drinking less often than did white students, but also consuming less alcohol on each occasion. Comparison of figures 2 and 3 shows that differences in the quantity of alcohol use were even more marked than were differences in the frequency of alcohol use. Findings presented in figure 4 illustrate the differences in drinking levels between white and black students. (Drinking levels is a classification of alcohol use based on measures of both quantity and frequency. See the technical notes for specific definitions.)

Figure 4 reveals the comparatively high level of abstinence among black students, also characteristic of the adult black population. Among black students, 41 percent of females and 34 percent of males were alcohol abstainers or drank less often than once a year. Among white students, 18 percent of females and 20 percent of males were alcohol abstainers.

As noted in Facts for Planning No. 1 (Lowman 1981), the differences between black students and white students were progressively larger as drinking levels increased. For example, 83 percent of black senior high school students reported they had ever had a drink, compared with 89 percent of white students In contrast, 69 percent of white students drank monthly and 30 percent drank weekly, while 49 percent of black students drank monthly and 19 percent drank weekly. The rate for whites was one and a half times higher than for blacks. Whites were four times more likely than blacks to be heavier drinkers, that is, to consume at least five drinks on each occasion at least once a week. Sixteen percent of white students and only 4 percent of black students were heavier drinkers (figure 4).

The search for explanations for the lower prevalence of alcohol use among black senior high school students raises a number of questions. Are there demographic variations in the samples of black students and of white students that can explain the differences in extent of alcohol use? Variations in the grade and sex composition of the two samples and in their distributions by region and community type are examined in the technical notes. Although notable differences do exist, they are not sufficient to explain the large discrepancy in the prevalence of alcohol use in the two groups. A group of eight variables (including socioeconomic status, grades in school, and religiosity) were found to account for

Figure 2. Frequency of alcohol use

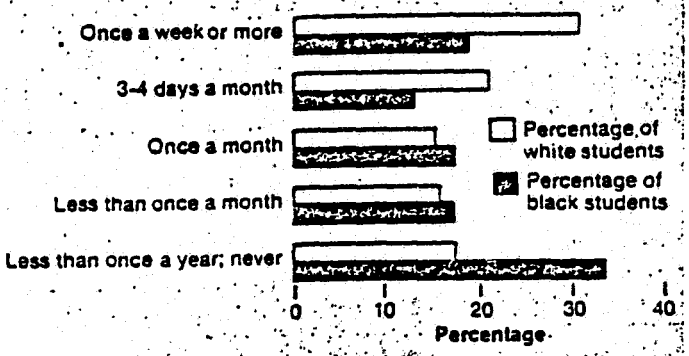


Figure 3. Quantity of alcohol use per drinking occasion

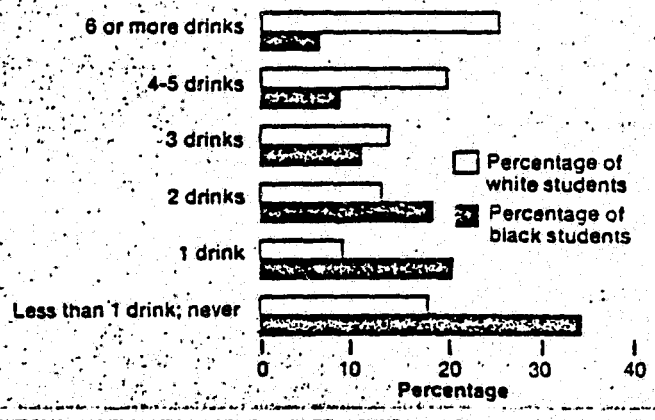
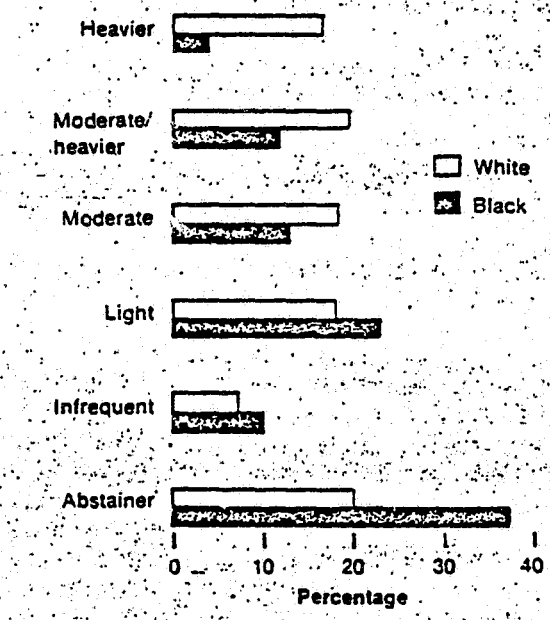
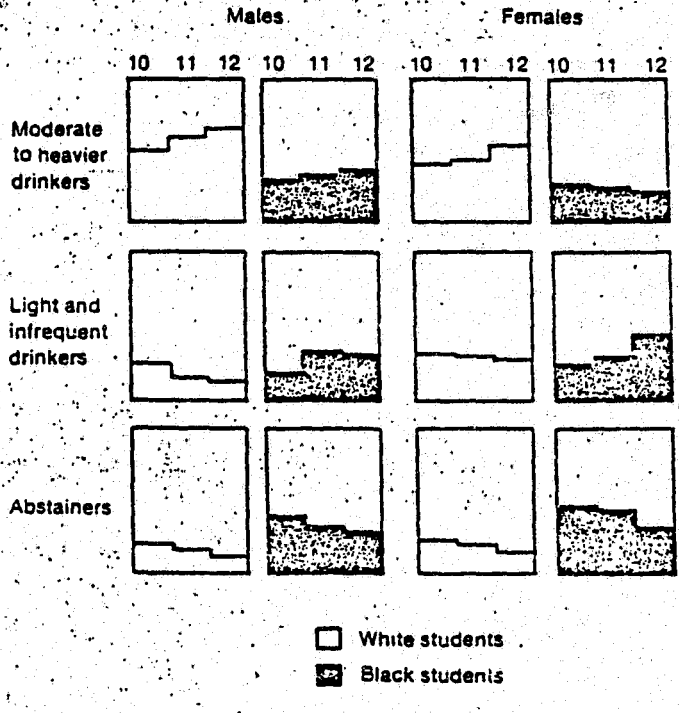


Figure 4. Drinking levels in a sample of senior high school students



Note: Drinking levels are defined in the technical notes.

Figure 5. Drinking level by school grade



only 16 percent of the variance in the frequency of alcohol use

Are black students more likely than white students to underreport alcohol use? Prevalence data on levels of marijuana use among the 1978 senior high school students show that black students reported levels of marijuana use similar to those reported by white students. This means that black students probably did not underreport alcohol use to a greater extent than did white students. Students generally are more likely to underreport the use of an illicit drug like marijuana than to underreport a more socially approved drug like alcohol. Among white students, 55 percent of males and 57 percent of females reported they had ever used marijuana—prevalence rates comparable in frequency to those among black students, of whom 51 percent of males and 47 percent of females reported marijuana use. Black and white students also reported comparable levels of use: 28 percent of both black students and white students reported using marijuana 10 or more times during the previous 6 months; 24 percent of white students and 28 percent of black ones reported having used marijuana within the past week.

Are there differences in alcohol use between the two groups that can be attributed to differences in patterns of socialization? The 1978 RTI data suggest that stylistic distinctions may influence the extent and levels of alcohol use in the two groups.

Differences in onset of alcohol use. The data represented in figure 5 suggest that increases in black students' levels of alcohol use at each grade level lagged behind increases in white students' drinking levels. This was the case among both males and females. Lower levels of alcohol use among black drinkers in each grade appear to result from a time lag, in that many black students start drinking at a later age than do whites.

Why do black students begin using alcohol later than white students? The 1978 RTI data suggest two factors that play a role—black students use other psychoactive drugs before they use alcohol, and they are much less likely than white students to drink with peers.

Psychoactive drug use. Studies on drug use among youth indicate that alcohol use generally precedes marijuana use (Kandel 1980). Consistent with this pattern is the RTI finding that most senior high school students who used marijuana also used alcohol. Nearly half of the students classified as moderate to heavier drinkers had used marijuana within the last month as compared with only 10 percent of the abstainers and infrequent and light drinkers (Lowman 1981/82*a*).

The RTI data on marijuana use among black students suggest that this pattern differs among a substantial number of black youth. Among black marijuana users, 24 percent were alcohol abstainers, in contrast with 4 percent of the white marijuana users who were alcohol abstainers.

A study of ethnic differences in drug use among a representative sample of high school students in New York reached a similar conclusion, based on longitudinal as well as cross-sectional data. "Whites begin the use of legal drugs at an earlier age than blacks, who begin the use of an illegal drug before whites," according to Marel (1977, p. 93).

Additional evidence that onset of alcohol use is later for blacks and that styles of alcohol and drug use differ for black and white students is provided in figure 6. Fewer black than white students reported simultaneous alcohol and marijuana use; 9 percent of black male students and 7 percent of black female students reported simultaneous use, while 20 percent of white male students and 17 percent of white females said they had used both substances at the same time.

Differences in the social contexts of alcohol use. Analyses of the 1978 data on social contexts of alcohol use show that drinking among youth was most common in settings where only peers were present—at unsupervised teenage parties and hangouts, at school functions when no adults were visible, and in cars at night (Harford in press; Harford and Spiegler 1982; Lowman 1981/82*b*). The students who reported they often drank alcoholic beverages in unsupervised settings were among those who reported the highest levels of alcohol use and the most frequent drunkenness.

Findings on alcohol use by black students and white students in various social contexts, presented in table 1, disclose very different patterns in the two subgroups. The most popular setting for alcohol use among black students appeared to be special occasions at home. The most common setting among white students was unsupervised teenage parties.

Even though black students reported lower levels of alcohol use in all social settings, the difference did not exceed 9 percent in contexts supervised by adults—dinner with the family, special occasions at home, and teenage parties with adults present. Differences in alcohol consumption in peer-only contexts, on the other hand, ranged from 15 to 27 percent. Twice as many white as black students reported they often drank at unsupervised teenage parties.

The drinking context questions do not tell us how often an individual was exposed to a particular context. They measure only the frequency of alcohol use when in the setting. The fact that the frequency of drinking in peer-only contexts is highly correlated with reported quantity and frequency of alcohol use (Harford and Spiegler 1982) suggests that black students attend peer-only parties where alcohol is served less often than do white students. This possibility is supported by the fact that only 47 percent of black students, compared with 75 percent of white students, reported that most of their classmates drank sometimes.

A New York State study suggests that black students may not be as greatly influenced by peers as are white students. In a reanalysis of 1971 survey data on students in New York State—originally collected by Kandel and associates (1965)—Marel (1977) showed that teenage values and peers exerted little influence over the initiation of black students into hard liquor use; white students were much more oriented to their peers. Parental factors, on the other hand, were found to exert a significant influence on the initiation of black youth into hard

Figure 6. Simultaneous use of alcohol and marijuana

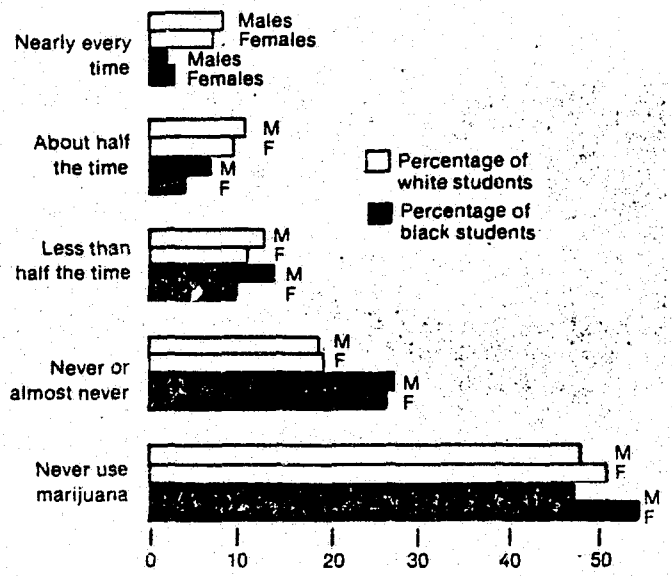


Table 1. Differences in drinking contexts among black youth and white youth

Drinking setting or occasion	Percent of students who often drink in the setting		Difference (White minus black)
	White	Black	
Adults present			
At home, special occasions	36.3	28.5	7.8
At home, dinner with family	7.4	4.3	3.1
Teenage parties	21.3	12.8	8.5
Peers only present			
Teenage parties	51.3	24.3	27.0
Hangouts	33.2	16.0	17.2
School activity	29.0	12.6	16.4
In cars at night	24.2	9.5	14.7

liquor use. Marel notes (p. 115), "Parents seem to be influential . . . as models of a specific behavior, hard liquor use, and in terms of their closeness, rather than in their roles as sanctioning agents." In another study of high school students in the 1960s, it was found that nonwhite students (black and Oriental) were not affiliated with cliques that drank regularly (Riester and Zucker 1968). The researchers suggested this might have accounted for the low prevalence of alcohol use among nonwhites, although the evidence was inconclusive because of the small size of the nonwhite sample.

The 1978 RTI data on the ethnic composition of the schools attended by the students sampled suggest that white students socialized in a relatively homogeneous environment, whereas the social life of black students probably was carried out in a more heterogeneous milieu. Of the white students sampled, 94 percent attended schools in which more than 75 percent of the students were white. Only 42 percent of the black students attended schools that were more than 75 percent black. Nearly half of the black students attended schools in which less than 50 percent of the students were black; 30 percent attended schools that were under 25 percent black.

The more heterogeneous social environments in which many of the black students resided may have been less conducive to the development of extensive social groups. The RTI and other studies only provide hints that the later onset and relatively low levels of alcohol use among black youth related in part to fewer social opportunities among blacks who either constituted a minority group in predominantly white schools or who resided in ethnically complex inner cities. (See the technical notes and table 2 for evidence of the big-city bias in the black sample and the suburban bias in the white group.) It will be the task of future research to determine the extent and nature of differences in developmental patterns of socialization among black youth and white youth and of their influence on levels of alcohol and drug use.

Implications

The research on stylistic differences in alcohol use by black senior high school students provides strong evidence that prevention programs developed to target students in general may not address the needs of black youth. Black students were found to drink less than white students and to begin drinking later. Unlike white students, many black students did not drink at all, and some became marijuana users before they became drinkers. Finally, data on the social contexts of alcohol use indicate that relatively fewer black than white students drank with their peers. These findings suggest that combined alcohol and drug abuse programs are more appropriate for black youth than are alcohol-specific programs.

Even though alcohol use is relatively limited among 10th to 12 grade black students, research on social and clinical alcohol-related problems among black adults indicates that high

risk for such problems can occur in early maturity. Alcohol problems have been found to be associated with work-role instability in the general population. Findings on the extent of alcohol abuse and problems among people in their twenties and on the larger school dropout rate among 18- and 19-year-old black youth argue for broad-based programs that integrate alcohol and drug abuse prevention strategies with efforts to provide training in vocational skills and to ensure that students complete high school.

In addition to these specific implications, the distinctiveness of patterns of alcohol use among black youth suggests the possible need for a similar tailoring of programs to styles of use in other ethnic groups. Unfortunately, the sample sizes for other ethnic groups surveyed by RTI are too small to permit this level of analysis (see the technical notes on ethnicity).

Another general implication of the 1978 RTI findings on alcohol use among black youth is that prevalence rates by themselves are not especially good indicators of high risk for alcohol problems. Additional data are needed to understand the nature of the transition in black youth's alcohol status from low risk in high school to high risk between 18 and 30 years of age. Also needed are data gathered in household surveys as well as data from school-based surveys, in order that school dropouts be included. There is also a need for longitudinal as well as cross-sectional studies, to obtain better information on differences in the age of onset and social contexts of alcohol and other drug use. Equally important in understanding the transition from low to high risk among black teens and young adults are qualitative investigations into the developmental and socialization processes of black youth.

Technical Notes

RTI survey methodology and procedure. A national probability survey of drinking practices among 10th to 12th graders was conducted by the Research Triangle Institute (RTI) in 1978 (Rachal et al. 1980), under contract to NIAAA with additional funding from the National Institute on Drug Abuse (NIDA).

Sampling strategy. RTI employed a three-stage stratified sampling strategy. The first stage involved selecting a probability sample of all counties in the 48 contiguous States and the District of Columbia, stratified by geographic region and community size. A second-stage probability sample was taken of all high schools in each county selected. At least one high school was chosen from each county and more than one from large counties. Finally, a probability sample of homerooms, one for each grade in school, was taken from the sample of high schools selected in the second stage. Questionnaires were self-administered by students grouped in homerooms or classes. Instructed and supervised by RTI-trained staff, students were assured that their responses would be anonymous and confidential.

Representativeness. In the 1978 study, some of the original, randomly selected sampling units were replaced, using probability measures. The "overall participation rate" in the final adjusted sample was 85 percent (the proportion of schools participating multiplied by the proportion of students participating).

The RTI sample was not representative of all the Nation's adolescents. Neither high school dropouts nor absentees were sampled. Both of these subgroups may manifest different drinking patterns from those that characterize the high school students. (See the technical note on high school dropouts.)

Inner-city students and members of the ethnic groups other than "white" or "black" were probably undersampled. Nonetheless, the sample was representative of the majority of the Nation's senior high school students at that time. More detailed discussions on sampling procedures and evaluations of sampling validity are contained in the RTI final report (Rachal et al. 1980). Information on an earlier 1974 survey and panel study can be found in the Technical Notes for Facts for Planning Nos. 1-5.

Ethnicity. Of the 4,918 students who provided usable questionnaires, 95 percent responded to the question asking for self-classification: "What is your racial/ethnic background?" Choices provided on the questionnaire were "American Indian or Alaskan Native," "Asian or Pacific Islander," "black, not of Hispanic origin," "Hispanic," "white, not of Hispanic origin," and "other, explain." About 76 percent of students who did respond to the question classified themselves as "white" and 11 percent as "black." The remaining 13 percent of respondents classified themselves as follows: nearly 6 percent as "Hispanic," 3 percent as "American Indian/Alaskan Native," 1 percent as "Asian," and nearly 4 percent as "other."

These categories may represent considerable internal ethnic diversity—for example, German or Italian "white," or Haitian or Cape Verdean "black." The RTI findings nonetheless reveal consistent differences in the levels of alcohol use among students who classified themselves as members of these very general categories.

Prevalence of alcohol use was highest among students who classified themselves as "white" or "American Indian/Alaskan Native," and lowest among those who classified themselves as "black" or "Asian." Prevalence ranged from high to low points on different measures among students who reported themselves to be "Hispanic" or "other."

Owing to undersampling, findings on youth from racial/ethnic groups other than "white" or "black" ones may not be representative of the Nation as a whole. The sample of black senior high school students (11 percent), on the other hand, is large enough to allow examination of some correlates of alcohol use among them on a national level.

Definitions of students' drinking levels. The RTI survey used the following definitions of drinking levels: *abstainers* don't drink or drink less than once a year; *infrequent drinkers* drink once a month at most and drink small amounts per typical drinking

Table 2. Demographic variations in 1978 RTI samples of white and black senior high school students

Demographic variable	White (N=3,528)	Black (N=496)
	Percent	Percent
Sex: Male	45.6	42.3
Grade:		
10th	32.7	29.2
11th	35.2	30.8
12th	32.1	39.9
Grade and sex:		
10th-male	43.5	42.1
11th-male	46.2	47.1
12th-male	52.9	38.9
Community type:		
Big city	15.4	60.9
Urban fringe	40.6	21.0
Medium city	9.0	5.2
Small town	34.9	12.9
Region:		
Northeast	30.7	21.6
North Central	27.1	10.7
South	24.4	54.2
West	17.7	13.5

Table 3. Demographic factors related to the frequency and quantity of alcohol use, based on linear regressions

Demographic factors	Frequency of alcohol use	Quantity of alcohol use
Males	.04*	.12*
Older students	.13*	.09*
Higher SES	.01	.01
Non-South	.05*	.01
Lower academic grades	.17*	.17*
Less frequent church attendance	.03	.05*
Non-Baptist/ non-Methodist	.05*	.01
Lower religiosity	.27*	.22*
White	.10*	.18*
Total variance (R^2) explained by these factors	16.2 percent	17.6 percent

*$p < .01$, or the probability that the relationship between the two factors occurred strictly by chance is less than 1 in 100.

Table 4. Percentage of school dropouts distributed by age (13 to 19 years), sex, and race, October 1977*

Age	Male		Female	
	White	Black	White	Black
	Percent		Percent	
13 years	1.1	1.1	0.9	0.0
14 years	1.0	1.4	0.7	1.4
15 years	1.8	0.7	2.1	1.3
16 years	5.6	3.5	7.9	6.1
17 years	11.7	10.3	10.3	10.8
18 years	17.1	22.6	13.8	15.9
19 years	17.0	25.3	15.9	24.7
3-35 years	12.3	12.6	17.0	17.2

*The percentage of school dropouts is based on the number of persons "not enrolled in school" who were "not high school graduates," divided by the total number of persons, as reported by the Bureau of the Census (1979: table 15) for specific categories (age, sex, and race).

occasion; *light drinkers* drink once a month at most and drink medium amounts per typical drinking occasion, or drink no more than three to four times a month and drink small amounts per typical drinking occasion; *moderate drinkers* drink at least once a week and small amounts per typical drinking occasion, or drink three or four times a month and medium amounts per typical drinking occasion, or drink no more than once a month and large amounts per typical drinking occasion; *moderate/heavier drinkers* drink at least once a week and medium amounts per typical drinking occasion, or drink three to four times a month and large amounts per typical drinking occasion; and *heavier drinkers* drink at least once a week and large amounts per typical drinking occasion. Facts for Planning No. 2 provides more detailed definitions of these six drinking levels, and discusses the questions underlying them and the procedures used to construct the drinking level classification.

Demographic Variations in the Two Samples. Overall differences in the prevalence of alcohol use among black and white students may arise in part from demographic variations in the two samples. Among high school students in general, alcohol use is greatest among males and increases among females and males with age or with grade in school (Lowman 1981; Rachal et al. 1980). It appears that 12th grade black females were oversampled in 1978: 61 percent of black 12th graders were females compared with 47 percent of white 12th graders who were (table 2).

Bureau of the Census data for October 1977, in the fall of the school year in which the RTI survey was conducted in the spring, show that the proportion of females among 16- to 18-year-olds in the 12th grade were similar for both black and white students (51 to 52 percent). This means the RTI sample could be biased toward a lower prevalence of alcohol use than there is among the Nation's black senior high school students as a whole. On the other hand, the larger proportion of black students in the sample who were 12th graders probably offsets the bias: 40 percent of black students sampled were 12th graders as compared with 32 percent of the white students sampled.

The majority of the black students sampled resided in big cities—61 percent as compared with only 15 percent of the white students sampled (table 2). The majority also resided in the South—54 percent as compared with 24 percent of the white students sampled. Forty percent of the black students resided in large Southern cities; only 4 percent of the white students did. The distribution of white students was less concentrated in any particular type of area. However, 40 percent did reside in suburban areas; three-quarters of these in the Northeast or North Central regions of the Nation.

Even though the black sample was prominently urban-southern and the white sample suburban-northern, discrepancies in the prevalence of alcohol use remained consistent within each regional or community type. For example, 67 percent of white students who attended schools in big cities drank at least once a month, compared

with 49 percent of black students who did; 65 percent of white students who resided in the South drank once a month as compared with 52 percent of the black students who did. (See Lowman 1981 for a discussion of regional variations in alcohol use related to ethnicity.)

Other demographic and behavioral variables have been proposed as influences on alcohol use in the student population. Lower levels of alcohol consumption have been reported for teenagers affiliated with Protestant religious denominations and for those who attain higher academic status in school work. One possible explanation for the differences in drinking levels between black students and white students is the predominately conservative and fundamentalist Protestant affiliation among black students.

In order to control for these sources of influence, measures of typical frequency of alcohol use and number of drinks per typical occasion were regressed on the following variables: (1) sex; (2) grade in school; (3) index of socioeconomic status; (4) south—variable comparing southern States (Alabama, D.C., Florida, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia) with all other States; (5) academic grades—whether students usually get As, As and Bs, Bs, Bs and Cs, Cs, Cs and Ds, Ds and Fs; (6) frequency of church attendance; (7) Baptist or Methodist—variable comparing Baptist and Methodist with all other religious denominations; (8) racial and ethnic—comparing white students with black students, and (9) religiosity. The religiosity scale is based on responses to several questions about religious beliefs and activities; see Rachal et al. (1980).

The standardized regression coefficients from each of the two regression analyses (frequency and quantity) are presented in table 3. Each coefficient reflects the effect of a particular variable after the effects of the others are controlled. Of particular concern in the present analysis are the coefficients for the racial and ethnic category. With respect to typical frequency, the coefficient is .10 and significant at the $p<.01$ level of significance. This indicates that the racial and ethnic category is significantly related to drinking frequency when all of the other variables are controlled. The direction of the association is positive—white students reported drinking more frequently than black students. Socioeconomic status and the frequency of church attendance were not significantly related to drinking frequency. For the other variables, factors that were significantly associated with more frequent drinking were being male, an older student, from non-Southern States, having lower academic grades, being non-Baptist and non-Methodist denominations, and having lower religiosity scores.

The racial and ethnic coefficient for quantity of alcohol is .18. This indicates that the racial and ethnic category was significantly related to drinking quantity when all of the other variables were controlled. The direction of the association is positive—white students reported a higher number of drinks per typical occasion than black students. Socioeconomic status, non-Southern States, and Baptist or Methodist were not significantly related to quantity. The direction of the association for the other variables is heavier consumption among males, older students, and those with lower academic grades, infrequent church attendance, and lower religiosity scores.

Overall, the explanatory power of these variables is not high, with only 16 percent of the variance in frequency and approximately 18 percent of the variance in quantity accounted for.

High School Dropouts.[1] Surveys of school populations exclude the dropout population, which has been shown to have higher levels of problem drinking. However, studies of institutionalized and delinquent students and school dropouts are inconsistent with respect to patterns of alcohol consumption among white teenagers and black teenagers: some studies report lower rates of problem drinking among black youth, others report higher rates, and others report no differences (Blane and Hewitt 1975).

A reasonable question to ask is whether or not the apparently low prevalence of alcohol use among black senior high school students results because more black students than white students drop out of high school. Bureau of the Census data for 1977 (Bureau of the Census 1979) suggest the answer is likely to be no. 1. They show that white dropout rates were similar to or slightly higher than black dropout rates up to 18 years of age. At 18, rates for black youth began to increase steeply and to exceed rates for white youth (table 4).

Between 17 and 19 years of age, school dropout rates doubled for black males and females, whereas they appeared to begin leveling off among white teenagers. By nineteen years of age, 25 percent of black males and females had dropped out of the high school as compared with 17 percent of white males and 16 percent of white females. However, the 8 to 9 percent greater number of black dropouts does not appear to have occurred early enough to cause a reduction in the prevalence of alcohol use among those 10th to 12th graders who remained in high school. (In the 1978 RTI sample, only 16 percent of all students, black or white, were 18 years old.)

More recent Bureau of the Census data for 1980 revealed patterns and levels of dropping out among black youth and white youth nearly identical to the 1977 findings (Bureau of the Census 1981), suggesting that this is a recurrent phenomenon. The risk of dropping out of high school clearly is higher for black teenagers than for white students.

[1]School dropout rates are based on Bureau of the Census data on the enrollment status of the population 3 to 34 years of age distributed by year of age, sex, and race. The Bureau of the Census reports the numbers of persons in each sociodemographic category (for example, 18-year-old white females) who were either (a) enrolled in school or (b) not enrolled in school. For persons not enrolled in school, the numbers are further broken down into those who were "high school graduates" and those who were "not high school graduates." The high school dropout rates reported in table 4 have been estimated by dividing the number of persons in a specific sociodemographic category who *were not enrolled in school* and who *were not high school graduates* by the total number of persons in that category.

References

ALCOHOL EPIDEMIOLOGIC DATA SYSTEMS (AEDS). *Cirrhosis of the Liver Mortality in the United States, Each State and County, and Selected SMSA's.* U.S. Alcohol Epidemiologic Data Reference Manual, Section 2. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, December 1980.

BLANE, H.T., and HEWITT, L.E. *Alcohol and Youth: An Analysis of the Literature, 1960-75.* Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1977.

CAHALAN, D., and ROOM, R. *Problem Drinking Among American Men.* Rutgers Center of Alcohol Studies Monograph No. 7. New Brunswick, NJ: Rutgers Center of Alcohol Studies, 1974.

CLARK, W., and MIDANIK, L. Alcohol use and alcohol problems among U.S. adults: Results of the 1979 national survey. In: National Institute on Alcohol Abuse and Alcoholism. *Alcohol Consumption and Related Problems.* Alcohol and Health Monograph No. 1. DHHS Pub. No. (ADM) 82-1190. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1982. pp. 3-52.

HARFORD, T.C. Situational factors in drinking: A developmental perspective on drinking contexts. In: Nirenberg, T.D., and Miller, P.M., eds. *Prevention of Alcohol Abuse.* New York: Plenum Press, in press.

HARFORD, T.C., and SPIEGLER, D. Environmental influences in adolescent drinking. In: National Institute on Alcohol Abuse and Alcoholism. *Special Population Issues.* Alcohol and Health Monograph No. 4. DHHS Pub. No. (ADM) 82-1193. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1982. pp. 167-193.

HARPER, F.D. Alcohol use among North American blacks. In: Israel, Y.; Glaser, F.B.; Kalant, H.; Popham, R.E.; Schmidt, W.; and Smart, R.G., eds. *Research Advances in Alcohol and Drug Problems,* Vol. 4. New York: Plenum Press, 1977. pp. 349-366.

HARPER, F.D., and DAWKINS, M.P. Alcohol and blacks: Survey of the periodical literature. *British Journal of Addiction* 71: 327-334, 1976.

KANDEL, D.B. Reaching the hard-to-reach: Illicit drug use among high school absentees. *Addictive Diseases* 1:465-480, 1975.

KANDEL, D.B. Drug and drinking behavior among youth. *Annual Review of Sociology* 6:235-285, 1980.

KANDEL, D.B.; SINGLE, E.; and KESSLER, R.C. The epidemiology of drug use among New York State high school students: Distribution, trends, and change in rates of use. *American Journal of Public Health* 66:43-55, 1976.

KING, L. Alcoholism: Studies regarding black Americans. In: National Institute on Alcohol Abuse and Alcoholism. *Special Population Issues.* Alcohol and Health Monograph No. 4. DHHS Pub. No. (ADM) 82-1193. Washington, DC: Supt. of Docs., U.S. Govt. Print. Off., 1982. pp. 385-407.

LOWMAN, C. Facts for planning no. 1: Prevalence of alcohol use among U.S. senior high school students. *Alcohol Health and Research World* 6(1):29-40, 1981.

LOWMAN, C. Facts for planning no. 2: Alcohol use as an indicator of psychoactive drug use among the nation's senior high school students. *Alcohol Health and Research World* 6(2): 1981/82*a*.

LOWMAN, C. Facts for planning no. 3: U.S. teenage alcohol use in unsupervised social settings. *Alcohol Health and Research World* 6(2): 1981/82*b*.

MAREL, R. "Drug Behavior of Black and White Adolescents: Patterns, Correlates, and Predictors of Use." Ph.D. dissertation, Columbia University, New York, 1977.

NATIONAL INSTITUTE ON ALCOHOL ABUSE AND ALCOHOLISM. *Statistical Report on NIAAA Funded Treatment Programs for Calendar Year 1980.* Data from the National Alcoholism Program Information System (NAPIS). Rockville, MD: NIAAA, 1982.

RACHAL, J.V.; GUESS, L.L.; HUBBARD, R.L.; MAISTO, S.A.; CAVANAUGH, E.R.; WADDELL, R.; and BENRUD, C.H. *The Extent and Nature of Adolescent Alcohol and Drug Use: The 1974 and 1978 National Sample Studies.* Adolescent Drinking Behavior, Vol. 1. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism, 1980.

RIESTER, A.E., and ZUCKER, R.A. Adolescent social structure and drinking behavior. *Personnel and Guidance Journal* 47(4):304-312, 1968.

U.S. BUREAU OF THE CENSUS. *School Enrollment—Social and Economic Characteristics of Students: October 1977.* Current Population Reports Series P-20, No. 333. Washington, DC: U.S. Department of Commerce, February 1979.

U.S. BUREAU OF THE CENSUS. *School Enrollment—Social and Economic Characteristics of Students: October 1980 (Advance Report).* Current Population Reports Series P-20 No. 362. Washington, DC: U.S. Department of Commerce, May 1981.

WRATHER, J. Social issues are themes for seminars. *Science* 218(4568):147, 1982. □

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