

# The Effect of School Dropout Rates on Estimates of Adolescent Substance Use among Three Racial/Ethnic Groups

## ABSTRACT

**Objectives.** This study examined, across three racial/ethnic groups, how the inclusion of data on drug use of dropouts can alter estimates of adolescent drug use rates.

**Methods.** Self-report rates of lifetime prevalence and use in the previous 30 days were obtained from Mexican American, White non-Hispanic, and Native American students ( $n = 738$ ) and dropouts ( $n = 774$ ). Rates for the age cohort (students and dropouts) were estimated with a weighted correction formula.

**Results.** Rates of use reported by dropouts were 1.2 to 6.4 times higher than those reported by students. Corrected rates resulted in changes in relative rates of use by different ethnic groups.

**Conclusions.** When only in-school data are available, errors in estimating drug use among groups with high rates of school dropout can be substantial. Correction of student-based data to include drug use of dropouts leads to important changes in estimated levels of drug use and alters estimates of the relative rates of use for racial/ethnic minority groups with high dropout rates. (*Am J Public Health*. 1997;87:51-55)

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## Introduction

Self-report surveys of youth in school serve as a primary source of information on the rate of substance use among young people.<sup>1</sup> The national survey of high school seniors and, more recently, 8th- and 10th-grade students conducted by Johnston et al. has provided invaluable data on trends of substance use over the past 20 years.<sup>2</sup> This source and other sources of school-based surveys are limited, however, as a result of their failure to obtain information on the substance use rates of school dropouts. There is abundant evidence that school status and adolescent substance use are related. A number of studies have reported higher rates of substance use among school dropouts than among youth who remain in school.<sup>3-8</sup> Even those dropouts who return to nontraditional schools are more likely to use illicit substances.<sup>1</sup> Chavez et al. compared rates of use among dropouts and two groups of students: those matched only on age to dropouts (control students) and those matched on age and grade point average to dropouts (at-risk students).<sup>9</sup> Generally, among both White non-Hispanic and Mexican American youth, dropouts reported the highest rates of use, followed by at-risk and control students. Clearly, youth who have dropped out of school are more likely to use illicit substances than youth who remain in school. Thus, surveys of substance use based on in-school youth only will underestimate use in the age cohort as a result of the failure to include the substance use rates of school dropouts.

Recognizing this limitation, Johnston et al. estimated the effect of absentees and dropouts on substance use rates obtained from their data.<sup>2</sup> They found that students who report a higher number of

absences from school also report higher rates of substance use. However, using a weighted method to account for the higher use among absentees, they found that no prevalence estimate was depressed more than 2.7%. They also developed extrapolated estimates assuming that differences between dropouts and high school seniors were (1) equivalent to the difference between absentees and seniors, (2) 1.5 times that difference, and (3) twice that difference. Corrections using these assumptions were based on a school dropout rate of 15%. Under the most extreme assumption, no correction exceeded 7.5%. Another method used by Johnston et al. was based on data from students and actual school dropouts obtained from the national household surveys conducted in 1977<sup>10</sup> and 1979.<sup>11</sup> They found that the differences in rates of marijuana use for dropouts and students were at or below levels obtained with the least extreme assumption. They cautioned, however, that the dropouts surveyed in the national household studies may not have included some of the more drug-prone dropouts.

Although inclusion of dropouts may only moderately affect overall estimates for the entire adolescent population, the degree of underestimation is likely to vary across different ethnic groups because of their different rates of school dropout. The National Center for Education Statistics reported that the status dropout rates for 1992 were 7.7% for White non-Hispanics,

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13.7% for Black non-Hispanics, and 29.4% for Hispanics.<sup>12</sup> A serious limitation exists, however, in presenting aggregated rates for Hispanics. Hispanic subtypes vary substantially in high school completion rates, with Cuban, Central and South American, and other Hispanics completing high school at higher rates than those of Mexican and Puerto Rican descent.<sup>13</sup> Other studies have reported on school dropout rates by individual Hispanic subtypes and White non-Hispanic groups using the same methodology so that comparisons between groups can be made. For example, a status dropout rate of 11% has been reported for White non-Hispanics, as compared with a rate of 46% for Mexican Americans.<sup>14</sup> Rates for other ethnic minority groups can be more difficult to obtain. Reports on Native American youth residing on reservations indicate that the dropout rate may reach as high as 85%; based on an average of 18 studies of Indian dropouts, however, Chavers estimated the average rate to be 50%.<sup>15</sup> The best estimates of dropout rates for the ethnic groups included in this study would be 11% for White non-Hispanics, 46% for Mexican Americans, and 50% for Native Americans.

To date, no data have been available that have compared rates of substance use among students and dropouts using the same method of measurement across different ethnic groups. This paper presents data on substance use among Mexican American, White non-Hispanic, and Native American school dropouts and students from the same schools and demonstrates how data on drug use of dropouts can alter estimates of the prevalence of drug use in different ethnic groups.

## Methods

### *The Dropout Sample*

Data on Mexican American and White non-Hispanic dropouts and students were collected from one school district in each of three communities in the southwestern United States: a city (population = 350 000), a midsized community (population = 90 000), and a small community (population = 30 000). Data on Native American dropouts and students were collected from seven different locations with large Indian populations. Five of the locations were reservations in the Midwest and West, another was a large metropolitan area in the Southwest with a large Native American population, and the final location was in Oklahoma.

Dropouts were defined as 7th-through 12th-grade students who had a period of absence from school lasting for 1 month or longer, with no contact with the school district or excused absences. At the time they were surveyed, they were not enrolled in any school. They would fall, then, into the grouping of status dropouts, which is consistent with the type of rate used to estimate dropout rates for the three groups in this study. This definition is more stringent than that recommended by Morrow,<sup>16</sup> whose standard definition of dropouts calls for a period of unexcused absence from school of 2 weeks or more. The adoption of a period of absence of 1 month or longer provides a sufficient period of time to ensure that youth are, in fact, school dropouts. Students were selected from the same schools dropouts had attended and were matched pairwise to dropout subjects on race/ethnicity, grade in school (last grade attended by dropout), and gender. Surveys were individually administered, participation was voluntary, and completed surveys were confidential. Project staff who administered the surveys were aware of the school status of participants, but their role was limited to obtaining informed consent and responding to general questions of participants. Dropouts were paid \$20 for their participation, and students were paid \$10 since they did not have to take their own time to complete the survey.

### *Sample Characteristics*

Three hundred eighty-seven Mexican American dropouts, 176 White non-Hispanic dropouts, 211 Native American dropouts, 355 Mexican American students, 176 White non-Hispanic students, and 207 Native American students were included in final analyses. Among the initial number of dropouts identified as eligible, 4.5% of Mexican Americans, 6.8% of White non-Hispanics, and 2.1% of Native Americans refused to participate. As a result of missing data and inconsistent responses, some participants were removed from the original sample (11.7% of Mexican Americans, 4.4% of White non-Hispanics, and 4.7% of Native Americans). Therefore, cells across groups were not equal. Analyses were conducted on pooled data from students and pooled data from dropouts. Analyses of variance were used in evaluating mean differences for age, last grade completed, and high school grade point average. The three groups of students were significantly different from each other in terms of age

(Mexican American, mean = 16.46 years; White non-Hispanic, mean = 16.75 years; Native American, mean = 16.02 years;  $F = 17.65, P < .001$ ). Similar results were found for age among dropouts (Mexican American, mean = 16.50 years; White non-Hispanic, mean = 16.65 years; Native American, mean = 17.12 years;  $F = 16.42, P < .001$ ). Native American dropouts were significantly older than dropouts in the other two groups. Last grade completed for dropouts indicated that White non-Hispanic dropouts had remained in school significantly longer than Mexican American dropouts (Mexican American, mean = 9.34 years; White non-Hispanic, mean = 9.59 years; Native American, mean = 9.52 years;  $F = 3.96, P = .019$ ). No differences were found in high school grade point average among students (Mexican American, mean = 2.37; White non-Hispanic, mean = 2.45; Native American, mean = 2.37;  $F = 0.053, P = .588$ ). Among dropouts, Native Americans had a higher mean grade point average (1.23) than both Mexican Americans and White non-Hispanics (0.92 and 1.11, respectively) ( $F = 10.43, P < .001$ ).

### *Drug Survey*

The survey used for this study was an instrument developed for clinical assessment of substance use<sup>17</sup> from which the American Drug and Alcohol Survey<sup>1</sup> was derived. It has been tested among minority and majority youth, and Cronbach alpha reliabilities of the substance involvement scales have ranged from .78 to .96 for White non-Hispanic youth, .74 to .92 for Mexican American youth, and .76 to .95 for Native American youth.<sup>1</sup> For purposes of illustration for this study, only lifetime prevalence questions (i.e., "Have you ever tried . . .?") and current use questions (i.e., "How often in the last month have you used . . .?") were used. Except for inhalants, for which a different question is used, results using this instrument have been comparable to those of the National Senior Survey.<sup>1</sup>

### *Dropout Correction*

Tables 1 and 2 present prevalence rates for students and dropouts, along with corrected rates. The corrected rates took into account substance use rates of both students and dropouts. In order to correct for the effect of dropouts, we applied the following weighted formulas:

$$P_c = P_{dor} P_{u|do} + (q_{dor}) P_{u|s}$$

$$\text{Var}(p_c) = p_{dor}^2 \left( \frac{p_{u\ do} \cdot q_{u\ do}}{n_{do}} \right) + q_{dor}^2 \left( \frac{p_{u\ s} \cdot q_{u\ s}}{n_s} \right),$$

where  $p_c$  is the corrected proportion of use among youth (both school youth and dropouts);  $p_{dor}$  is the rate of dropout within the population;  $q_{dor}$  is  $1 - p_{dor}$ ;  $p_{u\ do}$  is the proportion of use among dropouts;  $q_{u\ do}$  is  $1 - p_{u\ do}$ ;  $n_{do}$  is the number of dropouts sampled;  $p_{u\ s}$  is the proportion of use among in-school youth;  $q_{u\ s}$  is  $1 - p_{u\ s}$ ; and  $n_s$  is the number of students sampled. The quantity  $p_c - p_{u\ s}$  is the percentage change accounted for by using the weighted estimate:

$$\text{Var}(p_c - p_{u\ s}) = p_{dor}^2 \left( \frac{p_{u\ do} \cdot q_{u\ do}}{n_{do}} + \frac{p_{u\ s} \cdot q_{u\ s}}{n_s} \right).$$

The corrected estimate ( $p_c$ ) was based on the weighted formula, calculated separately within race/ethnicity in order to control for the differential dropout rates between Mexican Americans, Native Americans, and White non-Hispanics. An 11% dropout rate for White non-Hispanics, a 46% dropout rate for Mexican Americans, and a 50% dropout rate for Native Americans were used in calculations.

## Results

### Lifetime Prevalence

Table 1 presents percentages of lifetime prevalence for students and dropouts and the corrected rates for the age cohort (both students and dropouts). Table 1 also includes the increase in rate that resulted from the correction and 95% confidence intervals for the increase. For example, 65.6% of White non-Hispanic students reported at least one occasion during their lifetime of getting drunk, as compared with 91.7% of White non-Hispanic dropouts. When the correction formula was applied, the corrected rate for the age cohort was 68.5%. This represented a 2.9% increase over the rate based on student data only, and the 95% confidence interval for this difference (2.0, 3.8) was statistically significant. Comparisons within school status groups and across ethnic groups were also made. As can be seen in Table 1, the lifetime prevalence rate of getting drunk for White non-Hispanic dropouts was significantly greater than the rates reported by Native

American dropouts and Mexican American dropouts.

*School status and racial/ethnic comparisons.* With only two exceptions, the lifetime prevalence rates for students were not significantly different across the ethnic groups. Native American students reported a significantly higher level of inhalant use than Mexican American students, and White non-Hispanic students reported a higher rate of LSD use than Native American students.

Lifetime prevalence was substantially higher among dropouts than among students across all three ethnic groups. As shown in Table 1, all comparisons between students and dropouts were significantly different with one exception, LSD lifetime use among Native Americans. For all three groups, the average rate of use for dropouts across all drugs except alcohol was approximately twice that for students (2.20 times higher for Mexican Americans, 2.02 times higher for White non-Hispanics, and 1.76 times higher for Native Americans).

There was variation in use rates among dropouts across the three ethnic groups. White non-Hispanic dropouts, for example, reported higher rates of getting drunk than did either Mexican American or Native American dropouts. Native American dropouts, on the other hand, reported lower rates of stimulant and cocaine use than either White non-Hispanics or Mexican Americans. Finally, White non-Hispanic dropouts reported higher lifetime LSD use than the other two ethnic groups.

*Corrected rates.* Whereas uncorrected rates for students showed only small differences between ethnic groups, rates corrected for the drug use of dropouts showed that many differences were present in the entire cohort across ethnic groups. The effect of the correction is best illustrated for marijuana. White non-Hispanic, Native American, and Mexican American in-school students were similar in marijuana lifetime prevalence (45.5%, 45.8%, and 49.0%, respectively), with no significant differences between groups; the rates of use for dropouts in all three groups were also similar (80.0%, 75.7%, and 81.0%, respectively), and differences were statistically nonsignificant. However, in terms of the corrected rates, there was a significantly higher rate of use for both Mexican Americans and Native Americans than for White non-Hispanics. Although White non-Hispanic dropouts reported lifetime marijuana use at rates similar to those of

other dropouts, the correction for White non-Hispanics was minimal because of a low dropout rate, while high dropout rates led to large corrections for the two ethnic minority groups. Similar changes in relative rates of use occurred for getting drunk and for the other four drugs. Both the mean increase and the 95% confidence intervals for increase in rate indicated more change among the two ethnic minority groups.

### Use in the Previous Month

*School status and racial/ethnic comparisons.* The pattern of results for current use (Table 2) was similar to that found for lifetime use. There were no significant differences between ethnic groups among students, and dropouts in all three groups reported significantly higher rates of use in the previous month than students for all drugs (with the three exceptions among Native Americans shown in Table 2). Mexican American dropouts averaged 2.64 times higher rates than students, White non-Hispanic dropouts averaged 3.38 times higher rates than students, and Native American dropouts averaged 1.97 times higher rates than students. Native American dropouts reported lower previous month use than both White non-Hispanic and Mexican American dropouts for marijuana, stimulants, cocaine, and LSD.

*Corrected rates.* Mirroring the findings for lifetime prevalence, corrections were larger for Native Americans and Mexican Americans than for White non-Hispanics, and relative levels of drug use changed. After correction, for example, rates for current marijuana use were lower for White non-Hispanics and Native Americans than for Mexican Americans; there were no initial differences among students in school before correction.

## Discussion

Because of the geographic distribution of participants, results of this study are limited in generalizability to students and dropouts within the southwestern United States. With this limitation in mind, it can be concluded that rates of lifetime substance use among school dropouts are much higher than rates for youth who remain in school. Dropouts are likely to have tried substances at rates anywhere from 1.3 to 3.0 times greater than those of students in school for the six substances reported in this study. Results for current use were even more dramatic.

**TABLE 1—Lifetime Prevalence of Substance Use among Students and Dropouts and Corrected Estimates for the Total Age Cohort**

Substance	White Non-Hispanics, %				Native Americans, %				Mexican Americans, %					
	Students (n = 176)	Dropouts (n = 176)	Corrected (n = 352)	Increase in Rate <sup>a</sup>	Students (n = 207)	Dropouts (n = 211)	Corrected (n = 418)	Increase in Rate <sup>b</sup>	Students (n = 355)	Dropouts (n = 387)	Corrected (n = 742)	Increase in Rate <sup>c</sup>	95% CI	
Alcohol (intoxication)	65.6	91.7 <sup>bc</sup>	68.5	2.9	2.0, 3.8	59.3	79.2 <sup>b</sup>	69.3	10.0	5.6, 14.3	74.1	85.4 <sup>c</sup>	9.6	6.8, 12.4
Marijuana	45.5	80.0	49.3 <sup>ab</sup>	3.8	2.8, 4.8	45.8	75.7	60.8 <sup>d</sup>	15.0	10.5, 19.4	63.7 <sup>e</sup>	81.0	14.7	11.7, 17.7
Inhalants	23.5	38.3	25.1	1.6	0.6, 2.7	24.1 <sup>a</sup>	37.3	30.7 <sup>d</sup>	6.6	2.2, 11.0	24.7 <sup>d</sup>	34.0	8.0	5.1, 10.8
Stimulants	23.1	49.7 <sup>b</sup>	26.0 <sup>d</sup>	2.9	1.9, 4.0	19.6	35.5 <sup>bc</sup>	27.6 <sup>e</sup>	8.0	3.7, 12.2	21.3	47.7 <sup>c</sup>	12.1	9.1, 15.2
Cocaine	12.9	34.5 <sup>b</sup>	15.3 <sup>d</sup>	2.4	1.4, 3.3	9.4	25.0 <sup>bc</sup>	17.2 <sup>e</sup>	7.8	4.3, 11.3	13.8	41.3 <sup>c</sup>	12.7	9.9, 15.4
LSD	18.4 <sup>a</sup>	46.5 <sup>bc</sup>	21.5 <sup>d</sup>	3.1	2.1, 4.1	10.9 <sup>a</sup>	16.8 <sup>b</sup>	13.9 <sup>de</sup>	3.0	-0.3, 6.2	12.7	37.2 <sup>c</sup>	11.3	8.5, 14.0

Note. Differences between groups were calculated with the difference of proportion test for unequal sample sizes. Cells sharing common subscripts across racial/ethnic groups are significantly different ( $P < .05$ ). All differences between students and dropouts within race/ethnicity, except LSD for Native Americans, are significant ( $P < .05$ ). CI = confidence interval.

<sup>a</sup>Mean increase = 2.8%.

<sup>b</sup>Mean increase = 8.4%.

<sup>c</sup>Mean increase = 11.4%.

**TABLE 2—Percentage Reporting Substance Use in Previous Month among Students and Dropouts and Corrected Estimates for the Total Age Cohort**

Substance	White Non-Hispanics, %				Native Americans, %				Mexican Americans, %					
	Students (n = 176)	Dropouts (n = 176)	Corrected (n = 352)	Increase in Rate <sup>a</sup>	Students (n = 207)	Dropouts (n = 211)	Corrected (n = 418)	Increase in Rate <sup>b</sup>	Students (n = 355)	Dropouts (n = 387)	Corrected (n = 742)	Increase in Rate <sup>c</sup>	95% CI	
Alcohol (intoxication)	25.9	44.7	28.0	2.1	1.0, 3.1	21.0	38.7	29.9	8.9	4.5, 13.2	34.1	45.1	9.3	6.3, 12.4
Marijuana	16.4	40.8 <sup>a</sup>	19.1 <sup>c</sup>	2.7	1.7, 3.7	14.7	30.8 <sup>ab</sup>	22.8 <sup>d</sup>	8.1	4.1, 12.0	30.6 <sup>cd</sup>	45.4 <sup>b</sup>	12.6	9.7, 15.5
Inhalants	3.9	9.8	4.5 <sup>cd</sup>	0.6	0.1, 1.2	6.1	12.0	9.1 <sup>c</sup>	3.0	0.2, 5.7	9.0 <sup>d</sup>	14.1	4.4	2.5, 6.3
Stimulants	3.5	13.5 <sup>a</sup>	4.6 <sup>c</sup>	1.1	0.5, 1.7	3.7	4.3 <sup>ab</sup>	4.0 <sup>d</sup>	0.3	-1.6, 2.2	9.7 <sup>cd</sup>	13.5 <sup>b</sup>	3.2	1.3, 5.2
Cocaine	1.6	10.3 <sup>a</sup>	2.6 <sup>c</sup>	1.0	0.4, 1.5	0.9	2.4 <sup>ab</sup>	1.7 <sup>d</sup>	0.8	-0.5, 1.6	7.7 <sup>cd</sup>	12.6 <sup>b</sup>	4.1	2.4, 5.9
LSD	7.8	25.3 <sup>a</sup>	9.7 <sup>c</sup>	1.9	1.1, 2.8	4.3	8.9 <sup>ab</sup>	6.6 <sup>c</sup>	2.3	-0.1, 4.7	14.1 <sup>cd</sup>	21.8 <sup>b</sup>	6.5	4.3, 8.8

Note. Differences between groups were calculated with the difference of proportion test for unequal sample sizes. Cells sharing common subscripts across racial/ethnic groups are significantly different ( $P < .05$ ). All differences between students and dropouts within race/ethnicity are significant ( $P < .05$ ) for White non-Hispanics and Mexican Americans; all but stimulants, cocaine, and LSD are significant for Native Americans. CI = confidence interval.

<sup>a</sup>Mean increase = 1.6%.

<sup>b</sup>Mean increase = 3.9%.

<sup>c</sup>Mean increase = 6.7%.

Dropouts reported current substance use rates anywhere from 1.2 to 6.4 times greater than those reported by students in school. These results confirm our prior findings from a pilot study in which Mexican American and White non-Hispanic dropouts exhibited higher rates of substance use than youth who remained in school<sup>11</sup> and extend those findings to Native American youth. The results also show that rates of use for different drugs will vary among dropouts from different ethnic groups.

Johnston et al. have noted that correction of overall national rates to include dropouts would not lead to major changes in estimates of drug use.<sup>2</sup> Their corrections, however, were based on a relatively low overall dropout rate of 15%. When estimates are based on students from ethnic minority groups that have very high dropout rates, correction to include drug use of dropouts can lead to large changes as well as differences in relative rates of use across ethnic groups. The higher proportion of dropouts in the two ethnic minority groups considered in this study, in comparison with rates of dropout among White non-Hispanics, led to substantial shifts in drug use estimates when a weighted formula was used to correct estimates based on youth in school only. The effect of correcting for use of dropouts is not uniform across different population groups. Without results for school dropouts, surveys are likely to provide poor estimates of rates of use for any group with a high dropout rate.

This finding has important implications for prevention and public policy. It indicates that resources should be channeled toward the problems of these young minorities. The focus of programs should probably be on school adjustment. Efforts aimed at the prevention of school dropout not only would help meet critical educational goals but also might serve as a protective factor reducing the risk of

substance use. In this study, minority students who were in good standing in school were no more likely to use drugs than other students. Thus, the problem does not inhere in ethnicity but is highly linked to the ability to succeed in school. In those populations with high dropout rates, programs that encourage and reward educational performance, that identify and treat learning disabilities, and that deal with the economic, social, and health barriers that prevent continued attendance may reduce school dropout and may also dramatically reduce substance use.

These results should not be interpreted to mean that school-based substance use surveys are without value. The National Senior Survey and other surveys have provided invaluable data on secular trends in adolescent substance use, allowing researchers to track changes and informing those who develop drug prevention policy about the effectiveness of current prevention strategies and challenges that remain. Furthermore, in-school surveys provide basic data that are highly relevant for school-based prevention programs. These results do indicate, however, that such surveys can underestimate the drug use of certain populations. The substance use problem for groups with high dropout rates is likely to be greater than school-based surveys would indicate. □

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