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Alcohol, Tobacco, and Other Drug Use Prevention Programs in U.S. Schools: A Descriptive Summary

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Abstract This report identifies the prevalence of state, local, and commercially developed substance abuse prevention programs in middle and high schools from 2001 to 2007, using survey data from nationally representative samples of 1,206 schools. Based on school administrators' reports, schools and school districts offer students an average of 1.62 prevention programs during their school years from elementary through high school. Bivariate and multivariate regression analyses were conducted with school demographic characteristics public versus private, size, population density, region of the country, school race/ethnic composition, and socioeconomic status of the student body (SES) as predictors of total number of programs that students received and of the relative use of local, state, and commercial programs. Schools in the West had significantly fewer prevention programs than those in other regions of the country. Students in predominantly White and in higher SES schools received significantly more prevention programs than students in majority African American, majority Hispanic, or in lower SES affluent schools. The most frequently reported programs that students received were locally developed. D.A.R.E. was the most widely adopted prevention program. Findings from this study suggest that schools often develop their own curriculum to suit their students' needs, and students are exposed to multiple prevention programs through their school years, making it difficult to examine the effectiveness of any single program in preventing and reducing substance use among students.

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Substance use is a chronic problem that continues to impact U.S. youth. Trend data from the Monitoring the Future (MTF) study since 1975 indicate that the variety of substances used has proliferated over the years and substance use remains a major concern for parents, teachers, health professionals, youth workers, law enforcement, and policy makers (Johnston et al. 2010). Several governmental and nongovernmental agencies, including the Center for Substance Abuse Prevention in the Substance Abuse and Mental Health Services Administration (SAMHSA), support health education designed to include tobacco and drug prevention education. The Office of Safe and Drug-Free Schools, U.S. Department of Education, has funded drug and violence prevention programs that are executed through state and local educational agencies, as well as public and private nonprofit organizations. Universities and other research organizations supported by agencies such as the Centers for Disease Control and Prevention, the National Institute of Drug Abuse, and the National Institute of Mental Health also develop prevention programs for dissemination in schools. Finally, a number of states, school districts, and schools have developed their own drug prevention curricula. Consequently, there has been a proliferation of drug prevention programs resulting in tremendous variability in drug prevention curricula taught in U.S. schools. This has resulted in an increasing demand for accountability by legislators as well as researchers in the field. The Principles of Effectiveness stated in the Safe and Drug-Free Schools and Communities Act of 2002 (U.S. Department of Education 2002) requires school districts to implement evidence-based prevention programs. An important goal of *Healthy People 2010* (National Institutes of Health and Substance Abuse and Mental Health Services Administration 2000) was the prevention of youth substance abuse by

providing evidenced-based "research-proven programs for diverse racial and ethnic populations."

Despite the call for effective substance use prevention, many U.S. middle schools (Ringwalt et al. 2002) and high schools (Gottfredson and Gottfredson 2001) do not provide evidence-based curricula. While a majority of the school districts offer prevention education, most target elementary and middle schools, and less than half of the prevention programs offered delivered evidence-based instruction (Ringwalt et al. 2002). More recently, Ringwalt et al. (2009) reported an 8 % increase from 1999 to 2005 in the proportion of middle schools nationally that implemented a tested and effective drug prevention program. Furthermore, based on data collected from high schools in 2005, Ringwalt and colleagues (2008) reported that a relatively modest proportion of these schools delivered evidence-based substance prevention curriculum. Based on 2004–2005 data from state educational agencies, Cho and colleagues (Cho et al. 2009) reported that only a third of the middle and junior high schools across the nation used evidenced-based prevention curricula.

A task force appointed by the Society for Prevention Research Board of Directors has outlined detailed and comprehensive standards for prevention programs to be judged efficacious, effective, and ready for dissemination (Society for Prevention Research 2004). Elaborating on these standards, Flay et al. (2005) emphasize the importance of accounting for the "real world conditions" in which programs are implemented, which are often not considered when the efficacy of prevention programs is reported. However, as Sloboda and colleagues (2008) point out, substance use prevention programs in schools have become so pervasive that it is almost impossible to test program effectiveness with "pure" control schools where no intervention is offered. This all suggests that it is time to take stock of the variety and multiplicity of the prevention programs offered in schools across the nation.

Teachers regularly tailor curricula to meet the specific needs of their students (Ringwalt et al. 2002) or their preferred teaching style, such as formal lecturing as opposed to interactive guided participant modeling techniques (Backer 2000; Pentz 2004). Oftentimes, teachers omit key points or entire lessons from the programs they adopt. Teachers, schools, and school districts not only modify individual prevention programs, they sometimes elect to develop their own customized curricula from a variety of programs and other available curricular materials. Even when schools adopt a specific substance use prevention program, there is variability in the intensity of implementation in terms of the number of sessions offered (Payne et al. 2006). It is also possible that school districts may implement a program in the earlier grades but refrain from offering the recommended booster sessions in later grades. Even as the quality and quantity of implementation of any one program may vary between schools, schools may choose to implement two or more prevention programs either simultaneously, or in different grades, or in different classes (e.g., health education, physical education, science, etc.). Due to these many variations in prevention program implementations, it is often difficult to ascertain their effectiveness in the real world. Researchers and commercial program developers report the effectiveness of programs in reducing substance use when the program is implemented in its entirety with fidelity. However, once a program is adopted by a school or school district and its implementation no longer monitored by the developers, school personnel are in a better position to ascertain program effectiveness in reducing substance use among the student in their school. Therefore, in this study, we request school administrators' perspective on the effectiveness of each of the programs implemented in their school or schools that feed into their schools in reducing substance use among students.

Bearing in mind the imperfect nature of prevention program implementation, this paper identifies the [relative] prevalence of state, local, and commercial programs from 2001 to 2007 based on large nationally representative samples of U.S. schools. Using reports from school administrators, we document the mean number of different prevention programs students received by the time they were in eighth, tenth, and twelfth grades and the mean judged effectiveness of the nine most prevalent programs in reducing substance use among students. We also report the prevalence of prevention programs by several school demographic factors. If variations in prevention program prevalence are related to school demographic factors, then it will be important to determine the reasons for and consequences of these differences.

Furthermore, the near impossibility of a definitive test of program effectiveness (Sloboda et al. 2008) and schools' idiosyncratic implementation of prevention programs in terms of program elements selected suggest that an alternative is to examine the extent of students' exposure to key elements of prevention programs from elementary through high school. A review of the key elements of evidenced-based programs in the SAMHSA's registry (http://nrepp.samhsa.gov/ViewAll.aspx) and the report based on School Health Policies and Programs Study 2006 (Kann et al. 2007) suggest that effective prevention programs include preventive activities such as development of awareness and resistance skills (knowledge including messages from media, normative education, resistance to peer influences, and emphasis on healthy behavior), personal, efficacy, and

social skills (decision-making, coping and stress management, and communication); and affective components (e.g., improve self-esteem), role playing, and parental involvement intended to reduce substance use (Botvin 1990; Drug Strategies 1999). In this report, we present the extent of exposure to each of these activities and components across the different programs—local, state, and commercial—that eighth, tenth, and twelfth graders attend starting from their elementary school years up to the target grade that participated in the MTF study.

Methods

Sample

Beginning in 1998, the University of Michigan's Youth, Education, and Society study (YES), funded under a grant from the Robert Wood Johnson Foundation, started monitoring the extent and quality of drug prevention education in American schools (see www.yesresearch.org for more information on the study). YES gathered data from school administrators (usually principals) from schools that had participated in the MTF study, with a new sample of schools each year. For this report, data from 2001 to 2007 (N=1,206; 458 eighth-, 408 tenth-, and 340 twelfth-grade schools) were used.

MTF is based on large nationally representative samples of eighth-, tenth-, and twelfth-grade students selected through a three-stage sampling procedure. Geographic regions are selected first, followed by schools randomly selected with a probability proportional to size. The third step involves a random selection of students within these schools, usually clustered in whole classrooms. The schools participating in this study in 2001–2007 included a national representative sample of eighth, tenth, and twelfth graders and comprise the sample used for the present study; student data are not used.

Each school participated in the MTF study for two consecutive years. Administrators of schools that had just completed their second year of participation in MTF were invited to complete a survey for YES. Thus, every school administrator participated only once, toward the end of the second year of the school's participation after survey data from students were collected. The response rate to the YES survey ranged from 80 % to 85 % across the 7 years with an average of 83 %. Approximately 80 % of those responding were school principals, but in some cases assistant principals, teachers, or counselors completed the questionnaires.

Survey Administration Procedure

For the YES study, surveys were mailed to the school, and these were followed up with phone calls by trained callers to ensure that school administrators had received the surveys. If the completed questionnaires were not returned within a 4- to 6-week period, further follow up phone calls were conducted. If a returned questionnaire was incomplete, the respondents were called to follow-up on missing items. If sections on the prevention programming questionnaire were not returned, respondents were sent additional copies to be completed or to confirm that no such program was offered. The instructions at the beginning of the survey encouraged school administrator to ask the teachers who delivered the programs to complete the questionnaire.

To ensure that we received a detailed listing of all the prevention programs that students in the targeted grade received, school administrators or their selected representative completed a checklist of all the prevention curricula provided in their school and the schools that fed into their school. The checklist included 71 commercial programs with an option for an open-ended response where programs not present in the checklist could be included. Research assistants conducted a detailed and in-depth web search for every new program listed by school administrators. Wherever warranted, school administrators, and in some cases, program developers were contacted for additional information about the program.

School administrators were then asked to provide detailed information for each of the programs listed. School administrators were also requested to contact the feeder elementary or middle-school principals, if necessary, to check the accuracy of the information regarding prevention programs offered to the current targeted grade—eighth, tenth, or twelfth—when these students were in elementary and middle school.

School administrators reported all alcohol, tobacco, and other drug use (ATOD) prevention programs including those incorporated in health education classes, taught in any classes other than health education, or any additional programs students received from elementary grades to the target grade. They were encouraged to ask the teachers who taught the program to complete the specific section devoted to the listed program. In an effort to make sure that the person teaching the program/s filled in the appropriate sections, we requested a listing of all the school personnel who completed the various sections at the end of the questionnaire.

Measures

The YES survey instrument includes questions about (a) the school's substance use policies related to ATOD as well as physical activities and nutrition; and (b) alcohol, tobacco, and other drug prevention programs taught to eighth, tenth, or twelfth graders both in their current schools and while they were in schools that fed into their current school.

For every program listed, information was requested on:

a. Whether the program was developed by the state, locally, or by a commercial organization,[1]
b. Special curriculum features of the ATOD prevention program (e.g., providing knowledge, normative education, refusal skills, communication skills, coping skills, critical thinking skills, decision-making skills, parent involvement, and role-playing),
c. Percent of students in the target grade that participated in the prevention program,
d. Overall effectiveness of the ATOD prevention program in reducing substance use among students as perceived by the administrator, and
e. Characteristics of individual(s) responsible for delivering the program.

Demographic Characteristics

Table 1 includes the number of schools within each demographic characteristic. The prevalence and intensity of implementation of the various substance use programs were examined across the following school demographic characteristics:

Type of school: categorized as public and private.
School size: defined by the number of students in the target grade (eighth, tenth, or twelfth) as small (<75), medium (≥75 and <225), and large (≥225).
Racial/ethnic makeup of the student body: Schools where administrators report that 66 % or more of the student body is White are identified as "predominantly White." Schools where African American or Hispanic students constitute 50 % or more of the student body are labeled "majority African American" and "majority Hispanic," respectively. Schools that did not fall into the above three categories were classified as "other."
Percentage of Students Participating in Federal Lunch Program (PSPFLP): This was measured by the administrator's report of the percentage of students in the grade participating in the federal free and reduced lunch program. Eight percent had 75–100 % of all students participating; 15 % had 50–75 % participating; 30 % had 25–49 % participating, and 46 % had less than 25 % participating in the program. On average, 33.25 % of students (SD=25.96) participated in the federal free and reduced-lunch program. This measure, used as a continuous variable for the analyses, is considered an indicator of school socioeconomic status (SES).
Population density: Three strata based on population density, as defined by the U.S. Census Bureau—Large Metropolitan Statistical Areas (Large MSAs), Other Metropolitan Statistical Areas (Other MSAs), and non-Metropolitan Statistical Areas (non-MSAs) (see Johnston et al. 2010 for details).
Region of the country: Four mutually exclusive regions of the country based on Census categories—Northeast, Midwest, South, and West (see Johnston et al. 2010 for details).

Results

The descriptive results in this section pertain to all ATOD prevention programs that students received in elementary, middle, and high school. Data on reported use of local, state, and commercial programs and the frequencies of these programs by school demographic characteristics were weighted by number of students. Thus, data from a large school were weighted more than data from a small school to more accurately represent the student population's experience with the various programs, and it is the student population to which we wish to project the results.

Extent of Exposure to ATOD Prevention Programs

School administrators frequently reported that students received more than one ATOD prevention program. The number of programs the target grade students within each school received ranged from none to as many as six programs, with a weighted mean of 1.62 programs across all schools. Eight percent (N=97) of the schools in this sample reported that they had no prevention programs. Results of logistic regression analyses indicated that schools with no prevention programs did not differ significantly from schools that had one or more such programs by grade, population density, school size, and SES/PSPFLP. The odds of having no program were significantly higher in schools that were private, majority Hispanic, and located in the West. The likelihood of not having any prevention program was lower in schools located in the Midwest.

We conducted bivariate regression analyses in which the mean number of programs was regressed on each

[1] The categories local, state, and commercial programs were based on the school administrators' response to the questions "Please check the box below to indicate which best describes how this ATOD prevention program or segment of the health education curriculum was developed." Local programs refer to any ATOD prevention programs developed by the school or school district, while state programs refer to those developed by a state educational agency and delivered in health education courses, or any other courses such as science, physical education, etc., or special ATOD prevention courses. Commercial programs are developed by private or academic organizations. Developers of commercial programs often oversee, train personnel (either personnel from the organization, or school teachers or nurses), and coordinate the delivery of the program. Currently, there are over 100 such programs available. Although D.A.R.E. is also a commercial program, it is included as a separate category because it is the most widely known and used ATOD prevention program.

Table 1 Mean number of programs students attend by year and school demographic characteristics

	N	Mean number of programs (1–6)	Bivariate regression			Multivariate regression (including school racial composition)			Multivariate regression (including % students on free and reduced lunch status)		
			B	SE	*t*value	*B*	SE	*t*value	*B*	SE	*t*value
Year (2001–2007)	1,206	1.62	−0.05	0.01	−3.58***	−0.05	0.01	−3.94***	−0.05	0.01	−3.75***
Grade											
8 (reference)	458	1.64									
10	408	1.56	−0.07	0.06	−1.17	−0.12	0.06	−1.86	−0.13	0.06	−2.14*
12	340	1.66	0.02	0.07	0.34	−0.01	0.06	−0.20	−0.05	0.06	−0.76
Type of school											
Public (reference)	1,092	1.63									
Private	114	1.55	−0.08	0.09	−0.88	−0.02	0.10	−0.25	−0.18	0.11	−1.65
School size											
Small (reference)	183	1.61									
Medium	440	1.60	−0.01	0.08	−0.12	0.07	0.08	0.79	0.01	0.08	0.18
Large	583	1.64	0.03	0.08	0.36	0.21	0.09	2.35*	0.15	0.09	1.57
School racial composition											
Predominantly White (reference)	768	1.74									
Majority African American	87	1.47	−0.27	0.10	−2.59**	−0.24	0.11	−2.29*			
Majority Hispanic	90	1.23	−0.51	0.10	−5.03***	−0.39	0.11	−3.64***			
Other	261	1.46	−0.28	0.07	−4.28***	−0.21	0.07	−3.12**			
SES (percent of students on free and reduced-cost lunch)	1,206	1.62	−0.04	0.01	−3.88***				−0.05	0.01	−4.10***
Population density											
Non-MSA (reference)	290	1.72									
Other MSA	569	1.63	−0.09	0.07	−1.38	−0.10	0.07	−1.30	−0.15	0.07	−2.10*
Large MSA	347	1.52	−0.19	0.07	−2.65**	−0.17	0.08	−1.98*	−0.28	0.08	−3.45***
Region of the country											
West (reference)	237	1.37									
Northeast	219	1.64	0.27	0.09	3.18**	0.20	0.09	2.32*	0.31	0.09	3.61***
Midwest	320	1.81	0.44	0.08	5.65***	0.34	0.08	4.00***	0.42	0.08	5.29***
South	430	1.60	0.22	0.07	3.04**	0.18	0.07	2.30*	0.23	0.07	3.12**

Column 1 includes the numbers indicating the category within each categorical variable. Year of participation and percent of students on free and reduced-cost lunch are treated as continuous variables. *B* represents unstandardized regression coefficients

*$p<0.05$;**$p<0.01$; ***$p<0.001$

one of the independent variables (year, grade, type of school, school size, school racial/ethnic composition, SES/PSPFLP, population density, and region of the country), followed by multivariate regression analysis. Results of these analyses are presented in Table 1. Because school racial/ethnic composition and SES/PSPFLP are moderately correlated[2], the effect of each one would appear to be diminished when both are included in a regression model. Therefore, two series of multivariate analyses are presented in Table 1, with the first series including the school racial/ethnic composition and the second series including SES/PSPFLP in conjunction with other demographic characteristics namely, year, grade level, type of school (public/private), size of school (small, medium, or large), population density, and region of the country.

Controlling for school demographic characteristics other than participation in the federal lunch program, students in majority African-American ($B=-0.24$, $p<0.05$), majority Hispanic ($B=-0.39$, $p<0.001$), and other schools ($B=-0.21$, $p<0.01$) had significantly fewer prevention programs than students in predominantly White schools. Controlling for all demographic characteristics other than school ethnic/racial composition, schools with higher PSPFLP were significantly less likely to have more prevention programs than schools with lower PSPFLP, ($B=-0.05$, $p<0.001$).

[2] Schools differed significantly by race/ethnicity ($F_{(3,\ 1161)}=272.55$, $p<0.001$), with predominantly White schools having a lower percentage of students enrolled in the free and reduced-cost lunch program compared with majority African-American, majority Hispanic, and All Other race/ethnicity composition schools.

There was a significant decline ($B=-0.05$, $p<0.001$) in the total mean number of programs[3] students received from 2001 (mean=1.72) to 2007 (mean=1.45).[4] Tenth-grade students received significantly fewer ($B=-0.13$, $p<0.05$) prevention programs than 8th-grade students. Students in large MSA schools were exposed to significantly fewer programs than students in non-MSA schools, and students in schools in the Western region of the U.S. were exposed to significantly fewer prevention programs than those in all other regions of the country (Table 1). Post hoc tests revealed that, compared with the South, students in Midwestern schools received more prevention programs ($B_{(\text{bivariate})}=0.22$, $t=-3.22$***, $B_{(\text{multivariate})}=0.17$, $t=2.44$*). There were no significant differences across type of school (public/private) or size of school (small, medium, or large) in students' exposure to prevention programs.

Use of Local, State, Commercial, and D.A.R.E. Programs in Schools (2001–2007)

Tables 2 and 3 present the odds ratio that a school provided locally developed, state-developed, commercial, and/or D.A.R.E programs based on bivariate and multivariate logistic regression analysis with school demographic characteristics, grade, and year as predictor variables. Two sets of multivariate analyses were conducted; the first included schools' racial composition and excluded SES/PSPFLP (Table 2), and the second included SES/PSPFLP and excluded schools' racial composition (Table 3).

Locally Developed Programs

There was a significant, though moderate, decline from 2001 to 2007 in the odds of schools providing locally developed programs. There were no significant differences between public and private schools and large and small schools in the odds of providing local programs. The odds of providing locally developed programs were significantly higher in the large and other MSAs as compared with schools in non-MSAs. The odds of Southern schools having locally developed programs were lower than for schools in the Northeast and Midwest. Predominantly White as compared with majority Hispanic schools and schools with higher PSPFLP was also less likely to have locally developed prevention programs.

State-Developed Programs

Very few ($N=3$) private schools provided state-run programs, thus precluding any comparison in the odds of private and public schools providing state-run programs. The odds of providing state-developed programs were significantly lower in schools in the large and other MSAs as compared with schools in non-MSAs. The odds of having state-developed programs were highest in schools in the Southern region of the country. Predominantly White schools were also less likely than schools with a majority African American student body to provide state-developed programs.

D.A.R.E

There was a significant, though moderate, decline from 2001 to 2007 in the odds of schools providing D.A.R.E. The odds of providing D.A.R.E were significantly higher in public as compared with private schools, in large compared with small schools; and significantly lower in schools in the large and other MSAs as compared with schools in non-MSAs. Schools in the Midwest had the highest odds of offering D.A.R.E. Finally, predominantly White schools were more likely to offer D.A.R.E. than majority African-American and majority Hispanic schools.

Commercially Developed Programs

Predominantly White schools were also less likely than schools with a majority Hispanic student body to provide commercially developed programs. In bivariate regression, large schools compared with small schools and schools with higher PSPFLP compared with schools with lower PSPFLP were significantly less likely to provide commercially developed programs, but these associations were not significant in multivariate regression.

Judged Effectiveness of the Most Frequently Adopted Programs

The nine most frequently adopted programs are listed in Table 4. The most frequently reported programs that students received were locally developed. In fact, of all the programs that schools used, 47 % were described as local programs, 9 % as state programs, and 35 % as commercial programs including D.A.R.E. Of the commercial programs, D.A.R.E. was the most widely adopted, accounting for 30 % of all programs mentioned. Approximately 3 % of the programs were listed as health education curriculum. This category included schools where administrators reported that they provided health education curriculum, without indicating whether

[3] The total number of programs within each school was calculated based on the percentage of students in the participating grade that took each of the listed prevention programs.

[4] The decline from 2001 to 2007 is based on trend data from different schools each year; it is not based on longitudinal data from the same schools.

Table 2 Weighted percentage of students receiving various prevention programs by school demographic characteristics: bivariate and multivariate logistic regression results

		Local			State			Commercial			D.A.R.E		
		Odds ratio			Odds ratio			Odds ratio			Odds ratio		
	N	%	Bivariate	Multivariate	%	Bivariate	Multivariate	%	Bivariate	Multivariate	%	Bivariate	Multivariate
Total sample	1,206	63.6			13.6			22.0			55.6		
Grade													
8 (reference)	458	59.9			9.1			29.2			57.6		
10	408	64.8	1.24	1.13	13.9	1.61*	1.83*	21.7	0.67*	0.70*	51.5	0.78	0.69**
12	339	67.1	1.37*	1.28	16.5	1.97**	2.30***	15.6	0.45***	0.46***	58.0	1.01	0.95
Year (2001 to 2007)	1,206	63.6	0.89***	0.88***	13.6	1.14**	1.16**	22.0	0.94	0.95	55.6	0.93**	0.91**
Type of school													
Public (reference)	1,092	63.0			13.9			23.5			57.4		
Private	114	69.4	1.33	1.25	2.3	0.14**	0.21*	16.3	0.64	0.54*	38.7	0.47***	0.56**
School size													
Small (reference)	183	58.9			9.1			27.1			51.7		
Medium	440	64.6	1.27	1.40	12.7	1.45	1.04	24.5	0.87	0.82	53.2	1.06	1.22
Large	583	64.3	1.26	1.43	14.0	1.63	1.45	20.2	0.68*	0.60*	58.7	1.33	1.78**
School racial composition													
Predominantly White (reference)	768	67.6			10.7			21.9			60.9		
Majority African American	87	58.0	0.66	0.75	23.0	2.49***	2.08*	28.1	1.40	1.42	43.3	0.45***	0.45***
Majority Hispanic	90	47.1	0.43***	0.43**	14.2	1.38	1.63	34.9	1.92**	2.02**	41.6	0.52**	0.52**
Other	261	59.3	0.70*	0.78	15.1	1.49	1.20	19.5	0.87	0.93	49.0	0.64**	0.64**
SES (percent of students on free and reduced lunch)	1,206		0.90***	–		1.10**	–		1.09**	–		0.96	–
Population density													
Non-MSA (reference)	290	57.8			17.8			23.3			61.2		
Other-MSA	569	65.5	1.39*	1.35	12.7	0.68*	0.58*	24.0	1.04	1.26	55.8	0.80	0.81
Large-MSA	347	65.3	1.38	1.37	8.7	0.44***	0.40**	20.4	0.85	0.96	50.7	0.65**	0.72
Region of the country													
West (reference)	237	60.6			8.1			24.3			46.9		
Northeast	219	68.8	1.43	1.17	8.6	1.08	1.34	23.8	0.97	1.06	47.7	1.03	0.99
Midwest	320	74.8	1.93***	1.63**	4.1	0.49	0.52	24.3	1.00	1.08	66.2	2.22***	2.04***
South	430	54.4	0.77	0.72	24.0	3.06***	3.39***	20.4	0.80	0.82	56.6	1.48*	1.46*

Column 1 includes the number of schools indicating the category within each categorical variable. Year of participation and percent students on free and reduced-cost lunch are treated as continuous variables. *B* represents unstandardized regression coefficients

*$p<0.05$;**$p<0.01$;***$p<0.001$

Table 3 Weighted percentage of students receiving various prevention programs by school demographic characteristics: bivariate and multivariate logistic regression results (including % students on free and reduced-lunch status)

	N	Local			State			Commercial			D.A.R.E		
		Odds ratio			Odds ratio			Odds ratio			Odds ratio		
		%	Bivariate	Multivariate	%	Bivariate	Multivariate	%	Bivariate	Multivariate	%	Bivariate	Multivariate
Total sample	1,206	63.6			13.6			22.0			55.6		
Grade													
8 (reference)	458	59.9			9.1			29.2			57.6		
10	408	64.8	1.24	1.10	13.9	1.61*	1.81**	21.7	0.67*	0.73	51.5	0.78	0.66**
12	339	67.1	1.37*	1.25	16.5	1.97**	2.27***	15.6	0.45***	0.49***	58.0	1.01	0.88
Year (2001 to 2007)	1,206	63.6	0.89***	0.90***	13.6	1.14**	1.15**	22.0	0.94	0.94	55.6	0.93**	0.91**
Type of school													
Public (reference)	1092	63.0			13.9			23.5			57.4		
Private	114	69.4	1.33	1.04	2.3	0.14**	0.25*	16.3	0.64	0.60	38.7	0.47***	0.47**
School size													
Small (reference)	183	58.9			9.1			27.1			51.7		
Medium	440	64.6	1.27	1.32	12.7	1.45	1.10	24.5	0.87	0.83	53.2	1.06	1.08
Large	583	64.3	1.26	1.28	14.0	1.63	1.52	20.2	0.68*	0.63	58.7	1.33	1.61*
School racial composition													
Predominantly White (reference)	768	67.6		–	10.7		–	21.9		–	60.9		–
Majority African American	87	58.0	0.66	–	23.0	2.49***	–	28.1	1.40	–	43.3	0.45***	–
Majority Hispanic	90	47.1	0.43***	–	14.2	1.38	–	34.9	1.92**	–	41.6	0.52**	–
Other	261	59.3	0.70*	–	15.1	1.49	–	19.5	0.87	–	49.0	0.64**	–
SES (Percent of students on free and reduced lunch)	1,206		0.90***	0.94**		1.10**	1.05		1.09**	1.07*		0.96**	0.93**
Population density													
Non-MSA (reference)	290	57.8			17.8			23.3			61.2		
Other-MSA	569	65.5	1.35	1.24	12.7	.68*	0.64	24.0	1.04	1.38	55.8	0.80	0.71*
Large-MSA	347	65.3	1.37	1.15	8.7	0.44***	0.47*	20.4	0.85	1.10	50.7	0.65**	0.58**
Region of the country													
West (reference)	237	60.6			8.1			24.3			46.9		
Northeast	219	68.8	1.43	1.40	8.6	1.08	1.34	23.8	0.97	1.03	47.7	1.03	1.15
Midwest	320	74.8	1.93***	1.96**	4.1	0.49	0.49	24.3	1.00	1.01	66.2	2.22***	2.33***
South	430	54.4	0.77	0.81	24.0	3.06***	3.37***	20.4	0.80	0.76	56.6	1.48*	1.55**

Column 1 includes the number of schools indicating the category within each categorical variable. Year of participation and percent students on free and reduced-cost lunch are treated as continuous variables. *B* represents unstandardized regression coefficients

*$p<0.05$;**$p<0.01$;***$p<0.001$

Table 4 Number and judged effectiveness of the nine most frequently offered ATOD prevention programs (2001 to 2007)

Name of program	Number of programs	Percentage of all programs	Administrator's judged effectiveness for substance use reduction (1 to 5 scale) mean (SD)	NREPP quality of research rating for substance use prevention program (0 to 4 scale)
Locally developed program	1,067	47.1	3.29 (0.74)	_
D.A.R.E.	671	29.6	3.14 (0.92)	_
State curriculum	193	8.6	3.35 (0.87)	_
Health education curriculum	59	2.6	3.21 (0.75)	_
Project alert[d]	45	2.0	3.45 (0.86)	4.00
Here's looking at you	29	1.3	3.26 (0.71)	–
Life skills training[d]	23	1.0	3.65 (1.00)	3.90
Lion's quest[d]	15	0.7	3.90 (0.68)	3.10[a], 3.00 [b], 3.50 [c]
Too good for drugs II[d]	15	0.6	3.13 (0.60)	2.8

Effectiveness was measured on a 1 to 5 Likert-type scale with 1=Not at all effective to 5=Very effective. Health education curriculum includes health textbooks that we could confirm were school health curriculum. There are 2,267 programs listed by schools; 150 programs were a variety of other commercial programs. The denominator for percent was 2,267 the total number of reported programs. Overall quality of research rating includes reliability and validity of measures, intervention fidelity

[a] Tobacco use (Lion's Quest)

[b] Alcohol use (Lion's Quest)

[b] Marijuana use (Lion's Quest)

[d] Program included in the National Registry of evidence-based programs and practices (http://nrepp.samhsa.gov/ViewAll.aspx)

it was developed locally, or by the state.[5] The next five most popular ATOD programs in descending order were Alert, Here's Looking at You, Life Skills Training, Lions Quest, and Too Good for Drugs II.

The mean judged effectiveness for reducing substance use for these programs on a scale of 1 (Not at all effective) to 5 (Very effective) ranged between 3.13 and 3.90, and the standard deviations ranged between .60 and 1.00 (Table 4). The mean values suggest that school administrators were relatively neutral to slightly positive about the perceived effectiveness of the ATOD prevention programs that students in the target grade received either in their school or in feeder schools.

One-way analysis of variance comparing the five commercially developed programs plus D.A.R.E and health education curriculum indicated that there were no significant differences in the judged effectiveness among these programs, except between D.A.R.E (Mean $\text{effectiveness}_{\text{D.A.R.E}}=3.14$, $SD=0.92$), which received one of the lowest ratings, and Lion's Quest (Mean $\text{effectiveness}_{\text{Lion's Quest}}=3.90$, $SD=0.68$) ($F_{(1,\ 645)}=10.16$, $p<0.02$), which received the highest rating.

[5] Usually the health education curriculum included the use of a comprehensive health education text book.

Weighted Coverage of Key Components Across Programs

For each of the ATOD programs reported as being taught in the school or in feeder schools, administrators were asked to indicate the specific features or key components included, which we have grouped into four general categories here—cognitive (knowledge, normative education, refusal skills, communication skills, decision-making skills, analysis of media messages), affective (coping skills, improving self-esteem), behavioral (emphasizing healthy behavior and role playing), and parental involvement. As indicated earlier, respondents in the target grades received from none to as many as six programs ($\text{Mean}_{(\text{number of programs taught})}=1.62$). Therefore, the coverage for each of the key components can potentially range from none to 6. The descriptive data for extent of coverage of the key components are presented in Table 5.

The pattern of key component coverage was similar across the three grades, so results are shown for the three grades combined. Cognitive components rank highest, with providing knowledge regarding the long- and short-term effects of substance use and teaching decision-making and refusal skills receiving maximum coverage. Coverage of affective components is less, but higher than the behavioral

Table 5 Weighted sum of key components offered to students (eighth, tenth, and twelfth grades)

Key components taught	Coverage of components (possible range=0 to 6)	
	Mean	SD
Cognitive components		
Knowledge of effects of drug use	1.73	0.82
Decision-making skills	1.63	0.85
Refusal skills	1.58	0.85
Normative education	1.54	0.85
Affective components		
Coping skills	1.41	0.86
Communication skills	1.48	0.86
Improve self-esteem	1.44	0.85
Behavioral components		
Emphasize healthy behaviors	1.19	0.72
Analyze media messages	1.37	0.85
Involves role play	0.71	0.73
Involves parents	0.37	0.60

N schools=1,206

components (e.g., emphasizing health behavior, analyzing media messages, and role playing) or parental involvement.[6]

Prevention Program Instructors

School administrators were asked who delivers the various prevention programs, excluding D.A.R.E., which is delivered exclusively by police officers. The great majority of instructors of prevention programs were teachers, including health education teachers (88.7 %). Other persons who were listed as instructors of prevention programs were other outside ATOD prevention instructors (17.4 %), students (16.9 %), police officers (16.1 %), health care professionals (13.0 %), and school counselors (7.7 %). Very few curriculum coordinators (1.6 %), recovering users (1.2 %), and principals or assistant principals (0.1 %) were listed as instructors (multiple selections were permitted).

Discussion

Clearly, there is no lack of available prevention programs. Over 200 commercial programs are currently available. As the results indicate, D.A.R.E. continues to be the most widely used prevention program, despite the fact that it was not judged to be as effective as some of the other commercial programs. It was offered to more than half the national sample of students over the 7-year interval. However, its use declined from 2001 to 2007. Two thirds of the sampled schools offer locally developed programs. These findings are in line with Hallfors and Godette's (2002) report that 53 % of the surveyed school coordinators reported using locally developed curricula.

It appears, based on administrators' listings of programs taught, that schools oftentimes developed their own curriculum, cherry-picking from different programs and health education text books to suit their needs. Further complicating the issue, programs were often implemented in different grades and in different courses such as health education, physical education, or other classes such as biology. The findings indicate that program implementation is idiosyncratic, depending on the school or school district, and the teacher(s) in charge of delivering prevention education to students. The variability in program implementation reported in this and other studies (Hallfors and Godette 2002) adds urgency to Flay et al.'s (2005) call for considering "real world conditions" in developing evidence-based prevention programs.

As seen in Table 4, programs that were most frequently adopted are not necessarily perceived as the most effective by school administrators. Indeed, evidence-based programs, if ineffectively marketed, are less likely to be adopted by schools (Hallfors and Godette 2002). Four of the most frequently offered ATOD prevention programs identified in this study—Project Alert, Life Skills Training, Lion's Quest, and Too Good for Drugs II—are included in SAMHSA's national registry of evidence-based programs and practices. The reported effectiveness of these programs is based on experimental and quasi-experimental studies. The reported methodological rigor of the evaluations used to determine program effectiveness in reducing substance use (http://nrepp.samhsa.gov/ViewAll.aspx) was much higher for Project Alert and Life Skills Training (4.0 and 3.9 respectively on a 0 to 4 scale) than it was for Lion's Quest (2.3 for tobacco use, 3.0 for alcohol use, and 3.5 for marijuana use) and Too Good for Drugs II (2.8). Our data suggest that Lion's Quest (though offered in only 15 schools in the sample) had the highest judged effectiveness for reducing substance use based on school administrator ratings, possibly due to the comprehensive nature of the program. It is one of the few programs that actively solicit participation from family, community members, and the school. It also engages students at all grade levels—elementary, middle, and high school—to provide developmentally appropriate prevention instruction on essential skills needed for living healthy and productive lives.

The finding that students in schools with higher PSPFLP, majority African-American, and majority Hispanic schools

[6] School administrators were not asked to report the key components for D.A.R.E. The key components for D.A.R.E are based on information from *Making the Grade: a Guide to School Drug Prevention Programs* (Drug Strategies 1999).

received a significantly lower than average number of prevention programs compared with schools with lower PSPFLP and predominantly White schools is cause for concern. Students in schools with a higher PSPFLP and predominantly minority student populations are at greater risk of dropping out of school (Hernandez Jozefowicz-Simbeni 2008; Orfield et al. 2004) compared with students in predominantly White schools with a lower PSPFLP. Students in these schools are likely to benefit from more programs that educate them in refusal and decision-making skills. Yet, these are the very schools that are more likely to provide fewer prevention programs to their students. Unfortunately, the school administrator survey does not provide us the data to understand the reasons for this discrepancy between schools with high and low PSPFLP and predominantly White and majority Black schools. This finding requires collection of additional data that focuses on this issue.

Limitations of the Study

The purpose of this study was to report on the existing state of affairs in our schools with regard to prevention programs. In this report, we present the relative prevalence of state, local, and commercial programs in the United States. While the information contained in this report is valuable and unique, there are some limitations to this study. This is a descriptive report of what exists in schools. Therefore, it does not examine the relationship between the intensity and fidelity of implementation of prevention programs and students' use of substances. This is important and needs to be pursued for future research.

The findings suggest that, starting from the elementary grades, students in targeted grades received a combination of prevention programs, some that are identified as documented research-based programs and others with little documented research evidence. Thus, while the study identifies the nine most frequently offered programs, it was not feasible to document the proportional percentage of research-based programs currently offered by schools. This study does, however, highlight the problems associated with determining the fidelity with which programs are implemented in schools. The findings suggest that it is probably better to examine the relative effectiveness of key cognitive, affective, and behavioral components of the program.

Another limitation of this study is that a high percentage of principals state that the programs they list were developed locally in the district. Occasionally, they also report on state-developed programs. However, there was great variability in the content and curricula of the locally and state-developed prevention programs, precluding us from making any inferences about them. Even with regard to commercially developed programs, the numerous programs that were listed and the great variability in the intensity of implementation of these programs prevented us from making any sort of inferences that distinguished commercial programs from other programs. It was only in the case of a few popular programs, six to be precise, that we were able to examine the school administrators' report on the quality of program implementation.

Another limitation is the reliance on self-reported information. For the most part, we have no data on reliability and validity of reported information. It was not possible to monitor how conscientiously school administrators responded to our request regarding contacting the feeder elementary and middle schools for accurate information about the prevention programs that students in the targeted grade received. However, we believe most of the key information on what programs are used is likely to be known by either the principal or the person designated to fill out those sections of the questionnaire, and there is little "social desirability" reason not to be forthcoming in responding.

Conclusion and Future Directions

This study is one of the first to document, based on a nationally representative sample of schools, the existing state of affairs regarding the nature and implementation of school prevention programs. This first step will help us reassess our strategies for examining fidelity of program implementation and whether tailoring programs to local needs makes them more relevant and meaningful.

Certain key components are incorporated in all evidenced-based prevention programs (e.g., providing knowledge, refusal, and decision-making skills); other components are less frequently included (coping and communication skills, analyzing media); and some are seldom included (e.g., role playing and parental involvement). While there does not seem to be an agreement regarding critical components of prevention programs, recent research suggests that some of these components (e.g., decision-making skills) are more effective than others (e.g., providing knowledge about different substances) in preventing adolescent substance use (Hansen and Dunsebury 2004). A comparative study of key components that either independently or in combination have the highest potential to decrease students' substance use behavior needs to be examined. Regarding the problems related to fidelity of implementation and the need to consider real world conditions in developing programs, it may be worthwhile in future to examine the effectiveness of individual components within a program rather than the effectiveness of the program as a whole in preventing and reducing substance use among students. Further research is also required to examine the intensity of exposure to each of these key components as it relates to substance use among adolescents.

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