

Factors associated with adoption of evidence-based substance use prevention curricula in US school districts

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Abstract

This paper examines factors associated with the adoption of evidence-based substance use prevention curricula (EBC) in a national sample of school districts. Substance abuse prevention coordinators in public school districts ($n = 1593$), which were affiliated with a random sample of schools that served students in Grades 5–8, completed a written survey in 1999. Results indicated that 47.5% of districts used at least one EBC in their schools with middle school grades. Substance use prevention coordinators reported they had the greatest input in decisions about curricula. In a multivariate analysis of factors positively associated with district-level decisions to adopt evidence-based programs, significant factors included input from a state substance use prevention group, use of information disseminated by the National Institute on Drug Abuse or Center for Substance Abuse Prevention, use of local needs assessment data, consideration of research showing which curricula are effective and allocation of a greater proportion of the coordinator's time to substance use prevention activities. State and

federal agencies should increase their efforts to disseminate information about evidence-based programs, targeting in particular the district substance use prevention coordinator.

Introduction

During the past several decades, considerable empirical research has been devoted to determining the most effective approaches to school-based substance use prevention. Meta-analytic studies of this body of research have shown that programs that employ interactive teaching techniques, and emphasize knowledge of social influences, drug refusal skills and generic competency skills, are more effective than other approaches (Bruvold, 1993; Tobler and Stratton, 1997; Tobler *et al.*, 2000). Although the established effects of social influences programs have been relatively short-term for the most part, recent evaluations have shown long-term program effects up to 15 years [e.g. (Perry *et al.*, 1992; Elder *et al.*, 1993; Klepp *et al.*, 1993; Botvin *et al.*, 1995; Shope *et al.*, 1998; Vartiainen *et al.*, 1998; Taylor *et al.*, 2000)]. Overall, the literature suggests that the public health impact of effective substance use prevention programs could be substantial if they were implemented with fidelity on a wide scale (Anderson and Portnoy, 1989; Glasgow *et al.*, 1999).

Recently, in an effort to increase adoption of substance use prevention programs with empirical evidence of effectiveness, several federal agencies have published guides that describe 'exemplary', 'model' and/or 'promising' programs (Safe and

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Drug-Free Schools Program, 2001; National Institute on Drug Abuse, 1997; Center for Substance Abuse Prevention, 2002). In addition, schools that receive funding through the Safe and Drug-Free Schools and Community Act are now required to implement evidence-based prevention activities and strategies (US Department of Education, 1998). Despite these policy and dissemination efforts, a 1999 study of middle schools nationwide showed that only 35% of public middle schools and 13% of private schools were using one or more of 10 prevention curricula rated as effective by at least one of these federal agencies (Ringwalt *et al.*, 2002).

If we are to effectively 'bridge the gap' between substance use prevention research and practice, we need a better understanding of the process by which substance use prevention curricula are adopted. As a result of the dissemination efforts of various organizations, there is now a great deal of information available to schools about effective substance use prevention curricula. However, little is known how schools and districts access this information and use it to guide their decisions about curriculum adoption.

Previous research has shown that decisions to adopt, or initiate the use of, innovative programs and practices in schools are often made by school boards, and upper- and mid-level school district administrators, such as superintendents or curriculum specialists (Huberman and Miles, 1984; Crandall, 1989; Goodman, *et al.*, 1992). In the early stages of the process, teachers may give their opinions about the proposed program, but in general they are not the ultimate decision makers about whether the program will be adopted across the school district or within the school. However, when it comes to program implementation, most teachers have considerable autonomy regarding what goes on in their own classroom [e.g. (Rohrbach *et al.*, 1993)]. Thus, once a school district has adopted a new curriculum, it is typically the teachers who decide whether and how it is actually used.

During the past decade, authority for decision making about many aspects of school curriculum

has changed. In 1990, it was estimated that one-third of the nation's schools had adopted some version of a reform measure known as 'school-based management' (David, 1996). This approach typically involves the delegation of authority from the central district office to individual schools, shared decision making among various stakeholders about management issues such as budget, personnel and curriculum, and facilitative rather than directive leadership by the school principal (Odden and Wohlstetter, 1995; Holloway, 2000). With regard to the curriculum that will be administered, those individuals who are closest to the student are thought to be in the best position to make effective decisions (Hess, 1991; Bauer, 1992; Wohlstetter *et al.*, 1994). At present, the extent to which authority for decisions about substance use prevention curricula may have shifted from school district administrators to their constituent schools has not been explored.

Various organizational characteristics have been shown to be associated with the adoption of educational innovations. Schools are more likely to adopt new programs and practices if they have a climate that values innovativeness, teachers' opinions and shared decision making; if there is active support of principals and general support of district administrators for the new program; and if there is a good 'fit' between the new program and local needs (Berman and Pauly, 1975; Basch and Slipecevic, 1983; Roberts-Gray and Scheirer, 1988; Gold *et al.*, 1991; Smith *et al.*, 1993; Parcel *et al.*, 1995). Adoption decisions are also affected by characteristics of the innovation itself. Schools are more likely to adopt new programs that are well specified, require the same instructional strategies that teachers normally use and have a perceived relative advantage over current practices (Berman and Pauly, 1975; Fullan and Pomfret, 1977; Parcel *et al.*, 1995).

This paper examines the process by which evidence-based substance use prevention curricula (EBC) are adopted by school districts that serve students in middle school grades. Specifically, the paper addresses the following research questions:

- Which individuals and groups have the most input in decisions about substance use prevention curricula?
- What sources of information do districts use to guide decisions about which substance use prevention curriculum will be adopted?
- Which demographic, curriculum, and organizational factors have the strongest relationship with the adoption of effective substance use prevention curricula?

Method

Sample

The source of data for the present study was the School-based Substance Use Prevention Programs Study (SSUPPS), a national survey of substance use prevention practice in middle grades in the 1998–1999 school year (Ringwalt *et al.*, 2002; Ennett *et al.*, 2003). SSUPPS included two samples: (1) a random sample of all regular public and private schools in the 50 States and the District of Columbia that included some subset of middle grades, and (2) a sample of the school districts in which the selected public schools were nested. The present study focuses on the public school district sample.

The sampling frame of schools was constructed using the QED National Education Database (Quality Education Data, 1998). Eligible schools were those that included Grades 7 or 8, or those that were limited to Grade 6, or to Grades 5 and 6. Schools were excluded if they were non-regular schools (e.g. alternative), governmental schools (e.g. Bureau of Native American Affairs, Department of Defense), schools with fewer than 20 students or schools with no substance use prevention program whatsoever (3.2% of sampled schools). A random sample of public schools, stratified by school district poverty index, population density and school size, was selected with equal probability within each stratum.

Once the sample of public schools was selected, the associated sample of school districts was iden-

tified. Since the probability of selection of each of these districts was known, the sample could be used to generate valid estimates for districts nationwide. Of the 1984 eligible public school districts, 1593 (80.3%) responded to the survey. Additional information about the sample design is reported elsewhere (Jones *et al.*, 2002).

The school districts included in the sample had a mean enrollment of 9792 students. The mean percentage of white students and those falling below the federal poverty line was 81.8 and 25%, respectively. The region of the country in which the districts were located was as follows: 40% Midwest, 24.9% South, 17.6% West and 17.5% Northeast. The population density of the regions served by the districts was 56.6% rural, 39.2% suburban and 4.2% urban.

A comparison of the demographic characteristics of responding and non-responding public school districts indicated that urban districts (77.2%) and suburban districts (79.6%) were slightly less likely to respond to the survey than were rural districts (83.4%). In addition, school districts in the Midwest (83.4%) and South (82.8%) were somewhat more likely to respond to the survey than those in the Northeast (74.1%) and West (78.3%). There was no difference in response rates by the percentage of enrolled students falling below the federal poverty line.

Data collection

Data were collected from February to September of 1999. At the public school district level, a questionnaire was mailed to the individual determined to be the most knowledgeable about the district's substance use prevention programs. To determine appropriate respondents, school districts were contacted by telephone in advance. Following the initial mailing, a reminder postcard was mailed to all respondents. A prompt was administered by phone and up to two additional questionnaires were mailed, as needed, to achieve the response rate indicated above. The majority of respondents were Safe and Drug-Free Schools coordinators (74.5%) and/or substance use prevention coordinators (25.0%). Respondents received a \$10 cash incentive to complete the 45-min questionnaire.

Measures

Instrument

The 70-item questionnaire included sets of items that assessed (1) characteristics of substance use prevention programs used by the district, including evidence-based programs, (2) the process of decision making about substance use prevention programs in the district, (3) other potential explanatory variables, including school district capability characteristics, and (4) control variables, including substance use prevention coordinator background characteristics. Some items were adapted from previous studies [e.g. (Steckler *et al.*, 1992; Battistich *et al.*, 1995; Rohrbach *et al.*, 1998)] and others were developed specifically for the study by the research team.

Dependent variable

The primary dependent variable was whether school districts used EBC. Respondents were asked to identify the substance use prevention curricula currently used in their district at the middle/junior high school level from a list of 48 commonly used curricula; space was provided to write in the name of any other curricula not listed [see (Ringwalt *et al.*, 2002)]. Districts were classified as using EBC if they reported implementing any one or more of 10 effective curricula identified in five recent prevention program reviews (National Institute on Drug Abuse, 1997; Drug Strategies, 1999; Centers for Disease Control and Prevention, 2000; Center for Substance Abuse Prevention, 2000; Safe and Drug-Free Schools Program, 2001).

District demographic characteristics, including the total number of students enrolled in the district, percentage of white students, region of the country in which the district is located (Northeast, Midwest, South or West), population density (urban, suburban or rural) and student poverty (the number of students falling below the federal government poverty line as a percentage of the total number of students in the district), were obtained from the QED National Education Database (Quality Education Data, 1998).

To assess the curriculum decision-making process in the district, respondents were asked to rate

how much input 15 persons and groups, such as district administrators, teachers, parents and students, had in making decisions about the substance use prevention curricula to be used in the district (four-point scales; 0 = no input to 3 = a great deal of input). In addition, respondents were asked whether they had used each of 11 sources of information about substance use prevention curricula, such as professional conferences, marketing brochures and federal agencies, when making curricula selections (yes/no for each). To assess the influence of curriculum characteristics, respondents were asked to rate the extent to which 10 characteristics, such as content, cost, effectiveness and layout, influenced their selection of prevention curricula (four-point scales; 0 = not at all to 3 = a great deal).

Finally, four items that were adapted from previous studies (Rohrbach *et al.*, 1993; Rohrbach *et al.*, 1998) measured organizational factors associated with the use of curricula. The first item assessed the extent to which substance use prevention was a priority in the district. A second item measured perceived openness to trying new programs and practices (both rated on five-point scales ranging from 'strongly agree' to 'strongly disagree'). The third item assessed whether districts had received written or verbal information regarding the US Department of Education's four 'Principles of Effectiveness' for recipients of Safe and Drug-Free Schools funds (US Department of Education, 1998), one of which addresses the need to implement programs based on evaluation evidence that the program works. Finally, respondents were asked how many hours they spent on substance use prevention coordination during a typical 40-hour work week (1 = less than 10 hours to 5 = 40 hours or more). For data analyses, this variable was recoded to create the following five-point scale: 5, 15, 25, 35 or 45 hours/week.

Statistical analyses

Districts were categorized as either those that used at least one or did not use any EBC. The first phase of the analysis compared users and non-users of EBC on demographic characteristics, level of

input from various decision makers, sources of information used in curriculum selection, curriculum-related factors influencing decisions and organizational factors. χ^2 -tests and *t*-tests were used to examine differences in proportions and means on these variables, respectively, between users and non-users of EBC. In the second phase of the analysis, we regressed the presence or absence of an EBC on the decision-making, demographic and organizational variables that showed a statistically significant difference between the two groups of districts in bivariate analyses. We then used a backward elimination logistic procedure to determine the most parsimonious combination of variables that explain districts' use of EBC. We set our threshold of retention of the variables at $P < 0.05$, and report the adjusted odds ratio (OR) and associated level of significance only of explanatory variables that survived this procedure.

Analyses were conducted with Survey Data Analysis (SUDAAN) software, version 7.5, to provide variance estimates that account for the study's complex sampling design (Shah *et al.*, 1996). All analyses were weighted *a priori* to adjust for the sampling design and *ex post facto* for the demographic characteristics associated with non-response. The results may be generalized to public school districts in the US that include middle school grades.

Results

Decision-making input

A total of 757 districts (47.5%) reported they used at least one EBC. Table I compares districts that used at least one, relative to those that did not use any, EBC with regard to mean level of input in substance use prevention curriculum decisions from a broad range of individuals and groups. In both types of districts, school and district personnel had more influence on curriculum decisions than did groups at the state, federal and community level, with the most important decision maker being the district substance use prevention coordinator. The three next most important decision makers were

teachers, school principals and guidance counselors. Relative to non-users of EBC, districts with EBC received significantly greater input in curriculum decisions from district substance use prevention coordinators, district advisory committees, school guidance counselors, parents, students, community groups and state-level advisory groups that focus on substance use prevention issues.

Information about curricula

The sources of information that both users and non-users of EBC consulted when making their decisions about substance use prevention curricula were similar (Table II). The three most prevalent sources of information for both types of districts were professional conferences, state departments of education and marketing brochures. To guide their curriculum decisions, districts that used EBC were more significantly likely than those that did not to have accessed information from professional conferences and staff outside of their own school district, their state department of education, federal agencies such as the National Institute on Drug Abuse, Center for Substance Abuse Prevention and the Department of Education, publications summarizing effective programs, and local needs assessments and program evaluations.

Factors associated with use of evidence-based curricula

Table III compares the demographic characteristics of districts that did and did not use EBC. Districts that used EBC had a larger student enrollment and were more likely to be located in urban and suburban areas than were districts that did not use EBC.

Table IV presents differences between districts that used and did not use EBC on curriculum characteristics and organizational factors related to curriculum decision making. The curriculum characteristics that had more influence on decision-making by users relative to non-users of EBC were evidence of effectiveness, user-friendly layout, content, number of sessions, inclusion of training materials, inclusion of videos and the cost of training teachers. With regard to organizational factors, districts that used EBC devoted more hours

Table 1. Level of input in decisions about substance use prevention curricula in school districts using versus not using EBC^a

Decision maker	Districts using EBC (N = 757) [mean (SE)]	Districts not using EBC (N = 836) [mean (SE)]
State and federal		
State education agency	1.44 (0.04)	1.37 (0.04)
State-level advisory committee/group for substance use prevention issues	1.04 (0.04)	0.81 (0.04) ^c
District		
district Safe and Drug-free School coordinator/substance use prevention coordinator	2.47 (0.04)	2.29 (0.04) ^b
district health education coordinator	1.68 (0.06)	1.59 (0.05)
district general curriculum coordinator	1.47 (0.05)	1.44 (0.05)
district superintendent or other district administrators	1.89 (0.04)	1.92 (0.04)
district-level advisory committee/group for substance use prevention issues	1.79 (0.05)	1.49 (0.05) ^c
district school board	1.55 (0.04)	1.57 (0.04)
School		
school principals/school administrators	2.08 (0.04)	2.15 (0.03)
classroom teachers	2.13 (0.04)	2.23 (0.03)
school guidance counselors or other schoolsite staff	2.11 (0.04)	1.98 (0.04) ^a
parents	1.53 (0.04)	1.35 (0.04) ^b
students	1.22 (0.04)	1.11 (0.04) ^a
Community		
local police	1.36 (0.04)	1.30 (0.04)
community coalitions or groups	1.13 (0.04)	0.94 (0.04) ^b

For all items, range of responses was 0 = 'no input' to 3 = 'a great deal of input'.

^a $P < 0.05$,

^b $P < 0.001$,

^c $P < 0.0001$.

of a coordinator's time to substance use prevention, were more likely to be aware of the US Department of Education's Principles of Effectiveness and rated themselves as more likely to try innovative programs in general compared to districts that did not use EBC.

Table V presents the results of the multivariate backwards-elimination stepwise regression model we conducted to determine the strongest correlates of use of EBC. In the final step of the procedure, four of the five factors that showed a significant relationship with districts' use of EBC were specifically related to curriculum decision making. In districts that used EBC relative to districts that did not, curriculum decisions were more influenced by a state-level group focused on substance use prevention issues, information from federal agencies such as the National Institute on Drug Abuse and

Center for Substance Abuse Prevention, data from local needs assessments, and evidence of the curriculum's effectiveness. The fifth factor that was significantly associated with use of EBC was a greater allocation of the substance use prevention coordinator's time to coordination of prevention activities in the district.

Discussion

This study examined factors that are associated with school districts' decisions to adopt EBC. Our survey revealed that less than one-half (47.5%) of the nation's school districts reported using at least one EBC, in at least one middle school, in 1999. The study was conducted 1 year after the US Department of Education initiated the Principles

Table II. Sources of information used in selection of substance use prevention curricula in school districts using versus not using EBC

Information source	Districts using EBC (<i>N</i> = 757) [% (SE)]	Districts not using EBC (<i>N</i> = 836) [% (SE)]
Professional conferences outside own school district	88.6 (1.5)	83.3 (1.6) ^a
State-level Department of Education	84.2 (1.8)	78.7 (1.8) ^a
Marketing brochures, videos, etc.	80.2 (1.9)	77.1 (1.8)
Staff from other school districts	66.4 (2.2)	58.4 (2.1) ^b
National Institute on Drug Abuse or Center for Substance Abuse Prevention	64.5 (2.3)	50.6 (2.2) ^c
Federal-level Department of Education	63.8 (2.3)	55.1 (2.2) ^b
Formal district needs assessment	63.5 (2.3)	50.0 (2.2) ^c
Research or evaluation reports in professional journals	61.2 (2.3)	56.1 (2.2)
Publications summarizing effective practices	52.4 (2.3)	44.8 (2.2) ^a
County-level Office of Education	43.6 (2.3)	39.6 (2.1)
Formal outcome evaluation data from local research study of the curriculum	37.6 (2.2)	25.3 (1.9) ^c

^a*P* < 0.05,^b*P* < 0.01,^c*P* < 0.0001.**Table III.** Demographic characteristics of school districts using versus not using EBC

Characteristic	Districts using EBC (<i>N</i> = 757) [mean or % (SE)]	Districts not using EBC (<i>N</i> = 836) [mean or % (SE)]
No. students enrolled (mean)	4534 (196)	2808 (111) ^c
White student enrollment (%)	80.4 (1.00)	82.8 (0.80)
Students below federal poverty level (%)	25.9 (0.7)	24.3 (0.6)
Population density of geographic area served (%)		
urban	(0.6)	2.9 (0.4) ^c
suburban	43.1 (2.1)	36.5 (1.8) ^a
rural	51.0 (2.2)	60.6 (1.8) ^b
Region of the country (%)		
Northeast	16.2 (1.6)	18.5 (1.5)
Midwest	39.2 (2.2)	40.5 (1.9)
South	26.5 (1.8)	23.8 (1.6)
West	18.1 (1.7)	17.2 (1.5)

^a*P* < 0.05,^b*P* < 0.001,^c*P* < 0.0001.

of Effectiveness, a policy stipulating that districts receiving Safe and Drug-Free Schools and Communities funds must implement programs that have been shown to be effective (US Department of Education, 1998). Although the rate of use of EBC at the school district level was lower than one might

expect, it was higher than that reported by middle school teachers in the same districts (35%) (Ringwalt *et al.*, 2002). However, since the coordinators generally were reporting for multiple schools and/or teachers in their districts, it was more likely that they would report use of any of the published

Table IV. Factors related to decisions about substance use curricula in school districts using versus not using EBC

	Districts using EBC (N = 757) [mean or % (SE)]	Districts not using EBC (N = 836) [mean or % (SE)]
Curriculum factors (for all curriculum items, range of responses was 0 = 'not at all' to 3 = 'a great deal')		
content	2.67 (0.03)	2.54 (0.03) ^b
target grades	2.44 (0.03)	2.37 (0.03)
user-friendly layout	2.43 (0.03)	2.24 (0.04) ^c
cost of curriculum	2.35 (0.04)	2.28 (0.04)
research shows is effective	2.17 (0.04)	1.92 (0.04) ^d
cost of training teachers	2.11 (0.04)	1.98 (0.04) ^a
availability	2.09 (0.04)	2.09 (0.04)
training materials included	2.09 (0.04)	1.93 (0.04) ^b
video/media materials included	1.99 (0.04)	1.87 (0.04) ^a
no. sessions	1.92 (0.04)	1.75 (0.04) ^b
Organizational factors		
substance use prevention a high priority (mean) (five-point scale, 0 = 'strongly disagree' to 4 = 'strongly agree')	2.73 (0.04)	2.64 (0.04)
district innovativeness (mean) (five-point scale, 0 = 'strongly disagree' to 4 = 'strongly agree')	2.83 (0.04)	2.64 (0.04) ^c
Aware of Department of Education Principles of Effectiveness (%)	65.4 (2.2)	55.4 (2.0) ^b
district substance use prevention coordinator effort (mean hours/week) (range of responses 4–45 hours/week)	10.8 (0.4)	7.9 (0.3) ^d

^a*P* < 0.05,^b*P* < 0.01,^c*P* < 0.001,^d*P* < 0.0001.

curricula, including those categorized as evidence based, than would individual teachers in those districts. In addition, previous research has shown that even in instances where a substance use prevention curriculum is adopted 'district-wide' or 'school-wide', there is considerable variation in the extent to which that curriculum gets used by individual teachers within the district or school (Rohrbach *et al.*, 1996; Silvia and Thorne, 1997).

Our first research question addressed the relative input of various individuals and groups in school district decision making about substance use prevention curricula. District substance use prevention coordinators reported they had the greatest input in curriculum decisions and coordinators in districts that used EBC rated their input as significantly greater than that of coordinators in districts that did not use EBC. The second most influential group of decision makers in both types of districts was the

school personnel group, including teachers, principals and guidance counselors. In a previous study, we found that both teachers and school district coordinators rated district coordinators, teachers and principals as the three most influential groups of decision makers with regard to prevention curricula (Ringwalt *et al.*, 2004). Also, the present findings are consistent with those of another national survey of district substance use prevention coordinators (Hallfors and Godette, 2002). In addition, our findings suggest that the current national movement towards school-based management [e.g. (David, 1996)] may have led to greater sharing of authority for prevention curriculum decisions among district administrators and school personnel.

Our second research question addressed the sources of information that school districts utilize when making decisions about substance use

Table V. Final stepwise regression results: correlates of school districts' use of EBC (N = 1593)

	Adjusted OR (95% CI)
Curriculum decision input from state-level group for substance use prevention issues	1.22 (1.05, 1.42) ^c
Used National Institute on Drug Abuse or Center for Substance Abuse Prevention as source of information for curriculum selection	1.47 (1.09, 1.97) ^a
Used district needs assessment data as source of information for curriculum selection	1.46 (1.09, 1.96) ^a
Research showing curriculum is effective influenced selection of curriculum	1.20 (1.02, 1.42) ^a
District substance use coordinator % effort	1.02 (1.01, 1.04) ^c

OR adjusted for all other variables in the model.

^a $P < 0.05$,

^b $P < 0.01$,

^c $P < 0.001$.

prevention curricula. Of the 11 sources of information that we mentioned, the sources most commonly used by districts, i.e. professional conferences, professional colleagues, state and federal government (education departments, Center for Substance Abuse Prevention and National Institute on Drug Abuse), and marketing brochures, represent both interpersonal and written channels of communication. The least common sources our respondents relied on included local evaluation studies, journal articles and publications that summarize effective practices. Relative to other districts, the districts that used EBC were more likely to have consulted eight of the 11 sources we specified. In our final multivariate analysis of factors affecting decisions to use EBC, two of these information sources remained significant correlates, including materials from the National Institute on Drug Abuse or Center for Substance Abuse Prevention and formal district needs assessment data.

Our third research question examined the extent to which demographic characteristics, other district organizational factors and characteristics of the curricula themselves are associated with use of EBC. In bivariate comparisons, we found that districts using EBC had larger student enrollments, and were more likely to be located in urban and suburban areas, than were districts not using these programs. In addition, districts using EBC devoted

significantly more of the district coordinator's time to substance use prevention than did non-users. District size and infrastructure for prevention, including program coordination, are related. Since federal substance use prevention funds are distributed primarily on the basis of enrollment, larger districts have more resources overall, which makes them better able than smaller districts to hire a full-time prevention coordinator or support a high proportion of a coordinator's time with substance use prevention funds (Hallfors *et al.*, 2001). In our final multivariate model of correlates of evidence-based program use, the amount of time a district coordinator spent on substance use prevention remained a significant factor. This finding suggests that adequate time devoted to the coordination of substance use prevention activities at the district level may be a critical element of the implementation of EBC.

Most of curriculum-related characteristics that we examined were more influential in the decision making of districts that used EBC than those that did not. In our final model, the only curriculum-related characteristic that remained a significant correlate of use of at least one EBC was research indicating the program's effectiveness. It appears that the proven effectiveness of a program may become at least as important a factor in the selection of substance use prevention curricula as teacher

concerns such as the layout, cost and number of sessions in the curriculum.

These findings have several implications for national efforts to increase the implementation of evidence-based substance use prevention programs. First, it appears that decisions to adopt specific programs are influenced by a variety of information sources, such as written communications from program developers and government agencies, and interpersonal communications among school staff that occur at conferences and other professional settings. This suggests that in order to increase the use of EBC, information about them needs to be disseminated through multiple channels, such as flyers and brochures, government publications, web sites, and conference presentations. As districts adopt and model implementation of EBC, it is likely that information about the programs will be disseminated through informal interpersonal channels as well [*cf.* (Rogers, 1983)].

Second, our findings make it clear that state and federal substance use prevention agencies (e.g. Center for Substance Abuse Prevention and National Institute on Drug Abuse) have the potential to play a very important role in guiding district decisions to adopt EBC. These agencies should strengthen their current efforts to disseminate findings from prevention research. For example, the Center for Substance Abuse Prevention should continue to disseminate its list of 'model programs' (Center for Substance Abuse Prevention, 2002) to school district personnel, through such vehicles as its web site, Centers for the Application of Professional Technology and presentations at professional conferences. In addition, states that are receiving the latest generation of Center for Substance Abuse Prevention-sponsored State Incentive Grants should strongly encourage the community coalitions they support to promote the use of EBC in local schools.

Third, the school district substance use prevention coordinator should constitute one of the primary targets of these dissemination efforts. Our findings suggest that, even in districts that have decentralized curriculum decision-making processes, these prevention coordinators are critical

agents for disseminating information about substance use prevention curricula to the individual schools in their districts. Hence, effective communication between the district coordinators and information channels such as the Center for Substance Abuse Prevention, National Institute on Drug Abuse and Department of Education is of paramount importance.

Results of this study should be considered in light of the following limitations. First, many of the school districts in our sample reported using multiple prevention curricula and we do not know the relative emphasis they gave to each, the relative fidelity with which they taught them or the proportion of their middle schools in which EBC were implemented. Thus, in the districts that we classified as using EBC, teachers in some schools may not have taken the curricula off the shelf or may have implemented only a small portion of the lessons included in them. Second, the districts that responded to our survey were more likely to be located in rural areas, and in the Midwestern and Southern regions of the country. However, since we obtained a relatively high response rate from all districts and we weighted our findings for non-response bias, it is unlikely that the external validity of our study was compromised. Third, we focused our study on the use of substance use prevention curricula and did not address the extent to which school districts were implementing zero tolerance policies or other environmental interventions to reduce substance use among youth. Comprehensive reviews and meta-analytic studies of substance use prevention programs have shown that curricula that focus on social influences can help delay and reduce substance use among youth (Hansen, 1992; Tobler and Stratton, 1997; Skara and Sussman, 2003). However, because there has been limited evaluation of school anti-drug policies and other environmental strategies, the effectiveness of these approaches is unclear (National Center on Addiction and Substance Abuse, 2001; Berryhill and Prinz, 2003). Fourth, with the exception of demographic data, our study relied exclusively on self-reports of school district substance use prevention coordinators. We cannot rule out the

possibility of a social desirability bias to their responses, e.g. with regard to questions about specific curricula their districts were using. Furthermore, although coordinators may be the most knowledgeable about districts' substance use prevention activities, they may be more likely to understand and rate as 'high', for example, their own contribution to decisions relative to that of others. However, in a previous study we found that middle school teachers and substance use coordinators in the same districts both rated the coordinator as the most influential decision maker with regard to selection of curricula (Ringwalt *et al.*, 2004), providing support for the validity of coordinators' self-reports. A fifth limitation of the study is that we did not conduct an assessment of test-re-test reliability. However, even if we had, we would not necessarily have expected stability on the belief- and knowledge-based measures reported in the present paper, as they do not represent stable traits. A final limitation of the study is that the magnitude of differences we observed between districts using and not using EBC was relatively small, if statistically significant. More research is needed to improve our understanding the practical significance of such differences.

In conclusion, this study provides evidence that school district-level substance use prevention coordinators are the primary decision makers with regard to the adoption of EBC in their constituent middle schools. Decisions to use effective curricula are influenced by various sources of information; in particular, communications from state and federal agencies, such as the National Institute on Drug Abuse and Center for Substance Abuse Prevention, local needs assessment data, and evidence that specific programs work. In the near future, it is likely that we will see a substantial increase in the adoption of EBC and the relative importance of federal and state government as information brokers, as a result of the federal 'No Child Left Behind Act (NCLB)' of 2001. Title IV of the NCLB specifies that in order to meet the Principles of Effectiveness, a local education agency's Safe and Drug-Free Schools and Communities funds must be used to support programs based on 'scientifically-based

research' that provides evidence that the program reduces violence and substance use. However, although the law stipulates that these funds may support only prevention programs that have been tested with rigorous research designs and methods, it also includes a clause that allows local education agencies to apply for a waiver of that requirement, to allow them to implement 'innovative programs that demonstrate substantial likelihood of success'. Future studies should evaluate the impact of this policy on the adoption and use of effective substance use prevention programs nationwide.

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