

## REQUEST FOR CLEARANCE

### STUDY OF THE IMPLEMENTATION OF THE SAFE AND DRUG-FREE SCHOOLS AND COMMUNITIES ACT PROGRAM STATE GRANTS

#### SECTION B. DESCRIPTION OF STATISTICAL METHODOLOGY

##### **B.1 Respondent Universe**

The Study of the Implementation of the Safe and Drug-Free Schools and Communities Act Program State Grants has two separate populations of inference corresponding to the Prevalence Study and the Fidelity Study. For the Prevalence Study, the target population will include what are essentially all “regular” public elementary and secondary schools in the United States with the exception of a few types of schools. The target population for the Fidelity Study will be the subset of public elementary and secondary schools that have implemented research-based prevention programs (i.e., programs intended to prevent youth ATOD use and school crime) during the 2008-09 school year. A school will be asked to participate in the Fidelity Study if it both participates in the Prevalence Study and offers one of the research-based prevention programs identified during the Identification Study component of the study.

##### **B.1.1 Schools and Districts**

The respondent universe for the Prevalence Study will consist of public schools that provide instruction in any of grades 1 through 12 and are located in the 50 states and the District of Columbia. The 2006–07 NCES Common Core of Data (CCD) Public Elementary and Secondary School Universe file will be used to construct the school sampling frame. Although the 2006-07 CCD file has not yet been released by NCES, it is expected to be available in early 2009. However, rather than starting directly from the CCD files, the 2006-07 National Assessment of Educational Progress (NAEP) national sample frame (which will be derived from the 2006-07 CCD file) will be used if it is available. The advantage of using the NAEP frame is that it will have undergone many edits to eliminate closed and other types of “ineligible” schools (e.g., vocational schools with no enrollment, and ungraded, special education, hospital, and prison schools). In addition to the types of schools already eliminated from the NAEP sampling frame, other types of schools that are ineligible for the Prevalence Study will be eliminated as part of the establishment of the sampling frame. These include state-run schools, federal Department of Defense and Bureau of Indian Affairs schools, schools with a grade no higher than kindergarten, and schools outside the 50 states and the District of Columbia. Certain types of ineligible schools cannot be

identified in advance of sampling and must be eliminated later when schools and school districts are contacted about participation in the study. For example, only those sampled vocational-technical schools whose students attend *only* the vocational-technical school will be considered eligible for the study. As indicated in Table 5, an estimated 86,000 schools are expected to be included in the final sampling frame.

The corresponding respondent universe for the District Survey (which is part of the Prevalence Study) will include those public school districts with at least one school meeting the eligibility criteria described above. The district survey will collect information about district-level policies and programs that will be used to confirm whether the research-based programs reported by their schools have been implemented and whether the reported research-based programs have received SDFSCA program funding. Although data from the District Survey will be used to characterize the research-based programs reported by schools in the Prevalence Survey, the study has no plans to develop separate district-level estimates from the survey.

### **B.1.2 Research-Based Prevention Programs**

The respondent universe for the Fidelity Study will consist of those public elementary and secondary schools that have implemented one or more eligible research-based prevention programs during the 2008-09 school year. The list of eligible research-based programs will be developed in the Identification Study. Compilation of this list will start with the over 300 potentially eligible prevention programs assembled for the previous Study of the Implementation of Research-Based Programs to Prevent Youth Substance Abuse and School Crime.<sup>1</sup> Any additional SDFSCA-relevant programs identified by examining external sources will be added to this list. Consistent with the approach used in the previous study, each potentially eligible program will be screened to determine whether it is (a) entirely school-based or has separable school-based components, (b) focused on prevention of youth ATOD use or school crime, and (c) applicable to school-age youth. Those programs meeting these criteria will be eligible for the Provider Survey (which is part of the Fidelity Study).

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<sup>1</sup> Crosse, S., Williams, B., Hagen, C., Harmon, M., Ristow, L., DiGaetano, R., Broene, P., Alexander, D., Tseng, M., and Fong, M. (2008, under review). *Study of the Implementation of Research-based Programs to Prevent Youth Substance Abuse and School Crime: Final report*. Rockville, MD: Westat.

**Table 5. Distribution of schools in 2005-06 CCD file by instructional level, metropolitan status, and percent minority enrollment**

Instructional level*	Metropolitan status	Percent minority enrollment†	Number of schools in 2005-06 CCD**
Elementary	City	0 to 10%	1,311
		11 to 60%	5,562
		Over 60%	7,617
	Suburban/Town	0 to 10%	8,528
		11 to 60%	9,712
		Over 60%	4,677
	Rural	0 to 10%	10,032
		11 to 60%	4,007
		Over 60%	1,017
Middle	City	0 to 10%	324
		11 to 60%	1,509
		Over 60%	1,941
	Suburban/Town	0 to 10%	2,828
		11 to 60%	3,030
		Over 60%	1,181
	Rural	0 to 10%	2,771
		11 to 60%	1,316
		Over 60%	335
High	City	0 to 10%	355
		11 to 60%	1,548
		Over 60%	1,862
	Suburban/Town	0 to 10%	3,031
		11 to 60%	2,720
		Over 60%	866
	Rural	0 to 10%	5,577
		11 to 60%	2,000
		Over 60%	447
Total			86,104

\* Elementary: schools with a low grade of 1-3 and a high grade of 8 or less, or with a low grade of 4-6 and a high grade of 6 or less. Middle: schools with a low grade of 1-3 and a high grade of 9 or 10, or with a low grade of 4-7 and a high grade of 10 or less, or with a low grade of 8-9 and a high grade of 9 or less. High: schools with a low grade of 1-7 and a high grade of 11-12, or with a low grade of 8-12 and a high grade of 10 or higher.

† Percent of students in the school who are black or Hispanic.

\*\* Counts from the 2005-06 CCD file are given for illustration. The actual sampling frame will be constructed from the 2006-07 CCD file (or NAEP sampling frame if it is available).

## **B.2 Stratification and Sample Selection**

Stratification has two main (and sometimes conflicting) purposes. The first is to improve overall sampling precision. The second is to help ensure that certain key subsets of the population are adequately represented in the sample for subgroup analyses. Hence, we propose to design the sample to permit analysis of subgroups of schools defined by instructional level, metropolitan status, and percent minority enrollment. Stratification by metropolitan status and percent minority is important because, based on earlier studies, issues related to ATOD use and school crime are expected to be correlated with these variables.<sup>2</sup> Stratification by instructional level is important because research-based prevention programs are known to differ appreciably by instructional level. Hence, a total of 27 school strata will be formed by a cross-classification of three categorical variables with three values each: instructional level (elementary, middle, and high), metropolitan status (central city, other urban including suburban, rural), and percent minority (defined as the percentage of students who are black or Hispanic: 0-10% minority, 11 to 60% minority, over 60% minority). Within a given stratum, schools will be sampled at rates designed to achieve specified levels of precision for the major analytic domains of interest. In the following sections, we summarize the sampling methodology for the study.

### **B.2.1 Selection of School and District Samples**

Although data will be collected from staff who coordinate youth ATOD use and school crime prevention activities at the district level, the primary focus of the study is on the implementation of research-based youth ATOD use and school crime prevention programs in schools. Hence, the sample design will be geared toward producing precise school-level estimates. Specifically, we will select a stratified sample of approximately 6,000 public schools that avoids undue clustering by district and that achieves minimum precision levels for selected domains of interest. The resulting stratified school sample will then be used to identify the associated sample of districts. We estimate that the proposed stratified sample of 6,000 schools will be associated with approximately 3,800 unique districts.

The target school sample size of 6,000 will be allocated across the 27 categories (i.e., strata) indicated in Table 6 with the goal of achieving two objectives: to maximize the precision of estimates, and to keep the precision roughly constant across the marginal levels of the three school stratification

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<sup>2</sup> For examples of support, see: [http://www.cdc.gov/healthyouth/yrbs/pdf/yrbs07\\_us\\_disparity\\_race.pdf](http://www.cdc.gov/healthyouth/yrbs/pdf/yrbs07_us_disparity_race.pdf); <http://www.oas.samhsa.gov/2k4/ruralYouthAlc/ruralYouthAlc.pdf>; [http://nces.ed.gov/programs/crimeindicators/crimeindicators2007/ind\\_02.asp](http://nces.ed.gov/programs/crimeindicators/crimeindicators2007/ind_02.asp); [http://nces.ed.gov/programs/crimeindicators/crimeindicators2007/figures/fig\\_02\\_2.asp](http://nces.ed.gov/programs/crimeindicators/crimeindicators2007/figures/fig_02_2.asp); and [http://nces.ed.gov/programs/crimeindicators/crimeindicators2007/ind\\_18.asp](http://nces.ed.gov/programs/crimeindicators/crimeindicators2007/ind_18.asp).

variables (i.e., level, metropolitan status, and minority status). The sampling rates within the 27 strata will be set so as to obtain an overall sample size of approximately 6,000 schools. Note that within the 27 primary strata indicated in Table 6, further stratification (either implicitly through sorting or explicitly through formation of detailed substrata) may be employed. For example, sorting the schools by percent of students eligible for free/reduced-price lunch prior to sampling will induce an implicit stratification that will help ensure that all income levels are appropriately represented in the sample. Similarly, substratification by enrollment size will ensure that schools of all sizes are represented in the sample.

However, in the case of enrollment size, formation of explicit size classes for sampling purposes rather than implicit stratification might be preferable because it would permit the use of differential sampling rates by size class. In particular, this would allow the larger schools in a stratum to be oversampled if desired. Where differential sampling rates are used, the weights of the responding schools will be adjusted accordingly to reflect the overall probabilities of selection (see Section B.2.4). While the use of differential sampling rates will increase the variation in weights and design effects for broad subgroups of schools, it is necessary to ensure that the resulting sample sizes for key subgroups are adequate to meet the overall analytic objectives of the study.

Assuming an 85 percent response rate and a 95 percent eligibility rate, an initial sample of 6,000 schools will yield approximately 4,800 eligible responding schools for the Prevalence Study. Table 6 summarizes the sample sizes to be expected under the proposed design.

**Table 6. Expected samples for the Prevalence Study by level, metropolitan status, and percent minority enrollment**

Instructional level	Metropolitan status	Percent minority enrollment	Number to be sampled	Expected number of eligible respondents
Elementary	City	0 to 10%	81	65
		11 to 60%	51	41
		Over 60%	47	38
	Suburban/Town	0 to 10%	310	250
		11 to 60%	254	205
		Over 60%	199	161
	Rural	0 to 10%	404	326
		11 to 60%	403	325
		Over 60%	493	398
Middle	City	0 to 10%	322	260
		11 to 60%	195	157
		Over 60%	168	136
	Suburban/Town	0 to 10%	315	254
		11 to 60%	251	203
		Over 60%	188	152
	Rural	0 to 10%	167	135
		11 to 60%	189	153
		Over 60%	200	162
High	City	0 to 10%	619	500
		11 to 60%	226	182
		Over 60%	204	165
	Suburban/Town	0 to 10%	283	229
		11 to 60%	108	87
		Over 60%	88	71
	Rural	0 to 10%	113	91
		11 to 60%	57	46
		Over 60%	65	52
Total			6,000	4,845

### **B.2.2 Selection of Research-Based Prevention Programs**

As noted in the previous section, the focus of the Prevalence Study will be to identify schools with eligible research-based prevention programs. In the Study of the Implementation of Research-Based Programs to Prevent Youth Substance Abuse and School Crime, 42 percent of elementary schools, 46 percent of middle schools, and 33 percent of high schools indicated that they used

research-based programs in the 2004-05 school year. However, among the roughly 3,000 programs that were subsampled for the follow-up study of program characteristics, about 44 percent did not meet the eligibility criteria for the study. This left about 900-1,000 eligible research-based programs. Moreover, because of the subsampling of programs in the previous study, the researchers were not always able to characterize responding schools as having one or more eligible programs. For example, if a school had eight programs and four were subsampled for the follow-up study and all four turned out to be ineligible, one still could not definitively conclude that the school did not have an eligible research program. To avoid the potential for understating the prevalence of schools with eligible programs, all programs identified by the responding schools (rather than a subsample) will be included in the proposed Fidelity Study.

The prevalence estimates from the Study of the Implementation of Research-Based Programs to Prevent Youth Substance Abuse and School Crime suggest that an initial sample of 6,000 schools will yield approximately 2,000 schools reporting research-based programs (assuming a school-level response rate of 85 percent and school eligibility rate of 95 percent). In Table 7, we present estimates of the expected numbers of schools by selected subgroups assuming a total initial sample size of 6,000 schools and sampling rates similar to those used in the previous study. This table is intended to illustrate the rough orders of magnitude of the sample sizes to be expected under the proposed design. The actual sample sizes will depend on the final design to be specified for the study and may differ from those shown in the table.

**Table 7. Expected sample sizes based on an initial sample of 6,000 schools and prevalence rates reported in the Study of the Implementation of Research-Based Programs to Prevent Youth Substance Abuse and School Crime\***

Subgroup of sample	Number of schools to be sampled	Expected number of responding schools	Expected number of schools reporting research-based programs
Total sample	6,000	4,845	2,000
<i>Instructional level</i>			
Elementary	2,242	1,810	764
Middle	1,995	1,611	762
High	1,763	1,424	473
<i>Minority status</i>			
0 to 10%	2,614	2,111	816
11 to 60%	1,734	1,400	613
Over 60%	1,652	1,334	571
<i>Metropolitan status</i>			
Central city	1,913	1,545	670
Suburban	1,996	1,612	650
Rural	2,091	1,688	680
<i>Size</i>			
< 300	1,426	1,151	434
300-999	3,723	3,006	1,286
1000+	851	687	280
<i>Free Lunch</i>			
< 25%	1,853	1,496	529
26-55%	2,034	1,642	696
55%+	2,113	1,707	775

\* Crosse, S., Williams, B., Hagen, C., Harmon, M., Ristow, L., DiGaetano, R., Broene, P., Alexander, D., Tseng, M., and Fong, M. (2008, under review). *Study of the Implementation of Research-based Programs to Prevent Youth Substance Abuse and School Crime: Final report*. Rockville, MD: Westat.

### **B.2.3 Expected Levels of Precision**

In Table 8, we present the 95 percent confidence interval half-widths for a prevalence estimate of 50 percent that would be expected using the proposed stratification and sample allocation given in Table 6. These results provide a rough indication of the sampling precision to be expected from the proposed design. We based the design effects used to calculate the effective sample size on actual design effects obtained from the previous study for the estimated proportion of schools with a research-based program. The design effect, which is defined to be the ratio of the variance of an estimate based on a disproportionate stratified sample to the variance of an estimate based on a self-weighting sample of the



same size, primarily reflects the variation in weights resulting from the disproportionate allocation of schools to strata under the proposed design. To a lesser extent, it also reflects the impact of the differential nonresponse weighting adjustments described in Section B.2.4.

**Table 8. 95 percent confidence interval half-widths for an estimate of a 50-percent characteristic**

	Expected number of responding, eligible schools (n)	Effective school sample size (n/deff)*	95% CI half-width for P=50%
<b>Instructional level</b>			
Elementary	1,810	1,509	2.59%
Middle	1,611	1,342	2.69%
High	1,424	1,186	2.88%
<b>% Minority</b>			
0-10%	2,111	1,759	2.38%
11-60%	1,400	1,167	2.93%
60%+	1,334	1,112	2.98%
<b>Metro status</b>			
Central City	1,545	1,287	2.79%
Suburban	1,612	1,343	2.69%
Rural	1,688	1,407	2.69%
<b>Size</b>			
<300	1,151	959	3.27%
300-999	3,006	2,505	2.02%
1000+	687	573	4.13%
<b>% Eligible free/reduced-price lunch</b>			
< 25%	1,496	1,247	2.79%
26-55%	1,642	1,368	2.69%
55%+	1,707	1,423	2.69%
<b>Total</b>	<b>4,845</b>	<b>3,461</b>	<b>1.73%</b>

\*Average design effect (deff) for category = 1.2; deff for total=1.4.

#### **B.2.4 Estimation Procedures**

For estimation purposes, sampling weights reflecting the overall probabilities of selection will be attached to each data record. These weights will include upward adjustments for nonresponse at both the school and program levels. To compensate for school nonresponse, weight adjustment factors will be computed within subgroups or “cells” defined by the 27 school strata and other school-level variables, such as percent of students eligible for free/reduced price lunch and enrollment size. The

adjustment factor to be applied to the school base weight will be computed as the ratio of the weighted count of schools in the sample to the corresponding weighted count of the responding schools. The adjustment will have the effect of distributing the weight of the nonresponding schools in the cell to the responding schools, hence bringing the total weight of the responding schools to the level of the original sample. Adjustments for program nonresponse will be handled in a similar manner. Since all eligible programs identified in the Prevalence Study will be included in the study, the “base” weight for a program is simply the corresponding nonresponse-adjusted school weight. In this case, the adjustment cells to be used to compensate for program response will be defined by relevant program-level variables, such as program focus (e.g., ATOD use, school crime, or both), in addition to the school-level variables mentioned earlier.

To properly reflect the complex features of the sample design, standard errors of the survey-based estimates will be calculated using jackknife replication. Under the jackknife replication approach, 50-100 subsamples or “replicates” will be formed in a way that preserves the basic features of the full sample design. A set of estimation weights (referred to as “replicate weights”) will then be generated for each jackknife replicate. Using the full sample weights and the replicate weights, estimates of any survey statistic can be calculated for the full sample and each of the jackknife replicates. The mean square error of the replicate estimates then provides a measure of the variance (standard error) of the survey statistic.

### **B.3. Methods to Maximize Response Rates and Deal with Nonresponse**

In this section, we discuss specific methods that will be used to maximize response rates and the procedures that will be used to deal with nonresponse for each of the major components of the study. Key strategies for maximizing response include: (a) comprehensive recruitment of schools with notification of SEAs and districts to mitigate against potential nonresponse at the school level; (b) use of well-tested procedures and experienced staff for completing applications to conduct research in “special clearance” districts; (c) use of a web-based questionnaires whenever feasible, which provides convenience and is likely to reduce the time spent answering survey questions; and (d) extensive telephone follow-up of survey and item nonresponse, including the use of experienced telephone center staff who will help convert initial and/or repeated refusals. Westat has substantial experience in administering national education surveys. We expect that the response rate for this study will be 85 percent based on previous experiences with national surveys of school prevention programs.

### **B.3.1. Survey Response**

Recruitment efforts will begin with an introductory letter to Chief State School Officers, State Prevention Coordinators, and District Superintendents encouraging district and school participation from a senior ED official. Negotiations with schools and special clearance districts (i.e., districts with a formal application and review process for requests to participate in studies) about participating in the survey will stress the legitimacy of the overall study and emphasize the importance of their participation in this particular study component. Westat will contact individual districts in the study sample to inform them about the surveys. Next, Westat will obtain approval from each sampled school's principal, and work with the principal or the principal's designee in the school to help identify appropriate school-level respondents. Contact and descriptive information for these potential respondents will be entered into the study's database for use in producing survey materials such as letters and labels, as well as for tracking the progress of the survey.

Highly trained telephone interviewers will follow-up with the respondents who do not submit a completed survey within a three-week timeframe. These staff have been very successful in negotiating participation for many education and prevention-related studies such as the National Center for Education Statistics' (NCES) Fast Response Survey System, the NCES School Survey on Crime and Safety, the National Study on School Violence and Prevention, and the Study of the Implementation of Research-Based Programs to Prevent Youth Substance Abuse and School Crime. Each staff member will be assigned to monitor a particular set of schools and will retain those contacts throughout the data collection period. This continuity of support has proven very successful in gaining and maintaining rapport with busy school and program administrators who do not have the time to re-explain their problems or questions every time they call.

### **B.3.2. Item Response and Data Quality**

To ensure data quality, manual editing will be performed directly on the survey response forms. For data provided on web-based questionnaires, edits will be performed in real time by special computer software that is programmed with built-in data checks. For data provided on paper questionnaires, manual edits are designed to check each document for completeness, inter-item consistency, extraneous remarks, and proper adherence to any skip instructions; range checks (checks on responses beyond the anticipate range of response) will also be performed at this time. Whenever possible, sources outside the survey will be used to aid in checking data for accuracy and consistency.

Although these procedures are designed to maximize item response rates, the analysis will need to confront the issue of missing data. Experience with similar surveys indicates that some respondents will omit responses to some specific items (e.g., those viewed as reflecting negatively on a program), although they may have provided most of the data requested. By employing good survey data collection practices, including use of respondent contact information to conduct follow-up, the amount of missing data on any single variable will be minimized—still the most desirable solution. Where missing data still cannot be obtained, for analyses involving just one or two variables, the problem will be handled by omitting the cases with missing data, or, in the case of categorical response variables, by using an explicit “missing” or “unknown” category.

#### **B.4 Tests of Procedures and Methods**

In December 2008 and January 2009, Westat conducted pretests on the instruments for the study’s surveys. The pretest participants included personnel in six schools along with the corresponding district officials for those schools. The sample of participating schools, which was selected from the CCD, represented a range of instructional levels (elementary, middle, and high schools) and district sizes (large student enrollment and small to medium student enrollment). As a result of this process, all of the pretested instruments were revised as were some of the planned survey procedures.

#### **B.5 Statistical Consultation and Implementation of the Study**

The following statisticians were consulted on the statistical aspects of the design and analysis of the study:

- Adam Chu, Westat;
- Ralph DiGaetano, Westat; and
- Pam Broene, Westat.

The study is being conducted by Westat, Battelle Memorial Institute, and ISA Group, under contract with ED (Contract Number ED-04-CO-0059).

## **LIST OF APPENDICES**

### **A. Proposed Instruments**

Prevalence Questionnaire

District Questionnaire

Provider Questionnaire

Program Developer Protocol

### **B. Proposed Notification Letters and Related Materials**

Letter to Chief State School Officer

Letter to State Coordinator of Safe and Drug-Free and Communities Act Program

Letter to District Superintendent

Letter to District Coordinator

Web Survey Information Sheet

Letter to Principal

Letter to Program Provider