

## ***Appendix C***

### ***Weighting and Analysis***

## WEIGHTING AND ANALYSIS

Data for the two surveys compared here, the LAS and the SPM, are weighted. The procedures used in weighting the LAS data are detailed in Appendix A of that earlier report (U.S. Department of Health and Human Services, 2003). The SPM weighting approach is described in Appendix B of that document (Li, Shusterman, & Sedlak, 2009).

**Comparing the LAS and SPM survey findings.** In comparing the findings from the two studies, the first step was to identify or develop matching variables in the two studies. Since the SPM questionnaire was nearly identical to that used in the LAS, most existing variables matched automatically. The comparison analyses omitted variables that existed only in one survey as well as those that were measured by different questions in the LAS and the SPM.

For each matching variable, the analysts derived a dichotomous variable, with 1 representing the presence of the institutional characteristic or CPS practice in question and 0 representing the absence of the characteristic or practice. Next, the analysts calculated the percentage of agencies in each study that had a value of 1 on each matching variable. These analyses were conducted separately for each study, using WesVar with the full sample weight and replicate weights for the survey in question. This produced the appropriate standard error for each estimate. Lastly, using the estimated percentages and their standards of error, the analysts conducted *t* tests to determine whether the percentages of agencies with the corresponding characteristic differed statistically between the time of the 2002 LAS and 2005-2006 SPM.

**Examining the relationship between CPS agency characteristics and maltreatment rates.** The next step was to conduct regression analyses to examine the relationships between agencies with a specific CPS structure or practices and the rate of child maltreatment in their jurisdictions. These analyses used the agency as the unit of analysis and focused on those aspects of local CPS structure and practices that evidenced changes between 2002 and 2005–2006.

As described at the outset of Chapter 3, child maltreatment rates used as dependent variables in the regression analyses were computed by dividing number of children in each maltreatment category by number of children served by the agency multiplied by 1,000. The numerators for the rate measures were obtained from the NCANDS county-level maltreatment data from 2002 or 2006, as appropriate. Most CPS agencies in the LAS and the SPM served just one county. For these agencies, the NCANDS county-level data on child maltreatment were simply associated with the agency serving that county. Agencies that served more than one county were similarly associated with the maltreatment data for their jurisdictional area (i.e., combining the NCANDS data for the counties they served). The combined LAS and the SPM sample had six

agencies in three states that served a sampled county as well as one or more counties that were not sampled in the LAS or the SPM. We computed maltreatment rates for each of these agencies using the NCANDS data only for the sampled county that the agency served. When two or more local CPS agencies served a single county, the number of maltreated children in a category was split equally among the agencies for the purpose of calculating a maltreatment rate. Overall, the sample consisted of one two-agency county, one four-agency county, and three three-agency counties.

The denominator in the calculation of maltreatment rates was the number of children the agency served, as indicated in the 2001 and 2006 U.S. Census county population estimates. For agencies in the 2002 LAS that served a single county, the Census estimate of county population under 18 was assigned as the child population served by the agency. For multiple agencies that served the same county, the child population of the county was allocated proportionally to the agencies by the number of CPS workers. If the information on CPS workers was unavailable, the child population of the county was equally split among the agencies. For agencies in the 2005-2006 SPM, the population estimate was based on the population distributions in 2005 and 2006, with adjustments for the population shifts after the Hurricanes Katrina and Rita in the fall of 2005. The population served by each SPM agency is the child population in the reference county in the NIS-4 Survey Year. In multiagency counties, the county population was evenly divided among the agencies.

Once the dependent variables and independent variables were specified, the analysts created a combined WesVar data file by pooling the data from 2002 and 2005-2006. In addition to the dependent variables and the independent variable, the combined dataset also contained the full sample weights for the LAS and the SPM as well as a set of replicate weights developed using the JK<sub>n</sub> method. Specifically, the agency records from each study retained their original full sample weights. Combining the replicate weights from the two studies was somewhat more complicated. The LAS replicate weights were developed using JK<sub>n</sub> whereas the SPM replicate weights were developed using JK<sub>2</sub>. To adjust these differences, the replicate weights on the SPM records were duplicated (i.e., the full set was repeated in order to generate twice as many replicate weights for each SPM record). The replicate weights for the two were then concatenated, with LAS replicate weights assigned replicate weight identifiers a through m and the duplicated SPM replicate weights assigned replicate weight identifiers n through x. When the pooled data file was imported into WesVar, we identified the replicate weights as having been developed via the JK<sub>n</sub> method, but specified that the JK<sub>n</sub> factors for the SPM records were all 0.5. The combined database has 132 degrees of freedom. It was then tested to insure that it generated the same estimates and confidence intervals for the each component survey as those obtained in the earlier analyses on the separate survey databases.

There were a total of 430 agencies with valid survey data, including 307 agencies in the LAS and 123 agencies in the SPM. NCANDS maltreatment data were not available for 63 of 307 agencies in the LAS and 5 of 123 agencies in the SPM (i.e., 68 agencies of the combined total of 430). These agencies were excluded from the regression analysis. Because of these missing agencies, the national samples for the two

points in time did not generate estimates that corresponded to the national rates of maltreatment observed in NCANDS. This problem was corrected by computing simple post-hoc adjustment factors to the rates, as shown in Table C-1:

Table C-1. Post-hoc adjustment factors applied to county-level rates to ensure that the available study data generates national estimates corresponding to those from NCANDS.

Study	National rate estimated from pooled LAS/SPM data	National rate reported by NCANDS	Adjustment factor
<b>Maltreatment Rate</b> (# children alleged to be maltreated on investigated CPS reports per 1,000 in the general population)			
LAS	30.22	43.8	1.4493
SPM	38.52	47.8	1.2409
<b>Substantiation Percentage</b> (% of investigated children with substantiated/indicated maltreatment)			
LAS	0.3129	0.281	0.89805
SPM	0.2801	0.252	0.89968
<b>Substantiation Rate</b> (# of children with substantiated/indicated maltreatment per 1,000 in the general population)			
LAS	9.4589	12.3	1.30036
SPM	10.4608	12.1	1.15667

Thus, the regression analyses were based on a combined sample of 362 CPS agencies. Some agencies included in the database had missing values on certain agency characteristics, which further reduced number of cases for the analyses involving these variables.

The analysts then used WesVar with the pooled adjusted data to construct a series of bivariate linear regression models to examine the relationships between differences in CPS structure and practices and rates of child maltreatment.

## REFERENCES

Li, S., Shusterman, G., and Sedlak, A. (2009). *Fourth National Incidence Study of Child Abuse and Neglect (NIS-4): CPS Structure and Practices Mail Survey (SPM)*. Rockville, MD: Westat, Inc.

U.S. Department of Health and Human Services. (2003). *National Study of Child Protective Services Systems and Reform Efforts: Findings on Local CPS Practices*. Washington, D.C. U.S. Government Printing Office.

Available online at: <<http://aspe.hhs.gov/hsp/CPS-status03/CPS-practices03/index.htm>>