2016 NATIONAL SURVEY ON DRUG USE AND HEALTH

METHODOLOGICAL RESOURCE BOOK SECTION 11: PERSON-LEVEL SAMPLING WEIGHT CALIBRATION

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2016 NATIONAL SURVEY ON DRUG USE AND HEALTH: PERSON-LEVEL SAMPLING WEIGHT CALIBRATION

Prepared for the 2016 Methodological Resource Book (Section 11)

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List of Terms and Abbreviations

C	Center point.
CAI	Computer-assisted interviewing.
DU	Dwelling unit.
ev	Extreme weight adjustment. See Section 4.1 for more detail.
FI	Field interviewer.
GEM	Generalized exponential model. See Chapter 2 for more detail.
half-step	This refers to halving the increment in the Newton-Raphson iterative process for fitting GEM.
IQR	Interquartile range.
L	Lower bound on adjustment factor.
MPMN	Multivariate predictive mean neighbor.
nr	Nonresponse adjustment.
Outwinsor	Signifies the percentages of weights trimmed after extreme weight adjustment via winsorization.
PMN	Predictive mean neighborhood.
ps	Poststratification adjustment.
res.sdu.nr	Respondent screener dwelling unit nonresponse adjustment step. See Section 5.1.2 for more detail.
res.sdu.ps	Respondent screener dwelling unit poststratification adjustment step. See Section 5.1.3 for more detail.
res.sdu.ev	Respondent screener dwelling unit extreme weight adjustment step. See Section 5.1.4 for more detail.
sel.per.ps	Selected person-level poststratification adjustment step. See Section 5.2.2 for more detail.
res.per.nr	Respondent person-level nonresponse adjustment step. See Section 5.2.3 for more detail.
res.per.ps	Respondent person-level poststratification adjustment step. See Section 5.2.4 for more detail.
res.per.ev	Respondent person-level extreme weight adjustment step. See Section 5.2.5 for more detail.
SAE	Small area estimate.
SDU	Screener dwelling unit.
SE	Standard error.
SES	Socioeconomic status indicator. See Exhibit 3.1 for more detail.
SS	State sampling.
U	Upper bound on adjustment factor.
UPMN	Univariate predictive mean neighbor.
UWE	Unequal weighting effect. It refers to the contribution in the design effect due to unequal selection probability and is defined as $1 + \left[(n-1)/n\right] * CV^2$ where CV = coefficient of variation of weights, and n is the sample size.
VESTR	Variance estimation stratum.
VEREP	Variance estimation replicates.
Winsorization	A method of extreme weight adjustment that replaces extreme weights with the critical values used for defining low and high extreme weights.

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Overview

This report contains a brief review of the sampling weight calibration methodology used for the 2016 National Survey on Drug Use and Health (NSDUH), which was known as the National Household Survey on Drug Abuse (NHSDA) before 2002. This report also lists detailed documentation on the implementation steps and evaluation results from the weight calibration application. The constrained exponential modeling (CEM) method used in the surveys before 1999 (referred to in this report as the generalized exponential model [GEM]) was modified to provide more flexibility in dealing internally with the extreme weights and for setting bounds directly on the weight adjustment factors so they can become suitable for nonresponse (nr) and poststratification (ps) adjustments. The highlights of the method are summarized as follows:

- The inherent two-phase nature of the NSDUH design (viewing the large screener sample as the first phase and the actual questionnaire sample as the second phase) allows for the additional step of poststratifying the selected people to estimated controls from the large first-phase sample of people. This additional step results in stable controls for the later step of nonresponse adjustment at the respondent-person level. These two steps had been combined as one step in surveys before 1999, but they have been kept separate from 1999 onward.
- A poststratification step at the respondent-household level in the first phase of the screening interview reduced coverage bias resulting from the first-phase sampling and produced controls for use in poststratification at the selected-person level, respondent person-pair level, and respondent-household level in the second phase of the main interview. This step again takes advantage of the inherent two-phase design of the study.
- The built-in control on extreme weights in GEM can be supplemented by a separate step of extreme value adjustment after the final poststratification whenever the extreme weight percentage in the initial unadjusted weights is considered to be too large. This can be accomplished by using GEM so that the sample demographic distribution is preserved. This method represents an improvement over the trimming method implemented before the nonresponse adjustment in surveys before 1999 and the extreme value adjustment before the nonresponse adjustment used for the 1999 NHSDA. For the 2016 NSDUH, this final extreme value adjustment was judged to be unnecessary.

The GEM calibration method provides a unified approach to handling problems of extreme weights, nonresponse, and poststratification, and it uses current state-of-the-art technology.

Several chapters in this report describe the implementation and evaluation of GEM, and the appendices contain mainly tables. In the interest of reducing the size of the report, detailed domain-specific evaluation results are presented in the supplement to this report, which is available upon request.

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1. Introduction

The target population for the 2016 National Survey on Drug Use and Health (NSDUH) was the civilian, noninstitutionalized population aged 12 years or older residing within the United States. A coordinated sample design was developed for the 2014 through 2017 NSDUHs. The coordinated design facilitates 50 percent overlap in third-stage units (area segments) within each successive 2-year period from 2014 through 2017. This designed sample overlap slightly increases the precision of estimates of year-to-year trends because of the expected small but positive correlation resulting from the overlapping sampled area segments between successive survey years. The 50 percent overlap of segments significantly reduces segment listing costs because only one-half of the segments will need to be listed for the 2014 through 2017 surveys.

The current design provides for estimates by state in all 50 states plus the District of Columbia. States may therefore be viewed as the first level of stratification as well as a reporting variable. Unlike the previous designs, such as the 2005 through 2013 NSDUH design, where the sample was divided into 8 "large" states and 43 "small" states (which include the District of Columbia) with the large and small sample states designed to yield 3,600 and 900 respondents per state, respectively, for 2014 through 2017, the survey's sample was designed to yield

- 4,560 completed interviews in California;
- 3,300 completed interviews each in Florida, New York, and Texas;
- 2,400 completed interviews each in Illinois, Michigan, Ohio, and Pennsylvania;
- 1,500 completed interviews each in Georgia, New Jersey, North Carolina, and Virginia;
- 967 completed interviews in Hawaii; and
- 960 completed interviews in each of the remaining 37 states and the District of Columbia.

The target national sample size for the 2016 NSDUH was 67,507 people, and the achieved sample for the 2016 NSDUH was 67,942 people—corresponding to 50,095 responding dwelling units [DUs] selected at the second phase out of 135,165[1] DUs screened at the first phase, in which the first phase is screening and the second phase is interviewing.

In addition to having a different sample allocation by state, the 2014 through 2017 survey design places more sample in the 26 or older age groups to estimate drug use and related mental health measures more accurately among the aging population that uses drugs. For the 2014 through 2017 NSDUHs, each state sample will be allocated to age groups as follows: 25 percent for youths aged 12 to 17, 25 percent for young adults aged 18 to 25, 15 percent for adults aged 26 to 34, 20 percent for adults aged 35 to 49, and 15 percent for adults aged 50 or older. In the

[1] The number of DUs that completed the first-phase screening was 135,188, but some DUs did not have eligible people, so they were removed from the DU poststratification and person-level calibration steps. The number of DUs that had eligible people in them was 135,165.

2005 through 2013 NSDUHs, the sample was allocated equally across the 12 to 17, 18 to 25, and 26 or older age groups.

Similar to the 2005 through 2013 NSDUHs, the first stage of selection for the 2014 through 2017 NSDUHs is census tracts. This stage was included to contain sample segments within a single census tract to the extent possible.

The 2014 through 2017 survey design includes the selection of census block groups at the second stage of selection. This additional stage of selection was included to facilitate moving to an address-based sampling (ABS) design in the future, if desired. The selection of census tracts at the first stage of selection and census block groups at the second stage has the potential to reduce sampling variance by controlling the distribution of selected areas and reducing the chance of selecting neighboring and possibly similar areas within tracts and block groups.

Finally, as mentioned in Section 1.5, the 2014 through 2017 NSDUH fourth-stage sampling frames are supplemented with new DUs on the premises of sampled DUs that were missed during the original counting and listing activities (e.g., garage apartments).

The first stage of selection began with the construction of an area sample frame that contained one record for each census tract in the United States. If necessary, census tracts were aggregated within state sampling regions (SSRs) until each first-stage sampling unit met the minimum size requirement. In California, Florida, Georgia, Illinois, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, and Virginia, this minimum size requirement was 250 DUs in urban areas and 200 DUs in rural areas. In the remaining states and the District of Columbia, the minimum requirement was 150 DUs in urban areas and 100 DUs in rural areas. There were 48 census tracts per SSR selected with probabilities proportionate to a composite size measure and with minimum replacement (Chromy, 1979).

For the second stage of selection, adjacent census block groups were aggregated within selected census tracts as necessary to meet the minimum DU requirements (150 or 250 DUs in urban areas and 100 or 200 DUs in rural areas according to state). After the resulting second-stage sampling units were formed, they were sorted in the order they were formed (i.e., geographically), and one census block group was selected per sampled census tract with probability proportionate to a composite size measure and with minimum replacement (Chromy, 1979). Compared with prior years, the selection of census block groups is an additional stage of selection that was included to facilitate possible transitioning to an ABS design in the future.

Because census block groups generally exceed the minimum DU requirement, one smaller geographic region was selected within each sampled census block group. For this third stage of sampling, each selected census block group was partitioned into compact clusters[2] of DUs by aggregating adjacent census blocks. Consistent with the terminology used in previous NSDUHs, these geographic clusters of blocks are referred to as "segments." A sample DU in NSDUH refers to either a housing unit or a group quarters listing unit, such as a dormitory room

[2] Although the entire cluster is compact, the final sample of DUs represents a noncompact cluster. Noncompact clusters (selection from a list) differ from compact clusters in that not all units within the cluster are included in the sample. Although compact cluster designs are less costly and more stable, a noncompact cluster design was used because it provides for greater heterogeneity of dwellings within the sample. Also, social interaction (contagion) among neighboring dwellings is sometimes introduced with compact clusters (Kish, 1965).

or a shelter bed. Similar to census tracts and census block groups, segments were formed to contain a minimum of 150 or 250 DUs in urban areas and 100 or 200 DUs in rural areas according to state. This minimum DU requirement will support the overlapping sample design and any special supplemental samples or field tests that SAMHSA may wish to conduct.

One segment was selected within each sampled census block group with probability proportionate to size. The 48 selected segments in each SSR were then randomly assigned to a survey year and quarter of data collection.

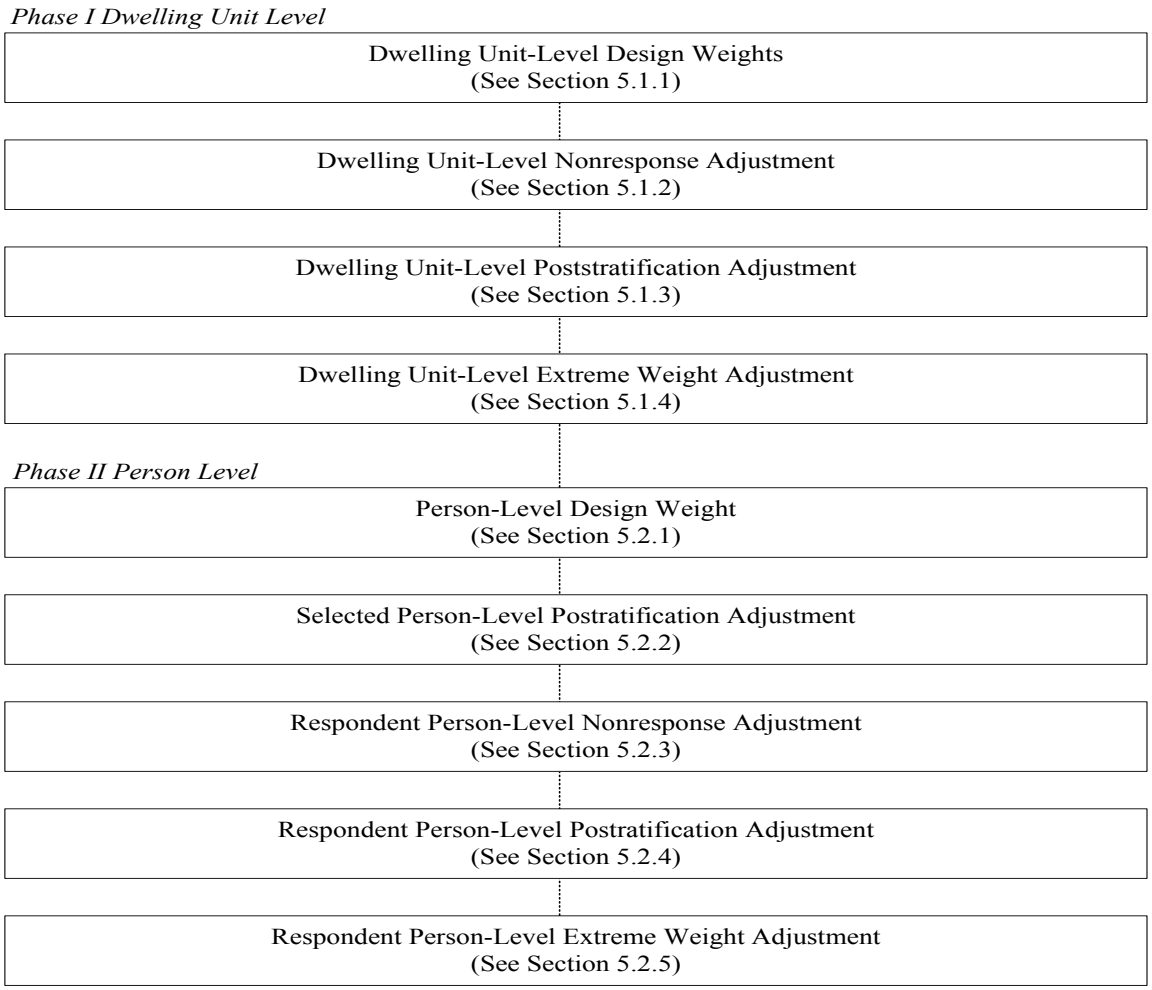
After sample segments for the 2016 NSDUH were selected, specially trained field household listers visited the areas and obtained complete and accurate lists of all eligible DUs within the sample segment boundaries. These lists served as the frames for the fourth stage of sample selection. Using a random start point and interval-based (systematic) selection, the actual listing units were selected from the segment frame. After DU selections were made, an interviewer visited each selected DU to obtain a roster of all people residing in the DU. Using the roster information obtained from an eligible member of the selected DU, zero, one, or two people were selected for the survey. Sampling rates were preset by age group and state. Roster information was entered directly into the electronic screening instrument, which automatically implemented this fifth stage of selection based on the state and age group sampling parameters.

As in previous years of the survey,[3] the 2016 NSDUH sample weighting posed challenges because of the sheer magnitude of the number of state-specific predictors used for nonresponse (nr) and poststratification (ps) adjustments. With the 51-state survey, using a single model for each of the adjustments was not practical; however, treating each state separately was not desirable because individual state sample sizes were not large enough to support reliable estimation of a number of parameters. Therefore, the 51 states were grouped into nine model groups corresponding to the nine U.S. Census Bureau divisions. This helped to keep a substantial number of predictor variables in each model and reduced the computing time that would be associated with fitting a larger model.

As with each survey after 1999, an important feature of the 2016 NSDUH sample weighting was to capitalize on the inherent two-phase nature of the NSDUH design (although the design was primarily viewed as multistage) by adding a step to poststratify the household weights in the first phase of the screening interview (see Exhibit 1.1). This reduced coverage bias resulting from the first phase of sampling and produced estimated controls for use in poststratification of person-pair weights and household weights in the second phase of the main interview. No other suitable source was available for obtaining these controls for poststratification. Note also that screener DU weights were poststratified to population counts by adjusting the DU's weighted contribution of person counts to various demographic domains. The second important feature was to add a step to poststratify selected people (including respondents and nonrespondents) to estimated controls from the large first-phase sample of people for various predictor variables at the segment, DU, and person levels. This provided stable controls for the step involving the nonresponse adjustment of respondent weights. Incorporating this important feature would not have been possible without screener data on the sociodemographics of members of the selected households.

[3] The survey was known as the National Household Survey on Drug Abuse (NHSDA) before 2002.

Exhibit 1.1 Sampling Weight Calibration Steps



As in previous NSDUHs, a modification of the earlier methodology of scaled constrained exponential modeling (CEM) (Folsom & Witt, 1994) was used to meet the new demands on the weighting mentioned previously (i.e., the two-phase design and large number of available predictors). The modified methodology, called the generalized exponential model (GEM) (Folsom & Singh, 2000), has several features:

- Like CEM, GEM can use a large number of predictor variables, such as those obtained from the first-phase screener sample for the 50 states plus the District of Columbia, and some of their interactions.
- GEM allows unit-specific bounds for the weights initially identified as extreme, which provide tight controls on the extreme weights. This built-in control is often adequate, in that the frequency of extreme weights, after the nonresponse and poststratification adjustments, is not usually high. However, if this is not the case, GEM can be used for a separate extreme weight adjustment after poststratification. This extra adjustment, which uses tighter bounds, will preserve the demographic population controls used in the poststratification step.

- GEM provides a unified approach to nonresponse, poststratification, and extreme weight adjustments. The differences are only in terms of the bounds and control totals that are used.
- GEM can be implemented efficiently using software developed at RTI.
- GEM is a generalization of the commonly used raking-ratio method in which a distance function is minimized such that (1) the initial weights are perturbed only a little and lie within certain bounds, and (2) control totals are met. It is also a generalization of Deville and Särndal's (1992) logit method in that the bounds on weights are not required to be uniform. Moreover, the lower bound can be set to one, which is desirable for the nonresponse adjustment. Like the previously mentioned methods, fitting GEM requires iterations (such as Newton-Raphson).

The report is organized as follows. In Chapter 2, GEM is reviewed, and a heuristic description outlines how GEM provides a unified approach to all three procedures' adjustments for nonresponse, poststratification, and extreme weight adjustment. In Chapter 3, potential predictor variables for use with nonresponse, poststratification, and extreme weight are discussed, and the strategy for dealing with many predictors via modeling groups of states is reviewed. In Chapter 4, practical steps for implementing GEM for the 2016 NSDUH are presented, and in Chapter 5, details of the weight calibrations, including all weight components corresponding to Phases I and II, are given. Chapter 6 presents the evaluation measures of calibrated weights and a sensitivity analysis of point estimates and standard errors (adjusted for calibration) of selected drug prevalence estimates, major depressive episode, and serious mental illness. The sensitivity analysis compares the estimates and standard errors from final models to those of the baseline models (which consist of only main effects). Nine appendices also are included. Appendix A presents technical details about GEM, Appendix B documents the creation and source of the poststratification control totals, and Appendix C contains information on the imputation methodology. Appendix D summarizes the GEM modeling, and the remaining five appendices contain various tables on weighted response rates, percentages of extreme weights and outwinsors, slippage rates, and weight adjustment summary statistics.

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2. Generalized Exponential Model for Weight Calibration

In survey practice, design weights are typically adjusted in three steps via the following methods: (1) weighting class adjustments for nonresponse, (2) raking-ratio adjustments for poststratification, and (3) winsorization for extreme weights. The bias introduced by winsorization is alleviated to some extent through poststratification. The nonresponse (nr) adjustment is a correction for bias that is introduced when estimates are based only on responding units; poststratification is an adjustment for coverage (typically undercoverage) bias, as well as for variance reduction (which is possibly due to correlation between the study and control, usually demographic, variables). If weights are not treated for extreme weight adjustment, the resulting estimates, although unbiased, will tend to have lower precision.

There are limitations in the existing methods of weight adjustment for nonresponse, poststratification, and extreme weight. For the nonresponse step, there are general raking-type methods, such as the scaled constrained exponential model developed by Folsom and Witt (1994), where the lower and upper bounds can be suitably chosen by using a separate scaling factor. The factor is set as the inverse of the overall response propensity. It would be beneficial to have a model for the nonresponse adjustment factor that incorporates the desired lower and upper bounds on the factor as part of the model. Note that the lower bound on the nonresponse adjustment factor should be 1 because it is interpreted as the inverse of the probability of response for a particular unit. For the poststratification step, the general calibration methods of Deville and Särndal (1992), such as the logit method, allow for built-in lower (L) and upper (U) bounds (for poststratification, typically $L < 1 < U$). However, it would be useful to have nonuniform bounds (L_k, U_k) depending on the unit k, such that the final adjusted weights, w_k, could be controlled within certain limits. An important application of this feature would be weight adjustments to allow the user to have some control over the final adjustment of weights initially identified as extreme weights. It would be advantageous to adjust for bias introduced in the extreme weight adjustment step (such as when extreme weights are treated via winsorization) so that the sample distribution for various demographic characteristics is preserved.

A modification of the earlier method of the scaled constrained exponential model of Folsom and Witt (1994), termed the generalized exponential model (GEM) and proposed by Folsom and Singh (2000), provides a unified approach to the three weight adjustments for nonresponse, poststratification, and extreme weight, and it has the valuable features mentioned previously. The functional form of the GEM adjustment factor is given in Appendix A. It generalizes the logit model of Deville and Särndal (1992), typically used for poststratification, such that the bounds (L, U) may depend on k. Thus, it provides a built-in control on extreme weights, during both nonresponse adjustments and poststratification. In addition, the bounds are internal to the model and can be set to chosen values (e.g., $L_k = 1$ in the nonresponse step). If the frequency of extreme weights is low after the final poststratification, a separate extreme weight adjustment step may not be necessary.

Note that in view of the nonresponse adjustment factor being defined as the inverse of response propensity, GEM requires it to be greater than 1. However, the built-in extreme weight

control feature of GEM essentially defines adjustment factors with regard to the critical value under winsorization. Therefore, although the adjustment factor with regard to the cutoff point is always greater than 1, with regard to the original weight, it can be less than 1. (See the example in Section 4.2 for details.)

In fitting GEM to a particular problem, choosing a large number of predictor variables along with tight bounds will have an impact on the resulting unequal weighting effect (UWE) and the percentage of extreme weights. In practice, this leads to somewhat subjective evaluations of trade-offs between the target set of bounds for a given set of factor effects, the target UWE, and the target proportions of extreme weights. The percentage of "outwinsors" (a term coined to signify the extent of residual weights after extreme weight adjustment via winsorization) is probably a more realistic benchmark in determining the robustness of estimates in the presence of extreme weights. Chapter 4 provides details about the GEM process and some practical guidelines about fitting such a model. In particular, an adaptive method based on realized minimum and maximum bounds after setting loose initial bounds is recommended for choosing bounds more objectively.

A large increase in the number of predictor variables in GEM typically would result in a higher UWE, indicating a possible loss in precision. By looking at the change in variance calculated for a model run with the minimal number of predictor variables versus the final model we reached during the weighting process, a more precise measure of loss (or gain) in precision can be obtained for variance of selected study variables. The results are presented in Chapter 6.

3. Predictor Variables in GEM for the 2016 NSDUH

For the 2016 National Survey on Drug Use and Health (NSDUH), the initial set of predictor variables was identical to the set used for the 2015 NSDUH. Exhibit 3.1 shows the definitions and levels of these predictor variables. Typical predictors used for the screener dwelling unit (DU) nonresponse adjustment were State, Quarter, Group Quarters Indicator, Population Density, Percentage Hispanic or Latino in Segment, Percentage Black or African American in Segment, Percentage Owner-Occupied DUs in Segment, and Segment-Combined Median Rent and Housing Value, which is also called the Socioeconomic Status (SES) indicator. The SES indicator was a composite measure based on (standardized) median rent, median housing value, and the percentage of dwellings that are owner occupied. Typical predictors for the person-level nonresponse adjustments were, in addition to those stated previously, Age, Gender, Race, Hispanicity, and Relation to Householder (i.e., the head of the household). For poststratification, predictors typically used were State, Age, Race, Gender, Hispanicity, and Quarter. In all cases, the model consisted of main effects and some interactions of these predictors. For a separate extreme weight adjustment with the generalized exponential model (GEM) after poststratification, the predictors were the same as those used in the poststratification (ps) adjustment.

Generally, it is desirable to include, whenever possible, poststratification predictors (correlated with the outcome variable) as part of nonresponse predictors (correlated with the response variable) because of the potential variance reduction; this works to offset the variance inflation, which is due to the random controls used in the nonresponse (nr) adjustment. In general, this is not possible because demographic information (often used for poststratification) is not available for nonrespondents. However, with a two-phase design, such as NSDUH's, this problem does not exist because the screener data contain the necessary information. There is, of course, the cost in time and effort required to edit and impute the screener-based predictors in advance of this nonresponse adjustment. Many times, the need to edit, impute, or both edit and impute nonresponse predictors for the full sample, which consists of respondents and nonrespondents, is eliminated because the poststratification and nonresponse adjustments are combined into a single poststratification step. However, the processes leading to nonresponse and coverage errors are likely to be different enough to benefit from separate modeling. The nonresponse-adjustment models also can benefit from bias reduction when segment-level variables, such as the percentage of owner-occupied DUs, are included in the model. Population totals for these segment-level variables have not been developed for use as poststratification controls.

Exhibit 3.1 Definition of Levels for Variables

Age (years)
1: 12-17, 2: 18-25, 3: 26-34, 4: 35-49, 5: 50+[1,2]

Gender
1: Male, 2: Female[1]

Group Quarters Indicator
1: College Dorm, 2: Other Group Quarter, 3: Non-Group Quarter[1]

Hispanicity
1: Hispanic or Latino, 2: Non-Hispanic or Latino[1]

Percent of Owner-Occupied Dwelling Units in Segment (% Owner-Occupied)
1: 50-100%,[1] 2: 10-<50%, 3:0-<10%

Percent of Segments That Are Black or African American
1: 50-100%, 2: 10-<50%, 3: 0-<10%[1]

Percent of Segments That Are Hispanic or Latino
1: 50-100%, 2: 10-<50%, 3: 0-<10%[1]

Population Density
1: MSA 1,000,000 or More, 2: MSA Less than 1,000,000, 3: Non-MSA Urban, 4: Non-MSA Rural[1]

Quarter
1: Quarter 1, 2: Quarter 2, 3: Quarter 3, 4: Quarter 4[1]

Race (3 levels)
1: White,[1] 2: Black or African American, 3: Other

Race (5 levels)
1: White,[1] 2: Black or African American, 3: American Indian or Alaska Native, 4: Asian, 5: Two or More Races

Relation to Householder
1: Householder or Spouse,[1] 2: Child, 3: Other Relative, 4: Nonrelative

Segment-Combined Median Rent and Housing Value (Rent/Housing)[3]
1: First Quintile, 2: Second Quintile, 3: Third Quintile, 4: Fourth Quintile, 5: Fifth Quintile[1]

States[4]

Model Group 1:	1: Connecticut, 2: Maine, 3: New Hampshire, 4: Rhode Island, 5: Vermont, 6: Massachusetts[1]
Model Group 2:	1: New Jersey,[1] 2: New York, 3: Pennsylvania
Model Group 3:	1: Illinois, 2: Indiana,[1] 3: Michigan, 4: Wisconsin, 5: Ohio
Model Group 4:	1: Iowa, 2: Kansas, 3: Minnesota, 4: Missouri,[1] 5: Nebraska, 6: South Dakota, 7: North Dakota
Model Group 5:	1: Delaware, 2: District of Columbia, 3: Georgia,[1] 4: Maryland, 5: North Carolina, 6: South Carolina, 7: Virginia, 8: West Virginia, 9: Florida
Model Group 6:	1: Alabama, 2: Kentucky, 3: Mississippi, 4: Tennessee[1]
Model Group 7:	1: Arkansas,[1] 2: Louisiana, 3: Oklahoma, 4: Texas
Model Group 8:	1: Colorado, 2: Idaho, 3: Montana, 4: Nevada, 5: New Mexico, 6: Utah, 7: Wyoming, 8: Arizona[1]
Model Group 9:	1: Alaska, 2: Hawaii, 3: Oregon, 4: Washington,[1] 5: California

MSA = metropolitan statistical area.

[1] The reference level for this variable. This is the level against which effects of other factor levels are measured.

[2] The age group 50+ was further broken down into 50-64 and 65+ for Person-Level Poststratification Adjustment and Person-Level Extreme Weight Adjustment, for which 65+ was used as the reference level.

[3] Segment-Combined Median Rent and Housing Value (also known as the Socioeconomic Status indicator) is a composite measure based on rent, housing value, and percent owner occupied.

[4] The states or district assigned to a particular model are based on census divisions.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Heuristically, the suitable number of state-specific controls should depend on the size of the realized sample in each state; because of this, the nature of the problem of too many controls in nonresponse- and poststratification-adjustment models is state specific. Therefore, for the 2016 NSDUH, the strategy proposed by Singh, Penne, and Gordek (1999) was followed and is discussed in the following paragraphs. Also using Singh et al. (1999), some general guidelines were used to choose an initial set of state-specific controls, and the initial set was modified iteratively as problems in maintaining them arose. The process began with the baseline model of one-factor effects and then proceeded with the addition of second- and third-order effects; collapsing was performed as necessary, depending on the individual state sample sizes. To obtain more precise state-level estimates, every effort was made to include as many important state-specific covariates as possible in models for nonresponse and poststratification weight adjustments. These covariates typically were defined by sociodemographic domains. However, keeping a multitude of state-specific covariates, especially higher order interactions, was not possible because individual state sample sizes were not large enough to support stable estimation of an adequate number of model parameters. Therefore, a hierarchical order was used for including covariates in the model; the order started with covariates at the national level, followed by covariates at the census division level within the nation, then covariates at the combined state level within the census division, and finally, whenever possible, covariates at the state level within the combined states.

When adding certain covariates to the model resulted in parameters that could not be estimated or were unstable, the hierarchy strategy mentioned previously was used to combine states within a census division so that covariates at the combined level could be included. However, this problem typically arose with state-specific higher order interactions, and states were collapsed only when combining levels of covariates within a state was not a reasonable alternative. This was thought to be beneficial in obtaining more reliable state-level estimates using small area estimation (SAE) techniques. The eight largest states were not combined with other smaller states, to the extent possible, so that direct state-level estimates could be obtained without relying on SAE.

As an objective check for the suitability of the number of factors, once a satisfactory convergent model was obtained (see Section 6.5 for details), the relative efficiency of a more complex model (with many effects) versus a simpler model (with fewer effects) was measured. In addition to the relative efficiency, the increase in the unequal weighting effect was checked.

For the 2016 NSDUH data, as for the previous years' data, it became apparent that the number of controls could be very high (in excess of 1,000). This many controls would be computationally prohibitive because the implementation of GEM involves iterative steps, and a matrix (whose dimension corresponds to the number of controls) must be inverted in each of these iterations. A solution would be to use separate models within groups of states rather than a single overall model. It can be shown that, if effects (two-factor or higher order) are always collapsed within a group of states, then fitting an overall model of GEM is equivalent to fitting separate models for each group. In this way, the computational problems associated with too many controls could be reduced. Therefore, in the 2016 NSDUH, as in the 1999 through 2015 surveys, nine model groups corresponding to the nine census divisions were used.

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4. Practical Aspects of Implementing GEM for NSDUH

As explained in Chapter 2, the generalized exponential model (GEM) can be used for nonresponse (nr) adjustment, poststratification (ps), and extreme weight (ev) adjustment (see Exhibit 4.1 for a schematic presentation of the steps). These steps were implemented using the GEM macro developed at RTI. A detailed discussion can be found in Chen, Penne, and Singh (2000).

4.1 Definition of Extreme Weights of Sampling Weights

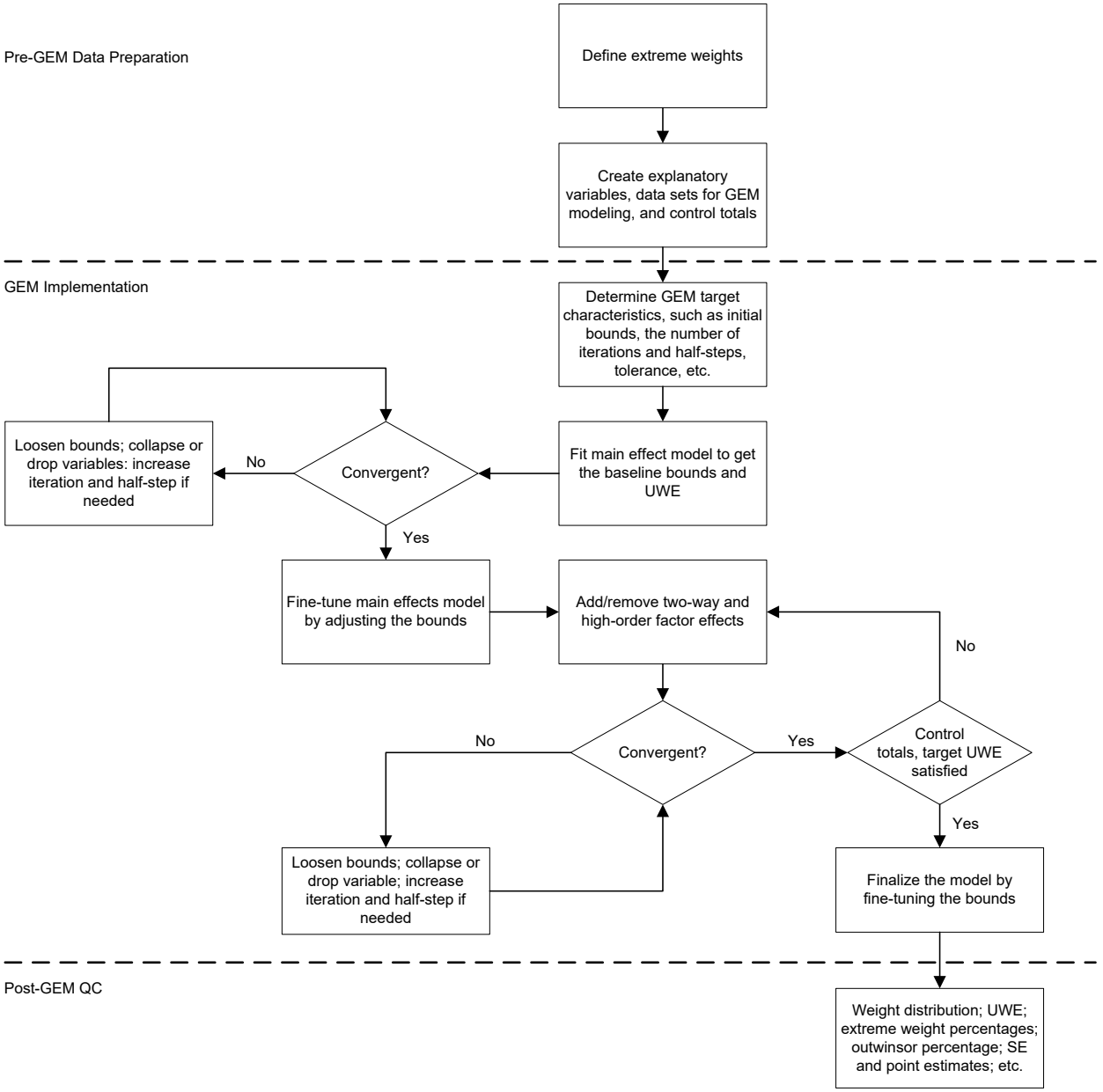
An important aspect of GEM is the built-in provision of extreme weight adjustment. Sampling weights for the survey generally were classified as extreme (high or low) if they fell outside the commonly used interval defined by the median $\pm 3 \times$ interquartile range (IQR) for some prespecified domains; these domains were usually defined by design strata, taking into account deep stratification. For example, the dwelling unit (DU)-level weight for the 2016 National Survey on Drug Use and Health (NSDUH) used the state sampling region (SSR) as the domain. The person-level weight adjustments used a hierarchy of four domains: (1) SSR × Age group, (2) State × Age group, (3) SSR, and (4) State. A minimum of 30 observations was required for defining the boundaries, or critical values, for extreme weights. If this minimum was not met at the lower level, the next level up in the hierarchy was used.

Although the SSR × Age group domain corresponded to a deep stratum, it could be unsuitable for defining extreme weights because of insufficient sample sizes. So, collapsing SSRs within a state gave rise to such domains as State × Age group. Even at this level, sample sizes could be insufficient, so SSRs and, later, states themselves could be used as domains to define extreme weights. The critical values for low and high extreme weights are denoted by $b_{k(l)}$ and $b_{k(u)}$, respectively. The critical points for extreme weights within GEM modeling were defined as the median $\pm 2.5 \times$ IQR, which was conservative when compared with the commonly used standard of the median $\pm 3 \times$ IQR. This is because, to better prevent the adjusted weights from crossing the standard boundary and those at or beyond the boundary, weights near but below it (which have the most potential to become extreme) were treated as extreme by GEM.

4.2 Definition of Lower and Upper Bounds for Weight Adjustment Factors

For implementing extreme weight control via GEM, the variable m_k was defined as $b_{k(u)} / w_k$ for high extreme weights, and $b_{k(1)} / w_k$ for low extreme weights, where w_k represents the sampling weight before adjustment, and $b_{k(u)}, b_{k(l)}$ denote the critical values for the extreme weights. (Note that under this definition, nonextreme weights have a value of 1 for m_k; for high extreme weights, the more extreme the weight is, the smaller m_k will be; conversely for low extreme weights, the more extreme the weight is, the bigger m_k will be.)

Exhibit 4.1 Generalized Exponential Model Steps



GEM = generalized exponential model; SE = standard error; UWE = unequal weighting effect.

The upper and lower bounds for the adjustment factors were defined, respectively, as the product of m_k and the upper and lower boundary parameters specified in the modeling of GEM. GEM allows inputs of three different upper (U) and lower (L) boundary parameters (L_1, and U_1, L_2, and U_2, L_3, and U_3, respectively) for high, non-, and low extreme weights. By applying a small upper boundary parameter for high extreme weights and a large lower boundary parameter for low extreme weights, the extreme weights could be controlled in the modeling.

GEM also requires specification of centers (C), such that L < C < U. For nonresponse adjustment, it was constructive to require all adjustments to be greater than 1 because the adjustments represented the inverse of response propensities. The value of C in this case was chosen as the inverse of the overall response propensity. For poststratification, centers were set to 1 so the adjusted weights would not be too far away from the original design weights. Here, lower bounds were chosen to be less than 1 and upper bounds were greater than 1 because the control totals could be larger or smaller than the estimated totals based on the design weights. The extreme weight adjustment is analogous to the poststratification adjustment (see Appendix A) in that it is a repeated poststratification with tighter bounds for extreme weights identified after the poststratification step. Section 4.7 gives guidelines for the choice of lower, center, and upper parameters.

The following example shows how the build-in extreme weight works. Table 4.1 lists 30 respondents from the dwelling-unit nonresponse (DUNR) adjustment step from 2016 NSDUH Model Group 3. Outlier level 0 is for nonextreme weight, 1 for high extreme weight, and 2 for low extreme weight. PRE_WT is the weight before PLNR adjustment, which is the product of weight 1 to weight 13. The critical values $b_{k(l)}$ and $b_{k(u)}$ are defined as median $\pm 2.5 \times$ IQR. L and U are nominal bounds that we specified in GEM modeling. m_k is defined as 1 for nonextreme weights, $b_{k(u)}$/PRE_WT for high extreme weights, and $b_{k(l)}$ /PRE_WT for low extreme weights. L_k is the actual lower bound for a certain respondent, which is the product of nominal lower bound L and m_k, whereas U_k is the upper bounds for the respondent, which is the product of nominal upper bound U and m_k. Alpha is the final nonresponse adjustment calculated from GEM, and POST_WT is weight after nonresponse adjustment, which is the product of PRE_WT and adjustment factor alpha.

Although GEM requires the nonresponse adjustment factor to be greater than 1, the actual adjustment could be less than 1 because of m_k. For example, respondent Case 18 has a high extreme weight of 2,134.50. The nominal lower bounds for GEM is 1.24, the actual lower and upper bounds are 0.5252 and 1.1437, and the adjustment factor is 0.9048, which is less than 1. Meanwhile, GEM also requires the nonresponse adjustment factor to be less than 5 (less than 3 for high extreme weights), but the actual adjustment could be greater than 5 because of m_k. For example, Case 30 has a low extreme weight of 693.58. The nominal higher bounds for GEM is 5.00, the actual lower and upper bounds are 1.0294 and 5.1468, and the adjustment factor is 5.1466, which is greater than 5.

We applied tighter upper bounds for the high extreme weights and tighter lower bounds for the low extreme weights so that the high extreme weights will not have a large adjustment

factor to make them more extreme, and the low extreme weights will not have a small adjustment factor to make them more extreme.

Table 4.1 List of 30 Respondents with Pre- and Post-Weights, Critical Values, Bounds, and Adjustment Factors from the Dwelling-Unit Nonresponse Adjustment Step for 2016 Model Group 3

Case ID	Outlier	PRE_WT	$b_{k(l)}$	$b_{k(u)}$	m_k	L	U	L_k	U_k	Alpha	POST_WT
1	0	575.79	109.66	1444.48	1.0000	1.00	5.00	1.0000	5.0000	1.1378	655.11
2	0	671.19	459.18	895.06	1.0000	1.00	5.00	1.0000	5.0000	1.4735	989.01
3	0	743.88	518.86	968.91	1.0000	1.00	5.00	1.0000	5.0000	1.3235	984.50
4	0	660.85	518.46	945.53	1.0000	1.00	5.00	1.0000	5.0000	2.1374	1412.52
5	0	785.59	672.61	882.02	1.0000	1.00	5.00	1.0000	5.0000	1.2383	972.80
6	0	663.66	507.38	853.57	1.0000	1.00	5.00	1.0000	5.0000	1.1486	762.26
7	0	774.84	483.18	1049.59	1.0000	1.00	5.00	1.0000	5.0000	1.1243	871.11
8	0	1066.54	684.26	1489.76	1.0000	1.00	5.00	1.0000	5.0000	1.2771	1362.07
9	0	742.36	483.18	1049.59	1.0000	1.00	5.00	1.0000	5.0000	1.2667	940.35
10	0	660.27	464.34	896.74	1.0000	1.00	5.00	1.0000	5.0000	1.4735	972.92
11	1	941.42	683.84	924.15	0.9604	1.24	2.70	1.1909	2.5930	1.3009	1224.67
12	1	928.17	675.04	879.18	0.9289	1.24	2.70	1.1518	2.5080	1.2582	1167.84
13	1	928.17	675.04	879.18	0.9289	1.24	2.70	1.1518	2.5080	1.2582	1167.84
14	1	1343.00	793.12	1384.10	0.9939	1.24	2.70	1.2325	2.6836	1.3685	1837.86
15	1	863.38	542.91	805.55	0.9077	1.24	2.70	1.1255	2.4507	1.1939	1030.80
16	1	898.12	675.04	879.18	0.9600	1.24	2.70	1.1904	2.5919	1.2644	1135.56
17	1	898.12	675.04	879.18	0.9600	1.24	2.70	1.1904	2.5919	1.2644	1135.56
18	1	2134.50	683.84	924.15	0.4236	1.24	2.70	0.5252	1.1437	0.9048	1931.33
19	1	941.42	683.84	924.15	0.9604	1.24	2.70	1.1909	2.5930	1.3009	1224.67
20	1	2134.50	683.84	924.15	0.4236	1.24	2.70	0.5252	1.1437	0.9048	1931.33
21	2	678.72	713.37	829.53	1.0653	1.00	5.00	1.0653	5.3265	1.4830	1006.53
22	2	549.91	551.37	794.27	1.0395	1.00	5.00	1.0395	5.1973	1.5777	867.58
23	2	549.57	530.81	822.96	1.0102	1.00	5.00	1.0102	5.0508	1.1225	616.90
24	2	687.58	672.61	882.02	1.0036	1.00	5.00	1.0036	5.0180	1.1679	803.04
25	2	538.18	519.53	759.40	1.0025	1.00	5.00	1.0025	5.0125	1.2177	655.34
26	2	549.57	530.81	822.96	1.0102	1.00	5.00	1.0102	5.0508	1.1225	616.90
27	2	532.41	542.91	805.55	1.0608	1.00	5.00	1.0608	5.3042	1.1898	633.43
28	2	549.91	551.37	794.27	1.0395	1.00	5.00	1.0395	5.1973	1.5777	867.58
29	2	549.91	551.37	794.27	1.0395	1.00	5.00	1.0395	5.1973	1.5777	867.58
30	2	693.58	701.17	854.36	1.0294	1.00	5.00	1.0294	5.1468	5.1466	3569.54

4.3 Definition of Control Totals

GEM modeling for nonresponse adjustment, poststratification, and extreme weight adjustment involved estimation of parameters of the adjustment factor model, such that specified control totals were satisfied. There were two types of control totals. For nonresponse adjustment, the control totals were from the full sample (i.e., respondents and nonrespondents), while for poststratification, control totals were obtained from external sources, such as the Census Bureau or a large first-phase screener sample. Specifically, for the 2016 NSDUH, the control totals for various domains for the selected person-level poststratification adjustment (sel.per.ps, see Section 5.2.2) were obtained from the first-phase sample containing roster information, and the control totals for the respondent person-level poststratification (res.per.ps, see Section 5.2.4) were obtained from the Census Bureau's Postcensal Population Estimates for various demographic domains. Controls used for extreme weight adjustment were the same as those for poststratification because they were based on the poststratified weight. (See Appendix B for more information.)

4.4 Efficient Computation Using Grouped Data

Because adjustment factors remained the same for units (DUs or people) having common values for all explanatory variables used in the model, the size of the sample data was reduced by grouping units having common values of these variables. Also, within the groupings, the units with extreme weights were further grouped such that, in addition to the common values of the explanatory variables, they also had common values of m_k. This significantly saved computation time, especially because the original sample size was large. Modeling GEM with grouped data was implemented by treating each group as a single record, with the associated weight defined as the sum of the individual weights in the group. Note that when using GEM with grouped data, the unequal weighting effect (UWE) and *t*-test statistics normally produced in the output would be misleading because the weights in grouped data are sums of the weights for the individual units within each group. Also, the definition of variance estimation stratum (VESTR) and replicates (VEREP) required for variance calculation would not be correct. To avoid these misleading results from using the grouped data, the final model was rerun with the full (ungrouped) data.

4.5 Steps in GEM Fitting

Exhibit 4.1 depicts the GEM steps. After specifying the GEM parameters, such as the initial upper and lower bounds, the number of the Newton-Raphson iterations and half-steps, and the type of weight adjustment (nonresponse adjustment, poststratification, or extreme weight adjustment), a forward selection method for modeling was used. A model with only main effects and loose bounds was first fit to obtain a set of realized baseline upper and lower bounds for extreme and nonextreme weights and to calculate a baseline UWE. Next, using the realized bounds, as many higher order interactions as possible were added to the model to help reduce bias, without unduly increasing the UWE and the extreme weight percentages. Convergence problems were addressed by loosening lower bounds and upper bounds and collapsing or dropping variables. In GEM, *t* tests and *p* values for significance of various effects could be computed for a previously converged model, which would be helpful in deciding about the collapsing of effects when convergence problems arose with realized bounds.

For this application, "collapsing" implies combining the "levels" of variables with other levels explicitly present in the model, while "dropping" implies combining with the reference levels, which are not explicitly represented in the model. Collapsing or dropping lower order interactions had a direct impact on the inclusion of the number of higher order interactions. For the 2016 NSDUH, when adding higher order terms, all previously selected explanatory variables were retained in the model. Possible reasons for nonconvergence included explanatory variables corresponding to domains with small sample sizes, or domains with large discrepancies between estimated totals based on the initial weights and the target control totals. The variables causing problems with convergence were identified by the high magnitude of the estimated model parameters. Once the explanatory variables were finalized, finer adjustments of upper bounds and lower bounds could optimize the model by reducing UWE and the extreme weight percentages.

4.6 Quality Control Checks

The distributions of the weights before and after each adjustment were compared to uncover any unusual impact of the weight adjustment on the initial weights. In addition to the weight distributions, the ratios of the maximum weight to the mean weight and the UWEs were compared across various domains both before and after each adjustment. The percentages of extreme weights were checked after each adjustment to see how effective the modeling was in controlling extreme weights. Coverage bias analysis based on the slippage (the distance between the total sample weighted count and the target population count) rates also was conducted to check the impact of poststratification on various noncontrolled domains (i.e., those factors that were dropped or collapsed in the model).

4.7 Practical Guidelines in Using GEM

1. Collapsing checks for domains with small sample sizes. The number of observations in various domains defined by levels of the factor effects was examined. If the domain sample size was 0 and the control total corresponding to this domain also was 0, the factor generally was dropped. This automatically collapsed the factor level with the reference level; however, if the control total was not 0, the factor could not be dropped because collapsing the domains together for the sample also would collapse the population domains together. The result would be that control totals could not be met for the reference levels involved. In these cases, the factor level corresponding to a 0 domain sample size should be collapsed with another level for which we are willing to compromise on satisfying the control total.

In general, domains with small sample sizes may cause problems during GEM modeling and prevent the model from converging. For the 2016 NSDUH, if the model did not converge because a domain sample size was small, the corresponding factor effect was collapsed with another effect based on substantive considerations. For example, if State was involved, then it was better, in general, to collapse within states; collapsing of geographically adjacent states was done only when there was no other reasonable alternative (see Section 4.8 for more details). The necessity of collapsing was checked at each stage of model enlargement in the forward selection of factors. If variables were collapsed at a previous stage, the corresponding factor levels were also collapsed using the hierarchy principle at succeeding stages involving higher order factor effects.

2. Singularity checks. As in the case of collapsing checks, singularity checks (i.e., linear dependence checks of realized value columns of the predictors) were performed for the baseline model; in addition, they were performed at each stage of model enlargement because singularities depended on what other predictors were in the model. (Note that, although all variables were linearly independent of each other, it was possible for the columns of their realized values to have been linearly dependent.) For nonresponse adjustment, any variable that was a linear combination of other variables was either dropped from the model or collapsed with other variables. To decide whether to drop or to collapse, a singularity check was performed for both respondents only and the full sample. If both samples showed the same set of variables causing singularity, then these singularity variables could be dropped; if not, collapsing needed to be performed. For poststratification adjustment, any variable that was a linear combination of other variables had to be collapsed with other variables because the variables corresponding to poststratification controls typically were linearly independent.

3. Finding the initial factor set. After the collapsing and singularity checks, the remaining factor effects at a given stage of model enlargement formed the initial factor set.

4. Baseline model. Starting with the model consisting of all one-factor effects from the initial factor set, a convergent version was found (after any required collapsing) under no restrictions on the bounds. The model was optimized by trying to reduce the UWE and tighten the bounds. If necessary (to obtain convergence), factors corresponding to large parameter estimates were collapsed. As an option, *p* values could have been used to determine which factors to collapse.

5. Baseline plus two-factor effects. All two-factor interactions from the initial factor set were added to the baseline model. A convergent version under no bound restrictions then was found, and the model was optimized using criteria described in Guideline 4. The non-state two-factor effects were added first, and then, in a separate step, the state two-factor effects were added.

6. Baseline with two and higher order factor effects. Starting with the optimized model from Guideline 5, the higher order factor effects were added—first the non-state three-factor effects, then, in a separate step, the state three-factor effects. Again, criteria from Guideline 4 were followed to obtain an optimal model.

7. Optimizing a model with respect to the target model characteristics. These are summarized in the following points:

- For each step of model enlargement, the UWE for the initial weights was computed. It was allowed to increase up to 20 percent, or the maximum allowable UWE (generally under six), whichever was lower.
- The following guidelines, based on empirical considerations, were used for setting the bounds. In the case of poststratification and separate extreme weight adjustments, the center was set as $C_1 = C_2 = C_3 = 1$. Instead of tightening the bounds to as close to 1 as possible, as was done for surveys before 2002, we used an adaptive approach to choose the bounds starting from the 2003 NSDUH; that is, starting with loose bounds of (0.1, 10), we performed GEM iteratively four times, each with the realized bounds from the previous iteration. The final bounds for nonextreme weights were desired to be around (0.2, 5). The iterations based on the adaptive approach generally met this desired criterion. If this was not the case, then collapsing of some model variables was allowed to meet this criterion. Finally, the bounds U_1 and L_3 were further tightened to be as close to 1 as possible to better control high and low extreme weights, while maintaining $L_3 \geq L_2$ and $U_1 \leq U_2$.
- In the case of nonresponse, the centers were set equal to the common value of the overall inverse response propensity, and all the three lower bounds (L_1, L_2, and L_3) were set to 1. Next, starting with the loose bounds of (1, 10), the bounds were chosen iteratively as mentioned above using the realized bounds from the previous GEM iteration. The bounds U_1 and L_3 were further tightened to as close to center as possible, while maintaining $L_3 \geq L_2$ and $U_1 \leq U_2$.

- Targets for the maximum acceptable percentages of extreme weights and outwinsors within GEM for nonresponse and poststratification were as follows: 3 percent for the unweighted extreme weights, 15 percent for weighted extreme weights, and 5 percent for outwinsors. These percentages are liberal and serve as guidelines only. In practice, reducing them by half is preferable. If these guidelines were not met after all stages of calibration, a separate GEM for adjustment of extreme weights was implemented after poststratification.

8. Evaluation measures. After each stage of model enlargement, various characteristics were examined for large values. These included the UWE, the ratio of the maximum to the mean for adjusted weight, the percentage of extreme weights and outwinsors, the distance between the total sample weighted count and the target population count (i.e., slippage rates for different domains), and other characteristics, such as weight summary statistics. In addition, the distributions of adjustment factors were checked for highly asymmetric tails. With the set of realized bounds for the final model, the baseline model was rerun, and then point estimates and standard errors (SEs) for selected outcome variables for the two models were compared. Generally, the two estimates were likely to be close, but not the SEs. The SEs for the final model were expected to be smaller but, at times, could be larger. Larger SEs were identified and examined because they could be an indication of instability of the model parameter estimates because of possible overfitting or insufficient sample sizes. In such situations, the final model was revised to get a more parsimonious model.

4.8 Variable Collapsing Guide

As discussed in Section 4.5, convergence problems in GEM were solved by either loosening bounds or collapsing model variables. Grouping proposed levels into a smaller number of categories could be done in several ways, but care was taken so that they remained meaningful. When constructing the model and attempting to obtain convergence, maintenance of logical groupings was a top priority. The following are some general guidelines that were followed when collapsing variables.

- *Ordinal variables*. Most of the proposed explanatory variables were ordinal. Thus, collapsing was done in a meaningful way, following the order. For example, the combined Rent/Housing quintile had five levels (i.e., 1st, 2nd, 3rd, 4th, and 5th quintile) with the 5th quintile set for the reference. If the 4th quintile needed to be collapsed, it would be collapsed with either the 3rd or 5th quintile.
- *Age groups*. Age group had five levels: 12 to 17, 18 to 25, 26 to 34, 35 to 49, and 50 or older (50 or older was further broken down into 50 to 64 and 65 or older for the person-level poststratification adjustment and the person-level extreme weight adjustment to increase the accuracy of estimates for these age groups). For the main effects, the age covariate with five or six levels was easy to incorporate in the model. For the interactions, every effort was made to maintain the age group, and, therefore, collapsing was performed within age groups first. Collapsing across age groups occurred only if the age groups could not be maintained separately.
- *Large and adjacent states*. In the main effects, fitting states separately in the model was not a problem. For the state-specific interactions, collapsing was done within the state first; collapsing with other adjacent states was done only if needed. For the eight

states with the largest sample sizes (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas), every effort was made to preserve all factor levels within states so that direct estimates could be made for the large states.

- *Race*. In the main effects and state-specific two-factor interactions, Race had five levels (white, black or African American, American Indian or Alaska Native, Asian, and two or more races), while in non-state-specific two- and three-factor effects, Race had three levels (white, black or African American, and other). If maintaining all five levels was difficult in the main effects or State × Race interactions, the following guidelines were followed: (1) collapse American Indian or Alaska Native and Asian if either of them caused a convergence problem; (2) collapse black or African American with two or more races if black or African American caused a convergence problem; (3) collapse two or more races with American Indian or Alaska Native or Asian, whichever had a smaller sample size, if two or more races caused a convergence problem; and (4) collapse American Indian or Alaska Native, Asian, and two or more races, or collapse all other Race groups if necessary. In the State × Race interactions, collapsing Race was done within State. If the three-level Race could not be maintained, the levels were collapsed to white and all other Race groups.

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5. Weight Calibration at Phase I Dwelling Unit and Phase II Person Levels

The 2016 National Survey on Drug Use and Health (NSDUH) was based on probability sampling so that valid inferences could be made from survey findings to the target population. Probability sampling refers to sampling in which every unit on the frame is given a known, nonzero probability of inclusion in the survey. This is required for unbiased estimation of the population total. The assumption of nonzero inclusion probability for every pair of units in the frame also is required for unbiased variance estimation. The basic sampling plan involved five stages of selection across two phases of design (see Exhibit 5.1). The first phase of the design was the dwelling unit (DU) level, and the second phase was the person level. The five stages of selection were as follows: within Phase I, (1) the selection of census tracts within the state sampling region (SSR); (2) the selection of census block groups from census tracts; (3) the selection of segments within each sampled census block group; (4) the selection of DUs within these segments, and within Phase II, and (5) the selection of eligible individuals within DUs (Table 5.1). Specific details of the sample design and sample selection procedures can be found in the 2016 sample design report in the *NSDUH Methodological Resource Book* (Center for Behavioral Health Statistics and Quality, 2017).

As part of the postsurvey data-processing activities, analysis weights were calculated for the 2016 NSDUH respondents that reflected the selection probabilities from various stages of the sample design. These sample weights were adjusted at both the DU level (screening sample) and person level (main interview sample) to account for bias due to extreme weights, nonresponse, and coverage.

The final Phase I DU-level and Phase II person-level sample weights for the 2016 NSDUH sample are products of several factors (see Exhibit 5.1), each representing either a probability of selection at some particular stage or some form of extreme weight, nonresponse, or poststratification adjustment. In the following sections, these components are described in greater detail. In summary, the first 11 factors are defined for all screener-complete DUs and reflect the fully adjusted DU-level weight. The latter five components reflect the person-level selection within each screened DU, as well as any additional adjustments for person-level extreme weight, nonresponse, and poststratification error. Note that the unconditional, final person-level weights for the 2016 NSDUH sample are the product of all 16 weight components, as illustrated in Exhibit 5.1.

Exhibit 5.2 shows the U.S. Census Bureau divisions and model groups used in the 2016 NSDUH person-level weight calibration.

Exhibit 5.1 Summary of 2016 NSDUH Sample Weight Components

Phase I Dwelling Unit Level

	2014-2016 Design Weight Components	Corresponding 2005-2013 Design Weight Components
#1	Inverse Probability of Selecting Census Tract	#1
#2	Inverse Probability of Selecting Census Block Group	
#3	Inverse Probability of Selecting Segment	#2
#4	Quarter Segment Weight Adjustment	#3
#5	Subsegmentation Inflation Adjustment	#4
#6	Inverse Probability of Selecting Dwelling Unit	#5
#7	Inverse Probability of Added/Subsampled Dwelling Unit	#6
#8	Dwelling Unit Release Adjustment	#7

	2014-2016 Weight Adjustment Components	Corresponding 2005-2013 Weight Adjustment Components
#9	Dwelling Unit Nonresponse Adjustment ***(res.sdu.nr)****	#8
#10	Dwelling Unit Poststratification Adjustment ***(res.sdu.ps)****	#9
#11	Dwelling Unit Extreme Weight Adjustment ***(res.sdu.ev)****	#10

Phase II Person Level

	2014-2016 Design Weight Component	Corresponding 2005-2013 Design Weight Component
#12	Inverse Probability of Selecting a Person within a Dwelling Unit	#11

	2014-2016 Weight Adjustment Components	Corresponding 2005-2013 Weight Adjustment Components
#13	Selecting Person-Level Poststratification Adjustment to Screener Data Controls ***(sel.per.ps)****	#12
#14	Person-Level Nonresponse Adjustment ***(res.per.nr)****	#13
#15	Person-Level Poststratification Adjustment ***(res.per.ps)****	#14
#16	Person-Level Extreme Weight Adjustment ***(res.per.ev)****	#15

* These adjustments use the generalized exponential model (GEM), which also involves pre- and postprocessing in addition to running the GEM macro. See Exhibit 4.1. For computational feasibility, all weight adjustments were done using the nine model groups based on U.S. census divisions defined in Exhibit 5.2.

Exhibit 5.2 U.S. Census Bureau Divisions/Model Groups

Model Group	Census Division
1	**New England (6 States)** Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
2	**Middle Atlantic (3 States)** New Jersey, New York, Pennsylvania
3	**East North Central (5 States)** Illinois, Indiana, Michigan, Ohio, Wisconsin
4	**West North Central (7 States)** Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
5	**South Atlantic (8 States and the District of Columbia)** Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, West Virginia
6	**East South Central (4 States)** Alabama, Kentucky, Mississippi, Tennessee
7	**West South Central (4 States)** Arkansas, Louisiana, Oklahoma, Texas
8	**Mountain (8 States)** Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, Wyoming
9	**Pacific (5 States)** Alaska, California, Hawaii, Oregon, Washington

Table 5.1 Sample Size, by Model Group for Each Stage of Sampling

Model Group	Eligible DUs	Completed DUs	Eligible People	Selected People	Completed People
1	17,241	13,275	27,433	8,391	5,686
2	21,247	15,000	32,611	10,391	7,025
3	23,212	18,087	38,132	13,117	9,215
4	16,760	14,144	28,566	9,532	6,808
5	33,831	25,958	54,067	17,631	12,761
6	9,429	7,749	16,072	5,493	3,863
7	12,807	10,646	22,627	8,338	6,209
8	16,651	13,822	29,307	10,458	7,854
9	21,971	16,507	37,562	12,256	8,521
Total	173,149	135,188	286,377	95,607	67,942

DU = dwelling unit.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

In the 2016 NSDUH, as in the 2000 through 2015 surveys, the order of the extreme weight adjustment step at both the DU and person level was different from the order used in the 1999 National Household Survey on Drug Abuse (NHSDA) computer-assisted interviewing (CAI). In the 1999 NHSDA CAI, the extreme weight adjustment step was introduced before nonresponse and poststratification, which was analogous to the traditional trimming step before nonresponse and poststratification. In the 1999 NHSDA, the initially identified extreme weights were held fixed at their winsorized values, and the nonextreme weights were adjusted so that the original sample distribution of the weights for various domains was preserved. As a better alternative for the surveys after 1999, the generalized exponential model (GEM) first was allowed to control the extreme weights during the nonresponse and poststratification steps, and then a separate extreme weight adjustment step was performed after poststratification, if necessary. This step would be like a repeated poststratification, except that the extreme weights identified after poststratification would have tighter bounds, thus preserving the sample distributions in various domains (equivalent to satisfying the poststratification controls). For the 2016 NSDUH, the extreme weight adjustment step was not necessary either at the DU level or at the person level.

5.1 Phase I Household-Level Weight Components

5.1.1 Weight Components #1 to #8: Selection of a Dwelling Unit

The first eight components in the Phase I sample weights reflect the probability of selecting the DUs. These components were derived from (1) the probability of selecting the census tract within each SSR, (2) the probability of selecting the census block group, (3) the probability of selecting the segment within each census tract, (4) a quarter segment weight adjustment, (5) a subsegmentation inflation factor, (6) the probability of selecting a DU from within each counted and listed sampled segment, (7) the probability of inclusion of added DUs, and (8) DU percent release adjustment.

Segments were selected with probabilities representing a full year's sample; therefore, Weight Component #4 was set to 1 in the 12-month analysis and was set to 2 in the 6-month analysis (because only half of the segments were used in the analysis). Also, when the field staff, who were responsible for counting and listing, traveled to a specified segment, occasionally they may have found the number of potential DUs to be much greater than what the sample frame (constructed from 2010 U.S. Census Bureau data adjusted for more recent Claritas projections) indicated. This happened either because of errors in the frame or, more commonly, because of rapid growth in a particular geographic area. When this occurred, the original segment was partitioned and a subsegment was randomly selected. There was an occasional second subsegmentation step when the initial partitioning of segments was insufficient due to out-of-date census counts or the segment was still too large to list after the original subsegmentation. Weight Component #5 (i.e., subsegmentation inflation factor) is an adjustment that accounts for this selection process.

As noted in the 2016 and earlier sample design reports, a lengthy process of determining the optimal DU sample was used during the design of the survey. Weight Component #6 is a result of this process and is equal to the inverse of the DU sample size divided by the total number of DUs counted and listed within a selected segment.

Furthermore, the list of DUs, which includes housing units and group quarters, was constructed by the counting and listing staff during the summer and fall of 2015. Because the listing was done a short time before the 2016 screening and interviewing activities began, no major discrepancies were expected. However, such factors as new construction, demolition, and inaccurate listing were present in some cases. More commonly, DUs may have been "hidden" and, therefore, overlooked by the counter and lister. For all DUs to be given a chance of being selected, the NSDUH has a procedure for locating and adding missed DUs. If the number of added DUs linked to any particular DU did not exceed 5, or if the number for the entire segment was less than or equal to 10, the FI was instructed to consider these DUs as part of his or her assignment. However, if either of these limits was exceeded, the FI would contact RTI for subsampling to be considered. Weight Component #7 accounts for any subsampling that occurred because of added DUs.

To account for corrections, modifications, or both that occurred during the process of design optimization, an additional sample was included throughout all four quarters. Weight Component #8 is the adjustment for the percentage of the DU sample released to FIs in these quarters.

For more detailed information on Weight Components #1 through #8, refer to the 2016 sample design report (Center for Behavioral Health Statistics and Quality, 2017).

5.1.2 Weight Component #9: Dwelling Unit–Level Nonresponse Adjustment

After DUs were selected, an FI was sent to the DU to screen the residence. Failure to obtain the screening interview from eligible DUs represented the first type of nonresponse encountered in the survey. To account for this nonresponse, as in previous surveys, the (unconditional) sample weights up to this point (equal to the product of Weight Components #1 through #8) were adjusted using a multiplicative adjustment factor derived from modeling response propensity via GEM.

5.1.3 Weight Component #10: Dwelling Unit–Level Poststratification Adjustment

The screener data provided a large sample with information on some demographic variables for the households; therefore, as in two-phase sampling, the screener dwelling unit (SDU) weights first were adjusted for nonresponse and poststratification. Later, estimates for household variables (which were based on screener data) were used as control totals for weight adjustments at the second phase and for person pair-level weights. This was useful because, unlike census controls that were available for individual people, no controls were available for person pairs. Note that for SDU poststratification, census controls still could be used because each SDU's contribution was computed as the number of people in the SDU who had certain demographic characteristics multiplied by the SDU weight. It follows that, although explanatory variables used for modeling the weight adjustment were counts instead of binary (0/1), as is often the case, person-level census controls still could be used. For example, age group had five categories (12 to 17, 18 to 25, 26 to 34, 35 to 49, and 50 or older); in SDU poststratification, category 12 to 17 was the number of the people in this age category within a DU, and so on. The intercept was the total number of people in the DU, which varied by SDU because SDU size was not constant. Note that when defining interaction control variables for count variables, the corresponding count variables were not simply multiplied, as was done for the binary case;

instead, the counts for the category defined by the interaction term (say, Age × Gender) were used.

In addition, the screening process only required the reporting of age for each person rostered; as a result, some fields of demographic information (e.g., race, Hispanic or Latino origin, gender, and two or more races) were missing. Missing data for race and Hispanic or Latino origin were imputed using the predictive mean neighborhood (PMN) methodology (see Appendix C). The probability of observing race (white, black or African American, American Indian or Alaska Native, Asian, and two or more races) was modeled using PROC MULTILOG in SUDAAN®, and the probability of observing Hispanic or Latino origin was modeled using PROC LOGISTIC in SAS. Those probabilities were used in computing predictive means and delta neighborhoods. The "hot deck" method then was used to randomly pick a donor from the neighborhood to impute a missing value for each case. Missing data for gender were imputed using an unweighted hot-deck methodology (see Appendix C). The data file was sorted by auxiliary variables that were considered relevant to the variable being imputed. The sort order of these auxiliary variables was chosen to reflect the degree of importance of the auxiliary variables in relation to the variable being imputed. Exhibit 5.3 displays the order in which demographic variables were imputed, along with explanatory variables used in the model or in hot-deck sorting.

Exhibit 5.3 Imputed Demographic Variables and Corresponding Explanatory or Auxiliary Sort Variables

Imputed Variable	Methodology	Explanatory or Auxiliary Sort Variables
Race	Multivariate predictive mean neighborhood (MPMN)	Census region, household type (white, black or African American, Hispanic or Latino), percentage of segments that are black or African American, percentage of segments that are Hispanic or Latino, percentage of owner-occupied dwelling units in segment, segment-combined median rent and housing value, age group
Hispanic or Latino Origin	Univariate predictive mean neighborhood (UPMN)	Census region, imputed race, household type (white, black or African American, Hispanic or Latino), percentage of segments that are black or African American, percentage of segments that are Hispanic or Latino, percentage of owner-occupied dwelling units in segment, segment-combined median rent and housing value, age group
Gender	Hot deck	Census division, imputation-revised Hispanic or Latino origin, imputation-revised race and a random sort number

5.1.4 Weight Component #11: Dwelling Unit–Level Extreme Weight Adjustment

The product of Weight Components #1 through #10 was checked to see if the extreme weight adjustment step was needed. Using the SSR as the domain for the extreme weight definition, weights were defined as extreme if they were outside the range defined by the median $\pm 3 \times$ interquartile range. Because the unweighted, weighted, and winsorized extreme weight percentages were not high, the extreme weight adjustment was not necessary (see results in Appendix F). Therefore, Weight Component #11 was set to 1 for every DU for which roster information was collected (i.e., every DU with a completed screener).

After this adjustment was completed, the final DU weight was calculated as the product of Weight Components #1 through #11 described previously. This adjusted weight was used to compute household-level estimates from the screener data. It also was used to compute person-level estimates derived from the full roster sample. In addition, these 11 weight components became the first 11 components of the final interview respondent sample weight. The remaining five weight components discussed in the next section account for the person-level probability of selection for those people for whom a NSDUH interview was sought; they also account for person-level nonresponse, extreme weights, and coverage errors resulting from the last stages of the sample design.

Details on the final models used for DU nonresponse (nr) and poststratification (ps) adjustment for each respective model group can be found in Appendix D.

Table 5.2 presents the weight distribution for design-based weight and unequal weighting effect (UWE) before the implementation of any weight adjustment and after the DU-level nonresponse adjustment and poststratification.

Table 5.2 Weight Distribution for Design-Based Weight and Weight after DU-Level Adjustments

	Minimum	25% Percentile	Median	75% Percentile	Maximum	Mean	*n*	UWE
Design-Based Weight	48	374	684	864	5,217	650	173,149	1.34
Weight after DU-Level Adjustments	12	436	907	1,235	10,844	914	135,165	1.43

DU = dwelling unit; UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

5.2 Phase II Person-Level Weight Components

5.2.1 Weight Component #12: Selection of a Person within a Dwelling Unit

The rate at which people were selected within each DU depended on the age group and was determined during the design of the 2016 study; this also was done for the probabilities of selecting DUs (i.e., Weight Component #6). Note that, similar to the previous surveys, all possible pairs of eligible rostered people were given some nonzero probability of selection to facilitate unbiased variance estimation. With the FIs' use of the Samsung tablets, selection probabilities were adjusted to reflect the total household composition. The survey design restricted the number of interviews to two per DU. With this restriction, a modified Brewer's selection method was used to select either zero, one, or two people from the DU. (Three ghost units were defined for each DU to allow for the selection of no people and to avoid division by 0 in Brewer's algorithm.) In short, if the sum of the selection probabilities for all eligible DU members was greater than 2, then the probabilities were ratio-adjusted to sum to 2; sums less than 2 were unadjusted. These adjusted rates then were retained as the final selection probabilities. An additional design change was made in 2002 and continued through 2016. A new pair-sampling strategy was implemented that increased the number of person pairs selected in DUs with older people on the roster (Chromy & Penne, 2002). Weight Component #12 represents the inverse of this probability of selection.

5.2.2 Weight Component #13: Selected Person-Level Poststratification Adjustment

The selected person-level poststratification step was started during the 1999 NHSDA. In NHSDAs before 1999, a combined step of person-level nonresponse and poststratification to estimated totals from the screener person data was used as a compromise to this step. As was done for the previous surveys, the combined step was divided into two separate steps; the first step was poststratification of the selected people (i.e., respondents and nonrespondents) to estimate control totals from the screener person data; the second step was respondent person-level nonresponse adjustment (see Component #14) to reproduce control totals from the selected person data (i.e., the full sample). Using two separate steps takes advantage of the inherent two-phase nature of the survey design (although the design is viewed primarily as multistage). With this step, more stable controls for the nonresponse adjustment were obtained (as compared with the traditional nonresponse adjustment) because of the additional selected-person poststratification. Note that this would not have been possible in the absence of screener data on the member demographics of the selected DUs. See Appendix D for details on the final models.

5.2.3 Weight Component #14: Respondent Person-Level Nonresponse Adjustment

The next step was to adjust the sample weights of the interview respondents to the weighted distributions over various demographic domains based on the full sample.

Demographic information for the main interview respondents was available from two sources—screener data and questionnaire data—while only screener data were available for the large first-phase sample of rostered individuals of all the screened DUs. However, to be consistent with respect to the data source, screener data for both respondents and nonrespondents were used for the person-level nonresponse adjustment. It may be noted that during screening, the only required demographic was the age of each person who was rostered. Thus, such demographics as race/ethnicity and gender of all the rostered eligible people were not required, and imputation procedures were needed to replace missing data for race/ethnicity and gender. For race/ethnicity, imputations were created using PMN methodology, and for gender, imputations were created using hot-deck methodology. It should be noted that answers from the questionnaire respondents potentially could cause discrepancies between screener values of demographics and their final imputation-revised values. Details on the final models used for the person nonresponse adjustment for each model group can be found in Appendix D.

5.2.4 Weight Component #15: Respondent Person-Level Poststratification Adjustment

This adjustment was to calibrate the weighted respondent-sample data for various demographic domains to the specified control totals obtained from the Census Bureau's estimates of the civilian, noninstitutionalized population aged 12 or older for the year 2016 based on the 2010 census. See Appendix B for details on the derivation of control totals.

After computing the various control totals that were needed, appropriate poststratification factors were applied to the sample weights using GEM to (1) control the resulting UWE and thereby reduce the potential variance inflation that could result from this weight adjustment, and (2) control for a larger number of main effect and lower order interaction control variables. Details on the final models used for the person-level poststratification adjustment for each model group can be found in Appendix D.

5.2.5 Weight Component #16: Respondent Person-Level Extreme Weight Adjustment

The weights for the product of Weight Components #1 through #15 were checked to see if the extreme weight adjustment step was needed, with extreme weights defined as described in Section 4.1. As in the case of Weight Component #11, unweighted, weighted, and winsorized extreme weight percentages were acceptably low. Therefore, it was decided that the extreme weight adjustment was not required at this stage either. See Appendix G for results. Therefore, Weight Component #16 was set to 1 for each responding person.

Table 5.3 presents the weight distribution and UWE before the implementation of any person-level weight adjustment and after selected person-level poststratification and person-level nonresponse adjustment and poststratification.

Table 5.3 Weight Distribution for Weight before Any Person-Level Adjustment and after Person-Level Adjustments

	Minimum	25% Percentile	Median	75% Percentile	Maximum	Mean	*n*	UWE
Weight before Any Person-Level Adjustment	12	938	1,866	3,494	67,588	2,808	95,607	2.07
Weight after Person-Level Adjustments	3	1,115	2,410	4,862	90,937	3,966	67,942	2.37

UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

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6. Evaluation of Calibration Weights

During the weight calibration process, several criteria for quality control were implemented to assess model adequacy. This chapter describes the individual procedures and presents a summary of their results. All tables referred to in this chapter can be found in Appendices E, F, G, H, and I. More details can be found in the supplement to the appendices.

6.1 Response Rates

Table E.1 in Appendix E displays the final sample sizes for the categories "selected," "eligible," and "completed" at the dwelling unit (DU) level, and for "selected" and "respondents" at the person level from the 2016 National Survey on Drug Use and Health (NSDUH), for both the national and state levels. This table also shows the weighted eligibility rates and weighted response rates for DU screeners and person-level interviews. Table E.1, at the national level, indicates an overall eligibility rate of 84.12 percent as compared with 83.52 percent for 2015. This similarity in overall rates held in nearly all states, with a few notable exceptions: the eligibility rate decreased from 89.63 to 75.40 percent for Idaho and increased from 76.27 to 82.63 percent for Alabama. The screening rate at the national level decreased from 79.69 percent for 2015 to 77.88 percent for 2016. The national interview response rate was 68.41 percent, a decrease of 0.74 percentage points compared with 69.15 percent for 2015, with the biggest decrease for Kentucky (from 71.97 percent for 2015 to 62.79 percent for 2016) and the biggest increase for Arizona (from 70.61 percent for 2015 to 75.35 percent for 2016). Table 6.1 presents summary statistics of overall response rates across individual states.

Table 6.1 Summary Statistics of Overall Weighted Response Rates across Individual States

Domain	National Level	Minimum	Median	Maximum
Dwelling Unit Level				
Eligibility Rate	84.12%	69.10% (Alaska)	83.53% (Indiana)	89.76% (Utah)
Screener Response Rate	77.88%	63.92% (New York)	81.20% (Virginia)	87.70% (North Dakota)
Person Level				
Interview Response Rate	68.41%	60.86% (Massachusetts)	69.35% (Alaska)	80.25% (New Mexico)

6.2 Percentages of Extreme Weights and Outwinsors

During the stages of modeling adjustments (i.e., nonresponse and poststratification), a major factor in deciding the adequacy of a particular model was the extent of resulting extreme weights among the weights. As explained in Section 4.1, the percentages of extreme weights for the input weight were calculated for some domains of interest prior to adjustment. These values then were compared with the resulting percentages of extreme weights using the product of weight components that included the new adjustment.

Table F.1 in Appendix F and Tables G.1 and G.2 in Appendix G present percentages of extreme weights at both the DU level for the nation and the person level for the individual states. Unweighted percentages are based on the actual counts of units and are defined as the ratio of extreme weights relative to the total sample size. Weighted percentages reflect the percentage of total extreme value weights relative to the total sample weight, while outwinsor percentages represent the total amount of residual weight (given that the weights are trimmed to the critical values that were used for extreme weight definition) relative to the total sample weight. For evaluation purposes, the outwinsor percentage is considered the most important of the three percentages. This assessment stems from the fact that its value reflects only the actual amount of weight that would be affected if trimming were implemented.

For the 2016 NSDUH sample, domains for extreme weight definitions were defined as follows for various weight adjustments via the generalized exponential model (GEM) (see Section 4.1):

- DU nonresponse by state sampling region (SSR);
- DU poststratification by SSR;
- selected person-level poststratification by SSR and age group,[4] state and age group, SSR, and state;
- person-level nonresponse by SSR and age group, state and age group, SSR, and state; and
- person-level poststratification by SSR and age group, state and age group, SSR, and state.

Before any weight adjustment was implemented, the percentage of unweighted extreme weights was 3.13 percent and the outwinsor was 0.54 percent for the product of design Weight Components #1 to #8. After DU-level nonresponse adjustment and poststratification, the percentage of unweighted extreme weights decreased to 1.55 percent and the outwinsor increased to 0.78 percent. When the design Weight Component #12 (inverse probability of selecting a person within a dwelling unit) was introduced, the percentage of unweighted extreme weights increased to 2.68 percent and the outwinsor increased to 1.39 percent. The person-level adjustments, which consisted of selected person-level poststratification, person-level nonresponse adjustment, and person-level poststratification, were able to bring down the percentage of unweighted extreme weights to 0.93 percent and the outwinsor to 0.48 percent.

6.3 Slippage Rates

The slippage rate for a given domain is defined as the percentage difference between the design-based domain population estimate and the census control total, relative to the census control, both before and after poststratification. The tables in Appendix H display national and state-level, domain-specific weight sums for both before and after poststratification. They also present the control totals to be met through poststratification and the relative percentage difference (or the amount of adjustment necessary [positive or negative] to meet the given totals). The first relative difference was used explicitly during the poststratification modeling

[4] Age group categories are 12 to 17, 18 to 25, 26 to 34, 35 to 49, and 50 or older.

procedure to identify potential problems for convergence; this was done because large differences in domains with relatively small sample sizes indicate potentially large adjustment factors, which may cause problems in convergence. The reason is that adjustments required for one domain may have an adverse effect for another domain when a unit belongs to both domains.

Consider Table H.11 for Florida, which indicates a sample size of 2,323 for race domain "white"; an initial total, also known as the design-based weight, of 13,055,033; a census total of 13,902,466; and an initial slippage rate of -6.10 percent. The ratio of the census total to the initial total gives the value of the weight adjustment: 1.06. Similar to this example, but in the opposite direction, is Table H.38 for Oklahoma. The domain "Age 65+" contains a sample size of 71 and an initial slippage rate of 10.95 percent. The initial total of 635,561 and the census total of 572,838 indicate that an adjustment of 0.90 would be required.

6.4 Weight Adjustment Summary Statistics

Tables I.1 to I.3 in Appendix I display summary statistics on the product of weight components for before and after all stages of adjustment, for both the DU and person levels. Note that these tables have before and after categories for all adjustments except for the DU poststratification (res.du.ps); this is because the before and after statistics are the same and are, therefore, displayed only as the category after. Note also that there could be changes, although minimal, in person-level specific demographic distributions from screener data to questionnaire data, so the respondent sample unequal weighting effect prior to poststratification based on the questionnaire data (e.g., see Table I.3, under the heading "After res.per.nr") would be only slightly different from what would be obtained after the nonresponse adjustment (e.g., see Table I.3, under the heading "Before res.per.ps"). The sample size (n) for the demographic domains from res.per.nr tables also could be different from the res.per.ps tables.

6.5 Sensitivity Analysis of Drug Use Estimates to Baseline Models

In general, there is a trade-off between bias reduction and variance reduction. For instance, with GEM (for nonresponse or poststratification), enlarging a simple model (such as the one with only main effects) has the potential of further reducing the bias. At the same time, this enlargement may be associated with a corresponding increase in the variance of the estimate of the population total. The increased variability comes from estimating the additional parameters included in the model. To check for possible overfitting of the GEM, a sensitivity analysis was conducted for the final poststratification step, where a simple baseline model was fitted with the same bounds and maximum number of iterations as those used for the final, more complex model. Then, point estimates and standard errors (SEs) were examined for substantial changes. If the SE increased only slightly under the complex model or, even better, if it decreased (which is possible because of the correlation between the study and predictor variables), then we would feel comfortable fitting the more complex model.

The SE, a ratio-adjusted estimator denoted by SE1, computed under the DESCRIPT procedure in SUDAAN®, treats the calibration adjustment factors as nonrandom. A more complete method of estimation would take into account the variability present in the weight adjustment. The sandwich formula for the Taylor linearization (see Vaish, Gordek, & Singh, 2000) is designed to provide an estimate of the variance that adjusts for the random calibration factors to sampling weights via GEM. This "sandwich variance," adjusting for the

poststratification variability, is denoted by SE2. Both SE1 and SE2 were calculated, as well as point estimates for a few important drug recency variables (past year marijuana, alcohol, and cigarette use), major depressive episode, and serious mental illness variables across four age groups (12 to 17, 18 to 25, 26 to 34, and 35 or older), for the eight states with the largest sample sizes.

When referring to the standard SUDAAN variance estimator for a survey weighted prevalence estimator, we call it the "naïve Taylor Series" standard error. The sandwich variance, also referred to as the variance estimate from a bias corrected estimating function (BCEF) (Singh & Folsom, 2000), is the "correct" Taylor Series linearization for the survey weighted prevalence estimate when the weights have been calibrated for nonresponse or poststratification. The sandwich variance estimates account for the variance contribution from the weight calibration. It was found in a preliminary study that the naïve Taylor linearization variance is somewhat conservative in comparison with the sandwich variance. The variance estimates of selected outcomes in Tables 6.2 to 6.8 show that, in general, sandwich variances (SE2) are smaller than the naïve Taylor linearization variances (SE1), with a few exceptions. These results confirm the conjecture that BCEF variances, or sandwich variances, are smaller despite the possibility of inflating variance due to adding the weight adjustment variation.

As noted previously, to check for overfitting, the variances of the baseline and final models were compared. In Tables 6.2 to 6.8, there are cases where the SE from the final model is slightly larger than the SE from the baseline model, indicating possible overfitting. However, the variance estimates for the two models (baseline and final) are generally similar to each other. Note that smaller variance estimates for the final model would indicate that the complex model for the poststratification adjustment resulted in better variance reduction (because of correlation between study and predictor variables) and bias reduction (because of meeting control totals corresponding to a number of factor effects). Therefore, the evidence does not favor the view that fitting a large number of parameters in GEM creates instability in estimates.

Table 6.2 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Lifetime Licit Drug Estimates, Cigarettes and Alcohol: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime											
Total	Point Estimates	57.52	57.41	50.86	50.65	53.12	53.25	56.84	56.26	62.12	62.04
	SE1	0.31	0.32	1.02	1.04	1.31	1.34	1.71	1.78	1.43	1.45
	SE2	0.28	0.28	0.88	0.87	1.27	1.20	1.67	1.73	1.39	1.41
12-17	Point Estimates	11.64	11.60	11.45	11.28	10.99	11.06	13.70	13.84	10.56	10.61
	SE1	0.32	0.32	1.05	1.01	1.30	1.32	1.47	1.53	1.32	1.33
	SE2	0.32	0.32	1.04	1.03	1.29	1.27	1.47	1.58	1.32	1.33
18-25	Point Estimates	50.65	50.53	43.49	43.19	43.06	42.82	51.16	51.39	52.79	52.64
	SE1	0.56	0.56	1.90	1.88	2.41	2.45	2.57	2.61	2.47	2.54
	SE2	0.55	0.52	1.90	1.76	2.41	2.16	2.56	2.62	2.44	2.18
26-34	Point Estimates	64.79	64.59	60.55	60.96	58.34	58.67	64.42	65.07	67.44	66.81
	SE1	0.62	0.63	2.04	2.05	2.29	2.33	2.72	2.80	3.39	3.42
	SE2	0.60	0.57	2.00	2.01	2.28	2.21	2.70	2.70	3.37	3.12
35+	Point Estimates	63.92	63.84	55.87	55.55	58.74	58.91	62.76	61.56	70.34	70.32
	SE1	0.42	0.43	1.46	1.49	1.67	1.71	2.38	2.54	1.76	1.81
	SE2	0.40	0.40	1.35	1.32	1.64	1.60	2.34	2.55	1.75	1.95
Alcohol Lifetime											
Total	Point Estimates	80.40	80.23	77.87	77.54	81.24	81.42	81.05	80.76	84.65	84.67
	SE1	0.24	0.25	0.92	0.92	1.06	1.07	1.12	1.22	0.90	0.93
	SE2	0.21	0.20	0.80	0.74	1.02	0.95	1.09	1.07	0.87	1.19
12-17	Point Estimates	27.07	26.97	27.12	26.95	30.77	30.76	27.75	27.80	30.05	30.05
	SE1	0.44	0.45	1.45	1.44	1.60	1.63	2.03	2.09	1.82	1.82
	SE2	0.44	0.44	1.43	1.43	1.58	1.61	2.05	2.15	1.83	1.87
18-25	Point Estimates	81.52	81.32	78.89	78.77	80.07	80.14	79.62	79.75	82.09	82.04
	SE1	0.41	0.42	1.52	1.51	1.59	1.60	1.89	1.92	1.85	1.87
	SE2	0.41	0.39	1.51	1.45	1.59	1.54	1.92	2.02	1.86	1.78
26-34	Point Estimates	89.71	89.56	88.91	88.94	88.27	88.54	87.08	87.41	92.51	92.08
	SE1	0.41	0.43	1.49	1.53	1.35	1.35	2.27	2.30	1.57	1.71
	SE2	0.40	0.39	1.45	1.48	1.35	1.30	2.27	2.25	1.57	1.60
35+	Point Estimates	85.82	85.63	82.44	81.97	86.03	86.24	88.01	87.36	91.41	91.50
	SE1	0.32	0.33	1.21	1.23	1.39	1.39	1.38	1.59	1.12	1.15
	SE2	0.29	0.28	1.11	1.05	1.35	1.26	1.36	1.41	1.10	1.77

(continued)

Table 6.2 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Lifetime Licit Drug Estimates, Cigarettes and Alcohol: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime									
Total	Point Estimates	56.30	55.97	63.58	63.25	60.41	60.10	51.11	51.17
	SE1	1.44	1.44	1.36	1.42	1.33	1.38	1.33	1.32
	SE2	1.36	1.30	1.34	1.31	1.31	1.26	1.22	1.17
12-17	Point Estimates	7.38	7.60	14.58	14.55	10.71	10.25	9.35	9.21
	SE1	1.07	1.10	1.75	1.75	1.41	1.38	1.17	1.23
	SE2	1.07	1.09	1.76	1.76	1.41	1.37	1.17	1.23
18-25	Point Estimates	46.86	47.00	53.95	53.57	54.95	54.27	49.43	49.30
	SE1	2.32	2.32	2.18	2.18	2.55	2.64	2.47	2.53
	SE2	2.30	2.17	2.17	2.13	2.55	2.51	2.42	2.23
26-34	Point Estimates	66.22	65.73	68.17	67.49	67.94	68.01	60.48	60.24
	SE1	2.57	2.56	2.56	2.63	2.72	2.91	2.69	2.73
	SE2	2.56	2.41	2.55	2.43	2.69	2.20	2.63	2.45
35+	Point Estimates	62.38	61.90	71.41	71.23	66.43	66.04	56.54	56.74
	SE1	1.90	1.92	1.75	1.85	1.78	1.84	1.86	1.86
	SE2	1.84	1.81	1.74	1.80	1.78	1.89	1.77	1.70
Alcohol Lifetime									
Total	Point Estimates	79.15	79.28	85.47	85.22	83.67	83.47	75.01	74.99
	SE1	1.05	1.09	0.86	0.89	1.10	1.18	1.08	1.08
	SE2	0.95	0.86	0.83	0.74	1.06	0.91	0.90	0.82
12-17	Point Estimates	28.88	29.13	28.10	28.19	26.51	25.77	24.12	23.96
	SE1	1.62	1.62	2.14	2.11	2.01	2.00	1.83	1.90
	SE2	1.61	1.59	2.14	2.07	2.02	1.94	1.83	1.84
18-25	Point Estimates	83.27	83.25	84.93	84.79	87.14	86.66	77.35	77.15
	SE1	1.43	1.40	1.70	1.69	1.63	1.91	1.74	1.80
	SE2	1.42	1.37	1.69	1.62	1.64	1.79	1.71	1.75
26-34	Point Estimates	89.22	89.10	92.37	91.74	91.48	90.83	87.26	87.43
	SE1	1.70	1.78	1.56	1.74	2.39	2.89	1.80	1.79
	SE2	1.67	1.59	1.54	1.35	2.37	1.54	1.77	1.72
35+	Point Estimates	82.60	82.77	92.26	92.13	88.91	88.86	80.38	80.37
	SE1	1.42	1.46	1.09	1.12	1.35	1.41	1.59	1.57
	SE2	1.32	1.18	1.07	1.06	1.35	1.31	1.40	1.27

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table 6.3 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Lifetime Illicit Drug Estimates, Marijuana and Cocaine: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime											
Total	Point Estimates	44.12	43.99	43.06	42.83	39.75	39.73	41.66	41.30	46.96	47.31
	SE1	0.32	0.33	1.11	1.11	1.61	1.60	1.58	1.60	1.49	1.55
	SE2	0.29	0.28	1.00	0.94	1.53	1.37	1.58	1.55	1.48	1.45
12-17	Point Estimates	14.84	14.77	17.44	17.32	18.41	18.33	16.78	16.83	16.76	16.74
	SE1	0.35	0.35	1.29	1.26	1.55	1.54	1.66	1.69	1.54	1.55
	SE2	0.35	0.35	1.29	1.27	1.54	1.51	1.65	1.69	1.54	1.55
18-25	Point Estimates	51.86	51.77	51.88	51.82	50.58	50.88	50.23	50.30	55.28	54.99
	SE1	0.53	0.54	1.82	1.84	2.42	2.43	2.26	2.25	2.45	2.54
	SE2	0.53	0.50	1.82	1.78	2.42	2.21	2.26	2.28	2.43	2.14
26-34	Point Estimates	56.28	56.08	54.10	54.76	51.56	51.57	55.14	55.73	57.67	57.25
	SE1	0.66	0.67	2.37	2.41	2.68	2.71	2.77	2.81	2.98	3.04
	SE2	0.64	0.61	2.31	2.26	2.63	2.49	2.77	2.75	2.95	2.82
35+	Point Estimates	44.06	43.93	42.16	41.67	38.17	38.11	40.58	39.82	47.44	48.11
	SE1	0.45	0.46	1.56	1.53	2.18	2.17	2.25	2.26	2.02	2.12
	SE2	0.41	0.39	1.45	1.31	2.10	1.92	2.23	2.16	2.02	2.08
Cocaine Lifetime											
Total	Point Estimates	14.45	14.43	17.34	17.26	12.93	12.84	11.86	11.79	12.90	13.16
	SE1	0.22	0.23	0.80	0.79	0.88	0.87	0.93	0.93	0.95	0.97
	SE2	0.21	0.21	0.78	0.75	0.85	0.78	0.93	0.90	0.95	1.03
12-17	Point Estimates	0.86	0.85	1.53	1.55	1.41	1.39	0.64	0.65	0.31	0.33
	SE1	0.09	0.09	0.35	0.35	0.47	0.48	0.29	0.29	0.19	0.20
	SE2	0.09	0.09	0.35	0.35	0.46	0.47	0.29	0.28	0.19	0.20
18-25	Point Estimates	11.36	11.28	14.01	14.02	12.75	12.57	9.96	10.08	8.18	8.18
	SE1	0.34	0.34	1.38	1.42	1.39	1.36	1.37	1.38	1.29	1.30
	SE2	0.34	0.33	1.38	1.35	1.39	1.28	1.36	1.34	1.28	1.22
26-34	Point Estimates	17.97	17.93	20.38	20.86	14.73	14.73	15.68	16.24	19.14	18.73
	SE1	0.49	0.49	1.80	1.84	1.65	1.65	1.93	2.01	2.41	2.43
	SE2	0.48	0.47	1.77	1.82	1.65	1.64	1.93	2.05	2.41	2.25
35+	Point Estimates	16.26	16.25	19.65	19.41	13.96	13.87	13.06	12.78	14.43	14.89
	SE1	0.32	0.32	1.08	1.07	1.24	1.23	1.37	1.36	1.30	1.33
	SE2	0.30	0.30	1.08	1.05	1.19	1.08	1.36	1.31	1.29	1.48

(continued)

Table 6.3 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Lifetime Illicit Drug Estimates, Marijuana and Cocaine: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime									
Total	Point Estimates	46.34	46.02	47.39	47.06	44.79	44.48	36.16	36.25
	SE1	1.39	1.40	1.35	1.34	1.37	1.41	1.14	1.16
	SE2	1.29	1.19	1.35	1.26	1.32	1.14	1.05	1.04
12-17	Point Estimates	14.46	14.61	16.00	16.01	11.71	11.38	11.19	11.25
	SE1	1.37	1.38	1.61	1.60	1.51	1.49	1.28	1.40
	SE2	1.36	1.35	1.62	1.62	1.50	1.47	1.28	1.41
18-25	Point Estimates	53.65	53.43	55.15	55.31	55.38	54.83	42.71	42.18
	SE1	2.28	2.26	2.13	2.12	2.35	2.54	2.29	2.31
	SE2	2.27	2.16	2.13	2.14	2.36	2.41	2.30	2.27
26-34	Point Estimates	58.80	58.05	57.60	57.38	60.82	60.01	45.25	45.30
	SE1	2.59	2.70	2.62	2.64	2.87	3.04	2.87	2.90
	SE2	2.57	2.51	2.61	2.51	2.86	2.42	2.80	2.55
35+	Point Estimates	46.12	45.79	48.21	47.77	43.74	43.64	36.72	36.99
	SE1	1.79	1.81	1.88	1.87	1.89	1.89	1.71	1.74
	SE2	1.70	1.62	1.87	1.74	1.85	1.72	1.61	1.58
Cocaine Lifetime									
Total	Point Estimates	15.62	15.47	14.12	13.92	13.83	13.69	11.57	11.56
	SE1	1.05	1.03	0.97	0.96	0.90	0.89	0.78	0.77
	SE2	1.01	0.93	0.95	0.90	0.88	0.78	0.75	0.76
12-17	Point Estimates	0.63	0.60	0.55	0.54	0.44	0.44	1.22	1.14
	SE1	0.32	0.31	0.28	0.27	0.26	0.26	0.43	0.41
	SE2	0.32	0.30	0.28	0.27	0.26	0.26	0.43	0.42
18-25	Point Estimates	10.70	10.50	8.93	8.94	10.44	10.25	11.69	11.37
	SE1	1.43	1.40	1.27	1.27	1.38	1.28	1.29	1.31
	SE2	1.43	1.39	1.27	1.23	1.38	1.24	1.29	1.28
26-34	Point Estimates	19.76	19.65	17.62	17.43	19.75	19.43	14.19	14.20
	SE1	2.07	1.94	1.88	1.90	2.06	2.04	1.95	1.97
	SE2	2.05	1.82	1.87	1.91	2.06	1.96	1.92	1.84
35+	Point Estimates	17.62	17.47	16.30	16.08	14.99	14.87	12.71	12.78
	SE1	1.41	1.40	1.39	1.38	1.30	1.26	1.15	1.15
	SE2	1.37	1.29	1.37	1.29	1.27	1.17	1.12	1.13

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table 6.4 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Year Licit Drug Estimates, Cigarettes and Alcohol: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year											
Total	Point Estimates	22.70	22.73	18.03	18.11	20.13	20.06	20.88	20.89	26.97	27.37
	SE1	0.27	0.27	0.73	0.74	1.20	1.20	1.21	1.26	1.40	1.40
	SE2	0.25	0.25	0.71	0.72	1.14	1.03	1.20	1.25	1.38	1.41
12-17	Point Estimates	7.19	7.17	7.53	7.59	5.75	5.74	8.02	8.03	6.64	6.70
	SE1	0.25	0.25	0.85	0.86	1.00	1.02	1.09	1.14	1.18	1.21
	SE2	0.25	0.25	0.85	0.87	1.00	1.00	1.09	1.15	1.18	1.19
18-25	Point Estimates	31.90	31.69	24.85	24.43	26.01	25.50	36.14	36.15	33.83	33.75
	SE1	0.50	0.51	1.63	1.59	2.03	2.02	2.31	2.36	2.42	2.50
	SE2	0.50	0.48	1.63	1.57	2.02	1.82	2.29	2.34	2.39	2.24
26-34	Point Estimates	33.52	33.47	31.21	31.97	29.20	29.29	30.71	30.81	40.00	39.28
	SE1	0.61	0.62	1.95	2.00	2.29	2.32	2.58	2.63	3.17	3.17
	SE2	0.61	0.59	1.92	2.04	2.28	2.27	2.59	2.68	3.14	2.99
35+	Point Estimates	20.65	20.75	14.74	14.78	19.08	19.05	17.47	17.46	25.88	26.63
	SE1	0.36	0.36	1.00	0.99	1.56	1.56	1.57	1.64	1.71	1.72
	SE2	0.34	0.34	0.99	0.99	1.49	1.38	1.58	1.69	1.70	1.85
Alcohol Past Year											
Total	Point Estimates	64.97	64.81	62.83	62.69	66.20	66.29	67.24	66.75	66.46	66.52
	SE1	0.30	0.31	1.01	1.00	1.35	1.33	1.47	1.52	1.33	1.35
	SE2	0.28	0.27	0.92	0.85	1.32	1.23	1.42	1.38	1.32	1.60
12-17	Point Estimates	21.65	21.63	21.80	21.64	23.54	23.88	20.72	20.82	25.22	25.28
	SE1	0.41	0.42	1.41	1.40	1.61	1.64	1.81	1.86	1.72	1.70
	SE2	0.41	0.42	1.41	1.38	1.59	1.59	1.80	1.88	1.72	1.72
18-25	Point Estimates	74.61	74.40	70.97	71.02	73.25	73.23	74.14	74.34	75.48	75.43
	SE1	0.47	0.48	1.76	1.76	1.90	1.91	2.08	2.12	2.02	2.03
	SE2	0.47	0.45	1.75	1.71	1.90	1.84	2.10	2.24	2.04	1.94
26-34	Point Estimates	79.06	78.93	77.52	78.01	77.57	77.83	79.17	79.59	85.32	84.85
	SE1	0.53	0.55	1.86	1.92	1.82	1.84	2.70	2.76	2.02	2.11
	SE2	0.53	0.52	1.83	1.86	1.80	1.71	2.69	2.70	2.03	2.02
35+	Point Estimates	66.14	65.96	63.44	63.14	67.86	67.91	70.13	69.14	66.75	66.91
	SE1	0.43	0.43	1.38	1.37	1.80	1.76	2.11	2.18	1.97	2.00
	SE2	0.40	0.39	1.27	1.16	1.77	1.69	2.05	2.01	1.93	2.41

(continued)

Table 6.4 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Year Licit Drug Estimates, Cigarettes and Alcohol: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year									
Total	Point Estimates	21.25	21.22	26.91	26.44	25.05	25.09	22.52	22.66
	SE1	1.12	1.09	1.47	1.46	1.33	1.34	1.15	1.12
	SE2	1.10	1.04	1.44	1.31	1.28	1.20	1.10	1.07
12-17	Point Estimates	5.08	5.18	9.19	9.28	6.68	6.16	5.34	5.11
	SE1	0.86	0.87	1.34	1.34	1.15	1.10	0.83	0.84
	SE2	0.85	0.87	1.34	1.31	1.16	1.11	0.84	0.81
18-25	Point Estimates	25.89	26.23	36.39	36.02	35.76	35.30	31.69	31.57
	SE1	2.12	2.18	2.15	2.14	2.38	2.46	2.06	2.05
	SE2	2.12	2.07	2.15	2.20	2.39	2.41	2.00	1.90
26-34	Point Estimates	33.59	33.47	37.44	36.66	36.52	36.59	29.41	29.36
	SE1	2.75	2.70	2.82	2.77	2.96	3.01	2.54	2.55
	SE2	2.76	2.66	2.81	2.66	2.95	2.76	2.55	2.46
35+	Point Estimates	19.51	19.39	25.38	24.93	23.00	23.26	21.66	22.00
	SE1	1.42	1.38	1.89	1.89	1.69	1.69	1.62	1.60
	SE2	1.41	1.35	1.86	1.73	1.64	1.57	1.55	1.53
Alcohol Past Year									
Total	Point Estimates	66.99	67.27	69.80	69.51	69.78	69.12	60.16	60.21
	SE1	1.30	1.29	1.34	1.38	1.43	1.51	1.23	1.24
	SE2	1.21	1.08	1.33	1.30	1.39	1.25	1.11	1.07
12-17	Point Estimates	23.27	23.45	23.47	23.68	22.84	21.99	19.37	19.17
	SE1	1.69	1.70	2.05	2.06	1.85	1.82	1.63	1.70
	SE2	1.69	1.66	2.05	1.99	1.85	1.74	1.63	1.68
18-25	Point Estimates	76.79	76.56	79.33	79.14	80.59	80.09	70.27	70.08
	SE1	1.74	1.70	1.91	1.91	1.87	2.07	1.99	2.03
	SE2	1.73	1.66	1.90	1.80	1.90	1.93	1.96	1.97
26-34	Point Estimates	80.05	80.33	82.88	82.11	85.78	85.12	76.92	77.07
	SE1	2.23	2.26	1.94	2.02	2.74	3.17	1.97	1.96
	SE2	2.18	2.00	1.94	1.86	2.72	1.93	1.94	1.92
35+	Point Estimates	67.68	68.05	71.79	71.61	70.52	69.88	60.72	60.86
	SE1	1.82	1.82	1.96	1.98	1.88	1.94	1.91	1.91
	SE2	1.72	1.55	1.94	1.88	1.86	1.79	1.75	1.70

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table 6.5 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Year Illicit Drug Estimates, Marijuana and Cocaine: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year											
Total	Point Estimates	13.93	13.94	16.87	17.00	12.73	12.83	11.73	11.68	16.33	16.45
	SE1	0.20	0.20	0.78	0.78	0.88	0.89	0.71	0.73	0.95	1.01
	SE2	0.18	0.18	0.75	0.75	0.83	0.74	0.68	0.63	0.95	0.99
12-17	Point Estimates	12.06	11.98	14.98	14.92	13.83	13.96	12.70	12.69	14.76	14.75
	SE1	0.30	0.31	1.22	1.19	1.30	1.35	1.25	1.29	1.49	1.50
	SE2	0.30	0.32	1.21	1.19	1.29	1.33	1.23	1.29	1.49	1.49
18-25	Point Estimates	33.14	32.98	35.59	35.37	34.57	34.74	33.15	33.18	37.18	37.07
	SE1	0.51	0.51	1.77	1.76	2.42	2.44	1.94	1.97	2.25	2.28
	SE2	0.52	0.50	1.76	1.71	2.42	2.32	1.96	2.19	2.23	2.17
26-34	Point Estimates	22.40	22.34	24.09	24.74	21.27	21.26	18.63	18.73	26.05	25.20
	SE1	0.54	0.55	2.00	2.06	2.10	2.12	2.16	2.21	2.80	2.74
	SE2	0.53	0.52	1.97	2.00	2.08	2.02	2.15	2.19	2.81	2.65
35+	Point Estimates	8.40	8.48	11.25	11.36	7.33	7.43	5.66	5.57	10.33	10.75
	SE1	0.23	0.24	0.95	0.94	0.93	0.94	0.75	0.76	1.15	1.23
	SE2	0.22	0.23	0.94	0.93	0.92	0.89	0.74	0.76	1.14	1.28
Cocaine Past Year											
Total	Point Estimates	1.89	1.88	2.60	2.63	1.75	1.81	1.34	1.35	1.50	1.63
	SE1	0.07	0.07	0.27	0.27	0.29	0.31	0.24	0.24	0.29	0.34
	SE2	0.07	0.07	0.27	0.27	0.28	0.27	0.24	0.24	0.29	0.34
12-17	Point Estimates	0.54	0.54	1.18	1.28	0.66	0.64	0.54	0.55	0.10	0.10
	SE1	0.07	0.07	0.32	0.34	0.28	0.28	0.27	0.28	0.10	0.10
	SE2	0.07	0.07	0.32	0.34	0.28	0.28	0.27	0.26	0.10	0.10
18-25	Point Estimates	5.60	5.55	8.35	8.32	5.49	5.42	4.81	4.93	3.12	3.15
	SE1	0.26	0.26	1.14	1.15	0.93	0.93	0.96	0.98	0.78	0.79
	SE2	0.26	0.25	1.13	1.08	0.93	0.89	0.96	0.97	0.78	0.78
26-34	Point Estimates	3.75	3.75	4.77	4.99	3.38	3.38	1.95	2.08	3.45	3.29
	SE1	0.25	0.25	0.99	1.04	0.92	0.94	0.73	0.79	1.39	1.36
	SE2	0.24	0.24	0.98	1.04	0.92	0.92	0.72	0.85	1.37	1.30
35+	Point Estimates	0.91	0.91	1.02	1.00	0.94	1.04	0.62	0.58	0.98	1.21
	SE1	0.07	0.07	0.25	0.25	0.28	0.32	0.25	0.24	0.33	0.44
	SE2	0.07	0.07	0.25	0.25	0.28	0.29	0.25	0.24	0.33	0.47

(continued)

Table 6.5 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Year Illicit Drug Estimates, Marijuana and Cocaine: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year									
Total	Point Estimates	14.99	15.02	13.97	13.97	13.43	13.21	9.98	9.93
	SE1	0.98	1.00	0.90	0.90	0.86	0.86	0.65	0.65
	SE2	0.92	0.88	0.88	0.79	0.83	0.77	0.59	0.56
12-17	Point Estimates	12.30	12.42	11.79	11.75	9.95	9.54	8.76	8.75
	SE1	1.23	1.24	1.27	1.26	1.34	1.33	1.01	1.14
	SE2	1.23	1.21	1.28	1.30	1.34	1.32	1.02	1.18
18-25	Point Estimates	35.16	34.96	33.03	33.15	33.46	32.94	25.78	25.40
	SE1	2.15	2.08	1.99	1.98	2.29	2.32	2.25	2.22
	SE2	2.11	2.02	1.99	1.98	2.31	2.20	2.25	2.20
26-34	Point Estimates	27.49	27.34	20.00	19.62	23.85	23.49	14.01	13.93
	SE1	2.31	2.33	1.70	1.68	2.29	2.31	1.74	1.75
	SE2	2.28	2.21	1.70	1.67	2.28	2.24	1.70	1.62
35+	Point Estimates	8.25	8.32	9.35	9.40	7.85	7.87	5.46	5.54
	SE1	1.11	1.16	1.08	1.10	0.91	0.91	0.74	0.74
	SE2	1.10	1.10	1.08	1.05	0.90	0.87	0.72	0.71
Cocaine Past Year									
Total	Point Estimates	2.65	2.66	1.73	1.71	2.42	2.37	1.29	1.21
	SE1	0.38	0.37	0.30	0.29	0.38	0.38	0.20	0.19
	SE2	0.37	0.34	0.29	0.28	0.38	0.38	0.19	0.18
12-17	Point Estimates	0.45	0.42	0.31	0.30	0.33	0.33	0.74	0.69
	SE1	0.27	0.25	0.22	0.21	0.23	0.23	0.34	0.33
	SE2	0.27	0.25	0.22	0.21	0.23	0.23	0.34	0.33
18-25	Point Estimates	5.08	5.07	3.59	3.57	4.57	4.42	5.24	4.95
	SE1	0.98	0.98	0.85	0.85	0.83	0.76	0.85	0.83
	SE2	0.99	0.97	0.85	0.83	0.83	0.77	0.85	0.82
26-34	Point Estimates	8.66	8.65	4.09	4.12	4.97	4.89	1.39	1.32
	SE1	1.56	1.47	1.01	1.02	1.33	1.30	0.53	0.53
	SE2	1.56	1.45	1.02	1.01	1.33	1.29	0.53	0.52
35+	Point Estimates	1.02	1.02	1.07	1.04	1.75	1.72	0.44	0.41
	SE1	0.32	0.32	0.42	0.40	0.56	0.55	0.21	0.20
	SE2	0.32	0.31	0.41	0.38	0.56	0.54	0.20	0.19

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table 6.6 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Month Licit Drug Estimates, Cigarettes and Alcohol: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month											
Total	Point Estimates	19.00	19.05	13.61	13.65	16.97	16.93	17.36	17.39	23.10	23.61
	SE1	0.25	0.25	0.68	0.67	1.16	1.16	1.17	1.23	1.25	1.26
	SE2	0.24	0.24	0.65	0.65	1.11	1.02	1.17	1.27	1.24	1.28
12-17	Point Estimates	3.45	3.43	2.80	2.75	2.45	2.48	4.55	4.67	3.59	3.63
	SE1	0.17	0.17	0.55	0.55	0.58	0.60	0.83	0.86	0.76	0.82
	SE2	0.17	0.16	0.55	0.55	0.58	0.59	0.83	0.89	0.76	0.80
18-25	Point Estimates	23.62	23.49	16.21	15.79	17.88	17.55	26.42	26.51	24.57	24.60
	SE1	0.46	0.46	1.38	1.35	1.55	1.55	2.05	2.09	2.31	2.37
	SE2	0.46	0.44	1.39	1.37	1.56	1.46	2.02	1.95	2.28	2.15
26-34	Point Estimates	27.56	27.51	24.38	25.16	23.92	23.88	25.22	25.19	34.74	34.16
	SE1	0.58	0.58	1.92	1.97	1.91	1.92	2.24	2.31	2.98	2.94
	SE2	0.57	0.56	1.91	2.00	1.90	1.87	2.25	2.31	2.95	2.84
35+	Point Estimates	18.39	18.51	11.89	11.87	17.17	17.18	15.65	15.66	23.27	24.14
	SE1	0.34	0.34	0.93	0.92	1.56	1.56	1.57	1.66	1.56	1.57
	SE2	0.33	0.32	0.91	0.89	1.49	1.38	1.58	1.70	1.54	1.70
Alcohol Past Month											
Total	Point Estimates	50.93	50.75	48.88	48.91	52.09	52.20	54.67	54.38	52.11	52.34
	SE1	0.32	0.32	1.04	1.05	1.49	1.48	1.54	1.56	1.36	1.42
	SE2	0.29	0.29	0.97	0.93	1.46	1.36	1.50	1.46	1.37	1.52
12-17	Point Estimates	9.14	9.19	9.71	9.67	8.55	8.72	10.31	10.54	11.23	11.10
	SE1	0.29	0.30	1.04	1.04	1.07	1.09	1.46	1.51	1.55	1.54
	SE2	0.29	0.30	1.03	1.02	1.06	1.11	1.45	1.47	1.55	1.57
18-25	Point Estimates	57.44	57.14	52.86	52.94	57.80	57.53	57.75	58.08	58.62	58.61
	SE1	0.55	0.55	1.92	1.91	2.38	2.41	2.94	2.94	2.36	2.37
	SE2	0.55	0.53	1.93	1.88	2.38	2.30	2.96	3.04	2.38	2.29
26-34	Point Estimates	64.21	64.08	64.10	64.55	64.29	64.33	61.90	62.58	69.33	68.82
	SE1	0.62	0.64	2.06	2.13	2.37	2.42	2.47	2.59	2.74	2.79
	SE2	0.61	0.60	2.01	2.09	2.33	2.27	2.44	2.67	2.76	2.72
35+	Point Estimates	52.68	52.48	49.98	49.94	53.91	54.10	59.08	58.30	53.19	53.64
	SE1	0.44	0.45	1.49	1.49	2.07	2.04	2.26	2.30	2.00	2.05
	SE2	0.42	0.41	1.40	1.30	2.05	1.95	2.21	2.18	1.98	2.17

(continued)

Table 6.6 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Month Licit Drug Estimates, Cigarettes and Alcohol: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month									
Total	Point Estimates	17.06	16.96	22.46	22.07	21.78	21.89	19.13	19.27
	SE1	1.03	1.01	1.37	1.36	1.28	1.30	1.11	1.08
	SE2	1.02	0.98	1.34	1.22	1.24	1.18	1.06	1.04
12-17	Point Estimates	1.76	1.83	4.94	4.93	3.57	3.16	1.68	1.58
	SE1	0.47	0.47	1.03	1.03	0.77	0.72	0.39	0.38
	SE2	0.47	0.48	1.03	1.02	0.77	0.73	0.39	0.39
18-25	Point Estimates	19.11	19.26	28.37	28.37	27.33	26.94	24.49	24.38
	SE1	1.93	1.97	2.05	2.03	2.19	2.25	1.98	1.95
	SE2	1.92	1.86	2.04	2.05	2.19	2.25	1.94	1.78
26-34	Point Estimates	25.84	25.51	31.80	30.92	31.81	32.00	25.13	25.11
	SE1	2.41	2.32	2.72	2.65	3.29	3.32	2.33	2.33
	SE2	2.42	2.28	2.71	2.54	3.29	3.10	2.32	2.25
35+	Point Estimates	16.59	16.45	21.85	21.47	20.99	21.28	19.43	19.73
	SE1	1.38	1.34	1.79	1.79	1.66	1.68	1.57	1.53
	SE2	1.37	1.32	1.77	1.64	1.61	1.57	1.50	1.47
Alcohol Past Month									
Total	Point Estimates	55.26	55.41	52.65	52.36	55.81	55.24	46.34	46.47
	SE1	1.39	1.38	1.36	1.39	1.27	1.34	1.23	1.22
	SE2	1.28	1.13	1.35	1.35	1.23	1.16	1.09	1.05
12-17	Point Estimates	10.63	10.74	7.25	7.51	10.46	9.82	7.92	8.21
	SE1	1.19	1.20	1.24	1.25	1.48	1.42	1.24	1.34
	SE2	1.20	1.20	1.23	1.22	1.48	1.41	1.25	1.34
18-25	Point Estimates	63.56	63.35	59.19	59.16	62.31	61.70	53.21	52.64
	SE1	1.88	1.89	2.43	2.42	2.41	2.46	2.38	2.39
	SE2	1.88	1.86	2.44	2.35	2.42	2.39	2.30	2.19
26-34	Point Estimates	67.59	67.98	65.83	65.04	69.43	68.59	62.57	62.75
	SE1	2.82	2.84	2.07	2.10	3.21	3.49	2.20	2.20
	SE2	2.75	2.53	2.08	2.08	3.19	2.67	2.16	2.13
35+	Point Estimates	56.55	56.70	55.07	54.84	57.67	57.17	47.36	47.62
	SE1	1.93	1.93	2.02	2.07	1.78	1.83	1.62	1.60
	SE2	1.83	1.66	2.02	2.02	1.76	1.72	1.49	1.47

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table 6.7 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Month Illicit Drug Estimates, Marijuana and Cocaine: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month											
Total	Point Estimates	8.88	8.90	11.35	11.42	7.83	7.93	7.58	7.61	11.00	10.93
	SE1	0.16	0.16	0.69	0.68	0.63	0.64	0.54	0.55	0.73	0.73
	SE2	0.15	0.15	0.67	0.64	0.60	0.56	0.52	0.54	0.74	0.91
12-17	Point Estimates	6.47	6.46	7.83	7.66	8.06	8.31	8.01	8.16	7.25	7.29
	SE1	0.23	0.24	0.96	0.93	1.01	1.05	0.99	1.04	1.02	1.02
	SE2	0.23	0.25	0.96	0.94	1.01	1.03	0.99	1.05	1.01	0.99
18-25	Point Estimates	20.90	20.78	24.60	24.44	19.97	19.71	22.33	22.42	22.83	22.72
	SE1	0.44	0.44	1.50	1.50	1.87	1.86	2.05	2.06	2.15	2.19
	SE2	0.43	0.41	1.48	1.46	1.87	1.77	2.03	2.07	2.13	2.06
26-34	Point Estimates	14.46	14.50	17.73	18.10	13.20	13.30	9.35	9.73	18.23	17.45
	SE1	0.46	0.47	1.71	1.76	1.66	1.69	1.59	1.65	2.44	2.38
	SE2	0.46	0.45	1.70	1.71	1.65	1.63	1.59	1.65	2.43	2.29
35+	Point Estimates	5.53	5.59	7.37	7.46	4.75	4.88	4.12	4.05	7.67	7.74
	SE1	0.18	0.19	0.81	0.80	0.70	0.72	0.62	0.63	0.95	0.97
	SE2	0.18	0.19	0.80	0.79	0.70	0.69	0.62	0.63	0.95	1.25
Cocaine Past Month											
Total	Point Estimates	0.69	0.70	1.05	1.08	0.66	0.70	0.32	0.32	0.49	0.56
	SE1	0.04	0.04	0.19	0.19	0.19	0.21	0.08	0.08	0.11	0.12
	SE2	0.04	0.04	0.19	0.19	0.19	0.19	0.08	0.08	0.11	0.14
12-17	Point Estimates	0.11	0.11	0.15	0.18	0.00	0.00	0.27	0.26	0.10	0.10
	SE1	0.03	0.03	0.09	0.11	0.00	0.00	0.19	0.19	0.10	0.10
	SE2	0.03	0.03	0.09	0.10	0.00	0.00	0.19	0.18	0.10	0.10
18-25	Point Estimates	1.61	1.60	2.59	2.61	1.44	1.46	1.52	1.52	0.80	0.79
	SE1	0.13	0.13	0.56	0.56	0.39	0.39	0.48	0.48	0.36	0.36
	SE2	0.13	0.13	0.55	0.56	0.39	0.39	0.48	0.49	0.36	0.37
26-34	Point Estimates	1.28	1.31	2.29	2.54	0.99	1.02	0.34	0.39	0.73	0.74
	SE1	0.15	0.15	0.72	0.78	0.40	0.41	0.34	0.39	0.52	0.52
	SE2	0.15	0.15	0.72	0.79	0.40	0.40	0.34	0.40	0.52	0.52
35+	Point Estimates	0.46	0.46	0.53	0.52	0.54	0.60	0.07	0.07	0.43	0.54
	SE1	0.05	0.05	0.21	0.20	0.24	0.27	0.00	0.00	0.16	0.19
	SE2	0.05	0.05	0.21	0.20	0.24	0.24	0.00	0.01	0.16	0.24

(continued)

Table 6.7 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Past Month Illicit Drug Estimates, Marijuana and Cocaine: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month									
Total	Point Estimates	9.37	9.45	8.90	8.87	8.54	8.45	6.16	6.16
	SE1	0.74	0.75	0.84	0.81	0.69	0.69	0.49	0.50
	SE2	0.71	0.67	0.83	0.77	0.67	0.63	0.47	0.47
12-17	Point Estimates	6.78	6.92	6.18	6.23	6.12	5.82	4.73	5.01
	SE1	1.01	1.03	0.94	0.93	1.04	1.03	0.80	0.90
	SE2	1.01	1.01	0.94	0.93	1.04	1.03	0.81	0.94
18-25	Point Estimates	22.39	22.52	20.35	20.55	21.59	21.55	15.10	14.88
	SE1	1.94	1.91	1.65	1.64	1.95	1.99	1.52	1.50
	SE2	1.92	1.85	1.66	1.68	1.95	1.88	1.53	1.47
26-34	Point Estimates	19.19	19.24	12.71	12.34	14.58	14.51	7.93	7.85
	SE1	2.28	2.29	1.81	1.75	1.85	1.91	1.35	1.36
	SE2	2.27	2.23	1.79	1.72	1.84	1.84	1.33	1.35
35+	Point Estimates	4.71	4.75	6.29	6.27	5.08	5.08	3.89	3.92
	SE1	0.76	0.76	1.00	0.98	0.70	0.69	0.55	0.54
	SE2	0.75	0.75	0.99	0.98	0.70	0.68	0.54	0.53
Cocaine Past Month									
Total	Point Estimates	0.79	0.80	0.60	0.57	1.14	1.13	0.42	0.38
	SE1	0.16	0.16	0.23	0.21	0.34	0.34	0.11	0.10
	SE2	0.16	0.17	0.23	0.21	0.34	0.34	0.11	0.10
12-17	Point Estimates	0.16	0.14	0.00	0.00	0.16	0.16	0.34	0.33
	SE1	0.16	0.14	0.00	0.00	0.15	0.15	0.20	0.19
	SE2	0.16	0.15	0.00	0.00	0.15	0.15	0.20	0.19
18-25	Point Estimates	1.72	1.69	0.89	0.88	1.21	1.17	1.45	1.32
	SE1	0.56	0.56	0.39	0.39	0.55	0.65	0.46	0.43
	SE2	0.56	0.57	0.40	0.39	0.55	0.64	0.46	0.43
26-34	Point Estimates	2.36	2.51	0.77	0.78	0.86	0.86	0.17	0.07
	SE1	0.74	0.76	0.38	0.39	0.51	0.51	0.17	0.07
	SE2	0.75	0.81	0.38	0.39	0.51	0.51	0.16	0.06
35+	Point Estimates	0.31	0.30	0.59	0.55	1.31	1.31	0.26	0.26
	SE1	0.16	0.16	0.34	0.31	0.51	0.50	0.16	0.16
	SE2	0.16	0.16	0.33	0.31	0.51	0.50	0.16	0.16

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table 6.8 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Major Depressive Episode (MDE) in the Past Year and Serious Mental Illness (SMI) in the Past Year among Persons Aged 18 or Older: 2016 NSDUH

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode											
Total	Point Estimates	6.73	6.71	6.35	6.30	6.18	6.19	5.07	5.06	7.10	7.11
	SE1	0.16	0.17	0.51	0.52	0.59	0.60	0.52	0.51	0.71	0.71
	SE2	0.16	0.17	0.51	0.51	0.59	0.58	0.52	0.49	0.70	0.68
18-25	Point Estimates	10.89	10.86	12.23	12.16	10.73	10.72	9.51	9.76	11.46	11.42
	SE1	0.33	0.33	1.03	1.05	1.35	1.34	1.39	1.42	1.27	1.29
	SE2	0.33	0.32	1.02	1.04	1.35	1.32	1.38	1.38	1.27	1.23
26-34	Point Estimates	8.03	7.99	6.84	6.87	7.07	7.01	4.44	4.67	7.58	7.61
	SE1	0.36	0.36	1.05	1.06	1.29	1.28	1.02	1.10	1.35	1.35
	SE2	0.36	0.36	1.04	1.03	1.28	1.22	1.02	1.15	1.35	1.29
35+	Point Estimates	5.60	5.58	4.96	4.89	5.26	5.29	4.31	4.21	6.11	6.13
	SE1	0.20	0.21	0.67	0.67	0.70	0.72	0.76	0.75	0.87	0.88
	SE2	0.20	0.22	0.67	0.66	0.70	0.69	0.76	0.71	0.86	0.85
Serious Mental Illness											
Total	Point Estimates	4.26	4.24	3.79	3.74	3.61	3.67	3.95	3.91	4.55	4.62
	SE1	0.13	0.14	0.39	0.40	0.49	0.50	0.47	0.46	0.56	0.56
	SE2	0.13	0.13	0.39	0.39	0.48	0.47	0.47	0.45	0.55	0.54
18-25	Point Estimates	5.92	5.89	6.15	6.02	5.75	5.70	5.01	5.12	5.38	5.42
	SE1	0.25	0.25	0.76	0.75	1.08	1.06	0.96	0.98	0.94	0.95
	SE2	0.25	0.24	0.76	0.77	1.08	1.05	0.95	0.94	0.94	0.96
26-34	Point Estimates	5.78	5.78	4.65	4.75	4.94	5.00	5.39	5.50	7.65	7.73
	SE1	0.30	0.30	0.85	0.89	0.97	0.97	1.49	1.52	1.36	1.38
	SE2	0.30	0.30	0.85	0.88	0.97	0.93	1.48	1.40	1.36	1.33
35+	Point Estimates	3.58	3.55	3.05	2.99	3.00	3.08	3.40	3.30	3.77	3.84
	SE1	0.17	0.17	0.51	0.51	0.59	0.60	0.66	0.65	0.69	0.70
	SE2	0.16	0.17	0.51	0.51	0.58	0.58	0.65	0.62	0.68	0.68

(continued)

Table 6.8 Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models—Drug Estimates (United States and Eight Large States): Major Depressive Episode (MDE) in the Past Year and Serious Mental Illness (SMI) in the Past Year among Persons Aged 18 or Older: 2016 NSDUH (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode									
Total	Point Estimates	6.53	6.54	7.50	7.55	6.71	6.63	5.16	5.13
	SE1	0.57	0.57	0.82	0.84	0.74	0.73	0.49	0.49
	SE2	0.57	0.54	0.82	0.81	0.73	0.70	0.49	0.48
18-25	Point Estimates	10.98	11.23	11.81	11.94	10.69	10.52	8.11	7.89
	SE1	1.13	1.17	1.35	1.35	1.40	1.41	1.04	1.07
	SE2	1.14	1.14	1.36	1.38	1.40	1.39	1.03	0.99
26-34	Point Estimates	6.65	6.52	9.84	10.12	8.48	8.58	7.20	7.16
	SE1	1.29	1.24	1.65	1.70	1.44	1.49	1.29	1.28
	SE2	1.29	1.21	1.64	1.57	1.44	1.48	1.30	1.28
35+	Point Estimates	5.59	5.58	6.17	6.15	5.57	5.49	3.94	3.97
	SE1	0.71	0.70	0.99	1.01	0.91	0.89	0.61	0.62
	SE2	0.70	0.68	0.99	1.03	0.90	0.89	0.60	0.62
Serious Mental Illness									
Total	Point Estimates	3.93	3.99	4.95	4.90	4.25	4.28	2.96	2.97
	SE1	0.54	0.54	0.53	0.52	0.60	0.63	0.40	0.40
	SE2	0.53	0.53	0.52	0.51	0.59	0.57	0.39	0.38
18-25	Point Estimates	5.55	5.58	8.75	8.83	5.92	6.04	4.42	4.43
	SE1	0.97	0.97	1.11	1.10	0.88	0.91	0.84	0.90
	SE2	0.96	0.94	1.11	1.08	0.88	0.92	0.83	0.85
26-34	Point Estimates	4.39	4.40	6.89	6.96	5.66	5.82	5.31	5.35
	SE1	1.03	1.02	1.35	1.36	1.20	1.28	1.18	1.20
	SE2	1.03	1.02	1.35	1.39	1.20	1.29	1.19	1.16
35+	Point Estimates	3.49	3.56	3.81	3.71	3.63	3.63	1.99	2.01
	SE1	0.70	0.71	0.66	0.65	0.76	0.76	0.38	0.39
	SE2	0.69	0.68	0.66	0.66	0.75	0.72	0.38	0.39

NOTE: Major Depressive Episode (MDE) is defined as in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), which specifies a period of at least 2 weeks when a person experienced a depressed mood or loss of interest or pleasure in daily activities and had a majority of specified depression symptoms.

NOTE: Serious Mental Illness (SMI) is defined as having a diagnosable mental, behavioral, or emotional disorder, other than a developmental or substance use disorder, assessed by the Mental Health Surveillance Study (MHSS) *Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition—Research Version—Axis I Disorders* (MHSS-SCID), which is based on the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). SMI includes persons with diagnoses resulting in serious functional impairment.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

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Appendix A: Technical Details about the Generalized Exponential Model

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Appendix A: Technical Details about the Generalized Exponential Model

A.1 Distance Function

Let $\Delta(w,d)$ denote the distance between the initial weights $d = \{d_k : k \in s\}$ and the adjusted weights *w*, with *k* being the k^{th} unit in the sample and *s* being the sample selected. The distance function minimized under the generalized exponential model (GEM), subject to calibration constraints, is given by

$$\Delta(w,d) = \sum_{k\in s} \frac{d_k}{A_k}\left\{(a_k - \ell_k)\log\frac{a_k-\ell_k}{c_k-\ell_k} + (u_k - a_k)\log\frac{u_k-a_k}{u_k-c_k}\right\}, \tag{A.1.1}$$

where $a_k = w_k / d_k, A_k = (u_k - \ell_k)/[(u_k - c_k)(c_k - \ell_k)]$ and ℓ_k, c_k, and u_k are prescribed real numbers. Let T_x denote the *p*-vector of control totals corresponding to predictor variables ($x_1, ..., x_p$). Then, the calibration constraints for the above minimization problem are

$$\sum_{k\in s} x_k d_k a_k = T_x. \tag{A.1.2}$$

The solution for the above minimization problem, if it exists, is given by a GEM with model parameters λ; that is,

$$a_k(\lambda) = \frac{\ell_k(u_k - c_k) + u_k(c_k - \ell_k)\exp\{A_k x_k'\lambda\}}{(u_k - c_k) + (c_k - \ell_k)\exp\{A_k x_k'\lambda\}}. \tag{A.1.3}$$

Note that the number of parameters in the GEM should be $\leq n$, where *n* is the size of the sample *s*. This is also the dimension of vectors *d* and *w*. It follows from equation A.1.3 that

$$\ell_k < a_k < u_k, k = 1,\ldots,n. \tag{A.1.4}$$

The weight adjustment factor achieved by the usual raking ratio algorithm (Singh & Mohl, 1996) can also be derived as a special case of the GEM, noting that for $\ell_k = 0, u_k = \infty, c_k = 1,$ and $k = 1,\ldots,n$, we have

$$\Delta(w,d) = \sum_{k\in s} d_k a_k \log a_k - \sum_{k\in s} d_k (a_k - 1) \tag{A.1.5}$$

and $a_k(\lambda) = \exp(x_k'\lambda)$.

The logit model of Deville and Särndal (1992) is also a special case of the GEM, by setting $\ell_k = \ell,\ u_k = u,$ and $c_k = 1$ for all *k*. The new method was introduced by Folsom and Singh (2000).

A.2 GEM Adjustments for Extreme Value Treatment, Nonresponse, and Poststratification

By choosing the user-specified parameters ℓ_k, c_k, and u_k appropriately, the unified GEM formula (A.1.3) can be justified for all three types of adjustment: extreme value treatment, nonresponse, and poststratification. For extreme value treatment via winsorization, denote the winsorized weights by $\{b_k\}$, where $b_k = d_k$ if d_k is not an extreme weight, and $b_k = \text{med}\{d_k\} \pm 3 * \text{IQR}$ if d_k is an extreme weight, where IQR denotes the interquartile range, and the median and quartiles for the weights are defined with respect to a suitable design-based stratum.

For the nonresponse adjustment, the sample is first divided into two parts: the nonextreme weight subsample and the extreme weight subsample. For nonextreme weights, the following are set: $\ell_2 = 1,\ c_2 = \rho^{-1},\ u_2 = u > \rho^{-1},$ where ρ is the overall response propensity. For extreme weights with high weights, $\ell_k = \ell_1 m_k,\ c_k = \rho^{-1} m_k,$ and $u_k = u_1 m_k,$ where $m_k = b_k / d_k$ and $1 \le \ell_1 < \rho^{-1} = c_1 < u_1$ are prescribed numbers. Similarly, for extreme weights with low weights, $\ell_k = \ell_3 m_k,\ c_k = \rho^{-1} m_k,\ u_k = u_3 m_k,$ and $1 \le \ell_3 < \rho^{-1} = c_3 < u_3$.

For the poststratification adjustment, the following weights are set: for nonextreme weights, $\ell_k = \ell_2,\ c_k = c_2 = 1,$ and $u_k = u_2;$ for high extreme weights, $\ell_k = \ell_1 m_k,\ c_k = m_k,$ and $u_k = u_1 m_k;$ and similarly, for low extreme weights, $\ell_k = \ell_3 m_k,\ c_k = m_k,$ and $u_k = u_3 m_k.$ The extreme value adjustment is identical to poststratification, except for tighter bounds on extreme weights resulting from the final poststratification.

Notice that the GEM allows the flexibility of specifying different bounds for different subsamples. In addition, the lower bound (in the case of nonresponse adjustments) can be made to equal one by choosing the center $c_k > 1$.

A.3 Newton-Raphson Steps

Let *X* denote the $n \times p$ matrix of predictor values, and for the v^{th} iteration,

$$\Gamma_{\phi v} = \text{diag}\left(d_k \phi_k^{(v)}\right),\ \phi_k^{(o)} = 1,$$

where $\phi_k^{(v)} = \left[\left(u_k - a_k^{(v)}\right)\left(a_k^{(v)} - \ell_k\right)\right] \Big/ \left[\left(u_k - c_k\right)\left(c_k - \ell_k\right)\right].$

Then, for the Newton-Raphson iteration v, the value of the p-vector λ is adjusted as

$$\lambda^{(v)} = \lambda^{(v-1)} + \left(X'\Gamma_{\phi,v-1}X\right)^{-1}\left(T_x - \hat{T}_x^{(v-1)}\right),$$

where $\lambda^{(0)} = 0$, and $\hat{T}_x$ is calculated by using equation A.1.2, in which a_k is calculated by plugging the current λ into equation A.1.3.

The convergence criterion is based on the Euclidean distance $\left\|T_x - \hat{T}_x^{(v)}\right\|$, which is defined as $\sqrt{\left(T_x - \hat{T}_x^{(v)}\right)'\left(T_x - \hat{T}_x^{(v)}\right)}$. At each iteration, it is checked to determine whether it is decreasing. If it is not, a half step is used in the iteration increment for λ.

A.4 Scaled Constrained Exponential Model

In National Household Surveys on Drug Abuse (NHSDAs)[1] prior to 1999, constrained exponential models (CEMs) were used for poststratification, and scaled CEMs were used for nonresponse adjustments. The CEM refers to the logit model of Deville and Särndal (1992), in which lower and upper bounds do not vary with k; that is, $\ell_k = \ell$, $u_k = u$, and $c_k = c = 1$, such that $\ell < 1 < u$. Thus, the CEM is a special case of the GEM. For the nonresponse adjustment, Folsom and Witt (1994) modified the CEM estimating equations by a scaling factor (ρ^{-1}, the inverse of the overall response propensity), such that $1 < \rho^{-1}a_k < \rho^{-1}u$. This implies that choosing ℓ in the CEM as ρ ensures that the scaled adjustment factor for nonresponse is at least one.

[1] The National Household Survey on Drug Abuse (NHSDA) was renamed the National Survey on Drug Use and Health (NSDUH) in the 2002 survey year.

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Appendix B: Poststratification Control Totals

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Appendix B: Poststratification Control Totals

For poststratification, quarterly state-specific totals for the target population (civilian, noninstitutionalized, aged 12 or older) are required for 120 demographic domains defined by Age, Race, Gender, and Hispanicity (6 × 5 × 2 × 2) (Exhibit B.1). The Population Estimates Branch of the U.S. Census Bureau produced, in response to a special request, the necessary population estimates based on monthly state-level estimates of the target population, which were based on the enumerated population from the census. In general, the controls include adjustments for births, deaths, and net migration, as well as adjustments from the Count Question Resolution Program and any geography updates. However, the controls do not include any adjustments for the undercount or overcount of specific populations as determined from the 2010 Census Coverage Measurement Program. Since the 2011 National Survey on Drug Use and Health (NSDUH), the control totals used for poststratification were based on the 2010 census. For the 2005 through 2013 NSDUHs, the sample and the source of design variables used as the generalized exponential model predictors were based on the 2000 census, but starting with the 2014 NSDUH, they are based on the 2010 census.

To arrive at quarterly estimates, approximations at the midpoints of the quarters were needed. To get these approximations, the estimates from the last 2 months in each quarter were averaged. For example, to obtain an approximation for the first quarter of 2016, the U.S. census estimates for February 1 and March 1 were averaged, resulting in a population estimate appropriate for February 15 (i.e., the midpoint of Quarter 1).

Exhibit B.1 Definition of Levels for Variables

Age (years)
1: 12-17, 2: 18-25, 3: 26-34, 4: 35-49, 5: 50-64, 6: 65+

Race
1: White, 2: Black or African American, 3: American Indian or Alaska Native, 4: Asian or Native Hawaiian or Pacific Islander, 5: Two or More Races

Gender
1: Male, 2: Female

Hispanicity
1: Hispanic or Latino, 2: Non-Hispanic or Latino

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Appendix C: Imputation Methodology

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Appendix C: Imputation Methodology

The adjustments of (1) dwelling unit (DU) poststratification, (2) poststratification of the selected sample to all eligible rostered people, and (3) person-level nonresponse required the use of demographic information obtained from the 2016 National Survey on Drug Use and Health (NSDUH) screener interview. However, at the time of screening, the only required information for an individual was age; thus, some demographic information (i.e., gender, Hispanic or Latino origin, and race) was missing. Therefore, some form of imputation was required for cases with missing data.[1]

As in 2002-2015, the predictive mean neighborhood (PMN) methodology was used for the 2016 NSDUH weighting process to impute "race" and "Hispanic or Latino origin" for the screener demographic information, as well as the questionnaire data (Singh, Grau, & Folsom, 2002). Because there was not a good set of predictors for PMN modeling, the unweighted sequential hot-deck method was used to impute gender.

C.1 Unweighted Hot Deck

This imputation was performed using an unweighted hot-deck methodology. The unweighted hot-deck method of imputing a variable with missing responses (which is called the base variable in this appendix) involved three basic steps.

1. *Forming imputation classes.* When a strong logical association existed between the base variable and certain auxiliary variables, the dataset was partitioned by the auxiliary variables, and imputation procedures were implemented independently within classes defined by the cross of the auxiliary variables.
2. *Sorting the file.* Within each imputation class, the file was sorted by auxiliary variables that were relevant to the item being imputed. The sort order of the auxiliary variables was chosen to reflect the degree of importance of the auxiliary variables in relation to the base variable being imputed (i.e., those auxiliary variables that were better predictors for the item being imputed were used as the first sorting variables).

   For the 2016 NSDUH, two types of sorting procedures were used to sort the files prior to imputation:

   (a) Straight Sort. A set of variables was sorted in ascending order by the first variable specified, then, within each level of the first variable, the file was sorted in ascending order by the second variable specified, and so on. For example:

1	1	1
1	1	2
1	2	1
1	2	2
1	3	1
1	3	2

[1] Because the imputation of these demographic variables was not required for the main NSDUH analysis, it is documented here.

2	1	1
2	1	2
2	2	1
2	2	2
2	3	1
2	3	2

(b) Serpentine Sort. A set of variables was sorted so that the direction of the sort (ascending or descending) changed each time the value of a variable changed. For example:

1	1	1
1	1	2
1	2	2
1	2	1
1	3	1
1	3	2
2	3	2
2	3	1
2	2	1
2	2	2
2	1	2
2	1	1

The serpentine sort has the advantage of minimizing the change in the entire set of auxiliary variables whenever any one of the variables changes its value.

3. *Replace missing values.* The file was sorted and then read sequentially. Each time an item respondent was encountered (i.e., the base variable was nonmissing), the base variable response was stored, updating the donor response, and any subsequent nonrespondent encountered received the stored donor response, creating the statistically imputed response. A starting value was needed if an item nonrespondent was the first record on a sorted file. Typically, the response from the first respondent on the sorted file was used as the starting value.

   Note that because the file was sorted by relevant auxiliary variables, the preceding item respondent (donor) closely matched the neighboring item nonrespondent (recipient) with respect to the auxiliary variables.

For more information on the general hot-deck method of item imputation, see Little and Rubin, 1987 (pp. 62-67).

With the unweighted sequential hot-deck imputation procedure, for any particular item being imputed, there was the risk of several nonrespondents appearing next to one another on the sorted file. To detect this problem in NSDUH, for every variable being imputed, a record was kept of the imputation donor. Then, by examining frequencies by imputation donor, if several nonrespondents were lining up next to one another in the sort, the situation could be detected. When this problem occurred, sort variables were added or eliminated, or the order of the sort variables was rearranged.

C.2 Predictive Mean Neighborhood (PMN)

Unweighted sequential hot deck is simple and quick to implement, but it has a number of disadvantages:

- The first few sorting covariates almost entirely determine what donor will be used for a particular respondent with missing data, regardless of how many sorting covariates are included.
- There is no mechanism derived from the data to weight the sorting covariates based on their relationship to the response variable.
- Weights are not used to determine the most appropriate donor for a respondent with missing data.
- The correlations across multiple outcome variables imputed to the same record are not accounted for when finding a donor.
- The choice of donor, after the sort has been completed, may be deterministic; this may introduce bias in estimating means and totals and, thus, make it difficult to determine the variance of the estimator when taking imputation into account.

To address the deficiencies of the unweighted sequential hot deck, the PMN methodology was developed for NSDUH. It is a combination of two commonly used imputation methods: a nonmodel-based hot deck and Rubin's model-based predictive mean matching method (Rubin, 1986). It enhances the predictive mean matching method in that it can be applied to both discrete and continuous variables either individually or jointly. It also enhances the nearest neighbor hot-deck method in that the distance function used to find neighbors is no longer ad hoc. It is easily applicable to problems of both univariate (UPMN) and multivariate (MPMN) imputations. Univariate imputation is used for imputing a single continuous or dichotomous discrete variable independently, whereas multivariate imputation arises when values of two or more variables are missing for a single respondent or when a single polytomous variable has missing values. (A polytomous variable is a categorical variable with three or more possible values, such as marital status, which is categorical and has the possible values of married, widowed, divorced, and never married.)

The procedure for implementing univariate and multivariable imputations can be summarized with the following six steps. Steps 2 through 5, and sometimes Step 6, were cycled through each of the variables in the order determined by Step 1. Steps 4 and 5 (Steps 4 through 6, when applicable) could be considered a variant of a random nearest neighbor hot deck.

Step 1: Hierarchy definition. Determine the order in which variables are modeled, so that variables early in the hierarchy may be used for modeling the conditional predictive mean (i.e., variables early in the hierarchy have the potential to be part of the set of covariates for variables later in the hierarchy).

For each variable:

Step 2: Setup for model building and hot-deck assignment. For each model that is fitted, two groups must be created: complete and incomplete data respondents (item respondents and item nonrespondents). Complete data respondents have complete data across the variables of interest, and incomplete data respondents encompass the remainder of respondents.

Step 3: Sequential hierarchical modeling. The model is built using the complete data for respondents only, with weights adjusted for item nonresponse.

Step 4: Computation of predictive means and delta neighborhoods. The predictive means for item respondents and item nonrespondents are calculated using the model coefficients. Then those item respondents whose predictive means are determined to be "close" (based on a distance function taking values within delta) to the item nonrespondents are considered part of the "delta" neighborhood.

Step 5: Assignment of imputed values using a univariate predictive mean. Using a simple random draw from the neighborhood developed in Step 4, a donor is chosen for each item nonrespondent.

If the variables for which Steps 2 through 5 have been completed are part of a complete multivariate set for which multivariate imputation is to be applied, Step 6 is the next step in the process. If the variables for which Steps 2 through 5 are completed are not part of a complete multivariate set, and other variables are still to be imputed, Step 2 is the next step. Otherwise, the process is finished.

Step 6: Determination of multivariate predictive mean neighborhood and assignment of imputed values. With multivariate imputation, the neighborhood is defined based on a vector of predictive means, rather than from a single predictive mean as in the univariate case.

The PMN methodology addresses all of the shortcomings of the unweighted sequential hot-deck method and was widely used for the imputation of a variety of variables in NSDUH, including both continuous and categorical variables with one or more levels. The models were fit using standard modeling procedures in SAS and SUDAAN®, while SAS macros were used to implement the hot-deck step, including the restrictions on the neighborhoods. Although creating a different neighborhood for each item nonrespondent was computationally intensive, the method was implemented successfully. For more details on PMN, see the 2016 editing and imputation report in the *NSDUH Methodological Resource Book* (Center for Behavioral Health Statistics and Quality, 2018).

Appendix D: Generalized Exponential Model Summary

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Appendix D: Generalized Exponential Model Summary

This appendix summarizes each model group throughout all stages of modeling the weight calibrations. Unlike much of the other information presented in this report, this appendix provides a model-specific overview of weight calibration, as opposed to a state- or domain-specific one.

The modeling for the 2016 National Survey on Drug Use and Health (NSDUH) involved taking nine generalized exponential model (GEM) groups through five adjustment steps: (1) dwelling unit (DU)–level nonresponse adjustment, (2) DU-level poststratification, (3) selected person-level poststratification, (4) person-level nonresponse adjustment, and (5) respondent person-level poststratification. The sampling weights after DU-level poststratification and person-level poststratification for this year were reasonably distributed, so the additional treatment of the extreme weight adjustment step was not necessary at the DU level or the person level. See Table D for a summary of the distributions of each of the weight components at the national level.

Model-specific summary statistics are shown in Tables D.1a and D.1b to D.9a and D.9b. Included in these tables, for each stage of modeling, are the following: the number of effects that were controlled directly; the high, low, and nonextreme weight bounds set to provide the upper and lower limits for GEM; weighted, unweighted, and winsorized weight proportions; the unequal weighting effect (UWE); and weight distributions. The UWE provides an approximate measure of variance and establishes how much impact a particular stage of modeling has on the distribution of the new product of weights. For more details on bounds, see Section 4.2. At each stage in the modeling, these summary statistics were calculated and used to evaluate the model that was constructed and its corresponding product of weights.

Such circumstances as small sample sizes and exact linear combinations (i.e., singularities) in the realized data led to situations where finalizing models with the originally proposed set of covariates was not possible. The text and exhibits in Sections D.1 to D.9 summarize the decisions made regarding final covariates that were included in each model. For a list of the proposed initial covariates considered at each stage of modeling, see Exhibit D1.1, and for the list of realized final model covariates, see Exhibits D1.1 through D9.5. The following sections establish a series of guidelines to assist in the interpretation of the covariates.

Table D Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (United States)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	48	0.41	51	0.12	12	1.01	12	0.09	9	0.44	10	0.05	3
1%	51	1.00	71	0.55	75	1.01	122	0.52	110	1.00	135	0.20	118
5%	83	1.05	112	0.78	116	1.01	247	0.74	238	1.05	299	0.46	268
10%	119	1.09	145	0.88	158	1.01	400	0.81	394	1.10	507	0.83	449
25%	374	1.15	432	0.99	436	1.32	938	0.91	931	1.21	1,196	0.97	1,115
Median	684	1.23	856	1.08	907	2.44	1,866	1.00	1,869	1.35	2,423	1.02	2,410
75%	864	1.35	1,113	1.17	1,235	3.25	3,494	1.10	3,521	1.54	4,840	1.08	4,862
90%	1,079	1.50	1,485	1.31	1,665	7.05	6,797	1.21	6,753	1.76	9,657	1.20	9,736
95%	1,248	1.65	1,680	1.44	1,925	8.17	9,110	1.31	9,122	1.96	13,451	1.38	13,477
99%	1,677	2.22	2,123	1.99	2,567	10.37	12,854	1.69	13,382	2.60	21,386	1.80	22,275
Maximum	5,217	5.15	4,674	5.00	10,844	22.90	67,588	9.10	52,850	7.06	61,302	5.36	90,937
n	173,149	135,188	135,188	135,165	135,165	95,607	95,607	95,607	95,607	67,942	67,942	67,942	67,942
Max/Mean	8.03	-	5.62	-	11.87	-	24.07	-	18.75	-	15.46	-	22.93

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

D.1 Final Model Explanatory Variables

For brevity, numeric abbreviations for variable levels are established in Exhibit 3.1 in Chapter 3 (included here as Exhibit D.1 for easy reference). There, a complete list is provided of all variables and associated levels used at any stage of modeling. In this report, each level of a variable is referred to as a covariate. Note that (1) not all variables or levels are present in all stages of modeling; (2) the initial set of covariates, allowing for differences in states across model groups, is the same for all model groups within a stage of modeling; and (3) the initial set of covariates changes across the stages of modeling. Exhibits D.2 through D.5 provide the initial covariates for the stages of modeling, and Exhibits D1.1 through D9.5 provide lists of the proposed and the final covariates for the nine model groups. This last group of exhibits is grouped by model groups and contains one exhibit for each stage of weight adjustment. The initial variables are found in the "Proposed" column, and the realized covariates are found in the "Final" column.

Section D.3 explains how to create cross-classification tables, which help to illustrate what covariates are controlled for at each stage of the modeling. The general pattern is as follows: directions to follow, semicolon, reason for the change. Sections D.2 and D.3 explain how to use various exhibits for selected model variables to construct these tables. For greater detail on why variable levels are collapsed or dropped, see Section 4.7.

Exhibit D.1 Definition of Levels for Variables

Age (years)
1: 12-17, 2: 18-25, 3: 26-34, 4: 35-49, 5: 50+[1,2]

Gender
1: Male, 2: Female[1]

Group Quarters Indicator
1: College Dorm, 2: Other Group Quarter, 3: Non-Group Quarter[1]

Hispanicity
1: Hispanic or Latino, 2: Non-Hispanic or Latino[1]

Percentage of Owner-Occupied Dwelling Units in Segment (% Owner-Occupied)
1: 50-100%,[1] 2: 10-<50%, 3: 0-<10%

Percentage of Segments That Are Black or African American
1: 50-100%, 2: 10-<50%, 3: 0-<10%[1]

Percentage of Segments That Are Hispanic or Latino
1: 50-100%, 2: 10-<50%, 3: 0-<10%[1]

Population Density
1: MSA 1,000,000 or More, 2: MSA Less than 1,000,000, 3: Non-MSA Urban, 4: Non-MSA Rural[1]

Quarter
1: Quarter 1, 2: Quarter 2, 3: Quarter 3, 4: Quarter 4[1]

Race (3 levels)
1: White,[1] 2: Black or African American, 3: Other

Race (5 levels)
1: White,[1] 2: Black or African American, 3: American Indian or Alaska Native, 4: Asian, 5: Two or More Races

Relation to Householder
1: Householder or Spouse,[1] 2: Child, 3: Other Relative, 4: Nonrelative

Segment-Combined Median Rent and Housing Value (Rent/Housing)[3]
1: First Quintile, 2: Second Quintile, 3: Third Quintile, 4: Fourth Quintile, 5: Fifth Quintile[1]

States[4]

Model Group 1:	1: Connecticut, 2: Maine, 3: New Hampshire, 4: Rhode Island, 5: Vermont, 6: Massachusetts[1]
Model Group 2:	1: New Jersey,[1] 2: New York, 3: Pennsylvania
Model Group 3:	1: Illinois, 2: Indiana,[1] 3: Michigan, 4: Wisconsin, 5: Ohio
Model Group 4:	1: Iowa, 2: Kansas, 3: Minnesota, 4: Missouri,[1] 5: Nebraska, 6: South Dakota, 7: North Dakota
Model Group 5:	1: Delaware, 2: District of Columbia, 3: Georgia,[1] 4: Maryland, 5: North Carolina, 6: South Carolina, 7: Virginia, 8: West Virginia, 9: Florida
Model Group 6:	1: Alabama, 2: Kentucky, 3: Mississippi, 4: Tennessee[1]
Model Group 7:	1: Arkansas,[1] 2: Louisiana, 3: Oklahoma, 4: Texas
Model Group 8:	1: Colorado, 2: Idaho, 3: Montana, 4: Nevada, 5: New Mexico, 6: Utah, 7: Wyoming, 8: Arizona[1]
Model Group 9:	1: Alaska, 2: Hawaii, 3: Oregon, 4: Washington,[1] 5: California

MSA = metropolitan statistical area.

[1] The reference level for this variable. This is the level against which effects of other factor levels are measured.

[2] The age group 50+ was further broken down into 50-64 and 65+ for Person-Level Poststratification Adjustment and Person-Level Extreme Weight Adjustment, for which 65+ was used as the reference level.

[3] Segment-Combined Median Rent and Housing Value (also known as the Socioeconomic Status indicator) is a composite measure based on rent, housing value, and percent owner occupied.

[4] The states or district assigned to a particular model are based on census divisions.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

D.2 Glossary of Terms Used in the Exhibits and Descriptions of the Variables in the Final Model

This glossary provides a list of general terms. Certain other specific terms are sometimes used within a particular section.

All levels present. All levels of the variable under consideration were included in the final model.

Coll. Collapse (levels). These levels of the factor effect were collapsed together. Levels that have been collapsed together no longer appear in the model as separate variables, but rather manifest themselves jointly in the model.

Conv. If model is not convergent, dropping or collapsing of variables is performed.

Drop all levels. All levels of a factor effect were completely removed from the model, as well as any combinations involving this factor.

Drop *level(s)*. These levels of a factor effect were collapsed into the reference set. The dropped levels manifest themselves jointly with the appropriate reference levels.

Drop *level(s)*; singularity/zero sample. During the modeling process, the levels of factor effect(s) listed were removed from the model because of either singularities or sample sizes of zero.

Drop or collapse using *. The asterisk is used as a wildcard character to indicate all levels of that factor effect.

Factor effects. Another name for covariates, or variables, such as "Age." In addition to one-factor effects, two-, and three-factor effects also are referenced, such as "Age × Race" and "Age × Race × Gender."

Hier. Factor effects collapsed/dropped at lower order and the hierarchical effect carries up. This indicates that one or more levels of factor effects were collapsed/dropped in an earlier stage, and that the same action (collapse/drop) was performed on the corresponding levels in all higher-order factor effects containing the dropped/collapsed levels.

Keep *level(s)*. These levels of the factor effect were kept in the model and the remainder into the reference set.

Reference/reference set. The reference levels of factor effects (see Exhibit D.1) are not explicitly listed in the set of model variables, but are represented implicitly in the model in the intercept term. These include one-, two-, and three-factor effects.

Repeat or **Do the same for *(effects)*.** The previous action was repeated for all effect levels listed.

Sing. Singularity is the linear dependence of columns of realized values of the predictors in the model. Any variable that is a linear combination of other variables is either dropped from the model or collapsed with other variables.

D.3 How to Interpret Collapsing and Dropping of Factor Effects

To help visualize what effects were directly controlled for in the model, a table that reflects the collapsing scheme employed can be constructed. The following is a complex example from the 2004 modeling, which demonstrates how to use the information found in Exhibits D1.1 through D9.5.

1. Consider the following entry for the factor effect of State × Age × Race (3 levels), for Model Group 9, for the Person-Level Nonresponse Adjustment.

Three-Factor Effects	Comments
State × Age × Race (3 Levels)	Coll. (2,1,2) & (2,1,3); hier. Repeat for all age levels in state (2); hier. Coll. (1,4,2) & (1,4,3); conv. Drop (3,4,2); sing. Drop (3,*,*); conv. Coll. (5,1,2) & (5,1,3); conv. Repeat for all age levels in state (5).

2. Determine the initial range of possible levels for the variables by referring to the variable definitions shown in Exhibit D.1:

State (for the model group in question, in this case, Model Group 9)

Model Group 9: 1: Alaska, 2: Hawaii, 3: Oregon, 4: Washington,[1] 5: California

Age (years)

1: 12-17, 2: 18-25, 3: 26-34, 4: 35-49, 5: 50+[1]

Race (3 levels)

1: White,[1] 2: Black or African American, 3: Other

3. Construct the cross-classification table.

For example, Race (5 levels) is defined this way:

Race (5 Levels)	White	Black or African American	Asian	American Indian or Alaska Native	Two or More Races

Shading indicates the reference-level set.

[1] This is the reference level for this variable. This is the level against which effects of other factor levels are measured.

This is the cross-classification table for State × Race (5 levels):

State × Race (5 levels)	White	Black or African American	Asian	American Indian or Alaska Native	Two or More Races
AK					
HI					
OR					
WA					
CA					

Shading indicates the reference-level set.

The cross-classification table of interest [State × Age × Race (3 levels)] is as follows:

State × Age × Race (3 Levels)	White	Black or African American	Other
AK × 12-17			
18-25			
26-34			
35-49			
50+			
HI × 12-17			
18-25			
26-34			
35-49			
50+			
OR × 12-17			
18-25			
26-34			
35-49			
50+			
WA × 12-17			
18-25			
26-34			
35-49			
50+			
CA × 12-17			
18-25			
26-34			
35-49			
50+			

Shading indicates the reference-level set.

The number of respondents in that class at this stage of modeling would appear within each cell of the table. Construction of the other cross-classification tables follows the same logic and is only necessary to the point of providing an understanding of the final table.

4. Use the information under the "Final" column definition to determine the combination of factors controlled.

Hier. This means the factor effect was collapsed at a lower order. Because this note is present, examine the information on lower-order factor effects that are the components of the interaction term, State × Race (3 levels) × Age; that is, look at the one-factor and two-factor effects for State, Race (5 levels), and Age, and their accompanying information:

One-Factor Effects	**Comments**
State	All levels present.
Race (5 Levels)	All levels present.
Age	All levels present.

Two-Factor Effects	**Comments**
State × Age	All levels present.
State × Race (5 Levels)	Coll. (1,3) & (1,4). Do the same for all other states except (2). Coll. (2,2), (2,3), & (2,4).
Age × Race (3 Levels)	All levels present.

Following these directions, the resulting two-factor table is:

State × Race (5 Levels)	White	Black or African American	Asian	American Indian or Alaska Native	Two or More Races
AK					
HI					
OR					
WA					
CA					

Shading indicates the reference-level set.

Continuing on to the three-factor level for the same example:

Three-Factor Effects	**Comments**
State × Age × Race (3 Levels)	Coll. (2,1,2) & (2,1,3); hier. Repeat for all age levels in state (2); hier. Coll. (1,4,2) & (1,4,3); conv. Drop (3,4,2); sing. Drop (3,*,*); conv. Coll. (5,1,2) & (5,1,3); conv. Repeat for all age levels in state (5).

The reason for the note "Hier." in the three-factor effects is that collapsing was done on the two-factor interaction term State × Race (5 levels). Because collapsing was done on this term, all three-factor crosses involving State × Race must maintain this same collapsing scheme.

After following the directions, the cross-classification table should appear as follows:

State × Age × Race (3 Levels)	White	Black or African American	Other
AK × 12-17			
18-25			
26-34			
35-49			
50+			
HI × 12-17			
18-25			
26-34			
35-49			
50+			
OR × 12-17			
18-25			
26-34			
35-49			
50+			
WA × 12-17			
18-25			
26-34			
35-49			
50+			
CA × 12-17			
18-25			
26-34			
35-49			
50+			

Shading indicates the reference-level set.

The unshaded cells represent the factors directly controlled for by the model (i.e., those factors that were not collapsed or dropped). The shaded cells represent the composite reference set, whose values may be obtained by utilizing the marginal sums, although when changes to the initially proposed set occur, it can make certain reference cell counts indistinguishable.

Exhibit D.2 Covariates for 2016 NSDUH Person Weights (res.sdu.nr)

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	
Quarter	4	3
Population Density	4	3
Group Quarter	3	2
% Black or African American	3	2
% Hispanic or Latino	3	2
% Owner-Occupied	3	2
Rent/Housing	5	4
Two-Factor Effects		
% Owner-Occupied × % Black or African American	3 × 3	4
% Owner-Occupied × % Hispanic or Latino	3 × 3	4
% Owner-Occupied × Rent/Housing	3 × 5	8
Rent/Housing × % Black or African American	3 × 5	8
Rent/Housing × % Hispanic or Latino	3 × 5	8
State × Quarter	Model Specific	
State × Population Density	Model Specific	
State × Group Quarter	Model Specific	
State × % Black or African American	Model Specific	
State × % Hispanic or Latino	Model Specific	
State × % Owner-Occupied	Model Specific	
State × Rent/Housing	Model Specific	
Three-Factor Effects		
State × % Owner-Occupied × % Black or African American	Model Specific	
State × % Owner-Occupied × % Hispanic or Latino	Model Specific	
State × % Owner-Occupied × Rent/Housing	Model Specific	
State × Rent/Housing × % Black or African American	Model Specific	
State × Rent/Housing × % Hispanic or Latino	Model Specific	

Exhibit D.3 Covariates for 2016 NSDUH Person Weights (res.sdu.ps)

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	
Quarter	4	3
Age	5	4
Race (5 levels)	5	4
Gender	2	1
Hispanicity	2	1
Two-Factor Effects		
Age × Race (3 levels)	5 × 3	8
Age × Hispanicity	5 × 2	4
Age × Gender	5 × 2	4
Race (3 levels) × Hispanicity	3 × 2	2
Race (3 levels) × Gender	3 × 2	2
Hispanicity × Gender	2 × 2	1
State × Quarter	Model Specific	
State × Age	Model Specific	
State × Race (5 levels)	Model Specific	
State × Hispanicity	Model Specific	
State × Gender	Model Specific	
Three-Factor Effects		
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8
Age × Race (3 levels) × Gender	5 × 3 × 2	8
Age × Hispanicity × Gender	5 × 2 × 2	4
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2
State × Age × Race (3 levels)	Model Specific	
State × Age × Hispanicity	Model Specific	
State × Age × Gender	Model Specific	
State × Race (3 levels) × Hispanicity	Model Specific	
State × Race (3 levels) × Gender	Model Specific	
State × Hispanicity × Gender	Model Specific	

Exhibit D.4 Covariates for 2016 NSDUH Person Weights (sel.per.ps and res.per.nr)

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	
Quarter	4	3
Age	5	4
Race (5 levels)	5	4
Gender	2	1
Hispanicity	2	1
Relation to Householder	4	3
Population Density	4	3
Group Quarter	3	2
% Black or African American	3	2
% Hispanic or Latino	3	2
% Owner-Occupied	2	2
Rent/Housing	5	4
Two-Factor Effects		
Age × Race (3 levels)	5 × 3	8
Age × Hispanicity	5 × 2	4
Age × Gender	5 × 2	4
Race (3 levels) × Hispanicity	3 × 2	2
Race (3 levels) × Gender	3 × 2	2
Hispanicity × Gender	2 × 2	1
% Owner-Occupied × % Black or African American	3 × 3	4
% Owner-Occupied × % Hispanicity	3 × 3	4
% Owner-Occupied × Rent/Housing	3 × 5	8
Rent/Housing × % Black or African American	3 × 5	8
Rent/Housing × % Hispanic or Latino	3 × 5	8
State × Quarter	Model Specific	
State × Age	Model Specific	
State × Race (5 levels)	Model Specific	
State × Hispanicity	Model Specific	
State × Gender	Model Specific	
State × % Black or African American	Model Specific	
State × % Hispanic or Latino	Model Specific	
State × % Owner-Occupied	Model Specific	
State × Rent/Housing	Model Specific	
Three-Factor Effects		
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8
Age × Race (3 levels) × Gender	5 × 3 × 2	8
Age × Hispanicity × Gender	5 × 2 × 2	4
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2
State × Age × Race (3 levels)	Model Specific	
State × Age × Hispanicity	Model Specific	
State × Age × Gender	Model Specific	
State × Race (3 levels) × Hispanicity	Model Specific	
State × Race (3 levels) × Gender	Model Specific	
State × Hispanicity × Gender	Model Specific	

Exhibit D.5 Covariates for 2016 NSDUH Person Weights (res.per.ps and res.per.ev)

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	
Quarter	4	3
Age	6	5
Race (5 levels)	5	4
Gender	2	1
Hispanicity	2	1
Two-Factor Effects		
Age × Race (3 levels)	6 × 3	10
Age × Hispanicity	6 × 2	5
Age × Gender	6 × 2	5
Race (3 levels) × Hispanicity	3 × 2	2
Race (3 levels) × Gender	3 × 2	2
Hispanicity × Gender	2 × 2	1
State × Quarter	Model Specific	
State × Age	Model Specific	
State × Race (5 levels)	Model Specific	
State × Hispanicity	Model Specific	
State × Gender	Model Specific	
Three-Factor Effects		
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10
Age × Race (3 levels) × Gender	6 × 3 × 2	10
Age × Hispanicity × Gender	6 × 2 × 2	5
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2
State × Age × Race (3 levels)	Model Specific	
State × Age × Hispanicity	Model Specific	
State × Age × Gender	Model Specific	
State × Race (3 levels) × Hispanicity	Model Specific	
State × Race (3 levels) × Gender	Model Specific	
State × Hispanicity × Gender	Model Specific	

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Appendix D1: Model Group 1: New England

(Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont)

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Table D.1a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 1: New England)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	3.01	8.75	1.08	1.66573	306	(1.19, 1.40)	(1.19, 1.40)
	1.24	4.03	0.75	1.81945	137	(1.06, 4.60)	(1.06, 4.60)
						(1.30, 5.00)	(1.30, 1.30)
res.sdu.ps	1.24	4.03	0.75	1.81966	232	(0.48, 1.10)	(0.48, 1.10)
	1.78	4.57	1.20	1.95132	232	(0.20, 5.00)	(0.20, 5.00)
						(0.90, 5.00)	(N/A, N/A)
sel.per.ps	3.05	6.86	1.86	2.92898	332	(0.20, 2.20)	(0.21, 2.20)
	2.34	6.36	1.45	3.13942	307	(0.20, 4.95)	(0.20, 4.94)
						(0.90, 1.98)	(0.90, 1.98)
res.per.nr	2.22	6.51	1.23	3.08749	332	(1.00, 2.80)	(1.00, 2.80)
	1.76	6.28	1.37	3.53981	258	(1.00, 5.00)	(1.00, 5.00)
						(1.50, 1.71)	(1.50, 1.71)
res.per.ps	1.79	6.56	1.50	3.53981	267	(0.20, 2.00)	(0.20, 1.97)
	1.00	3.93	0.59	3.53029	236	(0.20, 4.64)	(0.20, 4.61)
						(0.90, 1.46)	(1.46, 1.46)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \left[(n-1)/n\right]*CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.1b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 1: New England)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	73	1.01	87	0.17	22	1.01	31	0.15	10	0.44	10	0.11	3
1%	74	1.07	88	0.44	78	1.01	98	0.40	87	1.00	112	0.20	59
5%	82	1.11	95	0.75	92	1.01	149	0.64	132	1.00	178	0.42	163
10%	90	1.15	114	0.87	112	1.01	206	0.75	195	1.07	258	0.82	237
25%	147	1.18	187	0.94	183	1.25	354	0.87	350	1.24	471	0.96	454
Median	188	1.25	227	1.02	244	2.47	707	1.00	731	1.41	1,000	1.02	958
75%	548	1.35	602	1.10	644	3.38	1,819	1.13	1,835	1.62	2,580	1.07	2,543
90%	723	1.51	1,022	1.25	1,049	8.39	3,482	1.29	3,409	1.90	5,074	1.17	5,274
95%	752	1.60	1,130	1.40	1,255	10.26	5,516	1.42	5,226	2.16	8,232	1.52	8,486
99%	953	2.02	1,472	2.19	1,920	11.89	10,249	1.92	10,850	3.14	17,328	2.21	17,626
Maximum	1,687	4.60	3,191	5.00	5,787	18.39	30,157	4.94	46,360	5.00	61,302	4.61	40,502
n	17,241	13,275	13,275	13,271	13,271	8,391	8,391	8,391	8,391	5,686	5,686	5,686	5,686
Max/Mean	5.25	-	7.65	-	13.09	-	19.98	-	30.73	-	27.54	-	18.19

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 1 Overview

Dwelling Unit Nonresponse

All 24 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in all factors except the percent Owner-Occupied × Rent/Housing, Rent/Housing × percent Black or African American, State × Population Density, State × Group Quarter, State × percent Black or African American, State × percent Hispanic or Latino, and State × percent Owner-Occupied interactions. Out of 122 proposed variables, 89 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 160 proposed variables, 24 were included in the model.

In the final model, a total of 137 variables were included; see Exhibit D1.1.

Dwelling Unit Poststratification

All 19 proposed one-factor effects were included in the model.

All 86 proposed two-factor effects were included in the model.

All 127 proposed three-factor effects were included in the model.

In the final model, a total of 232 variables were included; see Exhibit D1.2.

Selected Person-Level Poststratification

All 37 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the percent Owner-Occupied × Rent/Housing, Rent/Housing × percent Black or African American, State × percent Black or African American, State × percent Hispanic or Latino, and State × percent Owner-Occupied interactions. Out of 168 proposed variables, 153 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Race and State × Race × Hispanicity interactions. Out of 127 proposed variables, 117 were included in the model.

In the final model, a total of 307 variables were included; see Exhibit D1.3.

Respondent Person-Level Nonresponse

All 37 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the Age × Race, percent Owner-Occupied × Rent/Housing, Rent/Housing × percent Black or African American, State × Race, State × percent Black or African American, State × percent Hispanic or Latino, and State × percent Owner-Occupied interactions. Out of 168 proposed variables, 150 were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Hispanicity × Gender, State × Age × Gender, and State × Hispanicity × Gender interactions. Out of 127 proposed variables, 71 were included in the model.

In the final model, a total of 258 variables were included; see Exhibit D1.4.

Respondent Person-Level Poststratification

All 20 proposed one-factor effects were included in the model.

All 95 proposed two-factor effects were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Race × Gender, Age × Hispanicity × Gender, Race × Hispanicity × Gender, State × Age × Gender, State × Race × Gender, and State × Hispanicity × Gender interactions. Out of 152 proposed variables, 121 were included in the model.

In the final model, a total of 236 variables were included; see Exhibit D1.5.

Exhibit D1.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 1: New England

Variables	Level	Proposed	Final	Comments
One-Factor Effects		**24**	**24**	
Intercept	1	1	1	All levels present.
State	6	5	5	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**122**	**89**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Drop (3,4); zero.
Rent/Housing × % Black or African American	3 × 5	8	6	Drop (2,4); zero. Drop (4,1); sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	6 × 4	15	15	All levels present.
State × Population Density	6 × 4	15	5	Keep (1,1), (2/4,2), (2/4,3), drop all others; zero/sing.
State × Group Quarter	6 × 3	10	2	Coll. (3,1) & (3,2), (5,1) & (5,2), drop all others; zero/conv.
State × % Black or African American	6 × 3	10	4	Keep (1/2/4/5,2), drop others; zero/sing.
State × % Hispanic or Latino	6 × 3	10	5	Keep (1,1/2), (3,2), (4,1/2), drop all others; zero/sing.
State × % Owner-Occupied	6 × 3	10	9	Drop (2,3); sing.
State × Rent/Housing	6 × 5	20	20	All levels present.
Three-Factor Effects		**160**	**24**	
State × % Owner-Occupied × % Black or African American	6 × 3 × 3	20	2	Keep (1,2,2), coll. (4,2,2) & (4,3,2), drop all others; hier./sing./zero.
State × % Owner-Occupied × % Hispanic or Latino	6 × 3 × 3	20	2	Keep (1,2,2), coll. (4,2,2) & (4,3,2), drop all others; hier./sing./zero.
State × % Owner-Occupied × Rent/Housing	6 × 3 × 5	40	13	Keep (1,2,1/3/4), coll. (1,2,2) & (1,3,2), (2,2,1/2/3), (3,3,3), (3,2,2/3), (5,2,1/2/3), drop all others; hier./sing./zero/conv.
State × Rent/Housing × % Black or African American	6 × 3 × 5	40	6	Keep (1,1/2/3/4,2), coll. (4,1,2) & (4,2,2), keep (4,3,2), drop all others; hier./sing./zero/conv.
State × Rent/Housing × % Hispanic or Latino	6 × 3 × 5	40	1	Keep (1,4,2), drop all others; hier./sing./zero/conv.
Total		**306**	**137**	

Exhibit D1.2 Covariates for 2015 NSDUH Person Weights (res.sdu.ps), Model Group 1: New England

Variables	Level	Proposed	Final	Comments
One-Factor Effects		**19**	**19**	
Intercept	1	1	1	All levels present.
State	6	5	5	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**86**	**86**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	6 × 4	15	15	All levels present.
State × Age	6 × 5	20	20	All levels present.
State × Race (5 levels)	6 × 5	20	20	All levels present.
State × Hispanicity	6 × 2	5	5	All levels present.
State × Gender	6 × 2	5	5	All levels present.
Three-Factor Effects		**127**	**127**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	6 × 5 × 3	40	40	All levels present.
State × Age × Hispanicity	6 × 5 × 2	20	20	All levels present.
State × Age × Gender	6 × 5 × 2	20	20	All levels present.
State × Race (3 levels) × Hispanicity	6 × 3 × 2	10	10	All levels present.
State × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
State × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Total		**232**	**232**	

Exhibit D1.3 Covariates for 2015 NSDUH Person Weights (sel.per.ps), Model Group 1: New England

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**37**	**37**	
Intercept	1	1	1	All levels present.
State	6	5	5	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**168**	**153**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Drop (3,4); zero.
Rent/Housing × % Black or African American	3 × 5	8	6	Drop (2/4,1); zero/sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	6 × 4	15	15	All levels present.
State × Age	6 × 5	20	20	All levels present.
State × Race (5 levels)	6 × 5	20	20	All levels present.
State × Hispanicity	6 × 2	5	5	All levels present.
State × Gender	6 × 2	5	5	All levels present.
State × % Black or African American	6 × 3	10	4	Drop (*,1), (3,2); zero/sing.
State × % Hispanic or Latino	6 × 3	10	5	Keep (1/4,1/2), (3,2); drop others, zero/sing.
State × % Owner-Occupied	6 × 3	10	9	Drop (2,3); sing.
State × Rent/Housing	6 × 5	20	20	All levels present.
Three-Factor Effects		**127**	**117**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	6 × 5 × 3	40	34	Drop (2,4,2/3), (5,3,2/3), (5,4,2/3); zero/sing, conv.
State × Age × Hispanicity	6 × 5 × 2	20	20	All levels present.
State × Age × Gender	6 × 5 × 2	20	20	All levels present.
State × Race (3 levels) × Hispanicity	6 × 3 × 2	10	6	Coll. (1,2,1) & (1,3,1), repeat for NH, RI and VT; zero/conv.
State × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
State × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Total		**332**	**307**	

Exhibit D1.4 Covariates for 201 NSDUH Person Weights (res.per.nr), Model Group 1: New England

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**37**	**37**	
Intercept	1	1	1	All levels present.
State	6	5	5	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**168**	**150**	
Age × Race (3 levels)	5 × 3	8	7	Coll (4,2) & (4,3); conv.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Drop (3,4); zero.
Rent/Housing × % Black or African American	3 × 5	8	6	Drop (2/4,1); zero/sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	6 × 4	15	15	All levels present.
State × Age	6 × 5	20	20	All levels present.
State × Race (5 levels)	6 × 5	20	18	Coll. (3,3) & (3,5), coll. (4,3) & (4,5); conv.
State × Hispanicity	6 × 2	5	5	All levels present.
State × Gender	6 × 2	5	5	All levels present.
State × % Black or African American	6 × 3	10	4	Drop (*,1), (3,2); zero/sing.
State × % Hispanic or Latino	6 × 3	10	5	Drop (2/4,*), (3,1); zero.
State × % Owner-Occupied	6 × 3	10	9	Drop (2,3); sing.
State × Rent/Housing	6 × 5	20	20	All levels present.
Three-Factor-Effects		**127**	**71**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	3	Coll (1,2,1) & (1,3,1), repeat for all ages; hier./conv. Drop (4,*,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	7	Coll. (4,2,1) & (4,3,1); hier.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); conv.
State × Age × Race (3 levels)	6 × 5 × 3	40	10	Coll. (1,4,2) & (1,4,3), repeat for all states; hier. Coll. (1,1,2) & (1,1,3), coll. (1,2,2) & (1,2,3), repeat for all states, drop (*,3/4,*); conv.
State × Age × Hispanicity	6 × 5 × 2	20	16	Drop (2/3/5,4,1), (5,3,1); conv.
State × Age × Gender	5 × 5 × 2	20	20	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	10	0	Drop all; conv.
State × Race (3 levels) × Gender	5 × 3 × 2	10	5	Coll (1,2,1) & (1,3,1), repeat for all states; conv.
State × Hispanicity × Gender	5 × 2 × 2	5	5	All levels present.
Total		**332**	**258**	

Exhibit D1.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 1: New England

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**20**	**20**	
Intercept	1	1	1	All levels present.
State	6	5	5	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**95**	**95**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	6 × 4	15	15	All levels present.
State × Age	6 × 6	25	25	All levels present.
State × Race (5 levels)	6 × 5	20	20	All levels present.
State × Hispanicity	6 × 2	5	5	All levels present.
State × Gender	6 × 2	5	5	All levels present.
Three-Factor Effects		**152**	**121**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	4	Coll. (1,2,1) & (1,3,1), repeat for all age levels, drop (5,*,1); conv.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	6 × 5 × 3	50	31	Coll. (1,4,2) & (1,4,3), coll. (1,5,2) & (1,5,3), drop (2/3,4/5, *), coll. (3,3,2) & (3,3,3), drop (4,5, *), drop (5,3/4/5, *); sing./zero/conv.
State × Age × Hispanicity	6 × 6 × 2	25	21	Drop (1/2/3/4,5,1); sing./conv.
State × Age × Gender	6 × 6 × 2	25	25	All levels present.
State × Race (3 levels) × Hispanicity	6 × 3 × 2	10	8	Coll. (1,2,1) & (1,3,1), (5,2,1) & (5,3,1); zero/conv.
State × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
State × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Total		**267**	**236**	

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Appendix D2: Model Group 2: Middle Atlantic

(New Jersey, New York, and Pennsylvania)

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Table D.2a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 2: Middle Atlantic)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	1.55	2.36	0.31	1.02348	153	(1.18, 1.50)	(1.18, 1.50)
	2.16	3.31	0.57	1.07257	115	(1.00, 4.95)	(1.00, 4.94)
						(1.00, 5.00)	(N/A, N/A)
res.sdu.ps	2.16	3.31	0.57	1.07258	127	(0.43, 2.50)	(0.45, 2.50)
	2.27	4.96	1.74	1.15846	127	(0.39, 5.00)	(0.41, 5.00)
						(0.90, 1.20)	(0.90, 1.20)
sel.per.ps	2.88	7.01	2.26	1.88833	197	(0.48, 2.90)	(0.48, 2.90)
	2.11	5.51	1.67	1.83600	194	(0.56, 3.22)	(0.56, 3.21)
						(0.90, 1.68)	(0.90, 1.68)
res.per.nr	2.06	5.49	1.69	1.86282	197	(1.00, 3.00)	(1.00, 3.00)
	2.56	7.36	1.54	2.05109	186	(1.00, 4.95)	(1.00, 4.94)
						(1.40, 5.00)	(1.40, 1.40)
res.per.ps	2.52	7.26	1.60	2.05109	147	(0.20, 1.56)	(0.20, 1.54)
	1.22	3.78	0.56	2.04421	146	(0.20, 4.06)	(0.20, 4.03)
						(0.90, 1.04)	(0.90, 1.03)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \left[(n-1)/n\right]*CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.2b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 2: Middle Atlantic)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	519	0.65	599	0.35	310	1.01	356	0.23	241	0.49	319	0.05	114
1%	543	1.05	673	0.58	506	1.01	575	0.64	564	1.00	613	0.22	267
5%	547	1.12	728	0.73	660	1.01	805	0.78	794	1.07	965	0.35	725
10%	550	1.17	776	0.84	748	1.01	946	0.83	942	1.12	1,201	0.79	1,138
25%	630	1.22	824	1.00	870	1.44	1,356	0.91	1,357	1.25	1,753	0.97	1,733
Median	690	1.34	918	1.08	987	2.41	2,399	1.00	2,344	1.39	3,163	1.02	3,222
75%	714	1.50	1,044	1.14	1,144	3.35	3,822	1.09	3,976	1.62	6,081	1.08	6,253
90%	797	1.80	1,330	1.24	1,470	8.00	8,290	1.21	8,080	1.93	11,909	1.36	11,835
95%	903	2.08	1,595	1.35	1,745	8.69	9,518	1.32	9,493	2.14	14,745	1.53	14,796
99%	1,219	2.69	1,931	2.19	2,460	9.24	13,380	1.72	13,633	2.88	24,429	1.83	24,992
Maximum	2,250	4.94	4,416	5.00	8,615	20.27	67,588	3.21	44,606	4.94	58,909	4.03	54,128
n	21,247	15,000	15,000	14,998	14,998	10,391	10,391	10,391	10,391	7,025	7,025	7,025	7,025
Max/Mean	3.22	-	4.47	-	8.05	-	20.01	-	13.19	-	11.78	-	10.82

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 2 Overview

Dwelling Unit Nonresponse

For the one-factor effects, College Dorm had to be collapsed with Other Group Quarter. Out of 21 proposed variables, 20 were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the State × Population Density, State × Group Quarter, and State × Rent/Housing interactions. Out of 68 proposed variables, 61 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 64 proposed variables, 34 were included in the model.

In the final model, a total of 115 variables were included; see Exhibit D2.1.

Dwelling Unit Poststratification

All 16 proposed one-factor effects were included in the model.

All 47 proposed two-factor effects were included in the model.

All 64 proposed three-factor effects were included in the model.

In the final model, a total of 127 variables were included; see Exhibit D2.2.

Selected Person-Level Poststratification

All 34 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the State × Rent/Housing interaction. Out of 99 proposed variables, 98 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the Age × Race × Hispanicity and State × Race × Hispanicity interactions. Out of 64 proposed variables, 62 were included in the model.

In the final model, a total of 194 variables were included; see Exhibit D2.3.

Respondent Person-Level Nonresponse

All 34 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the State × Race and State × Rent/Housing interactions. Out of 99 proposed variables, 97 were included in the model.

For the three-factor effects, variable collapsing or dropping were present in the Age × Race × Hispanicity, State × Age × Race, and State × Race × Hispanicity interactions. Out of 64 proposed variables, 55 were included in the model.

In the final model, a total of 186 variables were included; see Exhibit D2.4.

Respondent Person-Level Poststratification

All 17 proposed one-factor effects were included in the model.

All 53 proposed two-factor effects were included in the model.

For the three-factor effects, variable dropping was present in the State × Age × Hispanicity interaction. Out of 77 proposed variables, 76 were included in the model.

In the final model, a total of 146 variables were included; see Exhibit D2.5.

Exhibit D2.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 2: Middle Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**21**	**20**	
Intercept	1	1	1	All levels present.
State	3	2	2	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	1	Coll. (1) & (2); conv.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**68**	**61**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	3 × 4	6	6	All levels present.
State × Population Density	3 × 4	6	4	Drop (2,2), (2,3); sing.
State × Group Quarter	3 × 3	4	0	Drop all; conv.
State × % Black or African American	3 × 3	4	4	All levels present.
State × % Hispanic or Latino	3 × 3	4	4	All levels present.
State × % Owner-Occupied	3 × 3	4	4	All levels present.
State × Rent/Housing	3 × 5	8	7	Coll. (2,1) & (2,2); sing.
Three-Factor Effects		**64**	**34**	
State × % Owner-Occupied × % Black or African American	3 × 3 × 3	8	6	Drop (2,2,1), (2,3,1); sing.
State × % Owner-Occupied × % Hispanic or Latino	3 × 3 × 3	8	6	Drop (2,3,2), (3,3,1); sing.
State × % Owner-Occupied × Rent/Housing	3 × 3 × 5	16	6	Keep (2,3,3), (2,2,3), (2,2,4), (3,2,1), (3,2,2), (3,2,3), drop others; zero/sing./conv.
State × Rent/Housing × % Black or African American	3 × 3 × 5	16	8	Coll. (2,1,2) (2,2,2); hier. Keep (2,3,1), (2,3,2), (2,4,2), (3,1,1), (3,1,2), (3,2,2), (3,3,2), drop others; zero/sing.
State × Rent/Housing × % Hispanic or Latino	3 × 3 × 5	16	8	Coll. (2,1,1) & (2,2,1), (2,1,2) & (2,2,2); hier. Keep (2,1/2,1), (2,1/2,2), (2,3,1), (2,3,2), (2,4,2), (31,1), (3,1,2), (3,2,2), drop others; zero/sing.
Total		**153**	**115**	

Exhibit D2.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 2: Middle Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**16**	**16**	
Intercept	1	1	1	All levels present.
State	3	2	2	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**47**	**47**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	3 × 4	6	6	All levels present.
State × Age	3 × 5	8	8	All levels present.
State × Race (5 levels)	3 × 5	8	8	All levels present.
State × Hispanicity	3 × 2	2	2	All levels present.
State × Gender	3 × 2	2	2	All levels present.
Three-Factor Effects		**64**	**64**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	3 × 5 × 3	16	16	All levels present.
State × Age × Hispanicity	3 × 5 × 2	8	8	All levels present.
State × Age × Gender	3 × 5 × 2	8	8	All levels present.
State × Race (3 levels) × Hispanicity	3 × 3 × 2	4	4	All levels present.
State × Race (3 levels) × Gender	3 × 3 × 2	4	4	All levels present.
State × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
Total		**127**	**127**	

Exhibit D2.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 2: Middle Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**34**	**34**	
Intercept	1	1	1	All levels present.
State	3	2	2	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**99**	**98**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	3 × 4	6	6	All levels present.
State × Age	3 × 5	8	8	All levels present.
State × Race (5 levels)	3 × 5	8	8	All levels present.
State × Hispanicity	3 × 2	2	2	All levels present.
State × Gender	3 × 2	2	2	All levels present.
State × % Black or African American	3 × 3	4	4	All levels present.
State × % Hispanic or Latino	3 × 3	4	4	All levels present.
State × % Owner-Occupied	3 × 3	4	4	All levels present.
State × Rent/Housing	3 × 5	8	7	Coll. (2.1) & (2.2); sing.
Three-Factor Effects		**64**	**62**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	7	Coll. (3.2,1) & (3.3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	3 × 5 × 3	16	16	All levels present.
State × Age × Hispanicity	3 × 5 × 2	8	8	All levels present.
State × Age × Gender	3 × 5 × 2	8	8	All levels present.
State × Race (3 levels) × Hispanicity	3 × 3 × 2	4	3	Coll. (2.2.1) & (2.3.1); conv.
State × Race (3 levels) × Gender	3 × 3 × 2	4	4	All levels present.
State × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
Total		**197**	**194**	

Exhibit D2.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 2: Middle Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**34**	**34**	
Intercept	1	1	1	All levels present.
State	3	2	2	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**99**	**97**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	3 × 4	6	6	All levels present.
State × Age	3 × 5	8	8	All levels present.
State × Race (5 levels)	3 × 5	8	7	Coll. (3.3) & (3.4); conv.
State × Hispanicity	3 × 2	2	2	All levels present.
State × Gender	3 × 2	2	2	All levels present.
State × % Black or African American	3 × 3	4	4	All levels present.
State × % Hispanic or Latino	3 × 3	4	4	All levels present.
State × % Owner-Occupied	3 × 3	4	4	All levels present.
State × Rent/Housing	3 × 5	8	7	Drop (2,1); sing.
Three-Factor Effects		**64**	**55**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (2,2,1) & (2,3,1), (3,2,1) & (3,3,1), (4,2,1) & (4,3,1), drop (4,2/3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	3 × 5 × 3	16	15	Coll. (3,4,2) & (3,4,3); conv.
State × Age × Hispanicity	3 × 5 × 2	8	8	All levels present.
State × Age × Gender	3 × 5 × 2	8	8	All levels present.
State × Race (3 levels) × Hispanicity	3 × 3 × 2	4	0	Drop all; conv.
State × Race (3 levels) × Gender	3 × 3 × 2	4	4	All levels present.
State × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
Total		**197**	**186**	

Exhibit D2.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 2: Middle Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**17**	**17**	
Intercept	1	1	1	All levels present.
State	3	2	2	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**53**	**53**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	3 × 4	6	6	All levels present.
State × Age	3 × 6	10	10	All levels present.
State × Race (5 levels)	3 × 5	8	8	All levels present.
State × Hispanicity	3 × 2	2	2	All levels present.
State × Gender	3 × 2	2	2	All levels present.
Three-Factor Effects		**77**	**76**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	10	All levels present.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race(3 levels)	3 × 6 × 3	20	20	All levels present.
State × Age × Hispanicity	3 × 6 × 2	10	9	Drop (3,5,1); conv.
State × Age × Gender	3 × 6 × 2	10	10	All levels present.
State × Race (3 levels) × Hispanicity	3 × 3 × 2	4	4	All levels present.
State × Race (3 levels) × Gender	3 × 3 × 2	4	4	All levels present.
State × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
Total		**147**	**146**	

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Appendix D3: Model Group 3: East North Central

(Illinois, Indiana, Michigan, Ohio, and Wisconsin)

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Table D.3a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 3: East North Central)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	2.05	2.21	0.23	1.05158	255	(1.24, 2.70)	(1.26, 2.70)
	2.24	4.09	0.92	1.08927	156	(1.00, 5.00)	(1.00, 5.00)
						(1.00, 5.00)	(1.00, 5.00)
res.sdu.ps	2.24	4.09	0.92	1.08927	197	(0.34, 1.60)	(0.34, 1.60)
	1.28	2.00	0.28	1.09785	193	(0.24, 4.22)	(0.24, 4.21)
						(0.90, 2.34)	(0.90, 2.34)
sel.per.ps	2.59	4.70	0.82	1.72901	287	(0.48, 2.00)	(0.49, 2.00)
	1.59	3.51	0.48	1.73812	280	(0.31, 3.15)	(0.31, 3.14)
						(0.95, 3.15)	(0.95, 3.15)
res.per.nr	1.52	3.45	0.50	1.75397	287	(1.00, 2.85)	(1.00, 2.85)
	1.16	3.68	0.49	1.94064	272	(1.00, 3.53)	(1.00, 3.49)
						(1.30, 1.85)	(1.30, 1.85)
res.per.ps	1.14	3.68	0.50	1.94064	227	(0.20, 2.40)	(0.20, 2.40)
	0.88	3.73	0.76	2.03983	204	(0.20, 4.05)	(0.20, 4.05)
						(0.90, 1.05)	(0.90, 0.97)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \lceil (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.3b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 3: East North Central)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	220	0.63	512	0.24	230	1.01	267	0.18	143	0.50	203	0.12	74
1%	537	1.00	566	0.60	548	1.01	618	0.64	583	1.00	642	0.20	356
5%	545	1.05	633	0.85	648	1.01	820	0.78	810	1.07	992	0.72	849
10%	587	1.09	680	0.92	706	1.01	951	0.84	946	1.14	1,185	0.91	1,131
25%	667	1.15	780	1.00	831	1.32	1,262	0.93	1,276	1.25	1,677	0.98	1,657
Median	712	1.23	912	1.07	960	2.33	2,151	1.00	2,119	1.39	2,803	1.01	2,807
75%	775	1.33	1,029	1.14	1,125	3.02	3,422	1.08	3,465	1.55	4,876	1.04	4,832
90%	928	1.48	1,339	1.23	1,409	7.47	7,065	1.18	6,898	1.74	10,167	1.11	10,122
95%	1,098	1.66	1,522	1.32	1,654	7.88	8,241	1.26	8,198	1.89	12,854	1.25	12,827
99%	1,324	2.62	1,956	1.59	2,165	10.60	11,685	1.51	12,339	2.41	19,489	1.47	19,529
Maximum	3,673	5.15	3,897	4.21	5,670	15.70	49,991	3.47	26,067	3.49	50,474	4.05	72,427
n	23,212	18,087	18,087	18,086	18,086	13,117	13,117	13,117	13,117	9,215	9,215	9,215	9,215
Max/Mean	4.92	-	4.07	-	5.55	-	16.74	-	8.72	-	11.86	-	17.02

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 3 Overview

Dwelling Unit Nonresponse

For the one-factor effects, College Dorm had to be collapsed with Other Group Quarter and was then dropped because of a convergence problem. Out of 23 proposed variables, 21 were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the State × Group Quarter, State × percent Hispanic or Latino, and State × percent Owner-Occupied interactions. Out of 104 proposed variables, 90 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 128 proposed variables, 45 were included in the model.

In the final model, a total of 156 variables were included; see Exhibit D3.1.

Dwelling Unit Poststratification

All 18 proposed one-factor effects were included in the model.

All 73 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing was present in the State × Race × Hispanicity interaction. Out of 106 proposed variables, 102 were included in the model.

In the final model, a total of 193 variables were included; see Exhibit D3.2.

Selected Person-Level Poststratification

For the one-factor effects, College Dorm had to be collapsed with Other Group Quarter because of a convergence problem. Out of 36 proposed variables, 35 were included in the model.

For the two-factor effects, variable collapsing was present in the State × percent Hispanic or Latino interaction. Out of 145 proposed variables, 143 were included in the model.

For the three-factor effects, variable dropping was present in the State × Age × Hispanicity interaction. Out of 106 proposed variables, 102 were included in the model.

In the final model, a total of 280 variables were included; see Exhibit D3.3.

Respondent Person-Level Nonresponse

All 36 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the State × percent Hispanic or Latino interaction. Out of 145 proposed variables, 143 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Race, State × Age × Hispanicity, State × Race × Hispanicity, and State × Race × Gender interactions. Out of 106 proposed variables, 93 were included in the model.

In the final model, a total of 272 variables were included; see Exhibit D3.4.

Respondent Person-Level Poststratification

All 19 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the State × Race interaction. Out of 81 proposed variables, 80 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the Age × Race × Hispanicity, Age × Hispanicity × Gender, State × Age × Race, State × Age × Hispanicity, and State × Race × Hispanicity interactions. Out of 127 proposed variables, 105 were included in the model.

In the final model, a total of 204 variables were included; see Exhibit D3.5.

Exhibit D3.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 3: East North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**23**	**21**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	0	Coll. (1) & (2); conv. Drop (1,2); conv.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**104**	**90**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Population Density	5 × 4	12	12	All levels present.
State × Group Quarter	5 × 3	8	0	Drop all levels; hier.
State × % Black or African American	5 × 3	8	8	All levels present.
State × % Hispanic or Latino	5 × 3	8	6	Coll. (5,1) & (5,2); zero. Coll. (1,1) & (1,2); sing.
State × % Owner-Occupied	5 × 3	8	4	Coll. (1,3) & (1,2), repeat for all states; conv.
State × Rent/Housing	5 × 5	16	16	All levels present.
Three-Factor Effects		**128**	**45**	
State × % Owner-Occupied × % Black or African American	5 × 3 × 3	16	6	Coll. (1,3,1) & (1,2,1), (1,3,2) & (1,2,2), repeat for all states; hier. Coll. (4,3/2,1) & (4,3/2,2); sing. Coll. (1,3/2,1) & (1,3/2,2); conv.
State × % Owner-Occupied × % Hispanic or Latino	5 × 3 × 3	16	4	Coll. (1,3,1) & (1,2,1), (1,3,2) & (1,2,2), repeat for all states; hier. Coll. (1,3/2,1) & (1,3/2,2), (5,3/2,1) & (5,3/2,2); hier. Coll. (3,3/2,1) & (3,3/2,2), (4,3/2,1) & (4,3/2,2); sing.
State × % Owner-Occupied × Rent/Housing	5 × 3 × 5	32	11	Coll. (1,3,1) & (1,2,1), (1,3,2) & (1,2,2), repeat for all states; hier. Coll. (4,3/2,1) & (4,3/2,2); zero. Drop (3,3/2,4), (4,3/2,4); sing. Drop (1,3/2,4), (5,3/2,4); conv.
State × Rent/Housing × % Black or African American	5 × 3 × 5	32	14	Coll. (4,1,1) & (4,1,2), (5,4,1) & (5,4,2); zero. Coll. (3,3,1) & (3,3,2), (4,3,1) & (4,3,2); sing. Coll. (1,1,1) & (1,1,2), (1,2,1) & (1,2,2), (1,3,1) & (1,3,2), (1,4,1) & (1,4,2), (3,1,1) & (3,1,2), (3,2,1) & (3,2,2), (4,2,1) & (4,2,2), (5,1,1) & (5,1,2), (5,2,1) & (5,2,2), (5,3,1) & (5,3,2); conv. Drop (4,4,1); zero. Drop (3,4,1), (3,4,2), (4,4,2); sing.
State × Rent/Housing × % Hispanic or Latino	5 × 3 × 5	32	10	Coll. (1,1,1) & (1,1,2), (1,2,1) & (1,2,2), (1,3,1) & (1,3,2), (1,4,1) & (1,4,2), repeat for state 5; hier. Drop (5,3,1/2); zero. Drop (1,4,1/2), (5,4,1/2); sing. Coll. (3,1,1) & (3,1,2), (3,3,1) & (3,3,2), (4,1,1) & (4,1,2), (4,3,1) & (4,3,2); zero. Coll. (3,2,1) & (3,2,2), (4,2,1) & (4,2,2); sing. Drop (3,4,1), (4,4,1); zero. Drop (3,4,2), (4,4,2); sing.
Total		**255**	**156**	

Exhibit D3.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 3: East North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**18**	**18**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**73**	**73**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 5	16	16	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
Three-Factor Effects		**106**	**102**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 5 × 3	32	32	All levels present.
State × Age × Hispanicity	5 × 5 × 2	16	16	All levels present.
State × Age × Gender	5 × 5 × 2	16	16	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (1,2,1) & (1,3,1), repeat for all states; conv.
State × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**197**	**193**	

Exhibit D3.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 3: East North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**36**	**35**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	1	Coll. (1) & (2); conv.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**145**	**143**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 5	16	16	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
State × % Black or African American	5 × 3	8	8	All levels present.
State × % Hispanic or Latino	5 × 3	8	6	Coll. (5,1) & (5,2); zero. Coll. (1,1) & (1,2); sing.
State × % Owner-Occupied	5 × 3	8	8	All levels present.
State × Rent/Housing	5 × 5	16	16	All levels present.
Three-Factor Effects		**106**	**102**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 5 × 3	32	32	All levels present.
State × Age × Hispanicity	5 × 5 × 2	16	12	Drop (1,4,1), repeat for all states; conv.
State × Age × Gender	5 × 5 × 2	16	16	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
State × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**287**	**280**	

Exhibit D3.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 3: East North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**36**	**36**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**145**	**143**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 5	16	16	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
State × % Black or African American	5 × 3	8	8	All levels present.
State × % Hispanic or Latino	5 × 3	8	6	Coll. (5,1) & (5,2); zero. Coll. (1,1) & (1,2); sing.
State × % Owner-Occupied	5 × 3	8	8	All levels present.
State × Rent/Housing	5 × 5	16	16	All levels present.
Three-Factor Effects		**106**	**93**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 5 × 3	32	28	Coll. (4,1,2) & (4,1,3), (4,2,2) & (4,2,3), (4,3,2) & (4,3,3), (4,4,2) & (4,4,3); conv.
State × Age × Hispanicity	5 × 5 × 2	16	12	Drop (1,4,1), repeat for all states; conv.
State × Age × Gender	5 × 5 × 2	16	16	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (1,2,1) & (1,3,1), repeat for all states; conv.
State × Race (3 levels) × Gender	5 × 3 × 2	8	7	Coll. (4,2,1) & (4,3,1); conv.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**287**	**272**	

Exhibit D3.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 3: East North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**19**	**19**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**81**	**80**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 6	20	20	All levels present.
State × Race (5 levels)	5 × 5	16	15	Coll. (1,3) & (1,4); conv.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
Three-Factor Effects		**127**	**105**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	7	Coll. (5,2,1) & (5,3,1); sing. Coll. (3,2,1) & (3,3,1), (4,2,1) & (4,3,1); conv.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	4	Drop (5,1,1); conv.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 6 × 3	40	36	Coll. (1,5,2) & (1,5,3), repeat for all states; conv.
State × Age × Hispanicity	5 × 6 × 2	20	14	Drop (1,4,1), (1,5,1), (3,5,1), (4,5,1), (5,4,1), (5,5,1); conv.
State × Age × Gender	5 × 6 × 2	20	20	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	0	Drop all levels; conv.
State × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**227**	**204**	

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Appendix D4: Model Group 4: West North Central

(Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota)

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Table D.4a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 4: West North Central)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	3.70	3.05	0.20	1.52184	357	(1.08, 2.50)	(1.09, 2.50)
	1.30	1.91	0.31	1.53716	210	(1.00, 3.18)	(1.00, 3.18)
						(1.11, 1.42)	(1.12, 1.41)
res.sdu.ps	1.30	1.91	0.31	1.53721	267	(0.20, 1.10)	(0.20, 1.10)
	1.80	2.60	0.46	1.57892	263	(0.20, 4.89)	(0.20, 4.87)
						(0.90, 1.63)	(0.91, 1.63)
sel.per.ps	3.25	6.08	1.27	2.43181	377	(0.20, 2.50)	(0.20, 2.50)
	1.77	2.49	0.57	2.34192	351	(0.20, 4.60)	(0.20, 4.57)
						(0.90, 2.87)	(0.90, 2.87)
res.per.nr	1.76	2.57	0.62	2.34319	377	(1.00, 3.00)	(1.00, 3.00)
	1.37	2.89	0.67	2.59536	322	(1.00, 5.00)	(1.00, 5.00)
						(1.40, 4.78)	(1.40, 4.78)
res.per.ps	1.35	2.70	0.64	2.59536	307	(0.20, 2.30)	(0.20, 2.30)
	1.16	2.36	0.47	2.63091	266	(0.20, 4.11)	(0.20, 4.10)
						(0.90, 2.43)	(2.43, 2.43)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \lceil (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.4b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 4: West North Central)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	78	0.83	83	0.12	27	1.01	37	0.12	25	0.58	30	0.16	20
1%	79	1.00	85	0.55	88	1.01	111	0.36	95	1.00	126	0.33	111
5%	94	1.06	106	0.76	108	1.01	177	0.65	159	1.03	209	0.69	199
10%	105	1.08	121	0.86	126	1.01	275	0.78	250	1.10	314	0.87	297
25%	131	1.10	141	0.99	167	1.29	479	0.89	480	1.22	651	0.97	632
Median	438	1.16	503	1.07	528	2.49	1,129	1.00	1,115	1.35	1,458	1.01	1,454
75%	842	1.22	987	1.17	901	3.13	2,163	1.11	2,235	1.52	2,973	1.06	2,991
90%	989	1.30	1,171	1.28	1,286	7.20	4,221	1.25	4,345	1.75	6,144	1.12	6,074
95%	1,025	1.39	1,250	1.40	1,400	8.38	6,557	1.36	6,752	1.95	9,343	1.25	9,402
99%	1,153	1.64	1,404	1.80	1,690	9.54	10,444	1.95	10,196	2.78	16,304	1.76	15,787
Maximum	3,063	3.18	2,544	4.87	5,448	22.90	32,732	5.63	14,967	7.06	43,536	4.84	44,134
n	16,760	14,144	14,144	14,143	14,143	9,532	9,532	9,532	9,532	6,808	6,808	6,808	6,808
Max/Mean	6.46	-	4.53	-	9.10	-	17.64	-	8.14	-	16.91	-	17.14

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 4 Overview

Dwelling Unit Nonresponse

All 25 proposed one-factor effects were included in the model.

Variable collapsing or dropping was present in all two-factor effects except the percent Owner-Occupied × percent Black or African American, State × Quarter, State × percent Owner-Occupied, and State × Rent/Housing interactions. Out of 140 proposed variables, 122 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 192 proposed variables, 63 were included in the model.

In the final model, a total of 210 variables were included; see Exhibit D4.1.

Dwelling Unit Poststratification

All 20 proposed one-factor effects were included in the model.

All 99 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing was present in the Age × Race × Hispanicity and State × Race × Hispanicity interactions. Out of 148 proposed variables, 144 were included in the model.

In the final model, a total of 263 variables were included; see Exhibit D4.2.

Selected Person-Level Poststratification

All 38 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the percent Owner-Occupied × percent Hispanic or Latino, percent Owner-Occupied × Rent/Housing, Rent/Housing × percent Black or African American, Rent/Housing × percent Hispanic or Latino, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 191 proposed variables, 180 were included in the model.

For the three-factor effects, variable collapsing was present in the Age × Race × Hispanicity, State × Age × Race, and State × Race × Hispanicity interactions. Out of 148 proposed variables, 133 were included in the model.

In the final model, a total of 351 variables were included; see Exhibit D4.3.

Respondent Person-Level Nonresponse

All 38 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the percent Owner-Occupied × percent Hispanic or Latino, percent Owner-Occupied × Rent/Housing, Rent/Housing × percent Black or African American, Rent/Housing × percent Hispanic or Latino, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 191 proposed variables, 180 were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Hispanicity × Gender, State × Age × Gender, and State × Hispanicity × Gender interactions. Out of 148 proposed variables, 104 were included in the model.

In the final model, a total of 322 variables were included; see Exhibit D4.4.

Respondent Person-Level Poststratification

All 21 proposed one-factor effects were included in the model.

All 109 proposed two-factor effects were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Race × Gender, Race × Hispanicity × Gender, State × Age × Gender, State × Race × Gender, and State × Hispanicity × Gender interactions. Out of 177 proposed variables, 136 were included in the model.

In the final model, a total of 266 variables were included; see Exhibit D4.5.

Exhibit D4.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 4: West North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**25**	**25**	
Intercept	1	1	1	All levels present.
State	7	6	6	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**140**	**122**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	3	Coll. (3,1) & (3,2); zero.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Coll. (2,1) & (3,1); zero.
Rent/Housing × % Black or African American	3 × 5	8	7	Coll. (4,1) & (4,2); sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	7	Coll. (4,1) & (4,2); sing.
State × Quarter	7 × 4	18	18	All levels present.
State × Population Density	7 × 4	18	14	Coll. (1,1) & (1,2), do the same for states 5, 6, & 7; zero.
State × Group Quarter	7 × 3	12	9	Coll. (6,1) & (6,2); sing. Drop (5,1/2); zero.
State × % Black or African American	7 × 3	12	9	Coll. (2,1) & (2,2), do same for states 6 & 7; zero.
State × % Hispanic or Latino	7 × 3	12	8	Coll. (5,1) & (5,2); sing. Coll. (6,1) & (6,2); zero. Drop (7,1/2); zero.
State × % Owner-Occupied	7 × 3	12	12	All levels present.
State × Rent/Housing	7 × 5	24	24	All levels present.
Three-Factor Effects		**192**	**63**	
State × % Owner-Occupied × % Black or African American	7 × 3 × 3	24	9	Coll. (1,2,1) & (1,2,2), do the same for states 2, 3, & 5, coll. (2,3,1) & (2,3,2), do the same for states 5 & 6, keep (3,3,1), (3,3,2), drop remainder; hier./sing./zero.
State × % Owner-Occupied × % Hispanic or Latino	7 × 3 × 3	24	7	Coll. (1,2,1) & (1,2,2), do the same for states 3, 5, & 6, coll. (2,3,1) & (2,3,2), keep (2,2,1) & (2,2,2), drop remainder; hier./sing./zero.
State × % Owner-Occupied × Rent/Housing	7 × 3 × 5	48	26	Coll. (1,2,1) & (1,2,2) & (1,3,1) & (1.3.2), do the same for state 3. Coll. (1,2,3) & (1,3,3), do the same for states 2 & 5. Coll. (1,2,4) & (1,3,4), do the same for states 5 & 7. Coll. (2,2,1) & (2,3,1), do the same for states 5, 6, & 7. Coll. (3,2,3) & (3,2,4) & (3,3,3) & (3,3,4). Coll. (6,2,2) & (6,2,3). Drop (6,2/3,4). Keep remainder; hier./sing./conv.
State × Rent/Housing × % Black or African American	7 × 3 × 5	48	8	Coll. (1,1,1) & (1,1,2); do the same for state 2. Coll. (1,2,1) & (1,2,2), do the same for state 2. Coll. (3,4,1) & (3,4,2), do the same for state 5. Keep (5,2,1) & (5,2,2), drop remainder; hier./sing./zero.
State × Rent/Housing × % Hispanic or Latino	7 × 3 × 5	48	13	Coll. (1,1,1) & (1,1,2), do the same for states 2 & 5. Coll. (1,2,1) & (1,2,2), do the same for state 5. Coll. (1,3,1) & (1,3,2), do the same for states 2, 3, & 5. Coll. (2,4,1) & (2,4,2), do the same for state 3. Keep (2,2,1), (2,2,2), drop remainder; hier./sing./zero.
Total		**357**	**210**	

Exhibit D4.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 4: West North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**20**	**20**	
Intercept	1	1	1	All levels present.
State	7	6	6	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**99**	**99**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	7 × 4	18	18	All levels present.
State × Age	7 × 5	24	24	All levels present.
State × Race (5 levels)	7 × 5	24	24	All levels present.
State × Hispanicity	7 × 2	6	6	All levels present.
State × Gender	7 × 2	6	6	All levels present.
Three-Factor Effects		**148**	**144**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	7	Coll. (4,2,1) & (4,3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	7 × 5 × 3	48	48	All levels present.
State × Age × Hispanicity	7 × 5 × 2	24	24	All levels present.
State × Age × Gender	7 × 5 × 2	24	24	All levels present.
State × Race (3 levels) × Hispanicity	7 × 3 × 2	12	9	Coll. (6,2,1) & (6,3,1); zero. Coll. (1,2,1) & (1,3,1), (3,2,1), & (3,3,1); conv.
State × Race (3 levels) × Gender	7 × 3 × 2	12	12	All levels present.
State × Hispanicity × Gender	7 × 2 × 2	6	6	All levels present.
Total		**267**	**263**	

Exhibit D4.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 4: West North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**38**	**38**	
Intercept	1	1	1	All levels present.
State	7	6	6	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**191**	**180**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	3	Coll. (3,1) & (3,2); zero.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Coll. (2,1) & (3,1); zero.
Rent/Housing × % Black or African American	3 × 5	8	7	Coll. (4,1) & (4,2); sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	7	Coll. (4,1) & (4,2); sing.
State × Quarter	7 × 4	18	18	All levels present.
State × Age	7 × 5	24	24	All levels present.
State × Race (5 levels)	7 × 5	24	24	All levels present.
State × Hispanicity	7 × 2	6	6	All levels present.
State × Gender	7 × 2	6	6	All levels present.
State × % Black or African American	7 × 3	12	9	Coll. (2,1) & (2,2), do the same for states 6 & 7; zero.
State × % Hispanic or Latino	7 × 3	12	8	Coll. (5,1) & (5,2), drop (7,1/2); zero. Coll. (6,1) & (6,2); sing.
State × % Owner-Occupied	7 × 3	12	12	All levels present.
State × Rent/Housing	7 × 5	24	24	All levels present.
Three-Factor Effects		**148**	**133**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (4,2,1) & (4,3,1); zero. Coll. (3,2,1) & (3,3,1); sing. Coll. (2,2,1) & (2,3,1), (1,2,1) & (1,3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	7 × 5 × 3	48	43	Coll. (6,4,2) & (6,4,3); sing. Coll. (1,1,2) & (1,1,3), do the same for all age levels; conv.
State × Age × Hispanicity	7 × 5 × 2	24	24	All levels present.
State × Race (3 levels) × Hispanicity	7 × 3 × 2	12	6	Coll. (6,2,1) & (6,3,1); zero. Coll. (7,2,1) & (7,3,1); sing. Coll. (1,2,1) & (1,3,1), do the same for all remaining states; conv.
State × Race (3 levels) × Gender	7 × 3 × 2	12	12	All levels present.
State × Age × Gender	7 × 5 × 2	24	24	All levels present.
State × Hispanicity × Gender	7 × 2 × 2	6	6	All levels present.
Total		**377**	**351**	

Exhibit D4.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 4: West North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**38**	**38**	
Intercept	1	1	1	All levels present.
State	7	6	6	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**191**	**180**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	3	Coll. (3,1) & (3,2); zero.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Coll. (2,1) & (3,1); zero.
Rent/Housing × % Black or African American	3 × 5	8	7	Coll. (4,1) & (4,2); sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	7	Coll. (4,1) & (4,2); sing.
State × Quarter	7 × 4	18	18	All levels present.
State × Age	7 × 5	24	24	All levels present.
State × Race (5 levels)	7 × 5	24	24	All levels present.
State × Hispanicity	7 × 2	6	6	All levels present.
State × Gender	7 × 2	6	6	All levels present.
State × % Black or African American	7 × 3	12	9	Coll. (2,1) & (2,2), do the same for states 5 & 6; zero.
State × % Hispanic or Latino	7 × 3	12	8	Drop (7,1/2), coll. (6,1) & (6,2); zero. Coll. (5,1) & (5,2); sing.
State × % Owner-Occupied	7 × 3	12	12	All levels present.
State × Rent/Housing	7 × 5	24	24	All levels present.
Three-Factor Effects		**148**	**104**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	2	Coll. (1,2,1) & (1,3,1), (2,2,1) & (2,3,1), drop (3/4, 2/3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	7	Coll. (4,2,1) & (4,3,1); conv.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); conv.
State × Age × Race (3 levels)	7 × 5 × 3	48	31	Coll. (6,4,2) & (6,4,3); sing. Coll. (1,1,2) & (1,1,3), do the same for all age levels, do the same for states 1, 5, 6, & 7, drop (7,4,2/3); conv.
State × Age × Hispanicity	7 × 5 × 2	24	18	Drop (7,4,1); sing. Drop (7,3,1), (3,4,1), (1,3/4,1), (6,4,1); conv.
State × Age × Gender	7 × 5 × 2	24	24	All levels present.
State × Race (3 levels) × Hispanicity	7 × 3 × 2	12	2	Coll. (7,2,1) & (7,3,1); zero. Coll. (5,2,1) & (5,3,1), drop remainder; conv.
State × Race (3 levels) × Gender	7 × 3 × 2	12	9	Coll. (1,2,1) & (1,3,1), do the same for states 5 & 7; conv.
State × Hispanicity × Gender	7 × 2 × 2	6	6	All levels present.
Total		**377**	**322**	

Exhibit D4.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 4: West North Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**21**	**21**	
Intercept	1	1	1	All levels present.
State	7	6	6	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**109**	**109**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	7 × 4	18	18	All levels present.
State × Age	7 × 6	30	30	All levels present.
State × Race (5 levels)	7 × 5	24	24	All levels present.
State × Hispanicity	7 × 2	6	6	All levels present.
State × Gender	7 × 2	6	6	All levels present.
Three-Factor Effects		**177**	**136**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	6	Coll (3,2,1) & (3,3,1), (4,2,1) & (4,3,1), drop (5,2/3,1); conv.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	4	Drop (5,1,1); conv.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	7 × 6 × 3	60	40	Coll. (1,5,2) & (1,5,3), (6,4,2) & (6,4,3); sing. Drop (7,5,2/3), coll. (6,5,2) & (6,5,3); zero. Coll. (1,1,2) & (1,1,3), do the same for all age levels, do the same for states 3 & 7, drop (7,4,2/3), (3,5,2/3); conv.
State × Age × Hispanicity	7 × 6 × 2	30	21	Drop (3/7,4,1), (5/6,5,1); sing. Drop (3/7,5,1); zero. Drop (1/2,5,1), (1,4,1); conv.
State × Age × Gender	7 × 6 × 2	30	30	All levels present.
State × Race (3 levels) × Hispanicity	7 × 3 × 2	12	5	Coll. (6,2,1) & (6,3,1); sing. Coll. (7,2,1) & (7,3,1); zero. Do the same for all states, drop (5,2/3,1); conv.
State × Race (3 levels) × Gender	7 × 3 × 2	12	12	All levels present.
State × Hispanicity × Gender	7 × 2 × 2	6	6	All levels present.
Total		**307**	**266**	

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Appendix D5: Model Group 5: South Atlantic

(Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia)

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Table D.5a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 5: South Atlantic)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	3.24	3.66	0.48	1.32516	459	(1.18, 2.38)	(1.18, 2.37)
	1.67	2.21	0.31	1.34163	290	(1.00, 4.75)	(1.00, 4.75)
						(1.00, 1.39)	(1.00, 1.39)
res.sdu.ps	1.67	2.22	0.31	1.34169	337	(0.37, 1.50)	(0.37, 1.50)
	1.26	2.18	0.37	1.38284	337	(0.20, 4.55)	(0.20, 4.49)
						(0.90, 1.36)	(0.90, 1.36)
sel.per.ps	2.44	4.32	0.97	2.08298	467	(0.60, 2.68)	(0.62, 2.67)
	1.13	1.90	0.36	2.03971	454	(0.20, 4.18)	(0.20, 4.18)
						(0.30, 1.76)	(0.30, 1.72)
res.per.nr	1.39	3.27	0.60	2.05286	467	(1.00, 3.00)	(1.00, 3.00)
	1.10	2.43	0.47	2.24726	430	(1.00, 4.95)	(1.00, 4.93)
						(1.30, 3.20)	(1.30, 3.20)
res.per.ps	1.10	2.43	0.48	2.24726	387	(0.20, 1.64)	(0.20, 1.63)
	0.65	1.42	0.20	2.28234	359	(0.20, 4.91)	(0.20, 4.89)
						(0.90, 1.19)	(0.90, 1.19)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \lceil (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.5b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 5: South Atlantic)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	48	0.95	51	0.20	12	1.01	12	0.20	9	0.51	19	0.08	5
1%	49	1.04	56	0.55	57	1.01	100	0.59	93	1.01	108	0.22	95
5%	51	1.10	71	0.79	80	1.01	261	0.76	250	1.07	317	0.46	293
10%	53	1.14	100	0.88	110	1.01	428	0.83	414	1.12	541	0.86	489
25%	269	1.18	350	1.00	364	1.29	1,100	0.91	1,083	1.21	1,389	0.97	1,333
Median	779	1.25	969	1.09	1,037	2.45	2,066	1.00	2,085	1.34	2,662	1.02	2,657
75%	933	1.36	1,190	1.19	1,331	3.24	3,616	1.09	3,674	1.51	5,015	1.07	5,083
90%	1,150	1.54	1,426	1.31	1,634	7.27	7,885	1.18	7,520	1.69	10,037	1.18	10,028
95%	1,218	1.70	1,595	1.43	1,853	8.99	9,860	1.25	9,798	1.85	14,044	1.30	14,264
99%	1,468	2.05	2,302	1.91	2,509	9.60	13,487	1.52	13,784	2.40	22,064	1.87	22,670
Maximum	2,066	4.75	4,376	4.49	6,997	17.95	67,162	4.18	47,499	5.81	53,132	5.36	46,381
n	33,831	25,958	25,958	25,946	25,946	17,631	17,631	17,631	17,631	12,761	12,761	12,761	12,761
Max/Mean	3.08	-	5.01	-	7.27	-	21.92	-	15.65	-	12.67	-	11.06

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 5 Overview

Dwelling Unit Nonresponse

For the one-factor effects, College Dorm had to be collapsed with Other Group Quarter and was then dropped. Out of 27 proposed variables, 25 were included in the model.

For the two-factor effects, variable dropping was present in the Rent/Housing × percent Hispanic or Latino, State × Population Density, State × Group Quarter, State × percent Black or African American, State × percent Hispanic or Latino, and State × Rent/Housing interactions. Out of 176 proposed variables, 146 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Many factors were excluded because of zero sample sizes or exact linear combinations. Out of 256 proposed variables, 119 were included in the model.

In the final model, a total of 290 variables were included; see Exhibit D5.1.

Dwelling Unit Poststratification

All 22 proposed one-factor effects were included in the model.

All 125 proposed two-factor effects were included in the model.

All 190 proposed three-factor effects were included in the model.

In the final model, a total of 337 variables were included; see Exhibit D5.2.

Selected Person-Level Poststratification

All 40 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the Rent/Housing × percent Hispanic or Latino, State × percent Black or African American, State × percent Hispanic or Latino, and State × Rent/Housing interactions. Out of 237 proposed variables, 229 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Hispanicity and State × Race × Hispanicity interactions. Out of 190 proposed variables, 185 were included in the model.

In the final model, a total of 454 variables were included; see Exhibit D5.3.

Respondent Person-Level Nonresponse

All 40 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the Rent/Housing × percent Hispanic or Latino, State × Race, State × percent Black or African American, State × percent Hispanic or Latino, State × percent Owner-Occupied, and State × Rent/Housing interactions. Out of 237 proposed variables, 226 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Race, State × Age × Hispanicity, and State × Race × Hispanicity interactions. Out of 190 proposed variables, 164 were included in the model.

In the final model, a total of 430 variables were included; see Exhibit D5.4.

Respondent Person-Level Poststratification

All 23 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the State × Race interaction. Out of 137 proposed variables, 129 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Race, State × Age × Hispanicity, and State × Race × Hispanicity interactions. Out of 227 proposed variables, 207 were included in the model.

In the final model, a total of 359 variables were included; see Exhibit D5.5.

Exhibit D5.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 5: South Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**27**	**25**	
Intercept	1	1	1	All levels present.
State	9	8	8	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	0	Coll. (1) & (2), then drop; conv.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**176**	**146**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	7	Drop (1,1); zero.
State × Quarter	9 × 4	24	24	All levels present.
State × Population Density	9 × 4	24	18	Drop (1,*), (2,*); sing./zero.
State × Group Quarter	9 × 3	16	0	Drop all; hier.
State × % Black or African American	9 × 3	16	15	Drop (8,1); zero.
State × % Hispanic or Latino	9 × 3	16	13	Drop (6,1), (8,1/2); zero.
State × % Owner-Occupied	9 × 3	16	16	All levels present.
State × Rent/Housing	9 × 5	32	29	Drop (2,1), (8,3/4); sing./zero.
Three-Factor Effects		**256**	**119**	
State × % Owner-Occupied × % Black or African American	9 × 3 × 3	32	24	Coll. (2,3,1) & (2,3,2), (2,2,1) & (2,2,2); conv. Drop (6,3,2), (7,3,1), (7,3,2), (8,3,1), (8,3,2), (8,2,1); sing./zero.
State × % Owner-Occupied × % Hispanic or Latino	9 × 3 × 3	32	13	Keep (9,2,1/2), (1,3/2,2), (2,3/2,2), (4,3/2,2), (5,3/2,2), (6,2,2), (7,3,2), (7,2,2), drop all others; sing./conv./zero.
State × % Owner-Occupied × Rent/Housing	9 × 3 × 5	64	32	Coll. (9,3,1) & (9,3,2); conv. Keep (9,3,3), (9,2,*), (1,3,1/2/3), (1,2,3), (2,3,2/3), (2,2,3), (4,3,1), (4,3,3), (4,2,1/3/4), (5,3,2/4), (5,2,1/2/3), (6,3,1), (6,2,1/2/3), (7,3,3), (7,2,1/3/4), (8,2,1), drop all others; sing./conv./zero.
State × Rent/Housing × % Black or African American	9 × 3 × 5	64	33	Coll. (4,4,1) & (4,4,2); conv. Keep (9,1,2), (9,2,1/2), (9,3,1/2), (9,4,2), (1,2,1/2), (1,3,1/2), (1,4,2), (4,1/2,1), (4,3,1/2), (5,1,1/2), (5,2,1/2), (5,3,2), (6,1,1/2), (6,2,1/2), (6,3,2), (7,1,1/2), (7,2,1/2), (7,3,2), (8,1,2); drop all others; conv./sing./zero.
State × Rent/Housing × % Hispanic or Latino	9 × 3 × 5	64	17	Keep (9,1,2), (9,2,1/2), (9,3,2), (9,4,2), (1,2,2), (1,3,2), (2,3,2), (4,3/4,2), (5,1/2,2), (5,3,2), (6,1/2,2), (7,2/3,2), drop all others; sing./conv./zero.
Total		**459**	**290**	

Exhibit D5.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 5: South Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**22**	**22**	
Intercept	1	1	1	All levels present.
State	9	8	8	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**125**	**125**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	9 × 4	24	24	All levels present.
State × Age	9 × 5	32	32	All levels present.
State × Race (5 levels)	9 × 5	32	32	All levels present.
State × Hispanicity	9 × 2	8	8	All levels present.
State × Gender	9 × 2	8	8	All levels present.
Three-Factor Effects		**190**	**190**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	9 × 5 × 3	64	64	All levels present.
State × Age × Hispanicity	9 × 5 × 2	32	32	All levels present.
State × Age × Gender	9 × 5 × 2	32	32	All levels present.
State × Race (3 levels) × Hispanicity	9 × 3 × 2	16	16	All levels present.
State × Race (3 levels) × Gender	9 × 3 × 2	16	16	All levels present.
State × Hispanicity × Gender	9 × 2 × 2	8	8	All levels present.
Total		**337**	**337**	

Exhibit D5.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 5: South Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**40**	**40**	
Intercept	1	1	1	All levels present.
State	9	8	8	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**237**	**229**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	7	Drop (1,1); zero.
State × Quarter	9 × 4	24	24	All levels present.
State × Age	9 × 5	32	32	All levels present.
State × Race (5 levels)	9 × 5	32	32	All levels present.
State × Hispanicity	9 × 2	8	8	All levels present.
State × Gender	9 × 2	8	8	All levels present.
State × % Black or African American	9 × 3	16	15	Drop (8,1); zero.
State × % Hispanic or Latino	9 × 3	16	13	Drop (6,1), (8,1/2); zero.
State × % Owner-Occupied	9 × 3	16	16	All levels present.
State × Rent/Housing	9 × 5	32	29	Drop (2,1), (8,4); zero. Drop (8,3); sing.
Three-Factor Effects		**190**	**185**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	9 × 5 × 3	64	64	All levels present.
State × Age × Hispanicity	9 × 5 × 2	32	28	Drop (2,*,1); conv.
State × Age × Gender	9 × 5 × 2	32	32	All levels present.
State × Race (3 levels) × Hispanicity	9 × 3 × 2	16	15	Coll. (2,2,1) & (2,3,1); conv.
State × Race (3 levels) × Gender	9 × 3 × 2	16	16	All levels present.
State × Hispanicity × Gender	9 × 2 × 2	8	8	All levels present.
Total		**467**	**454**	

Exhibit D5.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 5: South Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**40**	**40**	
Intercept	1	1	1	All levels present.
State	9	8	8	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**237**	**226**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	7	Drop (1,1); zero.
State × Quarter	9 × 4	24	24	All levels present.
State × Age	9 × 5	32	32	All levels present.
State × Race (5 levels)	9 × 5	32	30	Coll. (8,3) & (8,4), (4,3) & (4,4); conv.
State × Hispanicity	9 × 2	8	8	All levels present.
State × Gender	9 × 2	8	8	All levels present.
State × % Black or African American	9 × 3	16	15	Drop (8,1); zero.
State × % Hispanic or Latino	9 × 3	16	13	Drop (6,1), (8,1/2); zero.
State × % Owner-Occupied	9 × 3	16	15	Coll. (8,2) & (8,3); conv.
State × Rent/Housing	9 × 5	32	29	Drop (2,1), (8,4); zero. Drop (8,3); sing.
Three-Factor Effects		**190**	**164**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	9 × 5 × 3	64	54	Coll. (6,3,2) & (6,3,3), (6,4,2) & (6,4,3); conv. Coll. (2,1,2) & (2,1,3), repeat for all age levels & for WV; conv.
State × Age × Hispanicity	9 × 5 × 2	32	24	Drop all for VA & WV; conv.
State × Age × Gender	9 × 5 × 2	32	32	All levels present.
State × Race (3 levels) × Hispanicity	9 × 3 × 2	16	8	Coll. (1,2,1) & (1,3,1), do the same for all states; conv.
State × Race (3 levels) × Gender	9 × 3 × 2	16	16	All levels present.
State × Hispanicity × Gender	9 × 2 × 2	8	8	All levels present.
Total		**467**	**430**	

Exhibit D5.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 5: South Atlantic

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**23**	**23**	
Intercept	1	1	1	All levels present.
State	9	8	8	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**137**	**129**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	9 × 4	24	24	All levels present.
State × Age	9 × 6	40	40	All levels present.
State × Race (5 levels)	9 × 5	32	24	Coll. (2,3) & (2,4), do the same for all states; conv.
State × Hispanicity	9 × 2	8	8	All levels present.
State × Gender	9 × 2	8	8	All levels present.
Three-Factor Effects		**227**	**207**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	10	All levels present.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	9 × 6 × 3	80	75	Coll. (2,1,2) & (2,1,3), do the same for all age levels; conv.
State × Age × Hispanicity	9 × 6 × 2	40	33	Drop (5,5,1), (8,4,1); sing. Drop (8,5,1); zero. Drop (8,1/2/3,1), (2,5,1); conv.
State × Age × Gender	9 × 6 × 2	40	40	All levels present.
State × Race (3 levels) × Hispanicity	9 × 3 × 2	16	8	Coll. (2,2,1) & (2,3,1), do the same for all states; conv.
State × Race (3 levels) × Gender	9 × 3 × 2	16	16	All levels present.
State × Hispanicity × Gender	9 × 2 × 2	8	8	All levels present.
Total		**387**	**359**	

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Appendix D6: Model Group 6: East South Central

(Alabama, Kentucky, Mississippi, and Tennessee)

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Table D.6a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 6: East South Central)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	5.73	6.25	1.15	1.05843	204	(1.16, 1.84)	(1.17, 1.84)
	5.07	5.98	1.00	1.07364	122	(1.02, 4.18)	(1.02, 4.17)
						(1.20, 2.19)	(1.22, 2.19)
res.sdu.ps	5.07	5.98	1.00	1.07365	162	(0.20, 1.50)	(0.20, 1.50)
	1.72	2.96	0.75	1.13276	151	(0.20, 5.00)	(0.20, 5.00)
						(0.90, 1.10)	(N/A, N/A)
sel.per.ps	3.26	5.38	1.38	1.73506	242	(0.21, 2.90)	(0.22, 2.90)
	0.96	2.27	0.56	1.76935	217	(0.31, 3.66)	(0.31, 3.65)
						(0.90, 4.47)	(0.90, 4.47)
res.per.nr	1.32	2.97	0.69	1.77655	242	(1.00, 2.50)	(1.00, 2.50)
	1.27	3.45	0.50	1.92924	196	(1.00, 5.00)	(1.00, 5.00)
						(1.40, 2.28)	(2.28, 2.28)
res.per.ps	1.35	3.24	0.48	1.92924	187	(0.20, 1.69)	(0.20, 1.69)
	0.85	2.73	0.57	1.97302	161	(0.20, 4.23)	(0.20, 4.21)
						(0.95, 1.05)	(N/A, N/A)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \left[(n-1)/n\right] * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.6b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 6: East South Central)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	360	1.02	525	0.13	122	1.01	162	0.12	122	0.60	233	0.10	56
1%	503	1.04	554	0.38	318	1.01	429	0.48	439	1.00	559	0.20	336
5%	517	1.06	601	0.81	560	1.01	678	0.70	669	1.02	818	0.65	757
10%	542	1.07	640	0.88	617	1.01	826	0.77	810	1.08	1,064	0.86	1,000
25%	585	1.13	705	0.97	733	1.35	1,226	0.88	1,220	1.22	1,574	0.96	1,548
Median	688	1.19	830	1.06	898	2.50	2,090	0.99	2,056	1.37	2,710	1.02	2,733
75%	864	1.26	1,022	1.17	1,122	3.23	3,631	1.11	3,582	1.56	4,926	1.07	4,941
90%	1,005	1.37	1,201	1.32	1,380	7.25	6,438	1.24	6,199	1.82	9,235	1.12	9,322
95%	1,069	1.43	1,345	1.44	1,560	7.53	7,856	1.38	7,737	2.03	12,506	1.27	12,410
99%	1,086	1.81	1,532	1.94	2,063	8.80	11,737	1.82	11,718	2.73	18,549	1.88	19,424
Maximum	1,200	4.17	2,681	5.00	5,637	15.29	27,619	9.10	33,669	5.00	41,774	4.21	41,711
n	9,429	7,749	7,749	7,748	7,748	5,493	5,493	5,493	5,493	3,863	3,863	3,863	3,863
Max/Mean	1.65	-	3.03	-	5.86	-	9.51	-	11.74	-	10.24	-	10.23

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 6 Overview

Dwelling Unit Nonresponse

All 22 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the percent Owner-Occupied × percent Hispanic or Latino, Rent/Housing × percent Hispanic or Latino, State × Group Quarter, State × percent Hispanic or Latino, and State × percent Owner-Occupied interactions. Out of 86 proposed variables, 68 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 96 proposed variables, 32 were included in the model.

In the final model, a total of 122 variables were included; see Exhibit D6.1.

Dwelling Unit Poststratification

All 17 proposed one-factor effects were included in the model.

All 60 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the Age × Race × Hispanicity, Race × Hispanicity × Gender, and State × Race × Hispanicity interactions. Out of 85 proposed variables, 74 were included in the model.

In the final model, a total of 151 variables were included; see Exhibit D6.2.

Selected Person-Level Poststratification

All 35 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the percent Owner-Occupied × percent Hispanic or Latino, Rent/Housing × percent Hispanic or Latino, and State × percent Hispanic or Latino interactions. Out of 122 proposed variables, 112 were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Race × Gender, Age × Hispanicity × Gender, State × Age × Race, State × Age × Gender, State × Race × Gender, and State × Hispanicity × Gender interactions. Out of 85 proposed variables, 70 were included in the model.

In the final model, a total of 217 variables were included; see Exhibit D6.3.

Respondent Person-Level Nonresponse

All 35 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the percent Owner-Occupied × percent Hispanic or Latino, Rent/Housing × percent Hispanic or Latino, State × Race, State × percent Hispanic or Latino, and State × percent Owner-Occupied interactions. Out of 122 proposed variables, 107 were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Hispanicity × Gender, State × Age × Gender, and State × Hispanicity × Gender interactions. Out of 85 proposed variables, 54 were included in the model.

In the final model, a total of 196 variables were included; see Exhibit D6.4.

Respondent Person-Level Poststratification

All 18 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the Age × Hispanicity interaction. Out of 67 proposed variables, 66 were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the State × Age × Gender and State × Hispanicity × Gender interactions. Out of 102 proposed variables, 77 were included in the model.

In the final model, a total of 161 variables were included; see Exhibit D6.5.

Exhibit D6.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 6: East South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**22**	**22**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**86**	**68**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	2	Coll. (3,1) & (3,2); zero. Coll. (2,1) & (2,2); conv.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	4	Coll. (3,1) & (3,2), (4,1) & (4,2); zero. Coll. (1,1) & (1,2), (2,1) & (2,2); sing.
State × Quarter	4 × 4	9	9	All levels present.
State × Population Density	4 × 4	9	9	All levels present.
State × Group Quarter	4 × 3	6	0	Drop all levels; zero, sing., conv.
State × % Black or African American	4 × 3	6	6	All levels present.
State × % Hispanic or Latino	4 × 3	6	3	Coll. (2,1) & (2,2); zero. Coll. (3,1) & (3,2); sing. Coll. (1,1) & (1,2); conv.
State × % Owner-Occupied	4 × 3	6	3	Coll. (3,1) & (3,2); zero. Coll. (2,1) & (2,2); sing. Coll. (1,1) & (1,2); conv.
State × Rent/Housing	4 × 5	12	12	All levels present.
Three-Factor Effects		**96**	**32**	
State × % Owner-Occupied × % Black or African American	4 × 3 × 3	12	3	Coll. (1,3,1) & (1,2,1), (1,3,2) & (1,2,2), repeat for all states; hier. Coll. (1,3/2,1) & (1,3/2,2); conv. Drop (3,3/2,1), (3,3/2,2); sing.
State × % Owner-Occupied × % Hispanic or Latino	4 × 3 × 3	12	2	Coll. (1,3,1) & (1,3,2), (1,2,1) & (1,2,2), repeat for all states; hier. Coll. (1,3,1/2) & (1,2,1/2); hier. Drop (3,3/2,1/2); zero.
State × % Owner-Occupied × Rent/Housing	4 × 3 × 5	24	8	Coll. (1,3,1) & (1,2,1), (1,3,2) & (1,2,2), (1,3,3) & (1,2,3), (1,3,4) & (1,2,4), repeat for all states; hier. Coll. (1,3/2,1) & (1,3/2,2), repeat for all states; conv. Drop (1,3/2,4); sing.
State × Rent/Housing × % Black or African American	4 × 3 × 5	24	16	Coll. (1,4,1) & (1,4,2), (2,1,1) & (2,1,2), (2,4,1) & (2,4,2); zero. Coll. (1,2,1) & (1,2,2), (1,3,1) & (1,3,2), (2,2,1) & (2,2,2), (3,1,1) & (3,2,1), (3,1,2) & (3,2,2); sing.
State × Rent/Housing × % Hispanic or Latino	4 × 3 × 5	24	3	Keep (1,1/2,1/2), (1,3,1/2), (2,1/2/3,1/2). Drop all others; hier./zero/sing./conv.
Total		**204**	**122**	

Exhibit D6.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 6: East South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**17**	**17**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**60**	**60**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 5	12	12	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
Three-Factor Effects		**85**	**74**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	1	Coll. (1,2,1) & (1,3,1); conv. Drop all others; zero, conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); conv.
State × Age × Race (3 levels)	4 × 5 × 3	24	24	All levels present.
State × Age × Hispanicity	4 × 5 × 2	12	12	All levels present.
State × Age × Gender	4 × 5 × 2	12	12	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	3	Coll. (3,2,1) & (3,3,1); zero. Coll. (1,2,1,) & (1,3,1), (2,2,1) & (2,3,1); conv.
State × Race (3 levels) × Gender	4 × 3 × 2	6	6	All levels present.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**162**	**151**	

Exhibit D6.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 6: East South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**35**	**35**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**122**	**112**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	2	Coll. (3,1) & (3,2); zero. Coll. (2,1) & (2,2); sing.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	4	Coll. (1,1) & (1,2); sing. Coll. (2,1) & (2,2), (3,1) & (3,2), (4,1) & (4,2); zero.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 5	12	12	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
State × % Black or African American	4 × 3	6	6	All levels present.
State × % Hispanic or Latino	4 × 3	6	3	Coll. (1,1) & (1,2); sing. Coll. (2,1) & (2,2), (3,1) & (3,2); zero.
State × % Owner-Occupied	4 × 3	6	5	Coll. (3,3) & (3,2); zero.
State × Rent/Housing	4 × 5	12	12	All levels present.
Three-Factor Effects		**85**	**70**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	3	Drop (4,2,1); zero. Drop (4,3,1); sing. Coll. (3,2,1) & (3,3,1); zero. Coll. (1,2,1) & (1,3,1), (2,2,1) & (2,3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); sing.
State × Age × Race (3 levels)	4 × 5 × 3	24	24	All levels present.
State × Age × Hispanicity	4 × 5 × 2	12	8	Drop (1,4,1), (2,4,1), (3,3,1), (3,4,1); conv.
State × Age × Gender	4 × 5 × 2	12	12	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	1	Coll. (1,2,1) & (1,3,1); zero. Drop all other levels; zero, conv.
State × Race (3 levels) × Gender	4 × 3 × 2	6	6	All levels present.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**242**	**217**	

Exhibit D6.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 6: East South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**35**	**35**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**122**	**107**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	2	Coll. (3,1) & (3,2); zero. Coll. (2,1) & (2,2); sing.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	4	Coll. (1,1) & (1,2); sing. Coll. (2,1) & (2,2), (3,1) & (3,2), (4,1) & (4,2); zero.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 5	12	12	All levels present.
State × Race (5 levels)	4 × 5	12	9	Coll. (1,4) & (1,5), (2,3) & (2,5), (3,3) & (3,4); conv.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
State × % Black or African American	4 × 3	6	6	All levels present.
State × % Hispanic or Latino	4 × 3	6	3	Coll. (2,1) & (2,2), (3,1) & (3,2); zero. Coll. (1,1) & (1,2); sing.
State × % Owner-Occupied	4 × 3	6	3	Coll. (3,3) & (3,2); zero. Coll. (1,3) & (1,2), (2,3) & (2,2); conv.
State × Rent/Housing	4 × 5	12	12	All levels present.
Three-Factor Effects		**85**	**54**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	3	Coll. (1,2,1) & (1,3,1), (2,2,1) & (2,3,1), (3,2,1) & (3,3,1); conv. Drop (4,2,1); zero. Drop (4,3,1); sing.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	4	Coll. (1,2,1) & (1,3,1), repeat for all age levels; conv.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); sing.
State × Age × Race (3 levels)	4 × 5 × 3	24	12	Coll. (1,1,2) & (1,1,3), (1,2,2) & (1,2,3), (1,3,2) & (1,3,3), (1,4,2) & (1,4,3), repeat for all states; conv.
State × Age × Hispanicity	4 × 5 × 2	12	11	Drop (1,4,1); sing.
State × Age × Gender	4 × 5 × 2	12	12	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	0	Drop all levels; zero, conv.
State × Race (3 levels) × Gender	4 × 3 × 2	6	4	Coll. (2,2,1) & (2,3,1), (3,2,1) & (3,3,1); conv.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**242**	**196**	

Exhibit D6.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 6: East South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**18**	**18**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**67**	**66**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	4	Drop (5,1); conv.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 6	15	15	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
Three-Factor Effects		**102**	**77**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	6	Drop (5,2,1), (5,3,1); hier. Drop (4,2,1); zero. Drop (4,3,1); sing.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	9	Coll. (5,2,1) & (5,3,1); sing.
Age × Hispanicity × Gender	6 × 2 × 2	5	4	Drop (5,1,1); hier.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (3,1,1) & (2,1,1); conv.
State × Age × Race (3 levels)	4 × 6 × 3	30	23	Coll. (2,5,2) & (2,5,3), (3,5,2) & (3,5,3); sing. Coll. (1,3,2) & (1,3,3), (2,1,2) & (2,1,3), (2,2,2) & (2,2,3), (2,3,2) & (2,3,3), (2,4,2) & (2,4,3); conv.
State × Age × Hispanicity	4 × 6 × 2	15	11	Drop (1,5,1), repeat for all states; hier. Drop (1,4,1); sing.
State × Age × Gender	4 × 6 × 2	15	15	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	0	Drop all levels; zero, conv.
State × Race (3 levels) × Gender	4 × 3 × 2	6	5	Coll. (3,2,1) & (3,3,1); conv.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**187**	**161**	

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Appendix D7: Model Group 7: West South Central

(Arkansas, Louisiana, Oklahoma, and Texas)

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Table D.7a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 7: West South Central)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	2.60	2.05	0.19	1.24156	204	(1.00, 1.50)	(1.00, 1.50)
	3.48	5.27	0.60	1.25871	147	(1.00, 3.04)	(1.00, 3.00)
						(1.10, 1.27)	(1.10, 1.26)
res.sdu.ps	3.48	5.27	0.60	1.25871	162	(0.48, 1.88)	(0.50, 1.84)
	1.57	3.36	0.73	1.30440	158	(0.26, 4.98)	(0.27, 4.98)
						(0.90, 1.43)	(0.90, 1.43)
sel.per.ps	2.83	6.25	1.34	1.73823	242	(0.48, 2.60)	(0.49, 2.60)
	1.42	3.48	0.91	1.79941	237	(0.43, 4.17)	(0.44, 4.16)
						(0.90, 2.08)	(0.90, 2.08)
res.per.nr	1.50	3.23	0.80	1.78536	242	(1.00, 2.50)	(1.00, 2.50)
	1.56	3.51	0.73	1.88793	206	(1.00, 3.95)	(1.00, 3.91)
						(1.30, 1.44)	(1.30, 1.31)
res.per.ps	1.66	3.75	0.79	1.88793	187	(0.20, 1.40)	(0.20, 1.40)
	0.97	1.97	0.27	1.89866	176	(0.20, 4.76)	(0.20, 4.76)
						(0.30, 5.00)	(N/A, N/A)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \lceil (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.7b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 7: West South Central)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	369	0.68	381	0.27	173	1.01	231	0.23	150	0.46	191	0.10	50
1%	376	1.00	412	0.55	371	1.01	475	0.55	369	1.01	422	0.20	318
5%	383	1.02	468	0.78	489	1.01	687	0.73	676	1.04	849	0.53	644
10%	404	1.06	518	0.90	556	1.01	898	0.81	874	1.08	1,138	0.86	998
25%	658	1.10	724	1.01	752	1.23	1,570	0.91	1,533	1.15	1,967	0.97	1,952
Median	754	1.18	968	1.09	1,132	2.46	2,669	1.01	2,651	1.29	3,412	1.03	3,482
75%	1,482	1.26	1,721	1.18	1,884	2.99	5,049	1.10	5,059	1.47	6,681	1.10	6,681
90%	1,677	1.38	2,021	1.32	2,296	5.59	8,101	1.20	8,416	1.65	11,596	1.19	11,563
95%	1,716	1.45	2,140	1.44	2,577	6.71	10,773	1.29	11,115	1.82	15,517	1.24	15,968
99%	1,982	1.85	2,821	1.96	3,485	7.39	14,813	1.56	15,434	2.56	22,083	1.58	22,970
Maximum	4,704	3.00	4,648	4.98	9,132	13.34	30,714	4.16	52,850	3.91	48,221	4.76	41,213
n	12,807	10,646	10,646	10,646	10,646	8,338	8,338	8,338	8,338	6,209	6,209	6,209	6,209
Max/Mean	4.58	-	3.76	-	6.69	-	8.14	-	13.78	-	9.36	-	8.00

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 7 Overview

Dwelling Unit Nonresponse

All 22 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the State × Group Quarter interaction. Out of 86 proposed variables, 81 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 96 proposed variables, 44 were included in the model.

In the final model, a total of 147 variables were included; see Exhibit D7.1.

Dwelling Unit Poststratification

All 17 proposed one-factor effects were included in the model.

All 60 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing was present in the Age × Race × Hispanicity interaction. Out of 85 proposed variables, 81 were included in the model.

In the final model, a total of 158 variables were included; see Exhibit D7.2.

Selected Person-Level Poststratification

All 35 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the State × percent Hispanic or Latino interaction. Out of 122 proposed variables, 121 were included in the model.

For the three-factor effects, variable collapsing was present in the Age × Race × Hispanicity interaction. Out of 85 proposed variables, 81 were included in the model.

In the final model, a total of 237 variables were included; see Exhibit D7.3.

Respondent Person-Level Nonresponse

All 35 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the State × percent Hispanic or Latino interaction. Out of 122 proposed variables, 121 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the Age × Race × Hispanicity, Race × Hispanicity × Gender, State × Age × Race, State × Age × Hispanicity, and State × Race × Hispanicity interactions. Out of 85 proposed variables, 50 were included in the model.

In the final model, a total of 206 variables were included; see Exhibit D7.4.

Respondent Person-Level Poststratification

All 18 proposed one-factor effects were included in the model.

All 67 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the Age × Race × Hispanicity, Race × Hispanicity × Gender, and State × Age × Hispanicity interactions. Out of 102 proposed variables, 91 were included in the model.

In the final model, a total of 176 variables were included; see Exhibit D7.5.

Exhibit D7.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 7: West South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**22**	**22**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**86**	**81**	
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	All levels present
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Population Density	4 × 4	9	9	All levels present.
State × Group Quarter	4 × 3	6	2	Drop (2,1/2), (3,1/2); zero.
State × % Black or African American	4 × 3	6	6	All levels present.
State × % Hispanic or Latino	4 × 3	6	5	Drop (2,1); zero.
State × % Owner-Occupied	4 × 3	6	6	All levels present.
State × Rent/Housing	4 × 5	12	12	All levels present.
Three-Factor Effects		**96**	**44**	
State × % Owner-Occupied × % Black or African American	4 × 3 × 3	12	7	Drop (2,3,2), (3,3,1); sing. Drop (2,3,1), (3,2,1); zero. Coll. (4,3,1) & (4,3,2); conv.
State × % Owner-Occupied × % Hispanic or Latino	4 × 3 × 3	12	3	Drop (4,3,1/2), (4,2,1), (2,2/3,1), (2,3,2), (3,3,1/2), (3,2,1); zero/sing.
State × % Owner-Occupied × Rent/Housing	4 × 3 × 5	24	9	Drop (4,3,*), (4,2,1), (2,3,*), (3,3,*), (3,2,1/4); zero/sing/conv.
State × Rent/Housing × % Black or African American	4 × 3 × 5	24	15	Drop (4,4,1), (2,2/3/4,1), (3,*,1,), (3,4,2); zero/sing.
State × Rent/Housing × % Hispanic or Latino	4 × 3 × 5	24	10	Drop (4,3/4/1), (2,1,1/2), (2,2,1/2), (2,3,1), (2,4,1/2), (3,1/2,1), (3,3,1), (3,4,1/2); zero/sing.
Total		**204**	**147**	

Exhibit D7.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 7: West South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**17**	**17**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**60**	**60**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 5	12	12	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
Three-Factor Effects		**85**	**81**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (1,2,1) & (1,3,1), repeat for all age levels; conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	4 × 5 × 3	24	24	All levels present.
State × Age × Hispanicity	4 × 5 × 2	12	12	All levels present.
State × Age × Gender	4 × 5 × 2	12	12	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	6	All levels present.
State × Race (3 levels) × Gender	4 × 3 × 2	6	6	All levels present.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**162**	**158**	

Exhibit D7.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 7: West South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**35**	**35**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**122**	**121**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 5	12	12	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
State × % Black or African American	4 × 3	6	6	All levels present.
State × % Hispanic or Latino	4 × 3	6	5	Drop (2,1); zero.
State × % Owner-Occupied	4 × 3	6	6	All levels present.
State × Rent/Housing	4 × 5	12	12	All levels present.
Three-Factor Effects		**85**	**81**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (1,2,1) & (1,3,1), repeat for all age levels; conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	4 × 5 × 3	24	24	All levels present.
State × Age × Hispanicity	4 × 5 × 2	12	12	All levels present.
State × Age × Gender	4 × 5 × 2	12	12	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	6	All levels present.
State × Race (3 levels) × Gender	4 × 3 × 2	6	6	All levels present.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**242**	**237**	

Exhibit D7.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 7: West South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**35**	**35**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**122**	**121**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	4	All levels present.
% Owner-Occupied × % Hispanic	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	8	All levels present.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 5	12	12	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
State × % Black or African American	4 × 3	6	6	All levels present.
State × % Hispanic or Latino	4 × 3	6	5	Drop (2,1); zero.
State × % Owner-Occupied	4 × 3	6	6	All levels present.
State × Rent/Housing	4 × 5	12	12	All levels present.
Three-Factor Effects		**85**	**50**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	0	Coll. and then drop all; sing./conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	0	Coll. (2,1,1) & (3,1,1), then drop; conv.
State × Age × Race (3 levels)	4 × 5 × 3	24	10	Coll. (2,1,2) & (2,1,3), repeat for all age levels for LA, OK, & TX, drop (3,3,*), (3,4,*); conv.
State × Age × Hispanicity	4 × 5 × 2	12	4	Drop all for AL & OK; conv.
State × Age × Gender	4 × 5 × 2	12	12	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	3	Coll. (2,2,1) & (2,3,1), repeat for OK & TX; conv.
State × Race (3 levels) × Gender	4 × 3 × 2	6	6	All levels present.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**242**	**206**	

Exhibit D7.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 7: West South Central

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**18**	**18**	
Intercept	1	1	1	All levels present.
State	4	3	3	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**67**	**67**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	4 × 4	9	9	All levels present.
State × Age	4 × 6	15	15	All levels present.
State × Race (5 levels)	4 × 5	12	12	All levels present.
State × Hispanicity	4 × 2	3	3	All levels present.
State × Gender	4 × 2	3	3	All levels present.
Three-Factor Effects		**102**	**91**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	5	Coll. (5,2,1) & (5,3,1); zero. Coll. (4,2,1) & (4,3,1); sing. Coll. (1,2,1) & (1,3,1), repeat for age levels 2 and 3; conv.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); conv.
State × Age × Race (3 levels)	4 × 6 × 3	30	30	All levels present.
State × Age × Hispanicity	4 × 6 × 2	15	10	Drop (2,*,1); conv.
State × Age × Gender	4 × 6 × 2	15	15	All levels present.
State × Race (3 levels) × Hispanicity	4 × 3 × 2	6	6	All levels present.
State × Race (3 levels) × Gender	4 × 3 × 2	6	6	All levels present.
State × Hispanicity × Gender	4 × 2 × 2	3	3	All levels present.
Total		**187**	**176**	

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Appendix D8: Model Group 8: Mountain

(Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming)

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Table D.8a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 8: Mountain)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	2.03	3.26	0.33	1.46403	408	(1.00, 1.30)	(1.00, 1.30)
	3.06	3.78	0.75	1.52665	183	(1.00, 5.00)	(1.00, 5.00)
						(1.10, 1.40)	(1.10, 1.39)
res.sdu.ps	3.06	3.78	0.75	1.52665	302	(0.44, 1.10)	(0.44, 1.10)
	1.59	3.19	0.71	1.65546	286	(0.20, 4.98)	(0.20, 4.97)
						(0.97, 2.15)	(0.98, 2.15)
sel.per.ps	2.48	4.52	1.06	2.49938	422	(0.20, 2.00)	(0.20, 2.00)
	1.40	3.33	0.72	2.56617	392	(0.29, 5.00)	(0.30, 5.00)
						(0.90, 4.31)	(0.90, 4.31)
res.per.nr	1.52	3.73	0.75	2.64288	422	(1.00, 2.80)	(1.00, 2.80)
	0.98	2.72	0.51	2.71804	385	(1.00, 4.45)	(1.00, 4.40)
						(1.00, 1.40)	(1.40, 1.40)
res.per.ps	1.02	2.84	0.50	2.71804	347	(0.20, 3.00)	(0.20, 2.95)
	0.79	3.10	0.63	2.90698	327	(0.20, 4.70)	(0.20, 4.69)
						(0.30, 5.00)	(N/A, N/A)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \lfloor (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.8b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 8: Mountain)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	79	0.68	79	0.20	29	1.01	38	0.09	24	0.58	36	0.11	13
1%	80	1.00	87	0.49	88	1.01	111	0.42	97	1.00	112	0.23	82
5%	90	1.00	106	0.78	117	1.01	165	0.72	156	1.05	190	0.41	177
10%	101	1.00	121	0.90	137	1.01	236	0.80	228	1.09	282	0.79	258
25%	157	1.05	173	1.04	212	1.31	488	0.89	477	1.16	602	0.96	566
Median	376	1.16	456	1.15	480	2.41	1,123	0.99	1,105	1.27	1,381	1.02	1,373
75%	748	1.28	871	1.29	986	3.11	2,359	1.11	2,411	1.44	3,150	1.09	3,112
90%	907	1.40	1,103	1.47	1,361	6.45	4,109	1.25	4,127	1.66	5,765	1.25	5,692
95%	938	1.49	1,211	1.63	1,622	7.74	5,790	1.37	5,958	1.84	8,078	1.40	8,160
99%	980	2.22	1,447	2.27	2,222	9.06	12,089	1.81	11,947	2.33	17,568	1.77	18,564
Maximum	1,447	5.00	4,674	4.97	5,722	11.89	25,549	5.12	25,388	4.40	31,276	4.69	42,987
n	16,651	13,822	13,822	13,822	13,822	10,458	10,458	10,458	10,458	7,854	7,854	7,854	7,854
Max/Mean	3.20	-	8.59	-	8.82	-	13.74	-	13.51	-	12.50	-	17.18

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 8 Overview

Dwelling Unit Nonresponse

For the one-factor effects, variable collapsing or dropping was present in Group Quarter and percent Black or African American. Out of 26 proposed variables, 24 were included in the model.

Variable collapsing or dropping was present in all two-factor effects except the percent Owner-Occupied × percent Hispanic or Latino, Rent/Housing × percent Hispanic or Latino, and State × Quarter interactions. Out of 158 proposed variables, 118 were included in the model.

Variable collapsing or dropping was present in all three-factor effects. Out of 224 proposed variables, 41 were included in the model.

In the final model, a total of 183 variables were included; see Exhibit D8.1.

Dwelling Unit Poststratification

All 21 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing was present in the State × Race interaction. Out of 112 proposed variables, 111 were included in the model.

For the three-factor effects, variable collapsing was present in the State × Age × Race and State × Race × Hispanicity interactions. Out of 169 proposed variables, 154 were included in the model.

In the final model, a total of 286 variables were included; see Exhibit D8.2.

Selected Person-Level Poststratification

For the one-factor effects, 50-100 percent of Segments That Are Black or African American was collapsed because the sample size was zero. Out of 39 proposed variables, 38 were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the percent Owner-Occupied × percent Black or African American, Rent/Housing × percent Black or African American, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 214 proposed variables, 196 were included in the model.

For the three-factor effects, variable collapsing was present in the State × Age × Race, State × Race × Hispanicity, and State × Race × Gender interactions. Out of 169 proposed variables, 158 were included in the model.

In the final model, a total of 392 variables were included; see Exhibit D8.3.

Respondent Person-Level Nonresponse

For the one-factor effects, 50-100 percent of Segments That Are Black or African American was dropped because the sample size was zero. Out of 39 proposed variables, 38 were included in the model.

For the two-factor effects, variable dropping was present in the percent Owner-Occupied × percent Black or African American, Rent/Housing × percent Black or African American, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 214 proposed variables, 196 were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Race, State × Race × Hispanicity, and State × Race × Gender interactions. Out of 169 proposed variables, 151 were included in the model.

In the final model, a total of 385 variables were included; see Exhibit D8.4.

Respondent Person-Level Poststratification

All 22 proposed one-factor effects were included in the model.

All 123 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the State × Age × Race, State × Age × Hispanicity, State × Race × Hispanicity, and State × Race × Gender interactions. Out of 202 proposed variables, 182 were included in the model.

In the final model, a total of 327 variables were included; see Exhibit D8.5.

Exhibit D8.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 8: Mountain

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**26**	**24**	
Intercept	1	1	1	All levels present.
State	8	7	7	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	1	Coll. (1) & (2); conv.
% Black or African American	3	2	1	Drop (1); zero.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**158**	**118**	
% Owner-Occupied × % Black or African American	3 × 3	4	2	Drop (*,1); zero.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	7	Coll. (3,3) & (3,4); conv.
Rent/Housing × % Black or African American	3 × 5	8	4	Drop (*,1); zero.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	8 × 4	21	21	All levels present.
State × Population Density	8 × 4	21	16	Drop (2,1), (3,1), (5,1), (7,1), (7,3); zero/sing.
State × Group Quarter	8 × 3	14	5	Coll. (1,1) & (1,2), (2,1) & (2,2), (3,1) & (3,2), (5,1) & (5,2), (7,1) & (7,2); hier. Drop remainder; sing/zero/conv.
State × % Black or African American	8 × 3	14	4	Keep (1,2), (4,2), (5,2), (6,2), drop remainder; sing./zero.
State × % Hispanic or Latino	8 × 3	14	12	Drop (3,*); zero.
State × % Owner-Occupied	8 × 3	14	9	Coll. (1,2) & (1,3); conv. Drop (2,*), (3,*); conv.
State × Rent/Housing	8 × 5	28	26	Coll. (3,3) & (3,4), (6,1) & (6,2); conv.
Three-Factor Effects		**224**	**41**	
State × % Owner-Occupied × % Black or African American	8 × 3 × 3	28	3	Coll. (1,2,1), (1,3,1), (1,2,2), & (1,3,2), (4,2,1) & (4,2,2), (4,3,1) & (4,3,2); conv., hier. Drop remainder; zero, sing./conv.
State × % Owner-Occupied × % Hispanic or Latino	8 × 3 × 3	28	3	Coll. (1,2,1) & (1,3,1), (1,2,2) & (1,3,2); conv., hier. Keep (4,2,1). Drop remainder; zero/sing./conv.
State × % Owner-Occupied × Rent/Housing	8 × 3 × 5	56	12	Coll. (1,2,1) & (1,3,1), (1,2,2) & (1,3,2), (1,2,3) & (1,3,3), (1,2,4) & (1,3,4), (4,3,3) & (4,3,4), (7,2,1) & (7,2,2), (7,2,3) & (7,2,4); conv, hier. Keep (4,2,2), (4,2,3), (4,2,4), (5,2,*). Drop remainder; zero/sing./conv.
State × Rent/Housing × % Black or African American	8 × 3 × 5	56	2	Coll. (1,2,1), (1,3,1), (1,2,2) & (1,3,2), (4,2,1), (4,2,2), (4,3,1), (4,3,2), (4,4,1), & (4,4,2); conv., hier. Drop remainder; zero/sing./conv.
State × Rent/Housing × % Hispanic or Latino	8 × 3 × 5	56	21	Keep (1,1,*), (1,2,*), (1,3,*), (1,4,2), (2,1,2), (2,2,2), (2,3,2), (4,2,*), (4,3,1), (4,4,*), (5,2,*), (5,3,1), (6,3,2), (6,4,2). Coll. (5,1,1) & (5,1,2); conv. Drop remainder; zero/sing./conv.
Total		**408**	**183**	

Exhibit D8.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 8: Mountain

Variables	Levels	Proposed	Final	Comment
One-Factor Effects		**21**	**21**	
Intercept	1	1	1	All levels present.
State	8	7	7	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**112**	**111**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	8 × 4	21	21	All levels present.
State × Age	8 × 5	28	28	All levels present.
State × Race (5 levels)	8 × 5	28	27	Coll. (6,3) & (6,4); conv.
State × Hispanicity	8 × 2	7	7	All levels present.
State × Gender	8 × 2	7	7	All levels present.
Three-Factor Effects		**169**	**154**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	8 × 5 × 3	56	48	Coll. (2,1,2) & (2,1,3), (2,2,2) & (2,2,3), (2,3,2) & (2,3,3), (2,4,2) & (2,4,3); conv. Repeat for state 3.
State × Age × Hispanicity	8 × 5 × 2	28	28	All levels present.
State × Age × Gender	8 × 5 × 2	28	28	All levels present.
State × Race (3 levels) × Hispanicity	8 × 3 × 2	14	7	Coll. (1,2,1) & (1,3,1); conv. Repeat for all states.
State × Race (3 levels) × Gender	8 × 3 × 2	14	14	All levels present.
State × Hispanicity × Gender	8 × 2 × 2	7	7	All levels present.
Total		**302**	**286**	

Exhibit D8.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 8: Mountain

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**39**	**38**	
Intercept	1	1	1	All levels present.
State	8	7	7	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	1	Coll. (1) & (2); zero.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**214**	**196**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	2	Coll. (1,1) & (1,2), (2,1) & (2,2); zero.
% Owner-Occupied × % Hispanic	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	4	Coll. (1,1) & (1,2), (2,1) & (2,2), (3,1) & (3,2), (4,1) & (4,2); zero.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	8 × 4	21	21	All levels present.
State × Age	8 × 5	28	28	All levels present.
State × Race (5 levels)	8 × 5	28	28	All levels present.
State × Hispanicity	8 × 2	7	7	All levels present.
State × Gender	8 × 2	7	7	All levels present.
State × % Black or African American	8 × 3	14	4	Coll. (1,1) & (1,2); zero. Repeat for states 4, 5, & 6. Drop remainder; zero.
State × % Hispanic or Latino	8 × 3	14	12	Drop (3,*); zero.
State × % Owner-Occupied	8 × 3	14	14	All levels present.
State × Rent/Housing	8 × 5	28	28	All levels present.
Three-Factor Effects		**169**	**158**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	8 × 5 × 3	56	48	Coll. (2,3,2) & (2,3,3), (3,3,2) & (3,3,3), (3,4,2) & (3,4,3), (7,4,2) & (7,4,3); sing/zero. Coll. (2,4,2) & (2,4,3), (3,1,2) & (3,1,3), (3,2,2) & (3,2,3), (7,3,2) & (7,3,3); conv.
State × Age × Hispanicity	8 × 5 × 2	28	28	All levels present.
State × Age × Gender	8 × 5 × 2	28	28	All levels present.
State × Race (3 levels) × Hispanicity	8 × 3 × 2	14	12	Coll. (3,2,1) & (3,3,1); zero. Coll. (2,2,1) & (2,3,1); conv.
State × Race (3 levels) × Gender	8 × 3 × 2	14	13	Coll. (2,2,1) & (2,3,1); sing.
State × Hispanicity × Gender	8 × 2 × 2	7	7	All levels present.
Total		**422**	**392**	

Exhibit D8.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 8: Mountain

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**39**	**38**	
Intercept	1	1	1	All levels present.
State	8	7	7	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	1	Drop (1); zero.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**214**	**196**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	2	Drop (*,1); sing.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	4	Drop (*,1); zero.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	8 × 4	21	21	All levels present.
State × Age	8 × 5	28	28	All levels present.
State × Race (5 levels)	8 × 5	28	28	All levels present.
State × Hispanicity	8 × 2	7	7	All levels present.
State × Gender	8 × 2	7	7	All levels present.
State × % Black or African American	8 × 3	14	4	Keep (1,2), (4,2), (5,2), (6,2). Drop remainder; zero.
State × % Hispanic or Latino	8 × 3	14	12	Drop (3,*); zero.
State × % Owner-Occupied	8 × 3	14	14	All levels present.
State × Rent/Housing	8 × 5	28	28	All levels present.
Three-Factor Effects		**169**	**151**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	8 × 5 × 3	56	46	Coll. (2,1,2) & (2,1,3), (2,2,2) & (2,2,3), (7,1,2) & (7,1,3), (7,2,2) & (7,2,3), (7,3,2) & (7,3,3); conv. Coll. (2,3,2) & (2,3,3), (2,4,2) & (2,4,3), (3,3,2) & (3,3,3), (3,4,2) & (3,4,3), (7,4,2) & (7,4,3); sing./zero.
State × Age × Hispanicity	8 × 5 × 2	28	28	All levels present.
State × Age × Gender	8 × 5 × 2	28	28	All levels present.
State × Race (3 levels) × Hispanicity	8 × 3 × 2	14	9	Coll. (2,2,1) & (2,3,1), (4,2,1) & (4,3,1), (5,2,1) & (5,3,1); conv. Drop (3,2,1), (7,2,1); zero.
State × Race (3 levels) × Gender	8 × 3 × 2	14	11	Drop (2,2,1); zero. Coll. (3,2,1) & (3,3,1); sing. Coll. (7,2,1) & (7,3,1); sing.
State × Hispanicity × Gender	8 × 2 × 2	7	7	All levels present.
Total		**422**	**385**	

Exhibit D8.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 8: Mountain

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**22**	**22**	All levels present.
Intercept	1	1	1	All levels present.
State	8	7	7	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**123**	**123**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	8 × 4	21	21	All levels present.
State × Age	8 × 6	35	35	All levels present.
State × Race (5 levels)	8 × 5	28	28	All levels present.
State × Hispanicity	8 × 2	7	7	All levels present.
State × Gender	8 × 2	7	7	All levels present.
Three-Factor Effects		**202**	**182**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	10	All levels present.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	8 × 6 × 3	70	58	Coll. (2,4,2) & (2,4,3), (2,5,2) & (2,5,3), (3,4,2) & (3,4,3), (3,5,2) & (3,5,3), (6,5,2) & (6,5,3), (7,4,2) & (7,4,3), (7,5,2) & (7,5,3); sing./zero. Coll. (4,4,2) & (4,4,3), (4,5,2) & (4,5,3), (6,4,2) & (6,4,3); conv. Drop (5,5,*); conv.
State × Age × Hispanicity	8 × 6 × 2	35	34	Drop. (3,5,1); conv.
State × Age × Gender	8 × 6 × 2	35	35	All levels present.
State × Race (3 levels) × Hispanicity	8 × 3 × 2	14	10	Coll. (2,2,1) & (2,3,1), (4,2,1) & (4,3,1); conv. Coll. (3,2,1) & (3,3,1), (7,2,1) & (7,3,1); sing.
State × Race (3 levels) × Gender	8 × 3 × 2	14	11	Coll. (3,2,1) & (3,3,1); sing./zero. Coll. (2,2,1) & (2,3,1), (7,2,1) & (7,3,1); conv.
State × Hispanicity × Gender	8 × 2 × 2	7	7	All levels present.
Total		**347**	**327**	

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Appendix D9: Model Group 9: Pacific

(Alaska, California, Hawaii, Oregon, and Washington)

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Table D.9a 2016 NSDUH Person Weight GEM Modeling Summary (Model Group 9: Pacific)

Modeling Step[1]	Extreme Weight Proportions			UWE[2]	# XVAR[3]	Bounds[4]	
	% Unweighted	% Weighted	% Outwinsor			Nominal	Realized
res.sdu.nr	5.21	7.07	0.83	1.34292	255	(1.08, 1.50)	(1.08, 1.50)
	0.91	0.98	0.19	1.36208	138	(1.00, 4.12)	(1.00, 4.11)
						(1.30, 1.45)	(1.30, 1.45)
res.sdu.ps	0.91	0.98	0.19	1.36205	197	(0.56, 1.20)	(0.56, 1.20)
	0.98	2.70	0.76	1.43547	197	(0.38, 5.00)	(0.41, 5.00)
						(0.95, 4.03)	(0.96, 4.03)
sel.per.ps	2.15	4.68	1.27	1.83432	287	(0.45, 2.91)	(0.47, 2.91)
	1.04	2.56	0.61	1.91806	272	(0.45, 4.91)	(0.46, 4.91)
						(0.50, 1.46)	(0.50, 1.44)
res.per.nr	1.24	3.23	0.66	1.94255	287	(1.00, 2.90)	(1.00, 2.90)
	1.38	3.86	0.75	2.19672	251	(1.00, 4.93)	(1.00, 4.92)
						(1.00, 5.00)	(N/A, N/A)
res.per.ps	1.49	4.28	0.90	2.19672	227	(0.20, 1.40)	(0.20, 1.40)
	0.80	2.38	0.41	2.29110	215	(0.20, 3.52)	(0.20, 3.52)
						(0.90, 1.05)	(1.05, 1.05)

[1] For a key to modeling abbreviations, see Chapter 5, Exhibit 5.1.

[2] Unequal weighting effect (UWE) is defined as $1 + \lceil (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.

[3] Number of proposed covariates (XVAR) on top line and number finalized after modeling.

[4] There are six sets of bounds for each modeling step. Nominal bounds are used in defining maximum/minimum values for the generalized exponential model (GEM) adjustment factors. The realized bound is the actual adjustment produced by the modeling. The set of three bounds listed for each step correspond to the high extreme values, the nonextreme values, and the low extreme values.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table D.9b Distribution of Weight Adjustment Factors and Weight Products for the 2016 NSDUH Person Weight (Model Group 9: Pacific)

	sel.sdu.des[1]	*res.sdu.nr*[1]		*res.sdu.ps*[1]		*sel.per.des*[1]		*sel.per.ps*[1]		*res.per.nr*[1]		*res.per.ps*[1]	
	1-8[2]	**9**[3]	**1-9**[3]	**10**[4]	**1-10**[4]	**12**[5]	**1-12**[5]	**13**[5]	**1-13**[5]	**14**[6]	**1-14**[6]	**15**[6]	**1-15**[6]
Minimum	74	0.41	83	0.30	51	1.01	65	0.19	41	0.59	58	0.12	22
1%	75	1.04	94	0.66	82	1.01	112	0.64	109	1.00	130	0.20	121
5%	94	1.11	112	0.83	112	1.01	204	0.79	203	1.07	260	0.23	246
10%	106	1.15	139	0.90	146	1.01	356	0.86	357	1.13	449	0.53	396
25%	171	1.22	250	1.00	286	1.50	1,159	0.93	1,169	1.22	1,526	0.93	1,119
Median	942	1.31	1,223	1.10	1,289	2.76	2,476	1.01	2,530	1.37	3,161	1.03	3,105
75%	1,063	1.44	1,492	1.20	1,681	3.50	4,908	1.09	4,849	1.56	6,862	1.17	6,972
90%	1,230	1.54	1,665	1.32	1,953	5.63	8,333	1.19	8,750	1.82	12,901	1.40	13,012
95%	1,247	1.59	1,768	1.47	2,151	7.05	10,207	1.28	10,970	2.05	16,929	1.48	17,263
99%	1,288	2.14	2,201	2.03	2,687	11.09	13,517	1.54	14,713	2.59	24,908	1.71	26,555
Maximum	5,217	4.11	4,198	5.00	10,844	17.45	41,481	4.91	50,536	4.92	58,830	3.52	90,937
n	21,971	16,507	16,507	16,505	16,505	12,256	12,256	12,256	12,256	8,521	8,521	8,521	8,521
Max/Mean	6.90	-	4.17	-	9.56	-	11.84	-	14.08	-	11.40	-	17.61

Note 1: Weight component 11 and weight products 1-11 are excluded because weight 11 = 1 for all selected dwelling units.
Note 2: Weight component 16 and weight products 1-16 are excluded because weight 16 = 1 for all respondents.
Note 3: Under the generalized exponential model (GEM), nonresponse adjustment factors (weight components #9 and #14) could be less than 1 due to the built-in control for extreme values. For an explanation, see Chapter 2.

[1] Sel.sdu.des refers to selected screener dwelling unit design weight, and sel.per.des refers to selected person design weight. For a key to other modeling abbreviations, see Chapter 5, Exhibit 5.1.
[2] Based on eligible dwelling units.
[3] Based on screener-complete dwelling units.
[4] Based on screener-complete dwelling units, occupants verified eligible.
[5] Based on selected persons.
[6] Based on questionnaire-complete persons.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Model Group 9 Overview

Dwelling Unit Nonresponse

For the one-factor effects, College Dorm was collapsed with Other Group Quarter. Out of 23 proposed variables, 22 were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the percent Owner-Occupied × percent Black or African American, Rent/Housing × percent Black or African American, State × Population Density, State × Group Quarter, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 104 proposed variables, 79 were included in the model.

Variable dropping was present in all three-factor effects. Out of 128 proposed variables, 37 were included in the model.

In the final model, a total of 138 variables were included; see Exhibit D9.1.

Dwelling Unit Poststratification

All 18 proposed one-factor effects were included in the model.

All 73 proposed two-factor effects were included in the model.

All 106 proposed three-factor effects were included in the model.

In the final model, a total of 197 variables were included; see Exhibit D9.2.

Selected Person-Level Poststratification

All 36 proposed one-factor effects were included in the model.

For the two-factor effects, variable collapsing or dropping was present in the percent Owner-Occupied × percent Black or African American, Rent/Housing × percent Black or African American, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 145 proposed variables, 132 were included in the model.

For the three-factor effects, variable collapsing was present in the Age × Race × Hispanicity interaction. Out of 106 proposed variables, 104 were included in the model.

In the final model, a total of 272 variables were included; see Exhibit D9.3.

Respondent Person-Level Nonresponse

All 36 proposed one-factor effects were included in the model.

For the two-factor effects, variable dropping was present in the percent Owner-Occupied × percent Black or African American, Rent/Housing × percent Black or African American, State × percent Black or African American, and State × percent Hispanic or Latino interactions. Out of 145 proposed variables, 132 were included in the model.

Variable collapsing or dropping was present in all three-factor effects except the Age × Race × Gender, Age × Hispanicity × Gender, State × Age × Gender, and State × Hispanicity × Gender interactions. Out of 106 proposed variables, 83 were included in the model.

In the final model, a total of 251 variables were included; see Exhibit D9.4.

Respondent Person-Level Poststratification

All 19 proposed one-factor effects were included in the model.

All 81 proposed two-factor effects were included in the model.

For the three-factor effects, variable collapsing or dropping was present in the Age × Race × Hispanicity, State × Age × Race, State × Age × Hispanicity, and State × Race × Hispanicity interactions. Out of 127 proposed variables, 115 were included in the model.

In the final model, a total of 215 variables were included; see Exhibit D9.5.

Exhibit D9.1 Covariates for 2016 NSDUH Person Weights (res.sdu.nr), Model Group 9: Pacific

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**23**	**22**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	1	Coll. (1) & (2); conv.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**104**	**79**	
% Owner-Occupied × % Black or African American	3 × 3	4	2	Drop (2,1), (3,1); sing./zero.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	4	Drop (*,1); sing./zero.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Population Density	5 × 4	12	6	Drop (1,1), (2,*), (3,3), (5,3); zero/ sing.
State × Group Quarter	5 × 3	8	2	Coll. (1,1) & (1,2);, repeat for all states; hier.; Drop (3,1/2); sing. Drop (5,1/2); conv.
State × % Black or African American	5 × 3	8	4	Drop (*, 1); zero/sing.
State × % Hispanic or Latino	5 × 3	8	5	Drop (1,1), (2,1), (3,1); zero.
State × % Owner-Occupied	5 × 3	8	8	All levels present.
State × Rent/Housing	5 × 5	16	16	All levels present.
Three-Factor Effects		**128**	**37**	
State × % Owner-Occupied × % Black or African American	5 × 3 × 3	16	3	Keep (1,2,2), (5,2,2), (5,3,2), drop others; zero/sing.
State × % Owner-Occupied × % Hispanic	5 × 3 × 3	16	9	Keep (1,2,2), (1,3,2), (2,2,2), (2,3,2), (3,2,2), (3,3,2), (5,2,1), (5,2,3), (5,3,2), drop others; zero/sing.
State × % Owner-Occupied × Rent/Housing	5 × 3 × 5	32	12	Keep (1,2,2), (2,2,2), (2,2,3), (3,2,1), (3,2,2), (5,2,*), (5,3,1), (5,3,2), (5,3,3); drop others; zero/sing.
State × Rent/Housing × % Black or African American	5 × 3 × 5	32	3	Keep (1,1,2), (5,1,2), (5,2,2); drop others; zero/sing.
State × Rent/Housing × % Hispanic or Latino	5 × 3 × 5	32	10	Keep (1,2,2), (2,1,2), (2,2,2), (2,3,2), (3,1,2), (3,2,2), (5,1,2), (5,2,2), (5,3,2), (5,4,2); drop others; zero/sing.
Total		**255**	**138**	

Exhibit D9.2 Covariates for 2016 NSDUH Person Weights (res.sdu.ps), Model Group 9: Pacific

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**18**	**18**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**73**	**73**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 5	16	16	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
Three-Factor-Effects		**106**	**106**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 5 × 3	32	32	All levels present.
State × Age × Hispanicity	5 × 5 × 2	16	16	All levels present.
State × Age × Gender	5 × 5 × 2	16	16	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
State × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**197**	**197**	

Exhibit D9.3 Covariates for 2016 NSDUH Person Weights (sel.per.ps), Model Group 9: Pacific

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**36**	**36**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**145**	**132**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	2	Coll. (3,1) & (3,2); zero. Coll. (2.1) & (2.2); sing.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	4	Coll. (1,1) & (1,2), (2,1) & (2,2), (3,1) & (3,2), (4,1) & (4,2); zero/sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 5	16	16	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
State × % Black or African American	5 × 3	8	4	Coll. (1,1) & (1,2), (2,1) & (2,2), (3,1) & (3,2); zero. Coll. (5.1) & (5.2); sing.
State × % Hispanic or Latino	5 × 3	8	5	Coll. (1,1) & (1,2), (2,1) & (2,2), (3,1) & (3,2); zero/conv.
State × % Owner-Occupied	5 × 3	8	8	All levels present.
State × Rent/Housing	5 × 5	16	16	All levels present.
Three-Factor Effects		**106**	**104**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	6	Coll. (3,2,1) & (3,3,1), (4,2,1) & (4,3,1); conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 5 × 3	32	32	All levels present.
State × Age × Hispanicity	5 × 5 × 2	16	16	All levels present.
State × Age × Gender	5 × 5 × 2	16	16	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	8	All levels present.
State × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**287**	**272**	

Exhibit D9.4 Covariates for 2016 NSDUH Person Weights (res.per.nr), Model Group 9: Pacific

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**36**	**36**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	5	4	4	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Relation to Householder	4	3	3	All levels present.
Population Density	4	3	3	All levels present.
Group Quarter	3	2	2	All levels present.
% Black or African American	3	2	2	All levels present.
% Hispanic or Latino	3	2	2	All levels present.
% Owner-Occupied	3	2	2	All levels present.
Rent/Housing	5	4	4	All levels present.
Two-Factor Effects		**145**	**132**	
Age × Race (3 levels)	5 × 3	8	8	All levels present.
Age × Hispanicity	5 × 2	4	4	All levels present.
Age × Gender	5 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
% Owner-Occupied × % Black or African American	3 × 3	4	2	Drop (2,1), (3,1); zero, sing.
% Owner-Occupied × % Hispanic or Latino	3 × 3	4	4	All levels present.
% Owner-Occupied × Rent/Housing	3 × 5	8	8	All levels present.
Rent/Housing × % Black or African American	3 × 5	8	4	Drop (1,1), (2,1), (3,1), (4,1); zero., sing.
Rent/Housing × % Hispanic or Latino	3 × 5	8	8	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 5	16	16	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
State × % Black or African American	5 × 3	8	4	Drop (1,1), repeat for all states; zero, sing.
State × % Hispanic or Latino	5 × 3	8	5	Drop (1,1), (2,1), (3,1); zero, sing.
State × % Owner-Occupied	5 × 3	8	8	All levels present.
State × Rent/Housing	5 × 5	16	16	All levels present.
Three-Factor Effects		**106**	**83**	
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (1.2,1) & (1,3,1), repeat for all age levels; conv.
Age × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
Age × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	1	Coll. (2,1,1) & (3,1,1); conv.
State × Age × Race (3 levels)	5 × 5 × 3	32	20	Coll. (1,1,2) & (1,1,3), repeat for HI, AK, & OR for all age levels; conv.
State × Age × Hispanicity	5 × 5 × 2	16	15	Drop (1,4,1); conv.
State × Age × Gender	5 × 5 × 2	16	16	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	4	Coll. (1.2,1) & (1,3,1), repeat for all states; conv.
State × Race (3 levels) × Gender	5 × 3 × 2	8	7	Coll. (2,2,1) & (2,3,1); conv.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**287**	**251**	

Exhibit D9.5 Covariates for 2016 NSDUH Person Weights (res.per.ps), Model Group 9: Pacific

Variables	Levels	Proposed	Final	Comments
One-Factor Effects		**19**	**19**	
Intercept	1	1	1	All levels present.
State	5	4	4	All levels present.
Quarter	4	3	3	All levels present.
Age	6	5	5	All levels present.
Race (5 levels)	5	4	4	All levels present.
Gender	2	1	1	All levels present.
Hispanicity	2	1	1	All levels present.
Two-Factor Effects		**81**	**81**	
Age × Race (3 levels)	6 × 3	10	10	All levels present.
Age × Hispanicity	6 × 2	5	5	All levels present.
Age × Gender	6 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity	3 × 2	2	2	All levels present.
Race (3 levels) × Gender	3 × 2	2	2	All levels present.
Hispanicity × Gender	2 × 2	1	1	All levels present.
State × Quarter	5 × 4	12	12	All levels present.
State × Age	5 × 6	20	20	All levels present.
State × Race (5 levels)	5 × 5	16	16	All levels present.
State × Hispanicity	5 × 2	4	4	All levels present.
State × Gender	5 × 2	4	4	All levels present.
Three-Factor Effects		**127**	**115**	
Age × Race (3 levels) × Hispanicity	6 × 3 × 2	10	7	Coll. (3,2,1) & (3,3,1), (4,2,1) & (4,3,1), (5,2,1) & (5,3,1); sing., zero, conv.
Age × Race (3 levels) × Gender	6 × 3 × 2	10	10	All levels present.
Age × Hispanicity × Gender	6 × 2 × 2	5	5	All levels present.
Race (3 levels) × Hispanicity × Gender	3 × 2 × 2	2	2	All levels present.
State × Age × Race (3 levels)	5 × 6 × 3	40	37	Coll. (3,5,2) & (3,5,3); sing. Coll. (2,4,2) & (2,4,3), (2,5,2) & (2,5,3); conv.
State × Age × Hispanicity	5 × 6 × 2	20	17	Drop (1,5,1), (2,5,1), (3,5,1); conv.
State × Age × Gender	5 × 6 × 2	20	20	All levels present.
State × Race (3 levels) × Hispanicity	5 × 3 × 2	8	5	Coll. (1,2,1) & (1,3,1), repeat for HI and OR; conv.
State × Race (3 levels) × Gender	5 × 3 × 2	8	8	All levels present.
State × Hispanicity × Gender	5 × 2 × 2	4	4	All levels present.
Total		**227**	**215**	

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Appendix E: Evaluation of Calibration Weights: Response Rates

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Table E.1 2016 NSDUH Weighted Response Rates: United States, District of Columbia, and the 50 States

Domain	Dwelling Unit (DU)					Person Level		Interview Response Rate	
	Selected DUs	Eligible DUs	Completed DUs	Eligibility Rate	Screening Rate	Selected Persons	Respondents	WT1-12[1]	WT1-13[2]
United States	205,589	173,149	135,188	84.12%	77.88%	95,607	67,942	68.44%	68.41%
Alabama	2,996	2,478	2,026	82.63%	82.04%	1,392	983	66.70%	67.70%
Alaska	3,272	2,386	1,901	69.10%	79.52%	1,325	960	69.03%	69.35%
Arizona	2,921	2,203	1,835	74.18%	83.43%	1,313	982	74.79%	75.35%
Arkansas	3,036	2,503	2,041	82.33%	81.73%	1,381	992	69.49%	68.69%
California	12,192	11,070	7,993	88.81%	72.01%	6,720	4,619	65.40%	65.26%
Colorado	2,570	2,163	1,757	83.72%	80.69%	1,324	920	67.04%	66.95%
Connecticut	2,980	2,559	1,931	85.54%	75.41%	1,392	937	65.01%	66.13%
Delaware	2,953	2,459	1,880	80.94%	76.98%	1,330	928	67.70%	67.39%
District of Columbia	5,940	5,119	3,401	86.42%	65.20%	1,260	967	74.11%	73.65%
Florida	11,282	9,267	7,135	79.20%	77.11%	4,794	3,435	68.22%	67.99%
Georgia	3,619	3,139	2,443	86.80%	77.88%	1,998	1,508	71.10%	70.64%
Hawaii	3,949	3,329	2,478	83.75%	73.74%	1,458	1,004	66.33%	66.67%
Idaho	2,653	2,151	1,842	75.40%	85.77%	1,429	1,088	74.13%	73.56%
Illinois	7,222	6,310	4,501	87.35%	71.35%	3,789	2,467	61.81%	61.69%
Indiana	2,560	2,149	1,665	83.53%	77.38%	1,286	933	69.65%	69.07%
Iowa	2,893	2,461	2,076	85.12%	84.27%	1,414	1,028	71.71%	71.26%
Kansas	2,522	2,204	1,848	87.46%	83.82%	1,363	996	71.16%	71.02%
Kentucky	3,162	2,586	2,104	81.87%	81.27%	1,445	953	62.76%	62.79%
Louisiana	2,946	2,381	1,934	80.97%	81.24%	1,328	959	70.61%	70.63%
Maine	3,941	3,022	2,473	75.47%	82.01%	1,394	992	71.53%	71.49%
Maryland	2,418	2,120	1,550	87.69%	72.57%	1,317	990	73.23%	73.80%
Massachusetts	3,700	3,252	2,365	86.38%	72.42%	1,596	988	61.77%	60.86%
Michigan	7,090	5,893	4,809	83.03%	81.40%	3,311	2,420	70.59%	70.70%
Minnesota	2,596	2,278	1,855	87.71%	81.33%	1,375	962	68.58%	68.19%
Mississippi	2,382	1,949	1,617	81.75%	83.00%	1,283	934	71.09%	70.78%

(continued)

Table E.1 2016 NSDUH Weighted Response Rates: United States, District of Columbia, and the 50 States (continued)

Domain	Dwelling Unit (DU)					Person Level		Interview Response Rate	
	Selected DUs	Eligible DUs	Completed DUs	Eligibility Rate	Screening Rate	Selected Persons	Respondents	WT1-12[1]	WT1-13[2]
Missouri	2,612	2,247	1,926	86.18%	85.56%	1,334	938	66.20%	67.25%
Montana	3,217	2,602	2,247	80.92%	86.51%	1,433	1,018	71.23%	71.14%
Nebraska	2,696	2,350	1,881	87.22%	80.01%	1,364	964	68.95%	69.06%
Nevada	2,379	2,095	1,526	87.95%	72.71%	1,268	966	72.48%	72.97%
New Hampshire	3,244	2,763	2,148	84.44%	77.51%	1,355	936	67.19%	66.54%
New Jersey	4,370	3,866	2,791	88.52%	71.09%	2,149	1,433	63.19%	63.94%
New Mexico	2,907	2,023	1,720	70.06%	84.86%	1,215	980	79.43%	80.25%
New York	12,398	10,716	6,932	86.06%	63.92%	4,934	3,232	61.44%	61.75%
North Carolina	4,122	3,470	2,832	82.89%	81.56%	2,089	1,508	71.49%	71.21%
North Dakota	3,511	2,882	2,521	81.76%	87.70%	1,344	960	69.08%	69.28%
Ohio	6,804	5,933	4,700	87.19%	79.21%	3,363	2,377	67.60%	67.60%
Oklahoma	2,654	2,198	1,794	83.30%	81.39%	1,374	965	68.24%	68.03%
Oregon	3,160	2,765	2,224	87.13%	80.46%	1,391	1,004	71.05%	71.23%
Pennsylvania	7,825	6,665	5,277	83.94%	79.17%	3,308	2,360	70.48%	70.14%
Rhode Island	3,072	2,653	2,043	86.38%	77.12%	1,356	937	67.37%	67.53%
South Carolina	2,832	2,251	1,849	78.76%	81.99%	1,326	970	72.46%	72.12%
South Dakota	2,813	2,338	2,037	83.21%	86.96%	1,338	960	70.92%	70.76%
Tennessee	3,034	2,416	2,002	79.27%	82.87%	1,373	993	70.57%	70.52%
Texas	6,793	5,725	4,877	83.08%	84.53%	4,255	3,293	74.68%	74.79%
Utah	1,483	1,331	1,138	89.76%	85.78%	1,215	936	74.82%	75.03%
Vermont	3,858	2,992	2,315	77.13%	77.15%	1,298	896	71.09%	71.51%
Virginia	3,920	3,376	2,743	86.15%	81.20%	2,077	1,493	68.86%	68.03%
Washington	2,779	2,421	1,911	86.82%	78.99%	1,362	934	66.41%	66.24%
West Virginia	3,172	2,630	2,125	82.76%	80.79%	1,440	962	63.87%	64.29%
Wisconsin	3,531	2,927	2,412	76.56%	82.32%	1,368	1,018	73.22%	72.76%
Wyoming	2,608	2,083	1,757	79.16%	84.46%	1,261	964	75.14%	75.18%

[1] Includes DU-level and person-level design weights, DU nonresponse adjustment, and DU poststratification adjustment.

[2] Includes a selected person poststratification weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Appendix F: Evaluation of Calibration Weights: Dwelling Unit–Level Percentages of Extreme Weights and Outwinsors

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Table F.1 2016 NSDUH Dwelling Unit–Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States

Domain	*n*	Before nr[1] (WT1*...*WT8)			After nr[1] & Before ps[2] (WT1*...*WT9)			After ps[2] (WT1*...*WT10)		
		% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]
United States	135,188	3.13%	3.89%	0.54%	2.11%	3.22%	0.57%	1.55%	2.99%	0.78%
Alabama	2,026	0.89%	1.06%	0.01%	0.39%	0.62%	0.10%	3.01%	4.74%	1.12%
Alaska	1,901	1.58%	4.82%	1.55%	1.89%	4.03%	0.62%	0.37%	1.05%	0.19%
Arizona	1,835	4.03%	4.77%	0.50%	3.00%	3.15%	0.39%	1.36%	3.32%	0.70%
Arkansas	2,041	0.00%	0.00%	0.00%	3.23%	4.91%	1.05%	2.35%	4.68%	1.03%
California	7,993	5.82%	7.15%	0.87%	0.74%	1.04%	0.18%	1.26%	2.99%	0.92%
Colorado	1,757	0.17%	0.07%	0.01%	1.31%	3.43%	1.49%	1.37%	2.92%	0.53%
Connecticut	1,931	0.00%	0.00%	0.00%	0.21%	0.42%	0.04%	2.02%	5.39%	1.28%
Delaware	1,880	5.90%	4.56%	0.14%	2.45%	4.85%	0.86%	1.70%	3.22%	0.53%
District of Columbia	3,401	5.15%	7.69%	1.34%	2.29%	3.13%	0.27%	0.82%	2.01%	0.46%
Florida	7,135	2.70%	4.78%	1.29%	1.09%	1.46%	0.10%	0.94%	1.73%	0.20%
Georgia	2,443	4.01%	3.59%	0.11%	2.13%	2.58%	0.17%	1.23%	2.29%	0.52%
Hawaii	2,478	1.37%	1.86%	0.17%	1.82%	2.18%	0.03%	0.52%	1.07%	0.21%
Idaho	1,842	0.65%	2.02%	0.69%	0.00%	0.00%	0.00%	0.43%	1.79%	0.57%
Illinois	4,501	0.40%	0.39%	0.03%	2.93%	5.43%	1.65%	1.27%	2.08%	0.36%
Indiana	1,665	0.00%	0.00%	0.00%	4.92%	6.15%	0.67%	0.42%	0.90%	0.23%
Iowa	2,076	2.02%	2.07%	0.18%	1.78%	2.14%	0.10%	2.36%	4.08%	1.00%
Kansas	1,848	0.00%	0.00%	0.00%	0.92%	1.02%	0.07%	1.84%	2.97%	0.72%
Kentucky	2,104	20.20%	25.29%	4.87%	17.02%	22.39%	3.95%	0.67%	1.08%	0.36%
Louisiana	1,934	9.00%	9.88%	0.54%	1.45%	1.70%	0.31%	0.57%	0.82%	0.15%
Maine	2,473	0.44%	0.78%	0.01%	1.46%	2.95%	0.87%	1.90%	3.05%	0.48%
Maryland	1,550	1.87%	2.50%	0.18%	2.90%	5.62%	2.11%	0.52%	1.19%	0.24%
Massachusetts	2,365	15.14%	19.16%	2.41%	3.72%	7.36%	1.29%	2.03%	5.05%	1.48%
Michigan	4,809	2.52%	2.55%	0.09%	1.52%	3.14%	0.95%	0.83%	1.72%	0.33%
Minnesota	1,855	0.00%	0.00%	0.00%	1.35%	2.29%	0.52%	1.29%	2.17%	0.46%
Mississippi	1,617	0.06%	0.04%	0.00%	1.36%	1.74%	0.06%	2.16%	3.93%	1.41%

(continued)

Table F.1 2016 NSDUH Dwelling Unit–Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before nr[1] (WT1*...*WT8)			After nr[1] & Before ps[2] (WT1*...*WT9)			After ps[2] (WT1*...*WT10)		
		% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]
Missouri	1,926	3.37%	4.28%	0.65%	0.31%	0.29%	0.02%	1.82%	1.74%	0.25%
Montana	2,247	0.98%	1.66%	0.22%	5.56%	9.64%	2.55%	0.76%	1.32%	0.19%
Nebraska	1,881	11.86%	11.72%	0.78%	5.26%	8.74%	1.75%	1.17%	2.60%	0.47%
Nevada	1,526	0.00%	0.00%	0.00%	3.21%	4.11%	0.35%	1.18%	2.45%	0.59%
New Hampshire	2,148	1.40%	2.38%	0.25%	0.88%	1.76%	0.32%	1.16%	2.47%	0.69%
New Jersey	2,791	0.93%	1.86%	0.32%	2.11%	4.12%	1.13%	1.58%	4.64%	1.65%
New Mexico	1,720	0.00%	0.00%	0.00%	0.58%	1.09%	0.06%	2.03%	4.75%	1.36%
New York	6,932	0.84%	1.74%	0.35%	1.15%	1.93%	0.37%	1.49%	5.13%	2.27%
North Carolina	2,832	0.25%	0.46%	0.12%	0.64%	1.08%	0.29%	1.24%	2.16%	0.37%
North Dakota	2,521	1.94%	1.55%	0.07%	0.00%	0.00%	0.00%	1.15%	2.24%	0.38%
Ohio	4,700	1.81%	1.70%	0.09%	1.64%	2.71%	0.37%	2.49%	3.16%	0.42%
Oklahoma	1,794	5.30%	4.54%	0.56%	4.24%	4.32%	0.13%	1.23%	2.99%	0.63%
Oregon	2,224	14.88%	19.28%	2.39%	0.45%	1.23%	0.58%	1.21%	2.45%	0.50%
Pennsylvania	5,277	2.82%	3.39%	0.26%	3.51%	4.81%	0.52%	3.70%	4.92%	1.39%
Rhode Island	2,043	0.00%	0.00%	0.00%	0.59%	1.26%	0.40%	1.91%	4.10%	1.11%
South Carolina	1,849	1.24%	1.28%	0.19%	0.16%	0.09%	0.01%	1.73%	3.70%	0.79%
South Dakota	2,037	7.07%	9.13%	0.41%	0.00%	0.00%	0.00%	3.04%	5.11%	0.90%
Tennessee	2,002	0.00%	0.00%	0.00%	0.25%	0.57%	0.07%	1.20%	2.50%	0.63%
Texas	4,877	0.16%	0.50%	0.26%	4.10%	6.12%	0.74%	1.76%	3.72%	0.82%
Utah	1,138	10.46%	13.27%	1.51%	3.87%	6.19%	1.19%	1.23%	3.34%	0.86%
Vermont	2,315	0.04%	0.08%	0.02%	0.26%	0.59%	0.19%	1.81%	3.75%	0.90%
Virginia	2,743	6.85%	7.42%	0.25%	3.06%	3.45%	0.21%	2.30%	2.66%	0.80%
Washington	1,911	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.84%	1.88%	0.29%
West Virginia	2,125	0.80%	1.51%	0.17%	1.41%	2.42%	0.10%	2.07%	3.02%	0.60%
Wisconsin	2,412	6.09%	8.04%	2.30%	1.74%	3.50%	0.92%	0.50%	1.20%	0.29%
Wyoming	1,757	2.90%	4.10%	0.33%	6.66%	9.99%	1.17%	4.50%	8.74%	1.93%

[1] nr = nonresponse adjustment.

[2] ps = poststratification adjustment.

[3] Weighted extreme value percentage = $100 * \sum_k w_{ek} / \sum_k w_k$, where w_{ek} denotes the weight for extreme weights and w_k denotes the weight for both extreme weights and nonextreme weights.

[4] Outwinsor weight percentage = $100 * \sum_k (w_{ek} - b_k) / \sum_k w_k$, where b_k denotes the cutoff point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Appendix G: Evaluation of Calibration Weights: Person-Level Percentages of Extreme Weights and Outwinsors

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Table G.1 2016 NSDUH Selected Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States

Domain	*n*	Before sel.per.ps[1] (WT1*...*WT12)			After sel.per.ps[1] (WT1*...*WT13)		
		% Unweighted	% Weighted[2]	% Outwinsor[3]	% Unweighted	% Weighted[2]	% Outwinsor[3]
United States	95,607	2.68%	5.62%	1.39%	1.64%	3.72%	0.84%
Alabama	1,392	3.45%	7.21%	1.76%	0.72%	1.70%	0.18%
Alaska	1,325	1.43%	3.51%	1.16%	1.13%	2.54%	0.28%
Arizona	1,313	2.28%	4.75%	1.30%	1.90%	3.73%	0.74%
Arkansas	1,381	2.82%	6.63%	1.93%	1.45%	3.34%	0.88%
California	6,720	2.05%	4.73%	1.25%	1.22%	3.07%	0.79%
Colorado	1,324	1.51%	3.13%	0.42%	1.36%	3.64%	0.74%
Connecticut	1,392	3.59%	10.38%	3.54%	2.51%	7.18%	1.64%
Delaware	1,330	3.23%	5.39%	1.00%	1.13%	1.95%	0.37%
District of Columbia	1,260	1.90%	4.30%	0.59%	1.19%	3.50%	0.88%
Florida	4,794	3.92%	9.24%	2.24%	2.25%	6.75%	1.17%
Georgia	1,998	1.45%	3.35%	0.69%	0.40%	1.01%	0.20%
Hawaii	1,458	2.13%	4.67%	1.61%	1.10%	1.69%	0.17%
Idaho	1,429	1.54%	2.76%	0.49%	2.52%	4.52%	1.11%
Illinois	3,789	2.22%	4.74%	0.91%	3.04%	7.46%	1.18%
Indiana	1,286	1.71%	3.66%	0.56%	1.48%	2.17%	0.30%
Iowa	1,414	4.03%	6.54%	1.53%	1.98%	3.38%	0.95%
Kansas	1,363	2.13%	5.32%	1.34%	1.17%	2.21%	0.43%
Kentucky	1,445	4.29%	4.68%	1.43%	1.11%	2.75%	0.86%
Louisiana	1,328	1.28%	2.82%	0.42%	0.38%	0.59%	0.07%
Maine	1,394	3.59%	5.81%	1.25%	2.15%	2.82%	0.59%
Maryland	1,317	1.37%	3.04%	0.74%	0.84%	1.58%	0.25%
Massachusetts	1,596	2.82%	6.30%	1.38%	2.44%	7.95%	1.87%
Michigan	3,311	2.45%	4.44%	0.87%	0.85%	1.58%	0.17%
Minnesota	1,375	3.35%	6.38%	1.53%	0.73%	1.46%	0.23%
Mississippi	1,283	3.51%	7.40%	2.33%	1.40%	2.49%	0.64%

(continued)

Table G.1 2016 NSDUH Selected Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before sel.per.ps[1] (WT1*...*WT12)			After sel.per.ps[1] (WT1*...*WT13)		
		% Unweighted	% Weighted[2]	% Outwinsor[3]	% Unweighted	% Weighted[2]	% Outwinsor[3]
Missouri	1,334	4.50%	6.75%	1.29%	1.27%	1.50%	0.34%
Montana	1,433	2.58%	4.20%	0.65%	0.77%	1.13%	0.18%
Nebraska	1,364	2.93%	7.30%	1.77%	3.45%	7.25%	2.08%
Nevada	1,268	2.05%	3.97%	1.12%	1.74%	4.06%	0.72%
New Hampshire	1,355	1.92%	3.66%	0.71%	0.74%	1.84%	0.22%
New Jersey	2,149	1.44%	5.06%	1.65%	1.30%	4.46%	1.23%
New Mexico	1,215	3.46%	9.05%	2.44%	1.48%	4.13%	1.19%
New York	4,934	2.55%	8.23%	2.83%	2.17%	6.29%	2.06%
North Carolina	2,089	2.44%	4.62%	1.11%	0.57%	0.98%	0.29%
North Dakota	1,344	2.31%	4.28%	0.99%	3.20%	7.68%	2.26%
Ohio	3,363	3.21%	5.86%	0.91%	1.58%	2.82%	0.28%
Oklahoma	1,374	2.55%	6.78%	1.20%	1.67%	4.75%	1.16%
Oregon	1,391	3.38%	5.37%	1.48%	1.58%	2.84%	0.43%
Pennsylvania	3,308	3.36%	5.85%	1.56%	2.60%	5.15%	1.28%
Rhode Island	1,356	3.69%	6.86%	1.83%	1.84%	4.73%	0.77%
South Carolina	1,326	2.87%	7.26%	1.69%	1.13%	2.07%	0.21%
South Dakota	1,338	3.51%	8.49%	1.37%	1.42%	3.31%	0.70%
Tennessee	1,373	2.26%	4.49%	0.85%	1.02%	2.78%	0.65%
Texas	4,255	2.70%	6.18%	1.39%	1.55%	3.82%	1.06%
Utah	1,215	1.65%	4.49%	1.20%	1.40%	3.99%	1.00%
Vermont	1,298	4.01%	8.05%	2.79%	3.78%	7.25%	2.76%
Virginia	2,077	2.12%	3.49%	0.90%	1.40%	3.69%	0.82%
Washington	1,362	2.20%	4.28%	0.77%	0.73%	1.40%	0.15%
West Virginia	1,440	3.96%	4.91%	1.24%	3.40%	4.00%	0.72%
Wisconsin	1,368	1.61%	2.85%	0.91%	1.32%	2.58%	0.48%
Wyoming	1,261	4.20%	11.06%	2.73%	1.43%	3.29%	0.38%

[1] Before sel.per.ps (WT1*...*WT12) and after sel.per.ps (WT1*...*WT13) used demographic variables from screener data for all selected persons; ps = poststratification adjustment.

[2] Weighted extreme value percentage = $100 * \sum_k w_{ek} / \sum_k w_k$, where w_{ek} denotes the weight for extreme weights and w_k denotes the weight for both extreme weights and nonextreme weights.

[3] Outwinsor weight percentage = $100 * \sum_k (w_{ek} - b_k) / \sum_k w_k$, where b_k denotes the cutoff point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table G.2 2016 NSDUH Respondent Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States

Domain	*n*	Before res.per.nr[1] (WT1*…*WT13)			After res.per.nr[1] (WT1*…*WT14)			Before res.per.ps[2] (WT1*…*WT14)			After res.per.ps[2] (WT1*…*WT15)		
		% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]
United States	67,942	1.65%	3.80%	0.83%	1.41%	3.91%	0.75%	1.42%	3.98%	0.79%	0.93%	2.75%	0.48%
Alabama	983	0.61%	1.75%	0.23%	0.92%	2.13%	0.47%	0.92%	2.13%	0.47%	0.81%	2.83%	0.96%
Alaska	960	0.94%	2.04%	0.16%	1.88%	5.17%	0.61%	1.56%	4.35%	0.55%	0.42%	1.44%	0.11%
Arizona	982	1.53%	3.27%	0.74%	1.22%	2.48%	0.49%	1.22%	2.48%	0.47%	0.61%	1.43%	0.16%
Arkansas	992	0.91%	2.84%	0.83%	1.61%	3.95%	0.91%	1.51%	3.72%	0.91%	1.71%	4.97%	1.08%
California	4,619	1.32%	3.33%	0.80%	1.00%	3.25%	0.57%	1.15%	3.63%	0.76%	0.19%	0.88%	0.07%
Colorado	920	1.20%	3.47%	0.60%	1.20%	2.75%	0.35%	1.20%	2.75%	0.29%	1.63%	5.31%	0.93%
Connecticut	937	3.09%	9.78%	2.21%	1.81%	6.10%	1.29%	1.92%	6.33%	1.37%	1.39%	4.86%	1.37%
Delaware	928	0.75%	1.34%	0.25%	0.97%	2.83%	0.59%	0.97%	2.83%	0.60%	0.65%	2.51%	0.23%
District of Columbia	967	1.14%	3.38%	0.92%	2.17%	6.82%	0.76%	2.07%	6.47%	0.70%	0.83%	2.62%	0.58%
Florida	3,435	2.39%	7.55%	1.40%	1.05%	2.31%	0.33%	1.05%	2.31%	0.33%	0.38%	0.88%	0.05%
Georgia	1,508	0.60%	1.11%	0.07%	1.06%	3.38%	0.35%	0.99%	3.14%	0.31%	0.46%	1.16%	0.04%
Hawaii	1,004	0.90%	1.06%	0.19%	0.70%	2.16%	0.36%	0.90%	2.51%	0.46%	0.10%	0.14%	0.01%
Idaho	1,088	2.67%	5.28%	1.26%	1.75%	3.36%	0.79%	1.75%	3.36%	0.79%	2.11%	4.36%	0.62%
Illinois	2,467	2.72%	6.98%	1.14%	1.95%	6.96%	0.90%	1.99%	7.20%	0.93%	1.34%	6.05%	1.04%
Indiana	933	1.61%	2.62%	0.36%	1.82%	5.17%	0.75%	1.39%	4.53%	0.71%	1.07%	5.90%	1.54%
Iowa	1,028	2.14%	3.87%	1.15%	1.65%	3.14%	0.57%	1.85%	3.56%	0.66%	1.75%	4.17%	0.78%
Kansas	996	1.31%	2.57%	0.52%	1.31%	3.00%	0.64%	1.20%	2.78%	0.63%	0.80%	1.49%	0.13%
Kentucky	953	1.57%	4.15%	1.34%	0.94%	1.00%	0.09%	0.94%	1.00%	0.09%	0.42%	0.42%	0.09%
Louisiana	959	0.83%	0.94%	0.10%	0.42%	0.97%	0.17%	0.52%	1.34%	0.24%	0.31%	0.67%	0.03%
Maine	992	2.52%	3.35%	0.69%	1.31%	2.27%	0.34%	1.41%	2.60%	0.45%	1.11%	2.42%	0.53%
Maryland	990	0.91%	1.71%	0.24%	1.01%	2.27%	0.19%	0.81%	1.70%	0.23%	0.51%	2.08%	0.46%
Massachusetts	988	2.43%	7.05%	1.13%	2.23%	8.16%	1.83%	2.33%	8.60%	2.06%	1.32%	4.99%	0.34%
Michigan	2,420	0.91%	1.69%	0.19%	0.70%	1.63%	0.16%	0.74%	1.74%	0.19%	0.58%	2.01%	0.53%
Minnesota	962	0.42%	0.61%	0.07%	0.62%	2.23%	0.63%	0.62%	2.23%	0.63%	0.83%	2.59%	0.74%
Mississippi	934	1.93%	3.92%	0.83%	1.18%	3.43%	0.49%	1.61%	4.02%	0.53%	1.18%	3.75%	0.61%

(continued)

Table G.2 2016 NSDUH Respondent Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before res.per.nr[1] (WT1*…*WT13)			After res.per.nr[1] (WT1*…*WT14)			Before res.per.ps[2] (WT1*…*WT14)			After res.per.ps[2] (WT1*…*WT15)		
		% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]
Missouri	938	1.07%	1.61%	0.42%	1.60%	3.11%	0.81%	1.60%	3.11%	0.78%	1.49%	2.64%	0.41%
Montana	1,018	0.79%	1.16%	0.15%	1.28%	2.63%	0.33%	1.28%	2.63%	0.33%	0.10%	0.33%	0.08%
Nebraska	964	3.32%	7.37%	2.11%	1.76%	4.01%	1.12%	1.76%	4.03%	1.13%	1.35%	2.65%	0.54%
Nevada	966	2.28%	5.39%	0.94%	1.35%	3.62%	0.43%	1.45%	4.17%	0.45%	0.62%	5.23%	1.91%
New Hampshire	936	0.53%	1.29%	0.08%	1.28%	3.27%	0.94%	1.28%	3.27%	0.93%	0.53%	1.08%	0.16%
New Jersey	1,433	1.40%	5.21%	1.60%	1.67%	5.19%	1.32%	1.61%	5.10%	1.66%	0.42%	2.42%	0.30%
New Mexico	980	1.94%	5.31%	1.42%	0.61%	2.06%	0.62%	0.71%	2.32%	0.66%	0.51%	2.43%	0.38%
New York	3,232	2.10%	6.15%	2.03%	3.13%	9.26%	1.76%	3.03%	9.00%	1.70%	1.21%	4.27%	0.58%
North Carolina	1,508	0.66%	1.20%	0.38%	0.40%	0.79%	0.13%	0.60%	1.15%	0.16%	0.53%	1.87%	0.19%
North Dakota	960	3.44%	7.36%	2.25%	1.77%	4.76%	1.23%	2.19%	5.12%	1.30%	1.98%	4.19%	1.27%
Ohio	2,377	1.43%	2.89%	0.31%	0.67%	1.68%	0.27%	0.67%	1.68%	0.27%	0.63%	1.93%	0.22%
Oklahoma	965	1.45%	4.77%	1.30%	1.14%	3.85%	0.56%	1.24%	4.42%	0.79%	1.35%	6.84%	0.86%
Oregon	1,004	1.89%	3.32%	0.54%	2.19%	3.93%	0.88%	2.29%	4.13%	0.90%	1.99%	4.46%	1.22%
Pennsylvania	2,360	2.54%	4.94%	1.29%	1.78%	4.86%	1.17%	1.82%	5.00%	1.20%	2.08%	4.44%	0.74%
Rhode Island	937	1.81%	4.63%	0.73%	1.60%	4.96%	1.01%	1.49%	4.69%	0.98%	1.07%	3.01%	0.55%
South Carolina	970	1.24%	2.17%	0.23%	0.72%	1.88%	0.60%	0.62%	1.70%	0.55%	0.52%	1.18%	0.07%
South Dakota	960	1.35%	3.21%	0.72%	1.35%	2.20%	0.44%	1.35%	2.20%	0.45%	0.94%	2.23%	0.48%
Tennessee	993	1.11%	2.63%	0.55%	1.91%	6.00%	0.74%	1.81%	5.12%	0.68%	0.91%	3.72%	0.56%
Texas	3,293	1.67%	3.65%	0.87%	1.70%	4.08%	0.90%	1.67%	4.16%	0.95%	0.79%	1.52%	0.24%
Utah	936	1.50%	4.09%	0.94%	1.50%	4.46%	1.18%	1.60%	4.60%	1.19%	0.96%	2.57%	0.53%
Vermont	896	4.02%	7.60%	3.08%	3.68%	7.66%	2.41%	3.68%	7.80%	2.47%	2.46%	5.08%	2.47%
Virginia	1,493	0.94%	2.22%	0.38%	0.94%	4.41%	1.53%	0.94%	4.41%	1.53%	0.67%	3.06%	0.57%
Washington	934	1.18%	2.93%	0.25%	1.50%	6.35%	1.13%	1.71%	7.33%	1.24%	2.46%	7.83%	1.77%
West Virginia	962	2.60%	2.57%	0.39%	1.46%	2.60%	0.55%	1.46%	2.60%	0.54%	1.66%	1.79%	0.48%
Wisconsin	1,018	1.38%	3.04%	0.55%	0.88%	2.16%	0.30%	0.69%	1.90%	0.29%	0.69%	2.82%	0.86%
Wyoming	964	1.66%	3.70%	0.20%	0.93%	2.78%	0.48%	0.83%	2.53%	0.48%	0.83%	3.29%	0.85%

[1] Before res.per.nr (WT1*...*WT13) and after res.per.nr (WT1*...*WT14) used demographic variables from screener data for all respondents; nr = nonresponse adjustment.

[2] Before res.per.ps (WT1*...*WT14) and after res.per.ps (WT1*...*WT15) used demographic variables from questionnaire data for all respondents; ps = poststratification adjustment.

[3] Weighted outlier percentage = $100 * \sum_k w_{ek} / \sum_k w_k$, where w_{ek} denotes the weight for outliers and w_k denotes the weight for both outliers and nonoutliers.

[4] Outwinsor weight percentage = $100 * \sum_k (w_{ek} - b_k) / \sum_k w_k$, where b_k denotes the cutoff point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Appendix H: Evaluation of Calibration Weights: Slippage Rates

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Table H.1 2016 NSDUH Slippage Rates: UNITED STATES

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		67,942	269,430,135	269,430,135	269,430,135	0.00	0.00
Quarter	**Quarter 1**	16,025	67,144,064	67,144,064	67,144,064	0.00	0.00
	Quarter 2	17,439	67,277,749	67,277,749	67,277,749	0.00	0.00
	Quarter 3	17,607	67,430,338	67,430,338	67,430,338	0.00	0.00
	Quarter 4	16,871	67,577,984	67,577,984	67,577,984	0.00	0.00
Age Group	**12-17**	17,081	24,875,264	24,896,527	24,896,527	-0.09	0.00
	18-25	16,435	34,491,276	34,570,728	34,570,728	-0.23	0.00
	26-34	10,528	38,746,065	38,821,397	38,821,397	-0.19	0.00
	35-49	13,572	60,452,095	60,318,574	60,318,574	0.22	0.00
	50-64	6,106	65,836,227	62,838,478	62,838,478	4.77	0.00
	65+	4,220	45,029,207	47,984,431	47,984,431	-6.16	0.00
Race	**White**	49,268	199,744,636	210,015,799	210,015,799	-4.89	-0.00
	Black or African American	9,246	34,863,538	34,287,222	34,287,222	1.68	0.00
	American Indian/Alaska Native	2,779	9,009,457	3,201,556	3,201,556	181.41	0.00
	Asian	3,531	17,557,832	16,281,595	16,281,595	7.84	0.00
	Two or More Races	3,118	8,254,672	5,643,964	5,643,964	46.26	0.00
Hispanicity	**Hispanic or Latino**	12,150	44,752,396	44,341,106	44,341,106	0.93	0.00
	Non-Hispanic or Latino	55,792	224,677,739	225,089,029	225,089,029	-0.18	0.00
Gender	**Male**	32,380	130,510,907	130,611,726	130,611,726	-0.08	0.00
	Female	35,562	138,919,228	138,818,409	138,818,409	0.07	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.2 2016 NSDUH Slippage Rates: ALABAMA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		983	4,064,691	4,064,691	4,064,691	0.00	-0.00
Quarter	**Quarter 1**	267	1,014,882	1,014,882	1,014,882	0.00	-0.00
	Quarter 2	201	1,015,553	1,015,553	1,015,553	0.00	-0.00
	Quarter 3	255	1,016,588	1,016,588	1,016,588	0.00	0.00
	Quarter 4	260	1,017,668	1,017,668	1,017,668	-0.00	0.00
Age Group	**12-17**	233	374,229	376,632	376,632	-0.64	0.00
	18-25	238	509,586	518,185	518,185	-1.66	-0.00
	26-34	140	557,236	548,871	548,871	1.52	0.00
	35-49	211	886,223	887,305	887,305	-0.12	-0.00
	50-64	93	1,005,788	968,667	968,667	3.83	-0.00
	65+	68	731,629	765,031	765,031	-4.37	0.00
Race	**White**	662	2,771,247	2,866,017	2,866,017	-3.31	0.00
	Black or African American	257	1,083,067	1,056,655	1,056,655	2.50	-0.00
	American Indian/Alaska Native	23	67,609	28,873	28,873	134.16	-0.00
	Asian	16	57,987	61,933	61,933	-6.37	-0.00
	Two or More Races	25	84,780	51,213	51,213	65.54	0.00
Hispanicity	**Hispanic or Latino**	52	144,545	142,429	142,429	1.49	0.00
	Non-Hispanic or Latino	931	3,920,146	3,922,262	3,922,262	-0.05	-0.00
Gender	**Male**	485	1,933,499	1,933,499	1,933,499	0.00	-0.00
	Female	498	2,131,192	2,131,192	2,131,192	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.3 2016 NSDUH Slippage Rates: ALASKA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		960	585,025	585,025	585,025	0.00	0.00
Quarter	**Quarter 1**	252	146,035	146,035	146,035	0.00	-0.00
	Quarter 2	325	146,218	146,218	146,218	0.00	0.00
	Quarter 3	168	146,360	146,360	146,360	0.00	0.00
	Quarter 4	215	146,413	146,413	146,413	0.00	-0.00
Age Group	**12-17**	236	59,359	59,359	59,359	0.00	0.00
	18-25	270	75,751	77,379	77,379	-2.10	0.00
	26-34	134	98,955	97,714	97,714	1.27	0.00
	35-49	185	131,504	131,423	131,423	0.06	-0.00
	50-64	94	155,821	143,211	143,211	8.81	0.00
	65+	41	63,635	75,939	75,939	-16.20	-0.00
Race	**White**	592	385,214	398,961	398,961	-3.45	-0.00
	Black or African American	32	20,142	19,894	19,895	1.24	-0.00
	American Indian/Alaska Native	164	85,464	84,508	84,508	1.13	0.00
	Asian	76	48,718	46,392	46,392	5.02	0.00
	Two or More Races	96	45,488	35,271	35,271	28.97	0.00
Hispanicity	**Hispanic or Latino**	74	39,495	36,240	36,240	8.98	0.00
	Non-Hispanic or Latino	886	545,531	548,785	548,785	-0.59	-0.00
Gender	**Male**	462	298,385	298,385	298,385	0.00	-0.00
	Female	498	286,640	286,640	286,640	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.4 2016 NSDUH Slippage Rates: ARIZONA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		982	5,742,769	5,742,769	5,742,769	0.00	0.00
Quarter	**Quarter 1**	261	1,425,877	1,425,877	1,425,877	0.00	0.00
	Quarter 2	208	1,432,463	1,432,463	1,432,463	0.00	0.00
	Quarter 3	300	1,439,126	1,439,126	1,439,126	0.00	0.00
	Quarter 4	213	1,445,303	1,445,303	1,445,303	-0.00	0.00
Age Group	**12-17**	234	548,755	549,195	549,195	-0.08	0.00
	18-25	232	734,468	747,345	747,345	-1.72	0.00
	26-34	155	818,040	801,450	801,450	2.07	0.00
	35-49	214	1,237,940	1,239,734	1,239,734	-0.14	0.00
	50-64	90	1,426,307	1,247,756	1,247,756	14.31	0.00
	65+	57	977,259	1,157,289	1,157,289	-15.56	0.00
Race	**White**	776	4,605,483	4,854,933	4,854,933	-5.14	0.00
	Black or African American	54	282,574	263,110	263,110	7.40	0.00
	American Indian/Alaska Native	78	488,631	282,534	282,534	72.95	0.00
	Asian	43	241,969	214,811	214,811	12.64	0.00
	Two or More Races	31	124,112	127,381	127,381	-2.57	0.00
Hispanicity	**Hispanic or Latino**	380	1,629,872	1,632,284	1,632,284	-0.15	0.00
	Non-Hispanic or Latino	602	4,112,897	4,110,485	4,110,485	0.06	0.00
Gender	**Male**	487	2,809,260	2,803,654	2,803,654	0.20	0.00
	Female	495	2,933,509	2,939,115	2,939,115	-0.19	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.5 2016 NSDUH Slippage Rates: ARKANSAS

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		992	2,468,292	2,468,292	2,468,292	0.00	0.00
Quarter	**Quarter 1**	228	615,766	615,766	615,766	0.00	0.00
	Quarter 2	231	616,438	616,438	616,438	-0.00	0.00
	Quarter 3	230	617,471	617,471	617,471	0.00	0.00
	Quarter 4	303	618,617	618,617	618,617	0.00	0.00
Age Group	**12-17**	233	235,753	236,955	236,955	-0.51	0.00
	18-25	262	321,449	317,177	317,177	1.35	0.00
	26-34	159	338,653	338,520	338,520	0.04	0.00
	35-49	193	525,678	535,921	535,921	-1.91	-0.00
	50-64	88	622,031	568,323	568,323	9.45	0.00
	65+	57	424,729	471,396	471,396	-9.90	0.00
Race	**White**	765	1,937,330	1,992,764	1,992,764	-2.78	0.00
	Black or African American	156	364,358	366,286	366,286	-0.53	-0.00
	American Indian/Alaska Native	16	31,920	23,915	23,915	33.47	0.00
	Asian	17	57,389	46,011	46,012	24.73	-0.00
	Two or More Races	38	77,295	39,315	39,315	96.60	0.00
Hispanicity	**Hispanic or Latino**	82	157,699	158,011	158,011	-0.20	0.00
	Non-Hispanic or Latino	910	2,310,593	2,310,281	2,310,281	0.01	0.00
Gender	**Male**	470	1,196,413	1,192,161	1,192,161	0.36	-0.00
	Female	522	1,271,879	1,276,131	1,276,131	-0.33	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.6 2016 NSDUH Slippage Rates: CALIFORNIA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		4,619	32,689,876	32,689,876	32,689,876	0.00	0.00
Quarter	**Quarter 1**	1,048	8,147,075	8,147,075	8,147,075	0.00	0.00
	Quarter 2	1,127	8,163,095	8,163,095	8,163,095	0.00	0.00
	Quarter 3	1,268	8,181,129	8,181,129	8,181,129	0.00	0.00
	Quarter 4	1,176	8,198,579	8,198,579	8,198,579	0.00	0.00
Age Group	**12-17**	1,191	3,053,611	3,034,119	3,034,119	0.64	-0.00
	18-25	1,071	4,346,306	4,358,028	4,358,028	-0.27	0.00
	26-34	692	5,148,140	5,161,494	5,161,494	-0.26	0.00
	35-49	939	7,611,308	7,651,649	7,651,649	-0.53	-0.00
	50-64	449	7,725,567	7,228,849	7,228,849	6.87	0.00
	65+	277	4,804,945	5,255,737	5,255,737	-8.58	0.00
Race	**White**	2,932	20,877,790	23,824,714	23,824,714	-12.37	0.00
	Black or African American	320	2,076,831	2,062,455	2,062,455	0.70	-0.00
	American Indian/Alaska Native	450	2,450,978	530,856	530,856	361.70	0.00
	Asian	608	5,635,992	5,223,741	5,223,741	7.89	0.00
	Two or More Races	309	1,648,285	1,048,111	1,048,111	57.26	0.00
Hispanicity	**Hispanic or Latino**	2,220	12,130,241	11,959,739	11,959,739	1.43	0.00
	Non-Hispanic or Latino	2,399	20,559,635	20,730,137	20,730,137	-0.82	-0.00
Gender	**Male**	2,192	16,016,343	16,006,044	16,006,044	0.06	0.00
	Female	2,427	16,673,534	16,683,833	16,683,833	-0.06	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.7 2016 NSDUH Slippage Rates: COLORADO

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		920	4,612,005	4,612,005	4,612,005	0.00	0.00
Quarter	**Quarter 1**	227	1,144,681	1,144,681	1,144,681	0.00	0.00
	Quarter 2	240	1,150,338	1,150,338	1,150,338	0.00	0.00
	Quarter 3	213	1,155,949	1,155,949	1,155,949	0.00	0.00
	Quarter 4	240	1,161,038	1,161,038	1,161,038	0.00	0.00
Age Group	**12-17**	242	422,380	423,725	423,725	-0.32	0.00
	18-25	213	608,032	599,128	599,128	1.49	0.00
	26-34	148	707,738	730,435	730,435	-3.11	0.00
	35-49	178	1,095,214	1,080,077	1,080,077	1.40	0.00
	50-64	89	1,201,753	1,050,410	1,050,410	14.41	0.00
	65+	50	576,887	728,230	728,230	-20.78	0.00
Race	**White**	726	3,784,462	4,076,651	4,076,651	-7.17	0.00
	Black or African American	52	199,750	191,604	191,604	4.25	0.00
	American Indian/Alaska Native	55	290,889	69,561	69,561	318.18	0.00
	Asian	36	178,159	160,706	160,706	10.86	0.00
	Two or More Races	51	158,746	113,483	113,483	39.88	0.00
Hispanicity	**Hispanic or Latino**	208	901,580	899,177	899,177	0.27	0.00
	Non-Hispanic or Latino	712	3,710,426	3,712,828	3,712,828	-0.06	0.00
Gender	**Male**	440	2,287,054	2,286,872	2,286,872	0.01	0.00
	Female	480	2,324,952	2,325,134	2,325,134	-0.01	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.8 2016 NSDUH Slippage Rates: CONNECTICUT

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		937	3,052,524	3,052,524	3,052,524	0.00	0.00
Quarter	**Quarter 1**	196	762,971	762,971	762,971	0.00	0.00
	Quarter 2	276	762,862	762,862	762,862	0.00	0.00
	Quarter 3	298	763,139	763,139	763,139	0.00	0.00
	Quarter 4	167	763,552	763,552	763,552	0.00	0.00
Age Group	**12-17**	222	274,381	278,000	278,000	-1.30	0.00
	18-25	248	388,963	388,847	388,847	0.03	0.00
	26-34	133	369,691	388,804	388,804	-4.92	0.00
	35-49	183	677,331	664,469	664,469	1.94	0.00
	50-64	100	975,370	774,390	774,390	25.95	0.00
	65+	51	366,788	558,014	558,014	-34.27	0.00
Race	**White**	701	2,362,286	2,496,625	2,496,625	-5.38	0.00
	Black or African American	112	348,562	341,483	341,483	2.07	0.00
	American Indian/Alaska Native	32	69,067	15,157	15,157	355.67	0.00
	Asian	43	144,387	144,458	144,458	-0.05	0.00
	Two or More Races	49	128,223	54,802	54,802	133.98	0.00
Hispanicity	**Hispanic or Latino**	180	432,635	436,681	436,681	-0.93	0.00
	Non-Hispanic or Latino	757	2,619,889	2,615,843	2,615,843	0.15	0.00
Gender	**Male**	426	1,457,825	1,472,802	1,472,802	-1.02	0.00
	Female	511	1,594,699	1,579,722	1,579,722	0.95	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.9 2016 NSDUH Slippage Rates: DELAWARE

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		928	802,361	802,361	802,361	0.00	0.00
Quarter	**Quarter 1**	214	199,867	199,867	199,867	0.00	0.00
	Quarter 2	280	200,351	200,351	200,351	0.00	0.00
	Quarter 3	200	200,850	200,850	200,850	0.00	0.00
	Quarter 4	234	201,293	201,293	201,293	0.00	0.00
Age Group	**12-17**	214	68,773	69,423	69,423	-0.94	0.00
	18-25	244	95,900	95,867	95,867	0.03	0.00
	26-34	148	112,178	110,748	110,748	1.29	0.00
	35-49	174	161,571	167,083	167,083	-3.30	0.00
	50-64	90	229,564	196,276	196,276	16.96	0.00
	65+	58	134,374	162,964	162,964	-17.54	-0.00
Race	**White**	582	548,753	575,479	575,479	-4.64	0.00
	Black or African American	232	174,925	173,437	173,437	0.86	0.00
	American Indian/Alaska Native	35	17,213	4,493	5,032	242.04	-10.71
	Asian	36	30,717	33,402	32,863	-6.53	1.64
	Two or More Races	43	30,754	15,550	15,550	97.77	0.00
Hispanicity	**Hispanic or Latino**	108	65,513	64,529	64,529	1.53	0.00
	Non-Hispanic or Latino	820	736,848	737,832	737,832	-0.13	0.00
Gender	**Male**	436	385,496	381,628	381,628	1.01	0.00
	Female	492	416,865	420,733	420,733	-0.92	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.10 2016 NSDUH Slippage Rates: DISTRICT OF COLUMBIA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		967	580,859	580,859	580,859	0.00	0.00
Quarter	**Quarter 1**	251	144,417	144,417	144,417	0.00	0.00
	Quarter 2	202	144,917	144,917	144,917	0.00	0.00
	Quarter 3	264	145,478	145,478	145,478	0.00	0.00
	Quarter 4	250	146,047	146,047	146,047	0.00	0.00
Age Group	**12-17**	240	30,940	30,940	30,940	0.00	0.00
	18-25	246	92,828	93,288	93,288	-0.49	0.00
	26-34	173	137,844	137,536	137,536	0.22	0.00
	35-49	201	135,555	135,387	135,387	0.12	0.00
	50-64	68	122,093	107,426	107,426	13.65	0.00
	65+	39	61,599	76,283	76,283	-19.25	0.00
Race	**White**	386	244,654	268,013	268,013	-8.72	0.00
	Black or African American	456	275,099	269,898	269,898	1.93	0.00
	American Indian/Alaska Native	50	19,757	7,453	3,335	492.50	123.52
	Asian	44	27,569	22,022	26,141	5.46	-15.76
	Two or More Races	31	13,781	13,473	13,473	2.28	0.00
Hispanicity	**Hispanic or Latino**	112	59,873	58,454	58,454	2.43	0.00
	Non-Hispanic or Latino	855	520,986	522,405	522,405	-0.27	0.00
Gender	**Male**	435	270,089	270,525	270,525	-0.16	0.00
	Female	532	310,770	310,334	310,334	0.14	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.11 2016 NSDUH Slippage Rates: FLORIDA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		3,435	17,554,248	17,554,248	17,554,248	0.00	0.00
Quarter	**Quarter 1**	880	4,358,318	4,358,318	4,358,318	0.00	0.00
	Quarter 2	783	4,377,852	4,377,852	4,377,852	0.00	0.00
	Quarter 3	773	4,398,790	4,398,790	4,398,790	0.00	0.00
	Quarter 4	999	4,419,288	4,419,288	4,419,288	0.00	0.00
Age Group	**12-17**	858	1,404,778	1,404,808	1,404,808	-0.00	0.00
	18-25	778	1,926,285	1,961,863	1,961,863	-1.81	0.00
	26-34	582	2,338,174	2,319,826	2,319,826	0.79	0.00
	35-49	725	3,703,213	3,713,376	3,713,376	-0.27	0.00
	50-64	285	4,491,850	4,125,543	4,125,543	8.88	0.00
	65+	207	3,689,948	4,028,832	4,028,832	-8.41	0.00
Race	**White**	2,323	13,055,033	13,902,466	13,902,466	-6.10	0.00
	Black or African American	734	2,870,719	2,752,503	2,752,503	4.29	0.00
	American Indian/Alaska Native	118	496,848	109,693	85,849	478.75	27.77
	Asian	131	623,971	502,753	526,597	18.49	-4.53
	Two or More Races	129	507,676	286,833	286,833	76.99	0.00
Hispanicity	**Hispanic or Latino**	1,084	4,347,565	4,237,419	4,237,419	2.60	0.00
	Non-Hispanic or Latino	2,351	13,206,683	13,316,829	13,316,829	-0.83	0.00
Gender	**Male**	1,637	8,431,366	8,430,833	8,430,833	0.01	0.00
	Female	1,798	9,122,882	9,123,415	9,123,415	-0.01	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.12 2016 NSDUH Slippage Rates: GEORGIA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,508	8,462,591	8,462,591	8,462,591	0.00	0.00
Quarter	**Quarter 1**	344	2,105,157	2,105,157	2,105,157	-0.00	0.00
	Quarter 2	445	2,112,206	2,112,206	2,112,206	0.00	0.00
	Quarter 3	345	2,119,262	2,119,262	2,119,262	0.00	0.00
	Quarter 4	374	2,125,966	2,125,966	2,125,966	0.00	0.00
Age Group	**12-17**	369	857,905	859,100	859,100	-0.14	0.00
	18-25	350	1,102,890	1,107,792	1,107,792	-0.44	0.00
	26-34	271	1,210,510	1,218,773	1,218,773	-0.68	0.00
	35-49	282	2,004,715	2,024,134	2,024,134	-0.96	0.00
	50-64	136	1,885,609	1,927,459	1,927,459	-2.17	0.00
	65+	100	1,400,962	1,325,334	1,325,334	5.71	0.00
Race	**White**	743	5,101,879	5,287,786	5,287,786	-3.52	0.00
	Black or African American	623	2,677,523	2,638,041	2,638,041	1.50	0.00
	American Indian/Alaska Native	32	133,886	39,065	41,195	225.01	-5.17
	Asian	50	369,281	362,745	360,615	2.40	0.59
	Two or More Races	60	180,023	134,954	134,954	33.40	0.00
Hispanicity	**Hispanic or Latino**	159	744,901	704,616	704,616	5.72	0.00
	Non-Hispanic or Latino	1,349	7,717,690	7,757,976	7,757,976	-0.52	0.00
Gender	**Male**	658	3,994,884	4,023,512	4,023,512	-0.71	0.00
	Female	850	4,467,707	4,439,080	4,439,080	0.64	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.13 2016 NSDUH Slippage Rates: HAWAII

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,004	1,157,906	1,157,906	1,157,906	0.00	0.00
Quarter	**Quarter 1**	202	289,246	289,246	289,246	0.00	0.00
	Quarter 2	239	289,336	289,336	289,336	0.00	0.00
	Quarter 3	297	289,549	289,549	289,549	0.00	0.00
	Quarter 4	266	289,775	289,775	289,775	0.00	0.00
Age Group	**12-17**	283	96,816	96,028	96,028	0.82	0.00
	18-25	241	132,877	131,256	131,256	1.23	-0.00
	26-34	139	162,189	166,297	166,297	-2.47	0.00
	35-49	181	247,101	251,323	251,323	-1.68	0.00
	50-64	93	305,208	272,952	272,952	11.82	0.00
	65+	67	213,715	240,050	240,050	-10.97	-0.00
Race	**White**	265	292,674	293,094	293,094	-0.14	-0.00
	Black or African American	17	20,690	17,307	17,308	19.54	-0.00
	American Indian/Alaska Native	10	13,341	4,217	4,217	216.34	0.00
	Asian	423	605,429	595,105	595,105	1.73	0.00
	Two or More Races	289	225,771	248,182	248,182	-9.03	0.00
Hispanicity	**Hispanic or Latino**	189	123,767	99,460	99,460	24.44	0.00
	Non-Hispanic or Latino	815	1,034,139	1,058,446	1,058,446	-2.30	-0.00
Gender	**Male**	474	561,965	561,965	561,965	0.00	0.00
	Female	530	595,941	595,941	595,941	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.14 2016 NSDUH Slippage Rates: IDAHO

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,088	1,373,371	1,373,371	1,373,371	-0.00	0.00
Quarter	**Quarter 1**	187	340,736	340,736	340,736	0.00	0.00
	Quarter 2	197	342,515	342,515	342,515	-0.00	0.00
	Quarter 3	313	344,267	344,267	344,267	-0.00	0.00
	Quarter 4	391	345,853	345,853	345,853	0.00	0.00
Age Group	**12-17**	270	147,812	147,812	147,812	0.00	0.00
	18-25	286	176,834	175,630	175,630	0.69	0.00
	26-34	168	195,789	193,527	193,527	1.17	0.00
	35-49	208	288,761	299,230	299,230	-3.50	0.00
	50-64	84	310,265	306,760	306,760	1.14	0.00
	65+	72	253,909	250,412	250,412	1.40	0.00
Race	**White**	992	1,274,633	1,290,334	1,290,334	-1.22	0.00
	Black or African American	8	7,839	10,304	10,304	-23.93	0.00
	American Indian/Alaska Native	38	37,592	22,343	22,343	68.25	0.00
	Asian	14	23,524	23,548	23,548	-0.10	0.00
	Two or More Races	36	29,783	26,842	26,842	10.96	0.00
Hispanicity	**Hispanic or Latino**	164	135,590	150,985	150,985	-10.20	0.00
	Non-Hispanic or Latino	924	1,237,781	1,222,386	1,222,386	1.26	0.00
Gender	**Male**	523	680,858	680,540	680,540	0.05	0.00
	Female	565	692,513	692,830	692,830	-0.05	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.15 2016 NSDUH Slippage Rates: ILLINOIS

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		2,467	10,702,668	10,702,668	10,702,668	0.00	0.00
Quarter	**Quarter 1**	581	2,676,265	2,676,265	2,676,265	0.00	0.00
	Quarter 2	590	2,675,302	2,675,302	2,675,302	0.00	0.00
	Quarter 3	630	2,675,390	2,675,391	2,675,391	-0.00	0.00
	Quarter 4	666	2,675,710	2,675,710	2,675,710	-0.00	0.00
Age Group	**12-17**	642	1,013,327	1,012,090	1,012,090	0.12	0.00
	18-25	607	1,352,258	1,363,215	1,363,215	-0.80	0.00
	26-34	369	1,569,822	1,557,060	1,557,060	0.82	0.00
	35-49	496	2,438,308	2,451,593	2,451,593	-0.54	0.00
	50-64	214	2,627,962	2,507,104	2,507,104	4.82	0.00
	65+	139	1,700,991	1,811,606	1,811,606	-6.11	-0.00
Race	**White**	1,824	7,968,300	8,363,949	8,363,949	-4.73	-0.00
	Black or African American	352	1,494,126	1,505,611	1,505,611	-0.76	0.00
	American Indian/Alaska Native	99	356,189	72,116	61,940	475.06	16.43
	Asian	107	619,774	601,062	611,238	1.40	-1.66
	Two or More Races	85	264,280	159,930	159,930	65.25	0.00
Hispanicity	**Hispanic or Latino**	483	1,669,177	1,685,592	1,685,592	-0.97	0.00
	Non-Hispanic or Latino	1,984	9,033,491	9,017,076	9,017,076	0.18	0.00
Gender	**Male**	1,187	5,166,332	5,192,812	5,192,812	-0.51	0.00
	Female	1,280	5,536,336	5,509,856	5,509,856	0.48	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.16 2016 NSDUH Slippage Rates: INDIANA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		933	5,503,158	5,503,158	5,503,158	0.00	0.00
Quarter	**Quarter 1**	235	1,373,192	1,373,192	1,373,192	0.00	0.00
	Quarter 2	208	1,374,726	1,374,726	1,374,726	0.00	0.00
	Quarter 3	291	1,376,683	1,376,683	1,376,683	0.00	0.00
	Quarter 4	199	1,378,558	1,378,558	1,378,558	0.00	0.00
Age Group	**12-17**	222	538,647	538,647	538,647	0.00	0.00
	18-25	236	731,776	743,072	743,072	-1.52	0.00
	26-34	155	754,886	748,472	748,472	0.86	0.00
	35-49	189	1,215,585	1,216,323	1,216,323	-0.06	0.00
	50-64	81	1,411,725	1,299,892	1,299,893	8.60	-0.00
	65+	50	850,538	956,752	956,752	-11.10	0.00
Race	**White**	783	4,735,359	4,772,555	4,772,555	-0.78	0.00
	Black or African American	84	500,025	498,208	498,208	0.36	0.00
	American Indian/Alaska Native	13	34,041	11,860	22,036	54.48	-46.18
	Asian	21	134,004	137,972	127,795	4.86	7.96
	Two or More Races	32	99,729	82,563	82,563	20.79	0.00
Hispanicity	**Hispanic or Latino**	89	332,970	329,444	329,444	1.07	0.00
	Non-Hispanic or Latino	844	5,170,188	5,173,714	5,173,714	-0.07	0.00
Gender	**Male**	459	2,673,602	2,679,757	2,679,757	-0.23	0.00
	Female	474	2,829,556	2,823,401	2,823,401	0.22	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.17 2016 NSDUH Slippage Rates: IOWA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,028	2,607,021	2,607,021	2,607,021	-0.00	0.00
Quarter	**Quarter 1**	210	650,460	650,460	650,460	0.00	0.00
	Quarter 2	277	651,179	651,179	651,179	-0.00	0.00
	Quarter 3	260	652,179	652,179	652,179	0.00	0.00
	Quarter 4	281	653,203	653,203	653,203	0.00	0.00
Age Group	**12-17**	273	246,216	243,421	243,421	1.15	0.00
	18-25	238	352,537	359,699	359,699	-1.99	0.00
	26-34	172	352,666	347,803	347,803	1.40	0.00
	35-49	208	554,112	548,344	548,344	1.05	0.00
	50-64	87	714,411	615,407	615,407	16.09	0.00
	65+	50	387,079	492,347	492,347	-21.38	-0.00
Race	**White**	921	2,390,706	2,408,811	2,408,811	-0.75	0.00
	Black or African American	56	89,866	84,406	84,406	6.47	0.00
	American Indian/Alaska Native	14	35,529	11,637	11,637	205.31	0.00
	Asian	16	65,606	67,964	67,964	-3.47	-0.00
	Two or More Races	21	25,314	34,204	34,204	-25.99	0.00
Hispanicity	**Hispanic or Latino**	85	145,054	130,848	130,848	10.86	0.00
	Non-Hispanic or Latino	943	2,461,967	2,476,173	2,476,173	-0.57	0.00
Gender	**Male**	521	1,285,432	1,288,127	1,288,127	-0.21	0.00
	Female	507	1,321,589	1,318,894	1,318,894	0.20	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.18 2016 NSDUH Slippage Rates: KANSAS

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		996	2,369,503	2,369,503	2,369,503	0.00	0.00
Quarter	**Quarter 1**	232	591,714	591,714	591,714	0.00	0.00
	Quarter 2	264	592,082	592,082	592,082	0.00	0.00
	Quarter 3	236	592,627	592,627	592,627	0.00	0.00
	Quarter 4	264	593,081	593,081	593,081	0.00	0.00
Age Group	**12-17**	258	237,465	237,465	237,465	0.00	0.00
	18-25	219	323,142	325,008	325,008	-0.57	0.00
	26-34	172	326,694	330,786	330,786	-1.24	0.00
	35-49	201	510,428	504,471	504,471	1.18	0.00
	50-64	87	564,795	552,659	552,659	2.20	0.00
	65+	59	406,979	419,115	419,115	-2.90	-0.00
Race	**White**	825	2,031,093	2,078,484	2,078,484	-2.28	0.00
	Black or African American	54	131,476	134,868	134,868	-2.51	0.00
	American Indian/Alaska Native	24	41,968	27,784	27,784	51.05	0.00
	Asian	40	81,403	74,093	74,093	9.87	0.00
	Two or More Races	53	83,563	54,274	54,274	53.96	0.00
Hispanicity	**Hispanic or Latino**	156	249,308	243,651	243,651	2.32	0.00
	Non-Hispanic or Latino	840	2,120,195	2,125,852	2,125,852	-0.27	0.00
Gender	**Male**	485	1,158,970	1,161,794	1,161,794	-0.24	0.00
	Female	511	1,210,533	1,207,709	1,207,709	0.23	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.19 2016 NSDUH Slippage Rates: KENTUCKY

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		953	3,684,220	3,684,220	3,684,220	0.00	0.00
Quarter	**Quarter 1**	208	919,446	919,446	919,446	0.00	0.00
	Quarter 2	236	920,408	920,408	920,408	0.00	0.00
	Quarter 3	262	921,624	921,623	921,624	0.00	-0.00
	Quarter 4	247	922,742	922,742	922,742	0.00	-0.00
Age Group	**12-17**	251	342,605	340,245	340,245	0.69	-0.00
	18-25	229	460,275	470,276	470,276	-2.13	-0.00
	26-34	121	498,256	491,281	491,281	1.42	0.00
	35-49	211	822,024	823,079	823,079	-0.13	0.00
	50-64	95	1,060,275	890,698	890,698	19.04	0.00
	65+	46	500,784	668,641	668,641	-25.10	-0.00
Race	**White**	784	3,244,581	3,280,276	3,280,276	-1.09	-0.00
	Black or African American	109	271,633	286,331	286,331	-5.13	-0.00
	American Indian/Alaska Native	9	31,034	10,755	10,755	188.54	-0.00
	Asian	17	56,341	56,362	56,362	-0.04	0.00
	Two or More Races	34	80,632	50,496	50,496	59.68	0.00
Hispanicity	**Hispanic or Latino**	46	91,193	108,452	108,452	-15.91	0.00
	Non-Hispanic or Latino	907	3,593,027	3,575,768	3,575,768	0.48	-0.00
Gender	**Male**	448	1,786,111	1,786,111	1,786,111	0.00	-0.00
	Female	505	1,898,109	1,898,108	1,898,109	0.00	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.20 2016 NSDUH Slippage Rates: LOUISIANA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		959	3,831,309	3,831,309	3,831,309	-0.00	0.00
Quarter	**Quarter 1**	203	956,520	956,520	956,520	-0.00	-0.00
	Quarter 2	221	957,283	957,284	957,284	-0.00	0.00
	Quarter 3	290	958,291	958,291	958,291	0.00	0.00
	Quarter 4	245	959,215	959,215	959,215	0.00	-0.00
Age Group	**12-17**	248	366,017	367,320	367,320	-0.35	0.00
	18-25	218	491,761	496,651	496,651	-0.98	0.00
	26-34	136	571,596	581,746	581,746	-1.74	-0.00
	35-49	191	855,718	832,120	832,120	2.84	0.00
	50-64	101	941,312	899,154	899,154	4.69	0.00
	65+	65	604,905	654,319	654,319	-7.55	0.00
Race	**White**	504	2,414,724	2,487,364	2,487,364	-2.92	-0.00
	Black or African American	379	1,188,183	1,193,320	1,193,320	-0.43	0.00
	American Indian/Alaska Native	21	51,198	29,313	29,313	74.66	0.00
	Asian	20	83,822	73,901	73,901	13.42	0.00
	Two or More Races	35	93,382	47,411	47,411	96.96	-0.00
Hispanicity	**Hispanic or Latino**	64	190,622	178,125	178,125	7.02	-0.00
	Non-Hispanic or Latino	895	3,640,688	3,653,184	3,653,184	-0.34	0.00
Gender	**Male**	454	1,832,191	1,827,259	1,827,259	0.27	-0.00
	Female	505	1,999,118	2,004,051	2,004,051	-0.25	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.21 2016 NSDUH Slippage Rates: MAINE

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		992	1,154,268	1,154,268	1,154,268	0.00	0.00
Quarter	**Quarter 1**	259	288,261	288,261	288,261	0.00	0.00
	Quarter 2	216	288,416	288,416	288,416	0.00	0.00
	Quarter 3	284	288,672	288,672	288,672	0.00	0.00
	Quarter 4	233	288,920	288,920	288,920	0.00	0.00
Age Group	**12-17**	228	92,420	90,994	90,994	1.57	0.00
	18-25	224	123,402	124,447	124,447	-0.84	0.00
	26-34	181	140,142	139,539	139,539	0.43	0.00
	35-49	209	239,447	237,985	237,985	0.61	0.00
	50-64	79	299,133	310,632	310,632	-3.70	-0.00
	65+	71	259,725	250,671	250,671	3.61	0.00
Race	**White**	922	1,097,979	1,101,486	1,101,486	-0.32	0.00
	Black or African American	12	14,794	14,667	14,667	0.87	-0.00
	American Indian/Alaska Native	11	5,180	7,709	7,709	-32.80	0.00
	Asian	15	15,194	14,600	14,600	4.07	0.00
	Two or More Races	32	21,120	15,806	15,806	33.62	0.00
Hispanicity	**Hispanic or Latino**	21	14,245	16,303	16,303	-12.62	-0.00
	Non-Hispanic or Latino	971	1,140,023	1,137,966	1,137,966	0.18	0.00
Gender	**Male**	485	559,666	561,225	561,225	-0.28	0.00
	Female	507	594,602	593,043	593,043	0.26	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.22 2016 NSDUH Slippage Rates: MARYLAND

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		990	5,027,075	5,027,075	5,027,075	0.00	0.00
Quarter	**Quarter 1**	211	1,254,901	1,254,901	1,254,901	0.00	0.00
	Quarter 2	258	1,255,932	1,255,932	1,255,932	0.00	0.00
	Quarter 3	279	1,257,397	1,257,397	1,257,397	0.00	0.00
	Quarter 4	242	1,258,845	1,258,845	1,258,845	0.00	0.00
Age Group	**12-17**	209	453,651	453,651	453,651	0.00	0.00
	18-25	229	609,690	612,960	612,960	-0.53	0.00
	26-34	183	715,956	729,266	729,266	-1.83	0.00
	35-49	200	1,184,187	1,149,977	1,149,977	2.97	0.00
	50-64	102	1,234,227	1,227,546	1,227,546	0.54	0.00
	65+	67	829,362	853,675	853,675	-2.85	0.00
Race	**White**	548	2,931,917	3,036,157	3,036,157	-3.43	0.00
	Black or African American	306	1,498,287	1,514,285	1,514,285	-1.06	0.00
	American Indian/Alaska Native	18	83,807	24,181	27,429	205.54	-11.84
	Asian	74	358,129	343,923	340,675	5.12	0.95
	Two or More Races	44	154,935	108,529	108,529	42.76	0.00
Hispanicity	**Hispanic or Latino**	105	429,146	439,221	439,221	-2.29	0.00
	Non-Hispanic or Latino	885	4,597,929	4,587,854	4,587,854	0.22	0.00
Gender	**Male**	470	2,390,298	2,390,298	2,390,298	0.00	0.00
	Female	520	2,636,777	2,636,777	2,636,777	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.23 2016 NSDUH Slippage Rates: MASSACHUSETTS

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		988	5,849,205	5,849,205	5,849,205	0.00	0.00
Quarter	**Quarter 1**	197	1,458,988	1,458,988	1,458,988	0.00	0.00
	Quarter 2	286	1,460,956	1,460,956	1,460,956	0.00	0.00
	Quarter 3	243	1,463,425	1,463,425	1,463,425	0.00	0.00
	Quarter 4	262	1,465,836	1,465,836	1,465,836	0.00	0.00
Age Group	**12-17**	229	490,661	486,692	486,692	0.82	0.00
	18-25	211	787,271	793,386	793,386	-0.77	0.00
	26-34	167	840,755	845,835	845,835	-0.60	0.00
	35-49	235	1,309,675	1,276,567	1,276,567	2.59	0.00
	50-64	84	1,391,329	1,408,484	1,408,484	-1.22	0.00
	65+	62	1,029,512	1,038,240	1,038,240	-0.84	0.00
Race	**White**	739	4,580,931	4,841,957	4,841,957	-5.39	0.00
	Black or African American	119	545,893	475,865	475,865	14.72	0.00
	American Indian/Alaska Native	23	107,772	27,274	27,274	295.14	0.00
	Asian	64	410,998	395,179	395,179	4.00	0.00
	Two or More Races	43	203,612	108,930	108,930	86.92	0.00
Hispanicity	**Hispanic or Latino**	144	601,064	604,787	604,787	-0.62	0.00
	Non-Hispanic or Latino	844	5,248,141	5,244,418	5,244,418	0.07	0.00
Gender	**Male**	450	2,812,322	2,810,843	2,810,843	0.05	0.00
	Female	538	3,036,883	3,038,362	3,038,362	-0.05	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.24 2016 NSDUH Slippage Rates: MICHIGAN

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		2,420	8,406,442	8,406,442	8,406,442	0.00	0.00
Quarter	**Quarter 1**	593	2,099,412	2,099,412	2,099,412	0.00	0.00
	Quarter 2	574	2,100,558	2,100,558	2,100,558	0.00	0.00
	Quarter 3	708	2,102,382	2,102,383	2,102,383	-0.00	0.00
	Quarter 4	545	2,104,089	2,104,089	2,104,089	-0.00	0.00
Age Group	**12-17**	608	774,692	774,747	774,747	-0.01	0.00
	18-25	599	1,108,612	1,104,650	1,104,650	0.36	0.00
	26-34	373	1,086,169	1,088,589	1,088,589	-0.22	0.00
	35-49	470	1,789,483	1,782,279	1,782,279	0.40	0.00
	50-64	204	2,003,950	2,080,228	2,080,228	-3.67	0.00
	65+	166	1,643,537	1,575,949	1,575,949	4.29	-0.00
Race	**White**	1,833	6,603,812	6,798,347	6,798,347	-2.86	-0.00
	Black or African American	374	1,106,394	1,128,783	1,128,783	-1.98	0.00
	American Indian/Alaska Native	43	134,740	59,309	59,309	127.18	0.00
	Asian	64	270,547	263,133	263,133	2.82	0.00
	Two or More Races	106	290,948	156,870	156,870	85.47	0.00
Hispanicity	**Hispanic or Latino**	185	402,795	368,377	368,377	9.34	0.00
	Non-Hispanic or Latino	2,235	8,003,646	8,038,065	8,038,065	-0.43	0.00
Gender	**Male**	1,164	4,078,613	4,085,385	4,085,385	-0.17	0.00
	Female	1,256	4,327,829	4,321,057	4,321,057	0.16	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.25 2016 NSDUH Slippage Rates: MINNESOTA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		962	4,605,050	4,605,050	4,605,050	0.00	0.00
Quarter	**Quarter 1**	236	1,147,726	1,147,726	1,147,726	0.00	0.00
	Quarter 2	232	1,150,019	1,150,019	1,150,019	0.00	0.00
	Quarter 3	242	1,152,521	1,152,521	1,152,521	0.00	0.00
	Quarter 4	252	1,154,785	1,154,785	1,154,785	0.00	0.00
Age Group	**12-17**	240	432,965	428,949	428,949	0.94	0.00
	18-25	220	569,752	574,038	574,038	-0.75	0.00
	26-34	149	682,153	668,511	668,511	2.04	0.00
	35-49	214	981,115	1,015,635	1,015,635	-3.40	0.00
	50-64	81	1,167,331	1,115,339	1,115,339	4.66	-0.00
	65+	58	771,735	802,578	802,578	-3.84	0.00
Race	**White**	766	3,943,477	3,993,297	3,993,297	-1.25	0.00
	Black or African American	88	264,287	253,744	253,744	4.16	0.00
	American Indian/Alaska Native	26	69,392	53,525	53,525	29.64	0.00
	Asian	50	245,281	220,793	220,793	11.09	0.00
	Two or More Races	32	82,613	83,691	83,691	-1.29	0.00
Hispanicity	**Hispanic or Latino**	71	181,339	208,783	208,783	-13.15	0.00
	Non-Hispanic or Latino	891	4,423,712	4,396,267	4,396,267	0.62	0.00
Gender	**Male**	435	2,278,224	2,278,224	2,278,224	0.00	0.00
	Female	527	2,326,826	2,326,826	2,326,826	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.26 2016 NSDUH Slippage Rates: MISSISSIPPI

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		934	2,447,209	2,447,209	2,447,209	0.00	-0.00
Quarter	**Quarter 1**	251	611,314	611,314	611,314	-0.00	-0.00
	Quarter 2	248	611,505	611,505	611,505	0.00	-0.00
	Quarter 3	218	611,947	611,947	611,947	0.00	-0.00
	Quarter 4	217	612,444	612,444	612,444	0.00	-0.00
Age Group	**12-17**	234	242,903	244,408	244,408	-0.62	0.00
	18-25	233	325,422	326,958	326,959	-0.47	-0.00
	26-34	155	329,991	333,828	333,828	-1.15	-0.00
	35-49	177	539,385	534,455	534,455	0.92	-0.00
	50-64	64	464,676	569,887	569,887	-18.46	0.00
	65+	71	544,832	437,673	437,673	24.48	-0.00
Race	**White**	510	1,474,287	1,488,254	1,488,254	-0.94	-0.00
	Black or African American	402	905,529	895,066	895,066	1.17	0.00
	American Indian/Alaska Native	5	9,931	13,810	13,811	-28.09	-0.00
	Asian	6	35,057	27,928	27,928	25.53	-0.00
	Two or More Races	11	22,405	22,151	22,151	1.14	-0.00
Hispanicity	**Hispanic or Latino**	21	59,479	62,813	62,813	-5.31	-0.00
	Non-Hispanic or Latino	913	2,387,730	2,384,396	2,384,396	0.14	-0.00
Gender	**Male**	454	1,154,305	1,156,904	1,156,904	-0.22	-0.00
	Female	480	1,292,905	1,290,305	1,290,306	0.20	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.27 2016 NSDUH Slippage Rates: MISSOURI

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		938	5,069,324	5,069,324	5,069,324	0.00	0.00
Quarter	**Quarter 1**	238	1,265,209	1,265,209	1,265,209	0.00	0.00
	Quarter 2	233	1,266,356	1,266,356	1,266,356	0.00	0.00
	Quarter 3	258	1,268,004	1,268,004	1,268,004	0.00	0.00
	Quarter 4	209	1,269,755	1,269,755	1,269,755	0.00	0.00
Age Group	**12-17**	215	466,585	468,693	468,693	-0.45	0.00
	18-25	232	653,162	649,195	649,195	0.61	0.00
	26-34	150	698,869	705,616	705,616	-0.96	0.00
	35-49	178	1,090,087	1,085,200	1,085,200	0.45	0.00
	50-64	94	1,224,550	1,218,488	1,218,488	0.50	0.00
	65+	69	936,070	942,132	942,132	-0.64	0.00
Race	**White**	715	4,237,591	4,278,895	4,278,895	-0.97	0.00
	Black or African American	150	561,138	565,779	565,779	-0.82	0.00
	American Indian/Alaska Native	9	45,059	27,736	27,736	62.46	0.00
	Asian	22	109,261	109,714	109,714	-0.41	0.00
	Two or More Races	42	116,274	87,200	87,200	33.34	0.00
Hispanicity	**Hispanic or Latino**	46	173,056	183,152	183,152	-5.51	0.00
	Non-Hispanic or Latino	892	4,896,268	4,886,171	4,886,171	0.21	0.00
Gender	**Male**	452	2,459,388	2,453,987	2,453,987	0.22	0.00
	Female	486	2,609,935	2,615,337	2,615,337	-0.21	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.28 2016 NSDUH Slippage Rates: MONTANA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,018	874,320	874,320	874,320	-0.00	0.00
Quarter	**Quarter 1**	222	217,738	217,738	217,738	0.00	0.00
	Quarter 2	236	218,297	218,297	218,297	0.00	0.00
	Quarter 3	322	218,879	218,879	218,879	-0.00	0.00
	Quarter 4	238	219,407	219,407	219,407	0.00	0.00
Age Group	**12-17**	258	74,323	74,323	74,323	-0.00	0.00
	18-25	265	110,254	110,690	110,690	-0.39	0.00
	26-34	139	116,845	115,648	115,648	1.04	0.00
	35-49	190	173,430	175,482	175,482	-1.17	0.00
	50-64	91	211,814	217,871	217,871	-2.78	0.00
	65+	75	187,654	180,307	180,307	4.08	0.00
Race	**White**	860	786,426	792,427	792,427	-0.76	0.00
	Black or African American	4	5,077	4,361	4,361	16.43	0.00
	American Indian/Alaska Native	96	50,251	50,090	50,090	0.32	0.00
	Asian	19	11,950	8,077	8,077	47.96	0.00
	Two or More Races	39	20,615	19,366	19,366	6.45	0.00
Hispanicity	**Hispanic or Latino**	44	27,634	27,767	27,767	-0.48	0.00
	Non-Hispanic or Latino	974	846,686	846,553	846,553	0.02	0.00
Gender	**Male**	472	436,087	436,087	436,087	0.00	0.00
	Female	546	438,232	438,233	438,233	-0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.29 2016 NSDUH Slippage Rates: NEBRASKA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		964	1,557,938	1,557,938	1,557,938	-0.00	0.00
Quarter	**Quarter 1**	240	388,315	388,315	388,315	0.00	0.00
	Quarter 2	228	389,040	389,040	389,040	0.00	0.00
	Quarter 3	251	389,892	389,892	389,892	-0.00	0.00
	Quarter 4	245	390,692	390,692	390,692	0.00	0.00
Age Group	**12-17**	241	153,264	153,264	153,264	0.00	0.00
	18-25	234	212,491	213,572	213,572	-0.51	0.00
	26-34	158	224,213	221,827	221,827	1.08	0.00
	35-49	202	336,733	335,419	335,419	0.39	0.00
	50-64	76	372,304	358,746	358,746	3.78	0.00
	65+	53	258,933	275,110	275,110	-5.88	0.00
Race	**White**	817	1,341,884	1,404,109	1,404,109	-4.43	0.00
	Black or African American	51	74,485	70,518	70,518	5.63	0.00
	American Indian/Alaska Native	31	53,557	18,834	18,834	184.36	0.00
	Asian	28	53,885	40,192	40,192	34.07	0.00
	Two or More Races	37	34,127	24,285	24,285	40.53	0.00
Hispanicity	**Hispanic or Latino**	137	144,055	143,815	143,815	0.17	0.00
	Non-Hispanic or Latino	827	1,413,883	1,414,123	1,414,123	-0.02	0.00
Gender	**Male**	460	768,412	768,412	768,412	0.00	0.00
	Female	504	789,526	789,526	789,526	-0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.30 2016 NSDUH Slippage Rates: NEVADA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		966	2,448,780	2,448,780	2,448,780	0.00	-0.00
Quarter	**Quarter 1**	248	607,694	607,694	607,694	0.00	-0.00
	Quarter 2	254	610,716	610,716	610,716	0.00	0.00
	Quarter 3	227	613,771	613,771	613,771	0.00	0.00
	Quarter 4	237	616,599	616,599	616,599	0.00	0.00
Age Group	**12-17**	248	223,671	224,692	224,692	-0.45	0.00
	18-25	229	286,551	285,894	285,894	0.23	0.00
	26-34	148	346,838	372,105	372,105	-6.79	0.00
	35-49	176	588,237	575,281	575,281	2.25	0.00
	50-64	107	641,079	554,511	554,511	15.61	0.00
	65+	58	362,405	436,297	436,298	-16.94	-0.00
Race	**White**	612	1,687,628	1,862,067	1,862,067	-9.37	0.00
	Black or African American	124	235,994	221,133	221,133	6.72	-0.00
	American Indian/Alaska Native	69	134,125	38,870	38,870	245.06	0.00
	Asian	102	277,003	243,754	243,754	13.64	0.00
	Two or More Races	59	114,030	82,957	82,957	37.46	0.00
Hispanicity	**Hispanic or Latino**	357	652,722	643,329	643,329	1.46	0.00
	Non-Hispanic or Latino	609	1,796,058	1,805,450	1,805,450	-0.52	-0.00
Gender	**Male**	475	1,210,923	1,211,430	1,211,430	-0.04	0.00
	Female	491	1,237,857	1,237,350	1,237,350	0.04	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.31 2016 NSDUH Slippage Rates: NEW HAMPSHIRE

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		936	1,153,236	1,153,236	1,153,236	0.00	0.00
Quarter	**Quarter 1**	210	287,744	287,744	287,744	-0.00	0.00
	Quarter 2	292	288,128	288,128	288,128	0.00	0.00
	Quarter 3	209	288,528	288,528	288,528	0.00	0.00
	Quarter 4	225	288,835	288,835	288,835	0.00	0.00
Age Group	**12-17**	233	94,598	95,915	95,915	-1.37	0.00
	18-25	204	142,724	142,331	142,331	0.28	0.00
	26-34	158	144,567	141,343	141,343	2.28	0.00
	35-49	210	239,945	243,817	243,817	-1.59	-0.00
	50-64	87	353,910	311,496	311,496	13.62	-0.00
	65+	44	177,491	218,334	218,334	-18.71	0.00
Race	**White**	862	1,077,359	1,087,812	1,087,812	-0.96	-0.00
	Black or African American	15	18,214	15,943	15,943	14.25	0.00
	American Indian/Alaska Native	6	15,671	3,346	3,346	368.32	0.00
	Asian	35	32,243	30,826	30,826	4.60	0.00
	Two or More Races	18	9,748	15,308	15,308	-36.32	0.00
Hispanicity	**Hispanic or Latino**	46	38,489	35,817	35,817	7.46	0.00
	Non-Hispanic or Latino	890	1,114,747	1,117,419	1,117,419	-0.24	-0.00
Gender	**Male**	440	567,003	567,003	567,003	0.00	0.00
	Female	496	586,232	586,232	586,232	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.32 2016 NSDUH Slippage Rates: NEW JERSEY

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,433	7,550,513	7,550,513	7,550,513	-0.00	0.00
Quarter	**Quarter 1**	293	1,885,345	1,885,345	1,885,345	0.00	0.00
	Quarter 2	429	1,886,369	1,886,369	1,886,369	0.00	0.00
	Quarter 3	407	1,888,312	1,888,312	1,888,312	-0.00	0.00
	Quarter 4	304	1,890,487	1,890,487	1,890,487	-0.00	0.00
Age Group	**12-17**	368	688,930	693,040	693,040	-0.59	0.00
	18-25	330	882,747	889,421	889,421	-0.75	0.00
	26-34	233	1,015,459	1,027,305	1,027,305	-1.15	0.00
	35-49	303	1,847,572	1,754,527	1,754,527	5.30	0.00
	50-64	120	1,869,955	1,851,036	1,851,036	1.02	0.00
	65+	79	1,245,850	1,335,184	1,335,184	-6.69	-0.00
Race	**White**	886	5,104,469	5,540,084	5,540,084	-7.86	-0.00
	Black or African American	245	1,123,905	1,083,664	1,083,664	3.71	-0.00
	American Indian/Alaska Native	71	210,318	44,205	44,205	375.77	0.00
	Asian	168	848,283	752,407	752,407	12.74	0.00
	Two or More Races	63	263,538	130,153	130,153	102.48	0.00
Hispanicity	**Hispanic or Latino**	403	1,444,031	1,412,444	1,412,444	2.24	0.00
	Non-Hispanic or Latino	1,030	6,106,482	6,138,069	6,138,069	-0.51	0.00
Gender	**Male**	699	3,637,223	3,640,683	3,640,683	-0.10	0.00
	Female	734	3,913,290	3,909,830	3,909,830	0.09	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.33 2016 NSDUH Slippage Rates: NEW MEXICO

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		980	1,719,897	1,719,897	1,719,897	-0.00	0.00
Quarter	**Quarter 1**	214	429,601	429,602	429,602	-0.00	0.00
	Quarter 2	260	429,790	429,790	429,790	0.00	0.00
	Quarter 3	318	430,119	430,119	430,119	0.00	0.00
	Quarter 4	188	430,387	430,387	430,387	0.00	0.00
Age Group	**12-17**	267	164,418	165,841	165,841	-0.86	0.00
	18-25	218	218,724	221,098	221,098	-1.07	0.00
	26-34	162	253,445	239,161	239,161	5.97	-0.00
	35-49	187	340,595	353,893	353,893	-3.76	0.00
	50-64	76	374,708	402,652	402,652	-6.94	0.00
	65+	70	368,006	337,251	337,251	9.12	0.00
Race	**White**	747	1,343,268	1,439,398	1,439,398	-6.68	0.00
	Black or African American	32	46,750	40,239	40,239	16.18	0.00
	American Indian/Alaska Native	148	237,614	171,630	171,630	38.45	0.00
	Asian	21	42,404	32,702	32,702	29.67	0.00
	Two or More Races	32	49,861	35,927	35,927	38.78	0.00
Hispanicity	**Hispanic or Latino**	529	813,548	801,477	801,477	1.51	0.00
	Non-Hispanic or Latino	451	906,349	918,420	918,420	-1.31	0.00
Gender	**Male**	497	838,971	836,044	836,044	0.35	0.00
	Female	483	880,926	883,853	883,853	-0.33	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.34 2016 NSDUH Slippage Rates: NEW YORK

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		3,232	16,748,367	16,748,367	16,748,367	-0.00	0.00
Quarter	**Quarter 1**	859	4,184,797	4,184,797	4,184,797	-0.00	0.00
	Quarter 2	877	4,185,272	4,185,273	4,185,273	-0.00	0.00
	Quarter 3	765	4,187,696	4,187,696	4,187,696	-0.00	0.00
	Quarter 4	731	4,190,601	4,190,601	4,190,601	-0.00	0.00
Age Group	**12-17**	859	1,407,183	1,411,235	1,411,235	-0.29	0.00
	18-25	777	2,192,531	2,176,812	2,176,812	0.72	0.00
	26-34	489	2,548,706	2,546,505	2,546,505	0.09	0.00
	35-49	627	3,726,429	3,735,156	3,735,156	-0.23	0.00
	50-64	286	3,967,563	3,935,073	3,935,073	0.83	0.00
	65+	194	2,905,955	2,943,586	2,943,586	-1.28	0.00
Race	**White**	2,063	10,978,983	11,844,916	11,844,916	-7.31	0.00
	Black or African American	582	3,018,606	2,866,084	2,866,084	5.32	0.00
	American Indian/Alaska Native	180	660,008	158,732	158,732	315.80	0.00
	Asian	269	1,691,808	1,536,144	1,536,144	10.13	0.00
	Two or More Races	138	398,962	342,491	342,491	16.49	0.00
Hispanicity	**Hispanic or Latino**	749	2,985,140	3,007,498	3,007,498	-0.74	0.00
	Non-Hispanic or Latino	2,483	13,763,227	13,740,869	13,740,869	0.16	0.00
Gender	**Male**	1,524	7,988,431	8,024,443	8,024,443	-0.45	0.00
	Female	1,708	8,759,936	8,723,924	8,723,924	0.41	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.35 2016 NSDUH Slippage Rates: NORTH CAROLINA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,508	8,419,860	8,419,860	8,419,860	0.00	0.00
Quarter	**Quarter 1**	323	2,095,207	2,095,207	2,095,207	0.00	0.00
	Quarter 2	409	2,101,452	2,101,452	2,101,452	0.00	0.00
	Quarter 3	366	2,108,262	2,108,262	2,108,262	0.00	0.00
	Quarter 4	410	2,114,939	2,114,939	2,114,939	0.00	0.00
Age Group	**12-17**	346	769,236	787,252	787,252	-2.29	0.00
	18-25	358	1,072,932	1,042,023	1,042,023	2.97	0.00
	26-34	235	1,135,949	1,140,119	1,140,119	-0.37	0.00
	35-49	316	1,912,572	1,939,098	1,939,098	-1.37	0.00
	50-64	155	2,132,937	1,982,135	1,982,135	7.61	0.00
	65+	98	1,396,235	1,529,234	1,529,234	-8.70	0.00
Race	**White**	929	5,867,706	6,086,763	6,086,763	-3.60	0.00
	Black or African American	386	1,791,567	1,819,727	1,819,727	-1.55	-0.00
	American Indian/Alaska Native	71	236,477	72,523	125,292	88.74	-42.12
	Asian	61	260,814	301,811	249,042	4.73	21.19
	Two or More Races	61	263,296	139,036	139,036	89.37	0.00
Hispanicity	**Hispanic or Latino**	191	645,016	658,027	658,027	-1.98	0.00
	Non-Hispanic or Latino	1,317	7,774,844	7,761,833	7,761,833	0.17	0.00
Gender	**Male**	717	3,999,231	3,995,637	3,995,637	0.09	0.00
	Female	791	4,420,630	4,424,223	4,424,223	-0.08	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.36 2016 NSDUH Slippage Rates: NORTH DAKOTA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		960	617,001	617,001	617,001	-0.00	0.00
Quarter	**Quarter 1**	225	154,255	154,255	154,255	-0.00	0.00
	Quarter 2	257	154,199	154,199	154,199	0.00	0.00
	Quarter 3	233	154,243	154,243	154,243	-0.00	0.00
	Quarter 4	245	154,304	154,304	154,304	0.00	0.00
Age Group	**12-17**	278	52,672	52,057	52,057	1.18	0.00
	18-25	236	100,321	99,863	99,863	0.46	-0.00
	26-34	122	95,751	96,824	96,824	-1.11	0.00
	35-49	196	124,134	124,459	124,459	-0.26	-0.00
	50-64	69	125,378	139,617	139,617	-10.20	0.00
	65+	59	118,745	104,181	104,181	13.98	0.00
Race	**White**	831	552,773	552,163	552,163	0.11	0.00
	Black or African American	27	15,569	16,043	16,043	-2.95	0.00
	American Indian/Alaska Native	43	27,761	29,439	29,439	-5.70	0.00
	Asian	21	4,169	9,784	9,784	-57.39	-0.00
	Two or More Races	38	16,729	9,572	9,572	74.78	0.00
Hispanicity	**Hispanic or Latino**	24	16,871	18,826	18,826	-10.38	0.00
	Non-Hispanic or Latino	936	600,130	598,175	598,175	0.33	0.00
Gender	**Male**	480	314,474	314,474	314,474	0.00	-0.00
	Female	480	302,527	302,527	302,527	-0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.37 2016 NSDUH Slippage Rates: OHIO

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		2,377	9,738,448	9,738,448	9,738,448	0.00	0.00
Quarter	**Quarter 1**	594	2,432,447	2,432,447	2,432,447	0.00	0.00
	Quarter 2	634	2,433,352	2,433,352	2,433,352	0.00	0.00
	Quarter 3	620	2,435,309	2,435,309	2,435,309	0.00	0.00
	Quarter 4	529	2,437,340	2,437,340	2,437,340	0.00	0.00
Age Group	**12-17**	578	899,797	905,155	905,155	-0.59	0.00
	18-25	583	1,215,804	1,215,046	1,215,046	0.06	0.00
	26-34	407	1,318,237	1,317,669	1,317,669	0.04	0.00
	35-49	463	2,086,595	2,097,460	2,097,460	-0.52	0.00
	50-64	217	2,636,056	2,382,452	2,382,452	10.64	0.00
	65+	129	1,581,959	1,820,666	1,820,666	-13.11	0.00
Race	**White**	1,887	8,022,953	8,162,052	8,162,052	-1.70	0.00
	Black or African American	308	1,195,585	1,167,756	1,167,756	2.38	0.00
	American Indian/Alaska Native	15	93,112	26,672	26,672	249.10	0.00
	Asian	72	233,238	220,095	220,095	5.97	0.00
	Two or More Races	95	193,560	161,873	161,873	19.58	0.00
Hispanicity	**Hispanic or Latino**	97	331,835	311,195	311,195	6.63	0.00
	Non-Hispanic or Latino	2,280	9,406,612	9,427,252	9,427,252	-0.22	0.00
Gender	**Male**	1,186	4,713,410	4,714,197	4,714,197	-0.02	0.00
	Female	1,191	5,025,038	5,024,250	5,024,250	0.02	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.38 2016 NSDUH Slippage Rates: OKLAHOMA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		965	3,198,970	3,198,970	3,198,970	-0.00	-0.00
Quarter	**Quarter 1**	231	797,977	797,977	797,977	0.00	0.00
	Quarter 2	259	798,987	798,987	798,987	-0.00	0.00
	Quarter 3	251	800,305	800,305	800,305	0.00	0.00
	Quarter 4	224	801,701	801,701	801,701	-0.00	0.00
Age Group	**12-17**	263	314,897	315,530	315,531	-0.20	-0.00
	18-25	234	423,635	425,978	425,978	-0.55	0.00
	26-34	141	461,313	467,472	467,472	-1.32	-0.00
	35-49	184	708,347	691,147	691,147	2.49	-0.00
	50-64	72	655,218	726,005	726,005	-9.75	0.00
	65+	71	635,561	572,838	572,838	10.95	0.00
Race	**White**	677	2,380,183	2,442,325	2,442,325	-2.54	0.00
	Black or African American	71	234,495	233,574	233,574	0.39	0.00
	American Indian/Alaska Native	91	289,284	281,223	281,223	2.87	0.00
	Asian	19	89,082	78,514	78,514	13.46	0.00
	Two or More Races	107	205,927	163,334	163,335	26.08	-0.00
Hispanicity	**Hispanic or Latino**	127	316,318	285,147	285,147	10.93	-0.00
	Non-Hispanic or Latino	838	2,882,653	2,913,823	2,913,823	-1.07	-0.00
Gender	**Male**	455	1,556,603	1,556,603	1,556,603	-0.00	0.00
	Female	510	1,642,367	1,642,367	1,642,368	-0.00	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.39 2016 NSDUH Slippage Rates: OREGON

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,004	3,478,192	3,478,192	3,478,192	-0.00	-0.00
Quarter	**Quarter 1**	210	863,665	863,665	863,665	0.00	-0.00
	Quarter 2	243	867,634	867,634	867,634	-0.00	-0.00
	Quarter 3	279	871,623	871,623	871,623	0.00	-0.00
	Quarter 4	272	875,270	875,270	875,270	0.00	-0.00
Age Group	**12-17**	244	291,562	291,562	291,562	0.00	0.00
	18-25	216	424,249	420,001	420,001	1.01	0.00
	26-34	163	496,203	506,493	506,493	-2.03	-0.00
	35-49	224	783,651	781,289	781,289	0.30	0.00
	50-64	100	946,817	800,599	800,599	18.26	0.00
	65+	57	535,710	678,247	678,247	-21.02	0.00
Race	**White**	837	2,975,260	3,068,655	3,068,655	-3.04	-0.00
	Black or African American	25	62,123	68,190	68,190	-8.90	0.00
	American Indian/Alaska Native	38	128,923	58,320	58,320	121.06	0.00
	Asian	49	178,866	173,765	173,765	2.94	0.00
	Two or More Races	55	133,020	109,262	109,262	21.74	0.00
Hispanicity	**Hispanic or Latino**	134	391,450	389,190	389,190	0.58	-0.00
	Non-Hispanic or Latino	870	3,086,742	3,089,002	3,089,002	-0.07	0.00
Gender	**Male**	472	1,700,455	1,704,233	1,704,233	-0.22	-0.00
	Female	532	1,777,737	1,773,959	1,773,959	0.21	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.40 2016 NSDUH Slippage Rates: PENNSYLVANIA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		2,360	10,840,710	10,840,710	10,840,710	0.00	0.00
Quarter	**Quarter 1**	560	2,709,156	2,709,156	2,709,156	-0.00	0.00
	Quarter 2	629	2,709,073	2,709,073	2,709,073	0.00	0.00
	Quarter 3	592	2,710,412	2,710,412	2,710,412	0.00	0.00
	Quarter 4	579	2,712,069	2,712,069	2,712,069	0.00	0.00
Age Group	**12-17**	614	926,082	925,024	925,024	0.11	0.00
	18-25	567	1,329,766	1,334,425	1,334,425	-0.35	0.00
	26-34	355	1,478,737	1,471,551	1,471,551	0.49	0.00
	35-49	441	2,265,857	2,273,654	2,273,654	-0.34	0.00
	50-64	218	2,757,361	2,687,021	2,687,021	2.62	0.00
	65+	165	2,082,905	2,149,036	2,149,036	-3.08	-0.00
Race	**White**	1,850	8,781,312	9,089,157	9,089,157	-3.39	-0.00
	Black or African American	335	1,259,516	1,176,129	1,176,129	7.09	0.00
	American Indian/Alaska Native	23	127,660	36,518	36,518	249.59	0.00
	Asian	72	394,688	380,387	380,387	3.76	0.00
	Two or More Races	80	277,534	158,519	158,519	75.08	0.00
Hispanicity	**Hispanic or Latino**	184	685,486	668,399	668,399	2.56	0.00
	Non-Hispanic or Latino	2,176	10,155,224	10,172,311	10,172,311	-0.17	0.00
Gender	**Male**	1,079	5,239,609	5,239,609	5,239,609	0.00	0.00
	Female	1,281	5,601,101	5,601,101	5,601,101	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.41 2016 NSDUH Slippage Rates: RHODE ISLAND

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		937	905,791	905,791	905,791	0.00	0.00
Quarter	**Quarter 1**	218	226,214	226,214	226,214	0.00	0.00
	Quarter 2	264	226,327	226,327	226,327	-0.00	0.00
	Quarter 3	241	226,526	226,526	226,526	-0.00	0.00
	Quarter 4	214	226,724	226,724	226,724	0.00	0.00
Age Group	**12-17**	222	73,529	73,856	73,856	-0.44	0.00
	18-25	238	125,922	127,610	127,610	-1.32	0.00
	26-34	122	127,978	125,430	125,430	2.03	0.00
	35-49	208	188,610	189,931	189,931	-0.70	0.00
	50-64	81	216,805	222,400	222,400	-2.52	0.00
	65+	66	172,947	166,564	166,564	3.83	0.00
Race	**White**	724	740,854	776,855	776,855	-4.63	0.00
	Black or African American	77	72,443	67,939	67,939	6.63	0.00
	American Indian/Alaska Native	40	29,323	7,924	7,924	270.05	0.00
	Asian	53	42,363	33,379	33,379	26.92	0.00
	Two or More Races	43	20,809	19,694	19,694	5.66	0.00
Hispanicity	**Hispanic or Latino**	174	118,115	120,865	120,865	-2.28	0.00
	Non-Hispanic or Latino	763	787,676	784,926	784,926	0.35	0.00
Gender	**Male**	427	432,737	434,936	434,936	-0.51	0.00
	Female	510	473,054	470,855	470,855	0.47	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.42 2016 NSDUH Slippage Rates: SOUTH CAROLINA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		970	4,133,914	4,133,914	4,133,914	0.00	0.00
Quarter	**Quarter 1**	175	1,027,631	1,027,631	1,027,631	-0.00	0.00
	Quarter 2	269	1,031,711	1,031,711	1,031,711	0.00	0.00
	Quarter 3	254	1,035,527	1,035,527	1,035,527	0.00	0.00
	Quarter 4	272	1,039,045	1,039,045	1,039,045	0.00	-0.00
Age Group	**12-17**	229	370,280	368,554	368,554	0.47	0.00
	18-25	236	498,077	511,293	511,293	-2.58	0.00
	26-34	141	563,851	558,779	558,779	0.91	-0.00
	35-49	206	889,490	895,295	895,295	-0.65	0.00
	50-64	84	950,910	987,274	987,274	-3.68	0.00
	65+	74	861,306	812,720	812,720	5.98	0.00
Race	**White**	660	2,845,970	2,891,653	2,891,653	-1.58	0.00
	Black or African American	258	1,089,823	1,096,092	1,096,092	-0.57	0.00
	American Indian/Alaska Native	15	56,561	40,612	21,514	162.90	88.77
	Asian	7	69,901	50,804	69,902	-0.00	-27.32
	Two or More Races	30	71,659	54,754	54,754	30.88	0.00
Hispanicity	**Hispanic or Latino**	67	190,197	196,564	196,564	-3.24	0.00
	Non-Hispanic or Latino	903	3,943,717	3,937,349	3,937,349	0.16	-0.00
Gender	**Male**	444	1,961,848	1,961,848	1,961,848	0.00	0.00
	Female	526	2,172,066	2,172,066	2,172,066	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.43 2016 NSDUH Slippage Rates: SOUTH DAKOTA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		960	701,645	701,645	701,645	0.00	-0.00
Quarter	**Quarter 1**	203	174,807	174,807	174,807	0.00	-0.00
	Quarter 2	268	175,181	175,181	175,181	0.00	0.00
	Quarter 3	253	175,620	175,620	175,620	0.00	0.00
	Quarter 4	236	176,037	176,037	176,037	0.00	-0.00
Age Group	**12-17**	256	67,236	66,650	66,650	0.88	0.00
	18-25	219	89,511	92,952	92,952	-3.70	-0.00
	26-34	158	99,145	97,508	97,508	1.68	0.00
	35-49	194	143,739	143,222	143,222	0.36	-0.00
	50-64	72	157,875	168,823	168,823	-6.48	0.00
	65+	61	144,140	132,490	132,490	8.79	0.00
Race	**White**	800	609,356	613,081	613,081	-0.61	-0.00
	Black or African American	17	10,112	12,134	12,135	-16.66	-0.00
	American Indian/Alaska Native	88	49,905	53,693	53,693	-7.05	-0.00
	Asian	15	11,189	10,881	10,882	2.82	-0.00
	Two or More Races	40	21,083	11,855	11,855	77.84	0.00
Hispanicity	**Hispanic or Latino**	44	22,897	21,509	21,509	6.45	-0.00
	Non-Hispanic or Latino	916	678,748	680,136	680,136	-0.20	0.00
Gender	**Male**	448	351,122	349,949	349,949	0.34	-0.00
	Female	512	350,523	351,696	351,696	-0.33	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.44 2016 NSDUH Slippage Rates: TENNESSEE

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		993	5,556,863	5,556,863	5,556,863	0.00	0.00
Quarter	**Quarter 1**	226	1,383,911	1,383,911	1,383,911	0.00	0.00
	Quarter 2	220	1,387,275	1,387,275	1,387,275	0.00	-0.00
	Quarter 3	277	1,391,028	1,391,028	1,391,028	0.00	0.00
	Quarter 4	270	1,394,649	1,394,649	1,394,649	0.00	0.00
Age Group	**12-17**	235	508,796	508,796	508,796	0.00	0.00
	18-25	226	703,186	698,244	698,244	0.71	0.00
	26-34	166	744,502	769,561	769,561	-3.26	0.00
	35-49	206	1,284,545	1,247,380	1,247,380	2.98	0.00
	50-64	86	1,263,676	1,313,941	1,313,941	-3.83	0.00
	65+	74	1,052,159	1,018,940	1,018,940	3.26	0.00
Race	**White**	748	4,333,959	4,443,499	4,443,499	-2.47	-0.00
	Black or African American	174	904,706	906,684	906,684	-0.22	0.00
	American Indian/Alaska Native	9	35,996	23,939	23,939	50.37	0.00
	Asian	33	151,119	104,576	104,576	44.51	0.00
	Two or More Races	29	131,082	78,164	78,164	67.70	0.00
Hispanicity	**Hispanic or Latino**	77	237,297	243,999	243,999	-2.75	-0.00
	Non-Hispanic or Latino	916	5,319,565	5,312,863	5,312,863	0.13	0.00
Gender	**Male**	475	2,665,612	2,665,612	2,665,612	0.00	-0.00
	Female	518	2,891,251	2,891,251	2,891,251	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.45 2016 NSDUH Slippage Rates: TEXAS

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		3,293	22,490,422	22,490,422	22,490,422	0.00	-0.00
Quarter	**Quarter 1**	827	5,586,502	5,586,502	5,586,502	0.00	0.00
	Quarter 2	859	5,610,426	5,610,427	5,610,427	-0.00	0.00
	Quarter 3	881	5,635,012	5,635,012	5,635,012	0.00	-0.00
	Quarter 4	726	5,658,483	5,658,483	5,658,483	0.00	-0.00
Age Group	**12-17**	826	2,404,697	2,410,422	2,410,423	-0.24	-0.00
	18-25	842	3,116,334	3,086,091	3,086,092	0.98	-0.00
	26-34	506	3,567,133	3,541,832	3,541,832	0.71	0.00
	35-49	638	5,362,014	5,383,737	5,383,738	-0.40	-0.00
	50-64	305	5,151,580	4,806,752	4,806,752	7.17	-0.00
	65+	176	2,888,664	3,261,587	3,261,587	-11.43	-0.00
Race	**White**	2,447	17,159,952	17,993,133	17,993,133	-4.63	-0.00
	Black or African American	454	2,742,856	2,762,334	2,762,335	-0.71	-0.00
	American Indian/Alaska Native	132	826,305	230,691	230,691	258.19	0.00
	Asian	153	1,224,962	1,156,090	1,156,090	5.96	0.00
	Two or More Races	107	536,347	348,174	348,174	54.05	-0.00
Hispanicity	**Hispanic or Latino**	1,503	8,319,637	8,323,367	8,323,367	-0.04	0.00
	Non-Hispanic or Latino	1,790	14,170,786	14,167,055	14,167,055	0.03	0.00
Gender	**Male**	1,565	10,966,733	10,969,712	10,969,712	-0.03	-0.00
	Female	1,728	11,523,689	11,520,711	11,520,711	0.03	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.46 2016 NSDUH Slippage Rates: UTAH

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		936	2,403,330	2,403,330	2,403,330	0.00	0.00
Quarter	**Quarter 1**	221	595,520	595,520	595,520	0.00	0.00
	Quarter 2	270	599,090	599,090	599,090	0.00	0.00
	Quarter 3	207	602,675	602,675	602,675	0.00	0.00
	Quarter 4	238	606,045	606,045	606,045	0.00	0.00
Age Group	**12-17**	238	297,963	297,786	297,786	0.06	0.00
	18-25	207	392,480	390,726	390,726	0.45	0.00
	26-34	135	378,736	390,598	390,598	-3.04	0.00
	35-49	183	573,986	567,312	567,312	1.18	0.00
	50-64	103	475,560	440,487	440,487	7.96	0.00
	65+	70	284,605	316,421	316,421	-10.05	0.00
Race	**White**	851	2,157,871	2,201,609	2,201,609	-1.99	0.00
	Black or African American	20	32,973	30,149	30,149	9.37	0.00
	American Indian/Alaska Native	15	46,922	35,016	35,016	34.00	0.00
	Asian	19	117,454	89,366	89,366	31.43	0.00
	Two or More Races	31	48,111	47,191	47,191	1.95	0.00
Hispanicity	**Hispanic or Latino**	160	310,410	305,553	305,553	1.59	0.00
	Non-Hispanic or Latino	776	2,092,920	2,097,778	2,097,778	-0.23	0.00
Gender	**Male**	448	1,194,132	1,197,623	1,197,623	-0.29	0.00
	Female	488	1,209,198	1,205,708	1,205,708	0.29	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.47 2016 NSDUH Slippage Rates: VERMONT

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		896	542,875	542,875	542,875	0.00	0.00
Quarter	**Quarter 1**	210	135,744	135,744	135,744	0.00	0.00
	Quarter 2	228	135,708	135,708	135,708	0.00	0.00
	Quarter 3	251	135,713	135,713	135,713	-0.00	0.00
	Quarter 4	207	135,710	135,710	135,710	0.00	0.00
Age Group	**12-17**	208	42,277	42,507	42,508	-0.54	-0.00
	18-25	248	74,796	74,978	74,978	-0.24	0.00
	26-34	128	63,469	64,297	64,297	-1.29	0.00
	35-49	165	109,722	109,102	109,102	0.57	0.00
	50-64	86	148,495	142,350	142,350	4.32	0.00
	65+	61	104,116	109,640	109,640	-5.04	0.00
Race	**White**	836	508,021	516,215	516,215	-1.59	0.00
	Black or African American	10	6,920	6,456	6,456	7.20	0.00
	American Indian/Alaska Native	5	4,876	2,130	2,130	128.92	0.00
	Asian	13	9,877	9,752	9,752	1.28	-0.00
	Two or More Races	32	13,181	8,322	8,322	58.38	0.00
Hispanicity	**Hispanic or Latino**	29	14,528	9,506	9,506	52.83	0.00
	Non-Hispanic or Latino	867	528,347	533,369	533,369	-0.94	0.00
Gender	**Male**	442	266,276	266,276	266,276	0.00	0.00
	Female	454	276,599	276,599	276,599	0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.48 2016 NSDUH Slippage Rates: VIRGINIA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,493	6,961,461	6,961,461	6,961,461	0.00	-0.00
Quarter	**Quarter 1**	342	1,736,555	1,736,555	1,736,555	0.00	0.00
	Quarter 2	409	1,738,727	1,738,727	1,738,727	0.00	-0.00
	Quarter 3	343	1,741,634	1,741,634	1,741,634	0.00	0.00
	Quarter 4	399	1,744,545	1,744,545	1,744,545	0.00	0.00
Age Group	**12-17**	389	625,354	628,350	628,350	-0.48	0.00
	18-25	392	878,592	880,842	880,842	-0.26	0.00
	26-34	205	965,654	991,573	991,573	-2.61	0.00
	35-49	259	1,608,600	1,595,683	1,595,683	0.81	0.00
	50-64	147	1,687,768	1,662,978	1,662,978	1.49	0.00
	65+	101	1,195,493	1,202,037	1,202,037	-0.54	-0.00
Race	**White**	950	4,725,537	4,964,559	4,964,559	-4.81	-0.00
	Black or African American	314	1,351,952	1,332,254	1,332,254	1.48	0.00
	American Indian/Alaska Native	52	134,141	41,668	36,072	271.87	15.52
	Asian	107	520,926	468,445	474,041	9.89	-1.18
	Two or More Races	70	228,906	154,535	154,535	48.13	0.00
Hispanicity	**Hispanic or Latino**	153	588,954	573,873	573,873	2.63	-0.00
	Non-Hispanic or Latino	1,340	6,372,507	6,387,588	6,387,588	-0.24	0.00
Gender	**Male**	719	3,348,437	3,344,886	3,344,886	0.11	0.00
	Female	774	3,613,024	3,616,575	3,616,575	-0.10	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.49 2016 NSDUH Slippage Rates: WASHINGTON

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		934	6,080,095	6,080,095	6,080,095	0.00	-0.00
Quarter	**Quarter 1**	194	1,509,915	1,509,915	1,509,915	0.00	-0.00
	Quarter 2	303	1,516,666	1,516,666	1,516,666	0.00	0.00
	Quarter 3	241	1,523,557	1,523,557	1,523,557	-0.00	0.00
	Quarter 4	196	1,529,958	1,529,958	1,529,958	0.00	0.00
Age Group	**12-17**	252	532,077	533,613	533,613	-0.29	0.00
	18-25	229	732,408	744,179	744,179	-1.58	0.00
	26-34	145	943,127	935,830	935,830	0.78	0.00
	35-49	176	1,437,384	1,389,498	1,389,498	3.45	0.00
	50-64	76	1,436,041	1,415,534	1,415,534	1.45	-0.00
	65+	56	999,058	1,061,442	1,061,442	-5.88	0.00
Race	**White**	701	4,713,389	4,936,779	4,936,779	-4.53	-0.00
	Black or African American	44	235,178	232,540	232,540	1.13	0.00
	American Indian/Alaska Native	43	240,377	104,693	104,693	129.60	0.00
	Asian	80	592,539	578,784	578,784	2.38	0.00
	Two or More Races	66	298,611	227,300	227,300	31.37	0.00
Hispanicity	**Hispanic or Latino**	177	653,618	656,260	656,260	-0.40	-0.00
	Non-Hispanic or Latino	757	5,426,477	5,423,835	5,423,835	0.05	0.00
Gender	**Male**	438	2,995,953	2,995,953	2,995,953	0.00	0.00
	Female	496	3,084,142	3,084,142	3,084,142	-0.00	-0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.50 2016 NSDUH Slippage Rates: WEST VIRGINIA

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		962	1,556,861	1,556,861	1,556,861	-0.00	0.00
Quarter	**Quarter 1**	228	389,775	389,775	389,775	-0.00	0.00
	Quarter 2	251	389,283	389,283	389,283	0.00	0.00
	Quarter 3	216	389,009	389,009	389,009	-0.00	0.00
	Quarter 4	267	388,794	388,794	388,794	0.00	0.00
Age Group	**12-17**	233	127,982	127,982	127,982	-0.00	0.00
	18-25	257	182,274	183,063	183,063	-0.43	0.00
	26-34	135	186,152	188,704	188,704	-1.35	0.00
	35-49	179	335,875	334,484	334,484	0.42	0.00
	50-64	80	367,292	387,417	387,417	-5.19	0.00
	65+	78	357,286	335,212	335,212	6.59	0.00
Race	**White**	888	1,454,010	1,468,007	1,468,007	-0.95	0.00
	Black or African American	35	52,813	51,477	51,477	2.60	0.00
	American Indian/Alaska Native	7	17,616	9,820	3,791	364.68	159.04
	Asian	6	9,298	7,860	13,889	-33.05	-43.41
	Two or More Races	26	23,123	19,697	19,697	17.39	0.00
Hispanicity	**Hispanic or Latino**	21	21,912	20,885	20,885	4.92	0.00
	Non-Hispanic or Latino	941	1,534,949	1,535,976	1,535,976	-0.07	0.00
Gender	**Male**	464	760,696	761,348	761,348	-0.09	0.00
	Female	498	796,165	795,513	795,513	0.08	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.51 2016 NSDUH Slippage Rates: WISCONSIN

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		1,018	4,866,705	4,866,705	4,866,705	-0.00	0.00
Quarter	**Quarter 1**	268	1,214,825	1,214,825	1,214,825	-0.00	0.00
	Quarter 2	220	1,215,934	1,215,934	1,215,934	0.00	0.00
	Quarter 3	313	1,217,354	1,217,354	1,217,354	-0.00	0.00
	Quarter 4	217	1,218,592	1,218,592	1,218,592	0.00	0.00
Age Group	**12-17**	294	446,722	445,459	445,459	0.28	0.00
	18-25	237	622,630	627,016	627,016	-0.70	0.00
	26-34	138	633,503	639,735	639,735	-0.97	0.00
	35-49	190	1,050,088	1,040,733	1,040,733	0.90	0.00
	50-64	89	1,251,761	1,211,186	1,211,186	3.35	0.00
	65+	70	862,002	902,576	902,576	-4.50	0.00
Race	**White**	840	4,259,258	4,330,602	4,330,602	-1.65	0.00
	Black or African American	81	301,835	285,971	285,971	5.55	0.00
	American Indian/Alaska Native	22	77,205	49,714	49,714	55.30	0.00
	Asian	49	155,421	133,539	133,539	16.39	0.00
	Two or More Races	26	72,986	66,879	66,879	9.13	0.00
Hispanicity	**Hispanic or Latino**	94	284,724	282,797	282,797	0.68	0.00
	Non-Hispanic or Latino	924	4,581,981	4,583,908	4,583,908	-0.04	0.00
Gender	**Male**	482	2,396,196	2,396,187	2,396,187	0.00	0.00
	Female	536	2,470,509	2,470,518	2,470,518	-0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table H.52 2016 NSDUH Slippage Rates: WYOMING

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		964	480,973	480,973	480,973	0.00	0.00
Quarter	**Quarter 1**	273	120,291	120,291	120,291	0.00	0.00
	Quarter 2	274	120,248	120,248	120,248	-0.00	0.00
	Quarter 3	165	120,235	120,235	120,235	0.00	0.00
	Quarter 4	252	120,198	120,198	120,198	0.00	0.00
Age Group	**12-17**	220	44,073	44,244	44,244	-0.39	0.00
	18-25	279	61,108	61,241	61,241	-0.22	0.00
	26-34	114	73,459	71,203	71,203	3.17	0.00
	35-49	196	98,276	102,378	102,378	-4.01	0.00
	50-64	91	120,464	116,584	116,584	3.33	0.00
	65+	64	83,593	85,324	85,324	-2.03	0.00
Race	**White**	846	440,062	450,210	450,210	-2.25	0.00
	Black or African American	19	6,328	5,922	5,922	6.86	-0.00
	American Indian/Alaska Native	53	16,436	11,577	11,577	41.97	0.00
	Asian	7	3,839	5,411	5,411	-29.06	-0.00
	Two or More Races	39	14,307	7,852	7,852	82.21	0.00
Hispanicity	**Hispanic or Latino**	101	44,790	43,424	43,424	3.15	0.00
	Non-Hispanic or Latino	863	436,183	437,549	437,549	-0.31	0.00
Gender	**Male**	483	241,441	243,397	243,397	-0.80	0.00
	Female	481	239,531	237,575	237,575	0.82	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Appendix I: Evaluation of Calibration Weights: Weight Summary Statistics

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Table I.1 2016 NSDUH Dwelling Unit–Level Weight Summary Statistics: United States, District of Columbia, and the 50 States

Domain	*n*	Before res.du.nr (WT1*...*WT8)[1]						After res.du.nr & Before res.du.ps (WT1*...*WT9)[1]						After res.du.ps (WT1*...*WT10)[1]					
		Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]
United States	135,188	48	351	682	863	5,217	1.34	51	432	856	1,113	4,674	1.36	12	436	907	1,235	10,844	1.43
Alaska	1,901	74	77	95	116	356	1.12	83	96	122	146	292	1.09	51	103	130	174	521	1.15
Alabama	2,026	618	641	718	740	879	1.01	683	811	860	960	1,395	1.02	173	831	919	1,034	4,967	1.06
Arkansas	2,041	369	383	404	456	523	1.01	381	463	515	556	1,211	1.03	173	506	575	648	2,470	1.07
Arizona	1,835	319	749	885	941	1,447	1.02	594	934	1,064	1,151	1,511	1.03	520	1,103	1,333	1,636	5,722	1.11
California	7,993	921	949	1,049	1,085	5,217	1.03	995	1,340	1,480	1,616	4,198	1.03	687	1,425	1,647	1,875	10,844	1.07
Colorado	1,757	345	793	854	911	1,297	1.01	657	886	998	1,162	4,674	1.08	270	999	1,183	1,366	4,641	1.08
Connecticut	1,931	366	393	443	570	695	1.05	444	526	601	772	1,324	1.06	105	523	655	837	3,082	1.19
District of Columbia	3,401	48	50	52	56	115	1.03	51	65	78	100	185	1.10	12	71	88	109	426	1.13
Delaware	1,880	103	110	142	152	300	1.03	122	157	180	195	550	1.04	55	170	191	220	690	1.06
Florida	7,135	655	681	775	790	2,066	1.08	722	896	968	1,079	2,828	1.08	227	951	1,066	1,238	6,997	1.11
Georgia	2,443	1,000	1,123	1,170	1,197	1,249	1.00	1,073	1,319	1,449	1,595	2,328	1.02	429	1,349	1,574	1,807	6,062	1.06
Hawaii	2,478	75	106	121	131	175	1.04	84	140	160	187	300	1.07	61	152	183	228	681	1.11
Iowa	2,076	402	417	487	513	580	1.01	451	505	582	615	727	1.02	121	550	599	669	3,070	1.06
Idaho	1,842	201	208	230	332	829	1.08	202	211	268	384	963	1.15	45	248	323	407	2,252	1.18
Illinois	4,501	220	666	680	740	759	1.00	512	812	916	1,072	3,396	1.07	230	870	996	1,164	4,646	1.08
Indiana	1,665	1,052	1,073	1,099	1,203	1,343	1.01	1,085	1,339	1,451	1,612	2,447	1.02	359	1,306	1,542	1,794	5,670	1.07
Kansas	1,848	421	455	483	503	537	1.00	421	519	571	620	832	1.02	231	538	598	672	2,421	1.06
Kentucky	2,104	570	588	594	602	829	1.02	640	704	721	766	2,519	1.04	138	710	820	957	3,845	1.07
Louisiana	1,934	596	670	677	692	825	1.00	684	797	862	911	1,989	1.02	240	824	938	1,056	3,284	1.04
Massachusetts	2,365	686	707	725	752	1,687	1.02	764	878	1,030	1,134	3,191	1.09	239	883	1,035	1,240	5,787	1.14
Maryland	1,550	770	844	939	1,004	1,332	1.03	972	1,114	1,213	1,550	4,376	1.10	439	1,140	1,386	1,643	4,721	1.09
Maine	2,473	146	150	182	195	318	1.02	177	201	214	232	587	1.03	49	200	221	250	858	1.05
Michigan	4,809	532	550	646	680	863	1.01	544	673	758	839	3,164	1.07	347	711	814	919	3,113	1.05
Minnesota	1,855	818	853	885	929	964	1.00	919	1,015	1,077	1,162	2,427	1.01	296	1,038	1,177	1,298	4,143	1.05
Missouri	1,926	938	989	1,020	1,050	3,063	1.02	938	1,127	1,180	1,287	2,544	1.02	412	1,156	1,279	1,385	5,448	1.05

(continued)

Table I.1 2016 NSDUH Dwelling Unit–Level Weight Summary Statistics: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before res.du.nr (WT1*...*WT8)[1]						After res.du.nr & Before res.du.ps (WT1*...*WT9)[1]						After res.du.ps (WT1*...*WT10)[1]					
		Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]
Mississippi	1,617	360	517	545	563	596	1.00	525	601	648	704	929	1.01	122	604	685	785	3,510	1.09
Montana	2,247	128	130	134	151	241	1.01	129	147	155	170	508	1.10	68	164	185	212	853	1.06
North Carolina	2,832	918	955	1,045	1,098	1,929	1.01	1,029	1,178	1,267	1,362	2,321	1.01	394	1,238	1,382	1,547	5,832	1.05
North Dakota	2,521	78	80	102	108	121	1.02	83	100	119	127	206	1.02	49	108	126	135	431	1.05
Nebraska	1,881	256	266	307	314	356	1.01	283	340	360	398	1,121	1.05	79	333	390	441	1,263	1.07
New Hampshire	2,148	162	167	188	204	325	1.02	177	213	239	269	921	1.03	66	217	251	281	1,039	1.07
New Jersey	2,791	651	672	732	896	1,574	1.03	673	874	1,024	1,263	4,416	1.09	348	909	1,107	1,382	8,510	1.16
New Mexico	1,720	263	274	315	376	453	1.03	263	325	400	475	751	1.04	71	392	457	529	2,417	1.11
Nevada	1,526	411	427	437	516	540	1.01	464	576	624	716	917	1.03	182	568	697	817	3,287	1.11
New York	6,932	519	551	627	694	1,337	1.02	599	814	941	1,086	2,616	1.08	350	824	983	1,192	8,615	1.21
Ohio	4,700	667	691	765	779	1,633	1.00	740	871	938	987	3,570	1.02	282	912	982	1,070	2,894	1.03
Oklahoma	1,794	493	514	700	735	1,291	1.05	526	680	819	891	1,721	1.07	186	714	851	990	5,970	1.13
Oregon	2,224	485	502	515	550	746	1.02	499	616	641	733	2,912	1.04	262	626	684	825	2,368	1.06
Pennsylvania	5,277	661	684	696	744	1,385	1.00	713	824	896	940	2,041	1.02	310	895	967	1,045	4,478	1.06
Rhode Island	2,043	137	141	150	169	174	1.01	148	178	200	222	770	1.03	35	173	202	233	935	1.09
South Carolina	1,849	165	691	705	793	1,072	1.02	515	804	883	1,021	1,453	1.02	258	880	993	1,202	3,442	1.09
South Dakota	2,037	113	118	128	134	178	1.02	116	134	140	169	237	1.03	27	145	162	185	728	1.08
Tennessee	2,002	832	893	959	1,041	1,200	1.01	890	1,032	1,134	1,268	2,681	1.03	223	1,110	1,271	1,461	5,637	1.08
Texas	4,877	1,349	1,415	1,502	1,653	4,704	1.02	1,364	1,593	1,744	1,991	4,648	1.04	526	1,688	1,926	2,233	9,132	1.08
Utah	1,138	542	591	621	658	919	1.03	551	637	693	879	3,163	1.09	146	693	832	990	4,032	1.13
Virginia	2,743	222	815	834	853	935	1.00	604	969	1,031	1,101	1,434	1.01	181	1,016	1,142	1,278	5,766	1.06
Vermont	2,315	73	75	84	91	166	1.02	87	94	114	124	257	1.03	22	90	110	130	596	1.12
Washington	1,911	785	808	1,033	1,169	1,204	1.02	817	1,134	1,315	1,440	2,253	1.04	471	1,183	1,444	1,683	5,670	1.10
Wisconsin	2,412	571	587	779	813	3,673	1.09	600	696	952	1,047	3,897	1.08	312	789	996	1,125	4,717	1.08
West Virginia	2,125	236	246	273	287	520	1.01	276	306	340	364	619	1.02	73	315	357	394	1,481	1.05
Wyoming	1,757	79	82	91	100	144	1.04	79	100	108	120	304	1.08	29	109	126	143	434	1.14

[1] WT1*…*WT8 are design-based weight components; nr = nonresponse adjustment; ps = poststratification adjustment.

[2] Q1 and Q3 refer to the first and third quartile of the weight distribution.

[3] Unequal weighting effect (UWE) is defined as $1 + \left[(n-1)/n\right] * CV^2$, where CV = coefficient of variation of weights.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table I.2 2016 NSDUH Selected Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States

Domain	*n*	Before sel.per.ps (WT1*...*WT12)[1]						After sel.per.ps (WT1*...*WT13)[1]					
		Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]
United States	95,607	12	938	1,866	3,494	67,588	2.07	9	931	1,869	3,521	52,850	2.09
Alaska	1,325	65	177	318	590	2,896	1.72	54	177	318	594	2,394	1.66
Alabama	1,392	190	1,379	2,416	3,609	15,772	1.54	199	1,425	2,231	3,593	13,812	1.53
Arkansas	1,381	264	767	1,388	1,953	13,824	1.63	211	796	1,353	1,968	14,635	1.67
Arizona	1,313	565	1,772	2,994	4,821	25,549	1.82	462	1,757	2,907	4,999	24,645	1.87
California	6,720	694	2,342	3,970	5,919	41,481	1.44	742	2,369	3,858	6,010	50,536	1.50
Colorado	1,324	350	1,583	2,732	4,109	17,813	1.51	352	1,535	2,713	4,325	25,388	1.58
Connecticut	1,392	112	805	1,435	2,655	30,157	2.11	23	866	1,493	2,667	25,142	1.95
District of Columbia	1,260	12	168	369	626	2,563	1.59	9	161	355	608	3,804	1.86
Delaware	1,330	100	240	431	658	3,655	1.81	79	239	406	689	3,585	1.84
Florida	4,794	318	1,496	2,558	3,606	67,162	2.10	245	1,544	2,461	3,664	47,499	2.00
Georgia	1,998	491	2,040	3,199	5,499	23,731	1.50	456	2,099	3,192	5,383	21,712	1.50
Hawaii	1,458	69	285	526	895	8,002	1.98	41	272	528	944	5,059	1.95
Iowa	1,414	144	822	1,354	1,771	14,047	1.77	32	781	1,280	1,892	9,438	1.88
Idaho	1,429	52	388	631	1,123	4,469	1.69	36	374	621	1,212	5,460	1.88
Illinois	3,789	267	1,207	2,117	3,238	17,905	1.65	143	1,231	2,095	3,246	19,509	1.67
Indiana	1,286	412	1,962	3,194	4,555	18,903	1.59	348	1,952	3,231	4,680	22,294	1.67
Kansas	1,363	360	843	1,378	2,039	13,871	1.59	159	768	1,285	1,956	9,202	1.65
Kentucky	1,445	183	1,112	1,870	2,942	27,619	1.70	122	1,074	1,781	3,080	22,222	1.70
Louisiana	1,328	379	1,355	2,232	3,415	12,342	1.53	262	1,278	2,169	3,664	13,480	1.56
Massachusetts	1,596	279	1,581	2,689	4,008	25,052	1.69	201	1,503	2,551	4,097	46,360	1.93
Maryland	1,317	538	1,802	2,879	5,032	27,532	1.59	312	1,771	2,763	4,728	15,749	1.58
Maine	1,394	65	315	506	792	5,121	2.04	29	323	500	810	4,601	2.09
Michigan	3,311	383	1,121	1,809	2,783	21,749	1.68	292	1,150	1,775	2,843	13,320	1.67
Minnesota	1,375	381	1,442	2,527	3,557	32,732	1.73	131	1,513	2,416	3,744	14,208	1.70
Missouri	1,334	622	1,831	3,050	4,401	22,873	1.60	201	1,809	3,004	4,661	14,967	1.50

(continued)

Table I.2 2016 NSDUH Selected Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before sel.per.ps (WT1*...*WT12)[1]						After sel.per.ps (WT1*...*WT13)[1]					
		Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]
Mississippi	1,283	162	867	1,429	2,067	12,078	1.62	184	881	1,353	2,131	8,855	1.66
Montana	1,433	71	234	441	657	3,107	1.79	67	239	409	662	3,686	1.93
North Carolina	2,089	459	1,897	3,092	4,320	25,234	1.56	425	1,885	3,119	4,596	18,042	1.60
North Dakota	1,344	50	204	346	474	1,992	1.61	25	176	320	542	6,642	1.91
Nebraska	1,364	88	498	806	1,206	8,602	1.79	69	498	805	1,220	9,904	1.81
New Hampshire	1,355	106	363	568	823	5,001	1.83	27	360	561	846	6,267	1.96
New Jersey	2,149	362	1,425	2,348	4,176	38,385	1.84	332	1,482	2,339	4,143	44,606	1.92
New Mexico	1,215	93	597	984	1,476	12,384	1.86	39	594	994	1,563	18,573	1.89
Nevada	1,268	263	839	1,387	2,550	9,468	1.64	78	811	1,344	2,809	10,858	1.59
New York	4,934	356	1,303	2,446	3,980	67,588	1.97	316	1,291	2,397	4,113	44,273	1.85
Ohio	3,363	331	1,272	2,234	3,137	18,252	1.66	264	1,278	2,123	3,151	14,203	1.65
Oklahoma	1,374	231	1,000	1,716	2,815	16,131	1.66	150	947	1,592	2,880	21,174	1.82
Oregon	1,391	285	1,033	2,020	2,863	15,742	1.64	332	1,067	1,916	2,882	13,249	1.68
Pennsylvania	3,308	357	1,367	2,376	3,428	37,400	1.78	241	1,360	2,258	3,739	27,333	1.76
Rhode Island	1,356	46	282	506	742	5,497	1.67	16	274	459	817	4,412	1.78
South Carolina	1,326	315	1,276	2,136	3,590	20,088	1.75	245	1,291	2,172	3,576	17,186	1.74
South Dakota	1,338	37	228	354	516	4,269	1.78	37	222	366	541	4,108	1.86
Tennessee	1,373	336	1,905	3,226	4,671	21,940	1.62	268	1,862	2,989	4,790	33,669	1.69
Texas	4,255	730	2,475	4,292	6,276	30,714	1.49	480	2,439	4,320	6,452	52,850	1.54
Utah	1,215	198	1,121	1,775	2,550	13,570	1.35	64	1,110	1,806	2,538	9,059	1.34
Virginia	2,077	211	1,358	2,464	4,373	25,011	1.57	126	1,344	2,408	4,884	21,582	1.60
Vermont	1,298	31	145	261	432	5,135	2.10	10	134	252	473	2,606	2.03
Washington	1,362	592	1,725	3,138	5,444	21,648	1.66	506	1,755	3,065	5,602	23,295	1.75
Wisconsin	1,368	502	1,416	2,500	3,873	49,991	1.91	203	1,392	2,429	4,290	26,067	1.81
West Virginia	1,440	102	424	768	1,273	12,903	1.78	47	431	758	1,245	5,333	1.75
Wyoming	1,261	38	144	268	429	3,034	1.84	24	141	257	483	2,248	1.81

[1] WT1*...*WT12 and WT1*...*WT13 used demographic variables from screener data; ps = poststratification adjustment.

[2] Q1 and Q3 refer to the first and third quartile of the weight distribution.

[3] Unequal weighting effect (UWE) is defined as $1 + \left[(n-1)/n\right] * CV^2$, where CV = coefficient of variation of weights.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.

Table I.3 2016 NSDUH Respondent Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States

Domain	*n*	Before res.per.nr (WT1*...*WT13)[1]						After res.per.nr (WT1*...*WT14)[1]						Before res.per.ps (WT1*...*WT14)[2]						Final Weight After res.per.ps (WT1*...*WT15)[2]					
		Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]
United States	67,942	9	902	1,796	3,356	48,155	2.11	10	1,196	2,423	4,840	61,302	2.31	10	1,196	2,423	4,840	61,302	2.31	3	1,115	2,410	4,862	90,937	2.37
Alaska	960	54	173	305	553	2,164	1.67	58	216	408	786	4,629	1.87	58	216	408	786	4,629	1.87	53	221	412	754	5,003	1.96
Alabama	983	199	1,404	2,134	3,371	13,812	1.55	303	1,764	2,891	4,766	25,325	1.74	303	1,764	2,891	4,766	25,325	1.74	61	1,783	2,899	4,826	29,563	1.80
Arkansas	992	222	774	1,294	1,895	14,635	1.70	250	1,040	1,657	2,724	15,992	1.85	250	1,040	1,657	2,724	15,992	1.85	50	1,013	1,715	2,798	18,314	1.93
Arizona	982	462	1,757	2,943	4,965	24,645	1.88	507	2,405	3,922	6,753	31,276	1.87	507	2,405	3,922	6,753	31,276	1.87	413	2,378	4,063	6,658	42,987	1.97
California	4,619	742	2,239	3,562	5,671	33,185	1.52	808	2,910	5,017	9,194	51,118	1.71	808	2,910	5,017	9,194	51,118	1.71	175	2,832	5,071	9,487	46,168	1.76
Colorado	920	382	1,466	2,613	4,184	25,388	1.64	437	1,893	3,716	6,424	28,931	1.72	437	1,893	3,716	6,424	28,931	1.72	122	1,806	3,597	6,301	40,792	1.89
Connecticut	937	23	830	1,389	2,610	25,142	2.06	25	1,157	2,096	3,929	34,736	2.18	25	1,157	2,096	3,929	34,736	2.18	6	1,122	2,056	4,080	38,279	2.21
District of Columbia	967	9	152	339	584	3,804	1.90	19	187	435	754	4,704	2.06	19	187	435	754	4,704	2.06	5	171	422	769	6,433	2.14
Delaware	928	79	238	389	650	3,585	1.87	83	307	546	967	6,290	1.98	83	307	546	967	6,290	1.98	23	307	547	1,033	6,849	2.09
Florida	3,435	245	1,480	2,358	3,479	47,499	2.05	301	1,913	3,196	5,257	44,967	2.24	301	1,913	3,196	5,257	44,967	2.24	82	1,918	3,215	5,281	46,381	2.29
Georgia	1,508	593	1,996	2,995	4,879	17,714	1.50	635	2,410	3,866	6,926	38,183	1.76	635	2,410	3,866	6,926	38,183	1.76	194	2,329	3,893	7,040	37,079	1.77
Hawaii	1,004	41	267	504	941	4,724	1.97	89	344	687	1,503	8,633	2.10	89	344	687	1,503	8,633	2.10	22	363	673	1,514	8,461	2.15
Iowa	1,028	32	764	1,268	1,868	9,438	1.90	78	1,015	1,687	2,748	15,740	1.97	78	1,015	1,687	2,748	15,740	1.97	40	1,026	1,664	2,765	28,556	2.14
Idaho	1,088	36	365	609	1,121	5,366	1.89	78	444	780	1,585	7,367	2.02	78	444	780	1,585	7,367	2.02	39	434	796	1,592	7,067	2.03
Illinois	2,467	143	1,184	1,964	3,111	19,509	1.68	279	1,696	2,910	5,016	33,886	1.93	279	1,696	2,910	5,016	33,886	1.93	88	1,664	2,937	5,062	55,628	2.03
Indiana	933	348	1,923	3,035	4,455	22,294	1.70	353	2,459	4,141	6,400	50,474	1.93	353	2,459	4,141	6,400	50,474	1.93	116	2,434	4,031	6,685	72,427	2.10
Kansas	996	236	758	1,258	1,908	7,741	1.63	274	980	1,704	2,714	19,313	1.80	274	980	1,704	2,714	19,313	1.80	116	994	1,729	2,736	12,606	1.80
Kentucky	953	169	1,011	1,704	2,995	22,222	1.76	281	1,416	2,566	4,685	25,976	1.91	281	1,416	2,566	4,685	25,976	1.91	56	1,365	2,611	4,775	22,366	1.93
Louisiana	959	262	1,252	2,128	3,609	11,726	1.55	262	1,682	3,006	5,130	19,135	1.65	262	1,682	3,006	5,130	19,135	1.65	85	1,703	3,040	5,202	23,566	1.69
Massachusetts	988	201	1,481	2,556	3,964	22,347	1.84	255	2,251	3,882	6,916	61,302	2.02	255	2,251	3,882	6,916	61,302	2.02	81	2,180	4,029	6,983	40,502	2.00
Maryland	990	312	1,765	2,716	4,534	15,749	1.59	318	2,289	3,667	6,222	25,348	1.63	318	2,289	3,667	6,222	25,348	1.63	91	2,266	3,663	6,118	30,996	1.68
Maine	992	30	320	498	808	4,601	2.09	33	435	699	1,215	7,755	2.13	33	435	699	1,215	7,755	2.13	10	436	706	1,204	7,676	2.16
Michigan	2,420	292	1,124	1,731	2,739	13,320	1.68	298	1,420	2,344	3,895	23,564	1.81	298	1,420	2,344	3,895	23,564	1.81	74	1,389	2,328	3,916	47,428	1.90
Minnesota	962	131	1,491	2,367	3,607	13,053	1.72	229	2,056	3,452	5,152	43,536	1.84	229	2,056	3,452	5,152	43,536	1.84	217	1,998	3,477	5,166	44,134	1.84
Missouri	938	201	1,773	2,872	4,414	14,967	1.50	203	2,232	3,803	6,769	28,437	1.71	203	2,232	3,803	6,769	28,437	1.71	105	2,259	3,803	6,960	29,936	1.72

(continued)

Table I.3 2016 NSDUH Respondent Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before res.per.nr (WT1*...*WT13)[1]						After res.per.nr (WT1*...*WT14)[1]						Before res.per.ps (WT1*...*WT14)[2]						Final Weight After res.per.ps (WT1*...*WT15)[2]					
		Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]
Mississippi	934	201	873	1,317	2,085	8,855	1.66	233	1,119	1,745	2,990	15,444	1.84	233	1,119	1,745	2,990	15,444	1.84	129	1,126	1,743	2,944	19,424	1.95
Montana	1,018	67	233	398	662	3,601	1.95	68	299	551	1,053	6,007	1.94	68	299	551	1,053	6,007	1.94	64	307	555	1,034	5,828	1.95
North Carolina	1,508	425	1,855	3,037	4,530	18,042	1.61	451	2,469	3,928	6,792	26,855	1.67	451	2,469	3,928	6,792	26,855	1.67	249	2,467	3,954	6,940	36,253	1.72
North Dakota	960	25	175	312	526	6,642	1.93	30	232	424	791	6,127	1.92	30	232	424	791	6,127	1.92	20	229	423	797	3,953	1.93
Nebraska	964	69	488	797	1,201	9,904	1.82	69	687	1,153	1,784	9,154	1.91	69	687	1,153	1,784	9,154	1.91	43	664	1,128	1,753	8,963	1.94
New Hampshire	936	27	360	547	827	4,882	1.93	120	481	764	1,223	13,220	2.15	120	481	764	1,223	13,220	2.15	25	497	769	1,211	7,912	2.12
New Jersey	1,433	332	1,416	2,235	3,803	44,606	2.02	374	1,913	3,250	5,991	58,909	2.14	374	1,913	3,250	5,991	58,909	2.14	136	1,912	3,334	6,268	54,128	2.19
New Mexico	980	39	584	989	1,533	18,573	1.94	65	704	1,201	1,933	17,481	1.92	65	704	1,201	1,933	17,481	1.92	57	670	1,197	1,941	12,035	2.00
Nevada	966	78	778	1,229	2,630	10,858	1.65	100	956	1,613	3,660	14,879	1.76	100	956	1,613	3,660	14,879	1.76	30	884	1,650	3,626	38,908	2.11
New York	3,232	316	1,198	2,197	3,842	44,273	1.85	325	1,681	3,290	6,437	51,315	2.11	325	1,681	3,290	6,437	51,315	2.11	114	1,698	3,413	6,497	48,144	2.07
Ohio	2,377	264	1,242	2,044	3,057	12,875	1.66	372	1,687	2,721	4,435	25,854	1.84	372	1,687	2,721	4,435	25,854	1.84	220	1,715	2,740	4,422	27,446	1.86
Oklahoma	965	150	895	1,502	2,779	21,174	1.87	191	1,266	2,283	4,131	25,235	1.96	191	1,266	2,283	4,131	25,235	1.96	157	1,178	2,298	4,091	27,888	2.06
Oregon	1,004	332	1,072	1,911	2,797	13,249	1.70	383	1,484	2,479	3,762	15,597	1.76	383	1,484	2,479	3,762	15,597	1.76	121	1,493	2,480	3,646	16,204	1.82
Pennsylvania	2,360	241	1,328	2,198	3,630	27,333	1.77	319	1,734	2,958	5,532	36,515	1.85	319	1,734	2,958	5,532	36,515	1.85	183	1,711	2,991	5,729	49,495	1.85
Rhode Island	937	16	271	447	782	4,412	1.78	17	363	614	1,172	7,499	1.92	17	363	614	1,172	7,499	1.92	3	346	602	1,200	7,312	1.96
South Carolina	970	245	1,225	2,109	3,547	17,186	1.78	325	1,628	2,838	4,943	22,153	1.83	325	1,628	2,838	4,943	22,153	1.83	121	1,587	2,893	5,042	22,887	1.83
South Dakota	960	37	217	357	523	4,108	1.88	37	288	481	776	4,108	1.93	37	288	481	776	4,108	1.93	40	288	470	784	6,513	1.95
Tennessee	993	268	1,860	2,930	4,622	23,034	1.66	268	2,351	4,034	6,670	41,774	1.79	268	2,351	4,034	6,670	41,774	1.79	153	2,293	4,089	6,616	41,711	1.82
Texas	3,293	480	2,391	4,164	6,218	48,155	1.53	483	2,868	5,267	8,539	48,221	1.65	483	2,868	5,267	8,539	48,221	1.65	318	2,957	5,283	8,653	41,213	1.65
Utah	936	64	1,081	1,751	2,441	8,702	1.35	80	1,321	2,238	3,323	13,154	1.42	80	1,321	2,238	3,323	13,154	1.42	63	1,316	2,272	3,408	10,351	1.39
Virginia	1,493	126	1,313	2,187	4,577	17,712	1.57	250	1,755	3,049	6,485	53,132	1.86	250	1,755	3,049	6,485	53,132	1.86	105	1,768	3,072	6,431	35,960	1.82
Vermont	896	10	134	252	499	2,606	2.02	10	185	380	758	3,287	1.94	10	185	380	758	3,287	1.94	9	188	363	763	3,258	1.97
Washington	934	506	1,700	2,912	5,426	23,295	1.76	628	2,291	4,030	7,949	58,830	2.01	628	2,291	4,030	7,949	58,830	2.01	139	2,212	4,018	8,152	90,937	2.20
Wisconsin	1,018	203	1,379	2,355	4,233	26,067	1.83	203	1,733	3,043	6,081	33,278	1.96	203	1,733	3,043	6,081	33,278	1.96	125	1,669	2,984	6,107	50,954	2.08
West Virginia	962	47	422	665	1,187	5,016	1.78	56	592	978	1,894	7,772	1.85	56	592	978	1,894	7,772	1.85	75	575	936	1,951	8,007	1.87
Wyoming	964	27	138	248	472	2,248	1.83	36	178	329	624	3,263	1.87	36	178	329	624	3,263	1.87	13	175	325	628	4,092	1.91

[1] WT1*...*WT13 and WT1*...*WT14 used demographic variables from screener data; nr = nonresponse adjustment.

[2] WT1*...*WT14 and WT1*...*WT15 used demographic variables from questionnaire data; ps = poststratification adjustment.

[3] Q1 and Q3 refer to the first and third quartile of the weight distribution.

[4] Unequal weighting effect (UWE) is defined as $1 + \left[(n-1)/n\right] * CV^2$, where CV = coefficient of variation of weights.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016.