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Substance Abuse and Mental Health Services Administration

2020 National Survey on Drug Use and Health (NSDUH): Methodological Resource Book

Section 11: Person-Level Sampling Weight Calibration

Substance Abuse and Mental Health Services Administration
Center for Behavioral Health Statistics and Quality
Rockville, Maryland

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2020 National Survey on Drug Use and Health (NSDUH): Methodological Resource Book, Section 11, Person-Level Sampling Weight Calibration

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U.S. Department of Health and Human Services
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Table of Contents

Table of Contents (continued)

Chapter **Page**

Appendix

List of Tables

List of Tables (continued)

Table **Page**

List of Tables (continued)

This page intentionally left blank

List of Exhibits

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List of Terms and Abbreviations

C	Center point.
DU	Dwelling unit.
ev	Extreme weight adjustment. See Section 5.1 for more detail.
FI	Field interviewer.
GEM	Generalized exponential model. See Chapter 3 for more detail.
half-step	This refers to halving the increment in the Newton-Raphson iterative process for fitting the GEM.
IQR	Interquartile range.
L	Lower bound on adjustment factor.
nr	Nonresponse adjustment.
outwinsor	The proportion of weights trimmed after extreme value adjustment via winsorization.
ps	Poststratification adjustment.
res.per.ev	Respondent person-level extreme weight adjustment step. See Section 8.2.4 for more detail.
res.per.nr	Respondent person-level nonresponse adjustment step. See Section 8.2.2 for more detail.
res.per.ps	Respondent person-level poststratification adjustment step. See Section 8.2.3 for more detail.
res.sdu.ev	Respondent screener dwelling unit extreme weight adjustment step. See Section 7.3.3 for more detail.
res.sdu.nr	Respondent screener dwelling unit nonresponse adjustment step. See Section 7.3.1 for more detail.
res.sdu.ps	Respondent screener dwelling unit poststratification adjustment step. See Section 7.3.2 for more detail.
SAE	Small area estimation.
SDU	Screener dwelling unit.
SE	Standard error.
sel.per.ps	Selected person-level poststratification adjustment step. See Section 8.2.1 for more detail.
SES	Socioeconomic status indicator. See Exhibit 4.1 for more detail.
slippage	The difference between the total calibrated weight and the target weight (e.g., census control total) for a domain (e.g., females aged 18 to 25). Slippage rate is defined as (calibrated weight – target weight)/target weight.
SSR	State sampling region.
U	Upper bound on adjustment factor.

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.
Winsorization	A method of extreme weight adjustment that replaces extreme weights with the critical values used for defining low and high extreme weights.

Overview

This report briefly reviews the sampling weight calibration methodology used for the 2020 National Survey on Drug Use and Health (NSDUH), which was known as the National Household Survey on Drug Abuse (NHSDA) before 2002, conducted under contract with RTI International.[1] The purpose of this report is to document the implementation and evaluation of the weighting process for the 2020 NSDUH person-level weighting. The constrained exponential modeling method used in the surveys before 1999 was modified, and the new method (referred to as the generalized exponential model [GEM] in this report) has been used to produce weights since 1999. The GEM has more flexibility in dealing with extreme weights and for setting bounds directly on the weight adjustment factors, so they can become suitable for nonresponse and poststratification adjustments. The introduction of the 50-state, plus the District of Columbia, sample design provided an opportunity for this modification to occur and to include state-level predictors. The GEM provides a consolidated method that can handle nonresponse, poststratification (including a much larger number of population controls for state estimation), and extreme weight adjustments. The highlights of the generalized exponential modeling method are summarized as follows:

- NSDUH's inherent two-stage interview[2] design (viewing the large screener sample as the first stage and the actual questionnaire sample as the second stage) allows for the additional step of poststratifying the weights of selected people to estimated controls from the large first-stage sample of people in screened dwelling units (DUs). 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 of the screening interview reduces coverage bias resulting from the DU sampling. This step also produces controls for use in poststratification at the selected-person level, respondent person-pair level, and respondent-household level in the main interview. This step takes advantage of the survey's inherent two-stage interview design.
- The built-in control on extreme weights in the GEM can be supplemented by a separate step of extreme value adjustment after the final poststratification whenever the extreme weight percentage in the poststratified weights is considered to be too large. This can be accomplished using the GEM so that the sample demographic distribution is preserved. This method is an improvement over the methods used for the 1999 NHSDA and earlier survey years. For the 2020 NSDUH person-level weighting, the extreme value adjustment steps at the DU and person levels were not required.

[1] RTI International is a trade name of Research Triangle Institute. RTI and the RTI logo are U.S. registered trademarks of Research Triangle Institute.

[2] The screening interview involves listing all eligible household members, along with their basic demographic information. Immediately after completion of the screening, 0, 1, or 2 people in the household are selected to complete the actual questionnaire interview. The first stage of data collection is screening, and the second stage is interviewing.

Several chapters in this report describe the implementation and evaluation of the GEM, and the appendices contain mainly tables that summarize the results of quality control and model assessment.

1. Introduction

The 2020 National Survey on Drug Use and Health (NSDUH) respondent universe was the civilian, noninstitutionalized population aged 12 years or older residing within the 50 states and the District of Columbia. Person-level analysis weights are assigned to NSDUH respondents to allow them to represent other individuals in the United States who were not part of the survey. Developing 2020 NSDUH person-level analysis weights involved two steps. The first step was to calculate design weights reflecting the 2020 NSDUH sample design, and the second step was to adjust design weights for nonresponse, coverage, and extreme values.

The goal of this report is to document the development of person-level analysis weights for the 2020 NSDUH, including design weight calculation, the methodology and process used to adjust design weights, and quality control measures and evaluation of final person-level weights.

The report is organized into 10 chapters and includes a list of references. The remainder of Chapter 1 provides an overview of the sample design for the 2020 NSDUH, the NSDUH person-level weighting process, the weight adjustment methodology, and the impact of the coronavirus disease 2019 (COVID-19) pandemic on data collection. The impact of data collection issues in 2020 on the weighting process is discussed in Chapter 2. Chapter 3 briefly describes the generalized exponential model (GEM). In Chapter 4, potential predictor variables used in nonresponse, poststratification, and extreme weight adjustments are discussed, and the strategy for dealing with many predictors via modeling groups of states is reviewed. In Chapter 5, extreme weights are discussed. Chapter 6 describes control totals for poststratification and how new control totals for educational attainment were calculated. Chapters 7 and 8 present details about weight calibration at the dwelling unit (DU) and person levels, including all weight components, covariates used, and weight distribution before and after each weight adjustment. Chapter 9 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 with those of the baseline models (which consist of only main effects). Finally, Chapter 10 discusses break-off analysis weights, which were new for the 2020 NSDUH.

Eight appendices also are included. Appendix A presents technical details about the GEM, Appendix B contains information on the methodology for imputing screener demographic variables, and Appendix C discusses the practical aspects of implementing the GEM for NSDUH. The remaining five appendices contain various tables on quality measures such as weighted response rates, percentages of extreme weights, slippage rates, and weight summary statistics.

1.1 Sample Design

A coordinated sample design was developed for the 2014 through 2017 NSDUHs. A large reserve sample of area clusters or segments was selected when the 2014 through 2017 NSDUH sample was selected. This reserve sample is being used to field the 2018 through 2022 NSDUHs. Thus, the 2018 through 2022 NSDUH designs simply continued the coordinated

design. The coordinated sample design was state based, with an independent, multistage area probability sample within each state and the District of Columbia.

The 2014-2022 NSDUHs had a stratified five-stage design. The state can be viewed as the first level of stratification and as a reporting variable. All states and the District of Columbia were partitioned into roughly equal-sized state sampling regions (SSRs) according to a composite size measure (i.e., population weighted by state and age group sampling rates). SSRs were formed by combining census tracts within each state such that each SSR within a state yielded, in expectation, roughly the same number of interviews during each state data collection period. This partitioning divided the United States into 750 SSRs.

The first stage of selection involved selecting census tracts. Per SSR, 48 census tracts were sequentially selected with probabilities proportionate to a composite size measure and with minimum replacement (Chromy, 1979).

The second stage of selection involved selecting one census block group from each sampled census tract. 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). One census block group was selected per sampled census tract with probability proportionate to a composite size measure and with minimum replacement.

In the third stage of selection, one smaller geographic region was selected within each sampled census block group. Each selected census block group was partitioned into compact clusters of DUs by aggregating adjacent census blocks. Those compact clusters were referred to as "segments" and contained a minimum of 150-250 DUs in urban areas and 100-200 DUs in rural areas according to state. One segment was selected within each sampled census block group using Chromy's method of sequential random sampling (Chromy, 1979). The 48 selected segments then were randomly assigned to a survey year and quarter of data collection. An equal probability subsample of eight segments was used for each NSDUH year. These eight segments were randomly assigned to quarters and to two panels within each quarter. For 2020, the first panel segments (panel G) were used for the 2019 and 2020 surveys, constituting the overlap sample. The second panel segments (panel H) were used for the 2020 survey and are being used again for the 2021 survey.

The fourth stage of selection involved selecting the minimum number of DUs needed in each segment to meet the target sample sizes for all age groups. After sample segments for the 2020 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 starting point and interval-based (systematic) selection from the listed frames, sample DUs were selected from the sample segments.

The fifth stage of selection involved selecting 0, 1, or 2 people from a sampled DU. After DU selections were made, an interviewer visited each selected DU to obtain a roster of all people aged 12 or older residing in the DU. Using the roster information, 0, 1, or 2 people were selected from the DU for the survey at the fifth stage of selection. 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.

The target national sample size for the 2020 NSDUH was 67,507 people, but as a result of the COVID-19 pandemic, the achieved sample for the 2020 NSDUH was 36,284 people, with 17,082 interviews completed in person and 19,202 interviews completed via web. The completed interviews corresponded to 28,889 responding DUs out of 87,827[3] DUs screened.

For more details on the 2020 NSDUH sample design, please see the report on the 2020 NSDUH sample design (Center for Behavioral Health Statistics and Quality [CBHSQ], 2021b). The person pair weighting process is described in the report on the 2020 NSDUH questionnaire dwelling unit-level and person pair-level sampling weight calibration (CBHSQ, 2022b).

1.2 Person-Level Weighting Process

In prior NSDUH years, one set of person-level analysis weights was developed. The final person-level analysis weights were the product of 16 weight components, as shown in Exhibit 1.1.

Among the 16 weight components, 9 reflected the study's stratified, five-stage sample design. The design weights were the product of the five stage-wise sampling weights (Weight Components #1-3, 6, and 12), each equal to the inverse of the selection probability for that stage. Under the third stage of selecting segments, there were two adjustments. One adjusted for the number of quarterly samples being examined (Weight Component #4), and the other was to account for selecting subsegments when necessary (Weight Component #5). Under the fourth stage of selecting DUs, there were two adjustments. One was to subsample missed DUs (Weight Component #7), and the other was to account for the percentage of DU sample release in each quarter (Weight Component # 8).

A total of seven components adjusted design weights for nonresponse, coverage, and extreme weights at the screening and interview phases. They were DU-level nonresponse adjustment (Weight Component #9), DU-level poststratification adjustment (Weight Component #10), DU-level extreme weight adjustment (Weight Component #11), selected person poststratification adjustment to screener data (Weight Component #13), person-level nonresponse adjustment (Weight Component #14), person-level poststratification adjustment (Weight Component #15), and person-level extreme weight adjustment (Weight Component #16). The DU extreme weight adjustment (Weight Component #11) at the screening phase and the person-level extreme weight adjustment (Weight Component #16) at the interview phase were not implemented for the 2020 NSDUH because extreme weight proportions were low after DU- and person-level poststratification adjustments. Both extreme weight adjustment factors were given a value of 1. Therefore, a total of five adjustment steps have been implemented in developing the NSDUH person-level analysis weights.

[3] The number of DUs that completed the screening was 90,937 (see Table 7.1), 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 was 87,827.

Exhibit 1.1 Summary of NSDUH Sample Weight Components

Dwelling Unit Level

	2014-2020 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	Added/Subsampled Dwelling Unit Adjustment	#6
#8	Dwelling Unit Release Adjustment	#7

	2014-2020 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

Person Level

	2014-2020 Design Weight Component	Corresponding 2005-2013 Design Weight Component
#12	Inverse Probability of Selecting a Person within a Dwelling Unit	#11

	2014-2020 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 Chapter 5). For computational feasibility, all weight adjustments were done using the nine model groups based on U.S. census divisions defined in Exhibit 7.1.

1.3 Methodology for Weight Adjustment

The GEM (Folsom & Singh, 2000), a modification of the earlier methodology of scaled constrained exponential modeling (Folsom & Witt, 1994), was used for all weight adjustments for NSDUH person-level weighting. The GEM has several features:

- Like constrained exponential modeling, the GEM can use a large number of predictor variables, such as those obtained from the screener sample for the 50 states plus the District of Columbia, and some of their interactions.
- The GEM has a built-in extreme weight control algorithm that applies tighter bounds to the predetermined extreme weights in the nonresponse and poststratification adjustments (CBHSQ, 2021c). This method is unlike the traditional method of winsorization in which extreme weights are truncated at prespecified levels and the trimmed portions of weights are distributed to the nontruncated cases. 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, the 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.
- The 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.
- The GEM can be implemented efficiently using software developed at RTI or using PROC WTADJUST in SUDAAN® (RTI International, 2013).
- The GEM is a generalization of the commonly used raking-ratio method (Oh & Scheuren, 1983) 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) weights sum to control totals. 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 the GEM requires built-in iterations (such as Newton-Raphson).

Chapter 3 further discusses the GEM methodology.

1.4 Impact of the COVID-19 Pandemic on the 2020 NSDUH Sample Design and Data Collection

Before the 2020 NSDUH, quarterly samples were released, and in-person data collection was conducted in each quarter. However, for the 2020 NSDUH, the Substance Abuse and Mental Health Services Administration (SAMHSA) suspended in-person data collection on March 16, 2020, because of COVID-19. A small-scale data collection effort was conducted in July 2020 to test protocols to reduce the risk of COVID-19 infection through in-person data collection. Because of ongoing COVID-19 infection rates in the United States, it was nearly impossible to perform conventional in-person data collection, which could reduce the respondent sample size

to an unacceptable level. Therefore, SAMHSA approved multimode data collection (in person and web based) for the 2020 NSDUH beginning in Quarter 4 (i.e., October to December 2020). In-person data collection resumed on October 1, 2020 (in locations where COVID-19 infection metrics were sufficiently low), and web-based data collection began on October 30, 2020. All sample DUs originally selected from the Quarters 2, 3, and 4 area segments for in-person data collection were released for web-based or in-person data collection in Quarter 4. Also, additional DUs were selected in some Quarter 2 and 3 segments and released to web-based data collection in Quarter 4 to partially compensate for the negative impact of the COVID-19 pandemic on data collection and response rates.

Because of the data collection interruption in 2020, and because the web-based data collection mode was introduced in Quarter 4, 2020 NSDUH person-level weighting was affected. Chapter 2 discusses the impact of these changes in Quarter 4 on the 2020 NSDUH person-level weighting.

2. Impact of Data Collection Interruption on the 2020 NSDUH Person-Level Weighting

The general methodology and procedures described in Sections 1.2 and 1.3 were applied to develop the person-level weights for the 2020 National Survey on Drug Use and Health (NSDUH). In addition to those general procedures, the person-level weighting process for the 2020 NSDUH included modifications to account for the disruption in data collection due to the coronavirus disease 2019 (COVID-19) pandemic and subsequent introduction of multimode data collection (in person and web based) in Quarter 4. Five modifications were made to the person-level weighting for the 2020 NSDUH:

1. Added an implicit unknown eligibility adjustment when dwelling units (DUs) selected for web-based data collection did not respond at the screening stage and their eligibility status was unknown.
2. Developed separate analysis weights for Quarters 1 and 4.
3. Added screening mode and interview mode to the nonresponse adjustments.
4. Added educational attainment to the person-level poststratification adjustment models to correct the imbalance of education level distributions in the sample.
5. Developed break-off analysis weights for adult respondents (with otherwise unusable interviews[4]) who did not complete the full interview.

These five modifications are discussed in Sections 2.1 through 2.5.

2.1 Implicit Unknown Eligibility Adjustment

When data are collected in person, field interviewers can identify ineligible sample dwelling units (SDUs) (e.g., vacancies) to allow the ineligible DUs to be excluded from the sample before weighting. For web-based data collection, however, DU members need to initiate the screening process. Consequently, web-based data collection yielded more DUs with unknown eligibility because an adult member did not contact RTI to begin the screening process. If eligibility was unknown for a DU, its eligibility status was imputed according to the historic DU eligibility rate in the state where the DU was located. DUs that were imputed to be ineligible were excluded from the weighting process before DU nonresponse adjustment. Section 7.2 contains a more detailed discussion of the implicit unknown eligibility adjustment.

2.2 Quarterly Analysis Weights

Separate analysis weights were developed for Quarter 1 (January to March) and for Quarter 4 (October to December) of 2020 for the following reasons:

1. New questionnaire items were added in Quarter 4; hence, Quarter 4 analysis weights were needed to analyze those new outcome variables.

[4] Details about the criteria for defining a NSDUH interview as usable are provided in Section 2.3.1 of Center for Behavioral Health Statistics and Quality (2021a).

2. Quarter 1 data collection was all in person, and Quarter 4 data collection was mainly web based, so separate analyses for Quarters 1 and 4 were necessary for analyzing data collected using different modes.
3. Nonresponse patterns differed between Quarters 1 and 4 because different data collection modes were employed. Separate nonresponse adjustments at the screening and interview phases could better address the nonresponse bias.

Quarterly analysis weights for 2020 were developed using a procedure similar to that used for developing person-level analysis weights in prior NSDUHs. Separate weights were produced by quarter, and state three-factor effects were not included so that models could converge with smaller sample sizes. Quarterly analysis weights were the product of the 16 weight components shown in Exhibit 1.1. Chapters 7 and 8 discuss how the quarterly analysis weights were developed. The annual analysis weights were calculated by combining data from Quarters 1 and 4 and dividing the nonzero Quarter 1 and 4 analysis weights by a factor of 2.

2.3 Addition of Data Collection Mode to the Nonresponse Adjustments

In-person data collection was conducted for Quarter 1 of the 2020 NSDUH as in previous years. In-person data collection was suspended in March 2020 because of the COVID-19 pandemic; thus, no data were collected in Quarter 2, and extremely limited in-person data collection was carried out in some counties in July 2020.[5] Multimode data collection was used in Quarter 4 when all SDUs originally selected from Quarter 2, 3, and 4 area segments for in-person data collection were released for web data collection or for in-person data collection (if feasible).

Response propensity is correlated with data collection mode; that is, web data collection tends to have lower response rates than in-person data collection (see Table 9.1). To correct the potential bias caused by mode differences, screener mode was added as a predictor variable in the Quarter 4 DU-level nonresponse adjustment model, and interview mode was added to the Quarter 4 person-level nonresponse adjustment model.

2.4 Addition of Educational Attainment to the Person-Level Poststratification Adjustment

Educational attainment has four categorical levels: less than high school, high school graduate, some college or associate's degree, and college graduate. In Table 2.1, Quarter 4 data (mainly web based) show a higher (unweighted) percentage of college graduates and a lower percentage of adults with a high school education or less compared with distributions from prior NSDUH years and data from Quarter 1 of 2020.

Table 2.2 shows the weighted distributions from prior NSDUH years and American Community Surveys (ACS). The educational attainment distributions for the 2016-2019 NSDUHs and the corresponding ACS distributions were similar and tended to be consistent over time, although educational attainment was not controlled in the poststratification adjustment models. The educational attainment distributions for in-person data collection from Quarter 1 of

[5] Quarter 3 data were combined with Quarter 4 data.

2020 aligned well with the 2019 NSDUH and 2019 ACS distributions. For Quarter 4 of 2020, the weighted educational attainment distributions were similar to the unweighted distributions, with a higher percentage of college graduates and a lower percentage of those with a high school education or less compared with previous NSDUH years.

Table 2.1 Unweighted Educational Attainment Distributions: Among Adults Aged 18 or Older; Percentages, 2016-2020

Educational Attainment	2016	2017	2018	2019	Quarter 1, 2020	Quarter 4, 2020
Less Than High School	12.7	12.2	12.2	11.7	12.4	6.3
High School Graduate	26.1	25.9	26.1	26.2	24.7	18.6
Some College or Associate Degree	34.4	33.8	33.8	33.6	33.4	30.1
College Graduate	26.8	28.1	27.9	28.5	29.5	45.0

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016-2019, and Quarters 1 and 4, 2020.

Table 2.2 NSDUH and ACS Weighted Educational Attainment Distributions: Among Adults Aged 18 or Older; Percentages, 2016-2020

Educational Attainment	2016		2017		2018		2019		2020	
	NSDUH[1]	ACS	NSDUH[1]	ACS	NSDUH[1]	ACS	NSDUH[1]	ACS	Quarter 1 NSDUH[1]	Quarter 4 NSDUH[1]
Less Than High School	13.2	12.6	12.5	12.1	12.4	11.8	12.0	11.5	11.9	8.4
High School Graduate	25.0	27.6	24.2	27.7	24.7	27.5	24.3	27.6	23.4	19.5
Some College or Associate's Degree	31.0	31.0	31.1	30.8	31.0	30.7	30.8	30.3	30.7	28.8
College Graduate	30.8	28.7	32.2	29.4	31.9	30.1	32.9	30.6	34.0	43.3

ACS = American Community Survey.

[1] Weighted distributions for the 2016-2019 NSDUHs are based on final analysis weights. Weighted distributions for Quarters 1 and 4 of 2020 are based on nonresponse-adjusted weights (no poststratification adjustment is included).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2016-2019, and Quarters 1 and 4, 2020; U.S. Census Bureau, American Community Survey, 2016-2019.

To correct the imbalance in educational attainment distribution, the educational attainment variable and its interaction with age, race, Hispanicity, and gender were added to the person-level poststratification adjustment models. The sources of data and methodology to calculate control totals for educational attainment in the poststratification models are discussed in Chapter 6.

2.5 Break-Off Analysis Weights for Adult Respondents

Break-off analysis weights were created to analyze the unimputed outcomes starting from the mental health and subsequent modules of the questionnaire.

In prior NSDUH years that used in-person data collection, a negligible percentage of respondents met usability criteria but broke off from the interview without fully completing it. In the 2019 NSDUH, for example, the unweighted break-off rate was 0.03 percent. Without field interviewers presenting the survey and engaging respondents in completing it, web-based respondents had a greater likelihood of breaking off during the interview compared with in-person respondents. When break-offs happened, all remaining data from that point on were missing.

In Quarter 4 of 2020, 8.6 percent of respondents aged 12 or older (unweighted) met the usability criteria but did not fully complete the interview. The corresponding unweighted percentage in Quarter 1 was only 0.05 percent. Among web-based respondents in Quarter 4 who broke off from the interview, the cumulative percentage who broke off by the end of the adult depression module was 58 percent.

For prior NSDUH years, it may be reasonable to assume that interview break-offs were rare and occurred randomly. Thus, excluding respondents from analyses if they had missing values caused by interview break-offs or applying zero imputation (i.e., treating missing values as equivalent to negative outcomes) were acceptable solutions. However, interview break-offs in 2020 during the mental health and adult depression modules for adults aged 18 or older might not be random occurrences. Web-based respondents with mental health conditions could have chosen to discontinue the survey rather than answer questions about their mental health. Excluding respondents with missing values or applying zero imputation can create substantial risk of bias when combined with a high break-off rate.

To overcome the bias issue caused by missing values from interview break-offs, an additional set of analysis weights was created to analyze unimputed outcome variables beginning with the mental health module for adults. Adults who did not complete the mental health or adult depression modules were treated as nonrespondents for this weight adjustment. The new analysis weights (referred to as the break-off weights) for the remaining adult respondents were adjusted to sum to the same totals as the main analysis weight for all adult respondents. This adjustment was performed separately for Quarters 1 and 4. This break-off adjustment was not performed for adolescents aged 12 to 17 because only a few adolescents broke off the interview.

Chapter 10 discusses in greater detail how the break-off analysis weights were developed.

3. Brief Description of the 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 adjustment is done to reduce the bias that is introduced when estimates are based on only responding dwelling 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 values, the resulting estimates will tend to have lower precision.

There are limitations in the existing methods of weight adjustment for nonresponse, poststratification, and extreme weights. 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 dwelling 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 dwelling unit k, such that the final adjusted weight, 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.

The generalized exponential model (GEM) proposed by Folsom and Singh (2000), a modification of the earlier scaled constrained exponential model of Folsom and Witt (1994), has been used for NSDUH person-level weight calibration since 1999 (Chen et al., 2000). It provides a unified approach to the three weight adjustments for nonresponse, poststratification, and extreme weight values, 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 (in general, unweighted extreme weight percentage is less than 3 percent, weighting extreme weight percentage is less than 15 percent, and outwinsor is less than 5 percent) after the final poststratification, a separate extreme weight adjustment step may not be necessary.

Note that because the nonresponse adjustment factor is defined as the inverse of response propensity, the GEM requires it to be greater than 1. However, the built-in extreme weight control feature of the GEM essentially defines adjustment factors with regard to the critical value under winsorization. Therefore, although the adjustment factor with regard to the cut-off point is always greater than 1, with regard to the original weight, it can be less than 1. (See the example in Section 5.2 for details.)

In fitting the 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. Details about the GEM process and some practical guidelines about fitting models for weight adjustment can be found in Appendix C.

A large increase in the number of predictor variables in the 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 that was reached during the weighting process, a more precise measure of estimated loss (or gain) in precision can be obtained for variance of selected study variables. The results are presented in Chapter 9.

4. Predictor Variables in Person-Level Weight Calibration via the Generalized Exponential Model

For the 2020 National Survey on Drug Use and Health (NSDUH), the initial set of predictor variables was identical to the set used for the 2019 NSDUH, except for the addition of two extra variables (mode and educational attainment). Exhibit 4.1 shows the definitions and levels of the predictor variables used in the 2020 NSDUH weight calibration. 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 owner-occupied dwellings. 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. For a separate extreme weight adjustment after poststratification, the same predictors as those used in the poststratification adjustment can be used. In all cases, the model consisted of main effects and some interactions of these predictors.

Variables used in the generalized exponential model (GEM) had been the same since 1999. In 2020, two additional sets of variables were added to the weight calibration, and state three-factor effects were not used. Here are the details:

1. Screening mode (web vs. in person) was added to the Quarter 4 DU-level nonresponse adjustment, and interview mode was added to the Quarter 4 person-level nonresponse adjustment. See Section 2.3 for details.
2. The educational attainment variable and its interactions with age, race, Hispanicity, and gender were added to the Quarter 1 and 4 person-level poststratification adjustments. See Section 2.4 for details.
3. The GEM usually consisted of main effects such as state, race, and so on; nonstate two-factor effects such as age × race; state two-way effects such as state × age; nonstate three-factor effects such as age × race × gender; and state three-way effects such as state × race × gender. For the 2020 NSDUH, analysis weights were developed separately for Quarters 1 and 4. The domain sizes for the state three-factor effects were small because of the smaller quarterly sample size, which could cause convergence problems for the GEM. Thus, the state three-factor effects were not used as predictors for 2020 weight calibration.

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 due to the random controls used in the nonresponse adjustment. In general, this is not possible because demographic information (often used for poststratification) is not available for nonrespondents. However, with a two-stage interview 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 before this nonresponse adjustment. Many times, the need to edit, impute, or 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 4.1 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 Black or African American in Segments
1: 50-100%, 2: 10-<50%, 3: 0-<10%[1]

Percentage of Hispanics or Latinos in Segments
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

Educational Attainment
1: Less Than High School, 2: High School Graduate, 3: Some College or Associate's Degree, 4: College Graduate

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]

Screening Mode
1: Web,[1] 2: Field

Interview Mode
1: Web,[1] 2: Field

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 percentage 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, Quarters 1 and 4, 2020.

As in previous survey years,[6] the 2020 NSDUH sample weighting posed challenges because of the sheer magnitude of the number of state-specific predictors used for nonresponse and poststratification adjustments. With the 51-state survey, using a single national 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 several 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 single national model.

For the 2020 NSDUH, the strategy proposed by Singh and colleagues (1999) for setting the controls for nonresponse and poststratification adjustment models was followed. Also using Singh and colleagues (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, 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.

As an objective check for the suitability of the number of factors, once a satisfactory convergent model was obtained (see Section 9.3.5 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.

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

5. Extreme Weights in the Generalized Exponential Model

5.1 Extreme Weight Definition

An important aspect of the generalized exponential model (GEM) is the built-in provision of extreme weight adjustment. Extreme weights (high or low) need to be defined in order for the GEM to apply tight bounds to preidentified extreme weights in weight calibration. Sampling weights for the National Survey on Drug Use and Health (NSDUH) generally were classified as extreme if they fell outside the commonly used interval defined by the median $\pm$ [3 × interquartile range (IQR)] for some prespecified domains; these domains were usually defined by design strata, taking into account deep stratification. Weights within the same domain tend to be similar, and extreme weights can easily be identified from the weight distributions within a domain.

At the dwelling unit level, state sampling region (SSR) was used to define extreme weights for the 2020 NSDUH.

At the person level, a hierarchy of four domains was used to define extreme weights: state, SSR, state × age group, and SSR × age group.

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.

Three percentages are calculated to measure the extreme weights:

1. Unweighted percentage of the extreme weight is defined as the number of respondents with extreme weight divided by the total number of respondents.
2. Weighted percentage of the extreme weight is defined as the sum of weights of the respondents with extreme weight divided by the total weight of all respondents with extreme weights or nonextreme weights.
3. Outwinsor is the sum of the absolute differences of initial weights and the cut-off value, divided by the sum of the initial weights.

Among the three percentages, outwinsor is the most important measure because it tells how much weights could be affected if extreme weights are trimmed to the cut-off value.

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 the GEM were defined as the median ± 2.5 × IQR, which was conservative when compared with the commonly used standard of the median ± 3 × IQR. Weights near but below the cut-off value (which have the most potential to become extreme) were treated as extreme by the GEM.

5.2 Definition of Lower and Upper Bounds for Weight Adjustment Factors

For implementing extreme weight control via the GEM, a ratio m_k is defined for each individual dwelling unit. This ratio is defined as $b_{k(u)} / w_k$ for high extreme weights, and $b_{k(l)} / w_k$ 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. (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.)

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 GEM. The 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.

The 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 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. Appendix C gives guidelines for the choice of lower, center, and upper parameters.

5.3 An Example of How the Built-in Extreme Weight Control in the Generalized Exponential Model Works

The following example shows how the built-in extreme weight works. Table 5.1 shows the weights for 30 respondents from the dwelling unit-level nonresponse adjustment step. The variable "outlier" is the extreme weight indicator: level 0 is for nonextreme weight, 1 for high extreme weight, and 2 for low extreme weight. PRE_WT is the weight before person-level nonresponse adjustment, which is the product of Weight Components #1 to #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 specified in the GEM. The variable 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 respondent-specific lower bound, which is the product of nominal lower bound L and m_k. U_k is the respondent-

specific upper bound, which is the product of nominal upper bound U and m_k. Alpha is the final nonresponse adjustment calculated from the GEM. POST_WT is the weight after nonresponse adjustment, which is the product of PRE_WT and nonresponse adjustment factor alpha.

Although the 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 bound for the 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, upper bounds for nonresponse adjustment are set to be less than 5 for nonextreme weights and low extreme weights and less than 3 for high extreme weights. The actual adjustment factor could be greater than 5 because of m_k. For example, Case 30 has a low extreme weight of 693.58. The nominal higher bound for the 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.

Tighter upper bounds were applied for the high extreme weights, and tighter lower bounds were applied for the low extreme weights. This was done 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 5.1 Examples of Respondents with Pre- and Post-Weights, Critical Values, Bounds, and Adjustment Factors

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	1,444.48	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	1,412.52
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	1,049.59	1.0000	1.00	5.00	1.0000	5.0000	1.1243	871.11
8	0	1,066.54	684.26	1,489.76	1.0000	1.00	5.00	1.0000	5.0000	1.2771	1,362.07
9	0	742.36	483.18	1,049.59	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	1,224.67
12	1	928.17	675.04	879.18	0.9289	1.24	2.70	1.1518	2.5080	1.2582	1,167.84
13	1	928.17	675.04	879.18	0.9289	1.24	2.70	1.1518	2.5080	1.2582	1,167.84
14	1	1,343.00	793.12	1,384.10	0.9939	1.24	2.70	1.2325	2.6836	1.3685	1,837.86
15	1	863.38	542.91	805.55	0.9077	1.24	2.70	1.1255	2.4507	1.1939	1,030.80
16	1	898.12	675.04	879.18	0.9600	1.24	2.70	1.1904	2.5919	1.2644	1,135.56
17	1	898.12	675.04	879.18	0.9600	1.24	2.70	1.1904	2.5919	1.2644	1,135.56
18	1	2,134.50	683.84	924.15	0.4236	1.24	2.70	0.5252	1.1437	0.9048	1,931.33
19	1	941.42	683.84	924.15	0.9604	1.24	2.70	1.1909	2.5930	1.3009	1,224.67
20	1	2,134.50	683.84	924.15	0.4236	1.24	2.70	0.5252	1.1437	0.9048	1,931.33
21	2	678.72	713.37	829.53	1.0653	1.00	5.00	1.0653	5.3265	1.4830	1,006.53
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	3,569.54

Note: Data are from the dwelling unit-level nonresponse adjustment step in model group 3 of 2016 NSDUH weighting.

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6. Control Totals for Poststratification Adjustments

For poststratification adjustments (dwelling unit poststratification and person-level 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 6.1). The Population Estimates Program of the U.S. Census Bureau produced, in response to a special request, the necessary domain estimates for the first day of each month in the prior calendar year. These domain estimates were 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, and adjustments from the Count Question Resolution program and any geography updates. However, the controls do not include any adjustments for under- or overcounting 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 decennial 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 Quarter 1 of 2020, the U.S. census estimates for February 1 and March 1, 2020, were averaged, resulting in a population estimate appropriate for February 15, 2020 (i.e., the midpoint of Quarter 1, 2020).

To calculate yearly (combining four quarters) population estimates, the quarterly estimates are averaged.

Exhibit 6.1 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
State
50 States and the District of Columbia

* In dwelling unit poststratification adjustment, age groups 50-64 and 65+ were collapsed to 50+.

In addition to the geographic and demographic variables listed earlier, educational attainment was added to the person-level poststratification models for the 2020 NSDUH. The control totals for educational attainment were calculated using the population estimates received from the U.S. Census Bureau and the educational distributions from the 2019 American Community Survey (ACS).

Because weight adjustments in the NSDUH person-level weighting were done in nine model groups corresponding to nine census divisions, educational attainment distributions for each census division were downloaded separately from the 2019 ACS for six geographic and demographic domains listed in Table 6.1. Some tabulations were based on the ACS restricted-

use file (ACS-RUF), such as census division, state by educational attainment, and gender by educational attainment. The age groups in the tabulations based on the ACS-RUF did not match the NSDUH age groups. Tabulations for race and Hispanicity from the ACS-RUF did not have all four educational attainment categories. The 2019 ACS offered tabulations based on the public use file that can be used to obtain educational attainment distributions for the desired NSDUH domains for age group, race, and Hispanicity. Table 6.1 lists domains and ACS data sources of educational attainment that were used in the 2020 NSDUH weighting.

Table 6.1 Educational Attainment, by Domain at the Census Division Level

Domain	Description	Data Source
Educational attainment	Four educational attainment categories Less than high school High school graduate Some college or associate's degree College graduate	ACS-RUF
State × educational attainment	Varies among census divisions	ACS-RUF
Age × educational attainment	Four age groups 18-25 26-34 35-49 50+	ACS-PUF
Race × educational attainment	Three race categories White Black or African American Other	ACS-PUF
Gender × educational attainment	Male Female	ACS-RUF
Hispanicity × educational attainment	Hispanic Non-Hispanic	ACS-PUF

ACS-PUF = American Community Survey public use file; ACS-RUF = American Community Survey restricted-use file.

Source: U.S. Census Bureau, American Community Survey, 2019.

ACS and NSDUH covered slightly different populations. For example, ACS covered more group quarters than NSDUH did. Therefore, population estimates from ACS data cannot be directly used in the poststratification adjustment; they need to be aligned to the population estimates received from the U.S. Census Bureau. The estimated population totals for educational attainment were calculated by multiplying the 2019 ACS educational attainment proportions by the 2020 civilian, noninstitutionalized population estimates in each domain. This method assumed that educational attainment distributions stay the same regardless of small differences in target populations. This assumption should hold well because the population coverage difference is expected to be very small. Table 6.2 provides an example to demonstrate how population estimates for educational attainment were calculated in Connecticut.

Table 6.2 An Example of Calculating Population Estimates for Educational Attainment in Connecticut, 2020 NSDUH

State	Educational Attainment	Civilian, Noninstitutionalized Population Estimate for Adults Aged 18 or Older (from the U.S. Census Bureau)	2019 ACS Proportion (from ACS-RUF)	Population Estimate Used in Poststratification Adjustment
Connecticut	Less than high school	2,794,746	9.41%	262,986 = (9.41% × 2,794,746)
	High school graduate		27.15%	758,774
	Some college or associate's degree		26.41%	738,092
	College graduate		37.03%	1,034,894

ACS = American Community Survey; ACS-RUF = American Community Survey restricted-use file.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020; U.S. Census Bureau, American Community Survey, 2019.

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7. Design Weights and Weight Calibration at the Dwelling Unit Level

The 2020 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 dwelling unit (DU) on the frame is given a known, nonzero probability of inclusion in the survey. This is required for (nearly[7]) unbiased estimation of the population totals. The assumption of nonzero inclusion probability for every pair of DUs in the frame also is required for unbiased variance estimation. The sampling plan involved five stages of selection at the DU and person levels (see Exhibit 1.1). The five stages of selection were as follows: at the DU level, (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, and (4) the selection of DUs within these segments, and at the person level, (5) the selection of eligible individuals within DUs (Table 7.1). Specific details of the sample design and sample selection procedures can be found in the 2020 NSDUH sample design report (Center for Behavioral Health Statistics and Quality [CBHSQ], 2021b).

Table 7.1 Sample Size by Quarter for Each Stage of Sampling

Quarter	Eligible Dwelling Units	Completed Dwelling Units	Eligible Persons	Selected Persons	Completed Persons
1	52,827	35,304	74,740	24,304	15,628
4	483,376	55,633	119,453	38,211	20,656
1 and 4	536,203	90,937	194,193	62,515	36,284

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

The 2020 NSDUH analysis weights were developed separately for Quarters 1 and 4 (see Section 2.2). The final DU- and person-level sampling weights for the 2020 NSDUH sample are products of several factors (see Exhibit 1.1), each representing a probability of selection at some particular stage or some form of nonresponse, poststratification, or extreme weight adjustment. The first 11 factors are defined for all screener-complete DUs and reflect the fully adjusted DU-level weight. They are discussed in this chapter. The latter five components reflect the person-level selection within each screened DU, and any additional adjustments for person-level nonresponse, poststratification, and extreme weight, and they are discussed in Chapter 8. Note that the unconditional, final person-level weights for the 2020 NSDUH Quarter 1 or 4 sample are the product of all 16 weight components, as illustrated in Exhibit 1.1. The annual analysis weights were then calculated by combining Quarter 1 and 4 weights and dividing the nonzero Quarter 1 and 4 analysis weights by a factor of 2 (see Section 8.3).

As in the previous survey years, the 2020 NSDUH consisted of respondents from 50 states and the District of Columbia, and the number of covariates was very high due to the second- and third-order interactions by state. Thus nine model groups corresponding to the nine

[7] Although technically a percentage estimated from a large area sample may be slightly biased, that bias provides an ignorable contribution to the estimate's mean squared error.

census divisions were used. Exhibit 7.1 shows the U.S. Census Bureau divisions and model groups used in the 2020 NSDUH person-level sampling weight calibration.

Exhibit 7.1 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

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

The first eight components in the 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 within each census tract.
3. The probability of selecting the segment within each census block group.
4. *Quarter segment weight 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).
5. *Subsegmentation inflation adjustment*: When the field staff traveled to a specified segment, occasionally they may have found the number of potential DUs to be much greater than what the sample frame indicated. 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 accounts for this subsegment selection process.

6. The probability of selecting a DU from within each counted and listed sampled segment. Weight Component #6 is equal to the inverse of the DU sample size divided by the total number of DUs counted and listed within a selected segment.
7. *Added DU adjustment*: The list of DUs was constructed by the counting and listing staff, but factors such as new construction, demolition, and inaccurate listing were present in some cases. Weight Component #7 accounts for any subsampling that occurred because of added DUs.
8. *DU percentage release adjustment*: To account for corrections, modifications, or both that occurred during the design optimization process, an additional sample was included throughout all four quarters. Weight Component #8 is the adjustment for the percentage of the DU sample released to field interviewers (FIs) in these quarters.

For more detailed information on Weight Components #1 through #8, refer to the 2020 NSDUH sample design report (CBHSQ, 2021b).

7.2 Implicit Unknown Eligibility Adjustment

When data are collected in person, FIs can identify ineligible DUs (e.g., vacancies) to allow the ineligible DUs to be removed from the sample before weighting. For web-based data collection, however, DU members needed to initiate the screening process for eligibility to be confirmed. Consequently, web-based data collection yielded more DUs with unknown eligibility because an adult DU member did not begin the screening process. For the 2020 NSDUH, eligibility status was unknown for DUs that did not initiate the web-based screening interview and that were not visited by an FI. If a DU's eligibility was unknown for web-based data collection, its eligibility status was randomly imputed according to the historic DU eligibility rate in the state where the DU was located. DUs that were imputed to be ineligible were excluded from the weighting process before the screening DU nonresponse adjustment. The historical state-level DU eligibility rates were obtained from the combined data from Quarters 2 through 4 of 2019 and Quarter 1 of 2020. The random imputation process was as follows:

1. Assigned a random number between 0 and 1 for each DU with unknown eligibility.
2. Merged the state-level DU eligibility rates with the data from step 1 above.
3. Assigned a DU to be ineligible if the random number is greater than the state-specific eligibility rate.

Table 7.2 shows that the imputed DU eligibility rates were similar to the historical DU eligibility rates. The overall rates were 80.88 percent (imputed) and 80.84 percent (historical).

Other options for predicting eligibility, including fitting logistic models, were considered. However, the current imputation method was considered to be the best option given the quality of historical state-level DU eligibility rates and the lack of DU-level data for screening nonrespondents. Further, applying an estimated eligibility rate to cases with unknown eligibility based on the best available information is consistent with American Association for Public Opinion Research (AAPOR) standards Response Rate 3 (AAPOR, 2016).

Table 7.2 NSDUH Web-Based Unknown DU Eligibility Imputation Summary, Quarter 4, 2020

State	Unknown Eligibility DU Count	Imputed Eligible DU Count	Imputed DU Eligibility Rate	Historical DU Eligibility Rate
Overall	502,685	406,568	80.88%	80.84%
Alabama	8,503	6,484	76.26%	76.52%
Alaska	7,693	5,807	75.48%	75.19%
Arizona	8,269	6,360	76.91%	76.87%
Arkansas	7,201	5,278	73.30%	74.30%
California	27,410	24,189	88.25%	88.28%
Colorado	7,195	5,559	77.26%	77.19%
Connecticut	7,509	6,463	86.07%	86.52%
Delaware	7,737	5,998	77.52%	77.16%
District of Columbia	9,329	7,788	83.48%	83.36%
Florida	25,530	19,155	75.03%	75.10%
Georgia	11,019	8,918	80.93%	80.90%
Hawaii	6,985	5,764	82.52%	81.73%
Idaho	6,932	5,507	79.44%	79.52%
Illinois	18,696	15,873	84.90%	84.38%
Indiana	8,063	6,510	80.74%	80.26%
Iowa	6,946	5,697	82.02%	82.26%
Kansas	6,309	4,946	78.40%	78.49%
Kentucky	8,760	6,996	79.86%	79.26%
Louisiana	7,519	5,809	77.26%	76.66%
Maine	5,341	3,869	72.44%	72.53%
Maryland	8,468	7,275	85.91%	85.70%
Massachusetts	8,090	7,000	86.53%	86.92%
Michigan	20,024	16,434	82.07%	82.07%
Minnesota	7,110	5,991	84.26%	84.04%
Mississippi	7,792	6,089	78.14%	78.02%
Missouri	7,650	6,055	79.15%	80.08%
Montana	6,504	5,074	78.01%	78.40%
Nebraska	8,116	6,633	81.73%	81.75%
Nevada	8,825	7,722	87.50%	87.62%
New Hampshire	6,032	4,792	79.44%	79.01%
New Jersey	10,082	8,686	86.15%	85.94%
New Mexico	7,844	6,046	77.08%	77.50%
New York	17,497	14,675	83.87%	83.95%
North Carolina	12,345	9,827	79.60%	79.08%
North Dakota	6,981	5,352	76.67%	77.35%
Ohio	18,622	15,463	83.04%	82.92%
Oklahoma	8,156	6,560	80.43%	80.57%
Oregon	6,687	5,704	85.30%	85.69%

Table 7.2 NSDUH Web-Based Unknown DU Eligibility Imputation Summary, Quarter 4, 2020 (continued)

State	Unknown Eligibility DU Count	Imputed Eligible DU Count	Imputed DU Eligibility Rate	Historical DU Eligibility Rate
Pennsylvania	16,793	14,229	84.73%	84.64%
Rhode Island	8,173	6,270	76.72%	76.99%
South Carolina	8,492	6,427	75.68%	76.45%
South Dakota	6,335	4,807	75.88%	75.78%
Tennessee	7,909	6,407	81.01%	80.48%
Texas	24,860	20,091	80.82%	80.52%
Utah	6,739	5,583	82.85%	82.54%
Vermont	4,203	3,176	75.57%	74.82%
Virginia	11,525	9,233	80.11%	79.39%
Washington	6,359	5,263	82.76%	83.37%
West Virginia	7,876	6,062	76.97%	77.32%
Wisconsin	7,181	5,575	77.64%	77.69%
Wyoming	6,469	5,097	78.79%	78.70%

Note: The historical state-level DU eligibility rates were based on NSDUH data from Quarters 2 and 4, 2019, and Quarter 1, 2020.

7.3 Dwelling Unit Adjustment Factors

7.3.1 Weight Component #9: Dwelling Unit-Level Nonresponse Adjustment

After DUs were selected, they were sent a letter inviting them to participate in the survey. In segments deemed safe for field work, an FI was sent to the DU to screen the residents. In other segments, the DU was invited to participate via web. 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 NSDUHs, 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 generalized exponential modeling.

Exhibit 7.2 provides the initial covariates for the DU-level nonresponse adjustment. Screening mode is new to 2020 and was used for only data from Quarter 4, when in-person and web modes were implemented. The state three-factor effects were used in previous years, but for Quarters 1 and 4 of the 2020 NSDUH, they were not used because of small sample sizes.

Exhibit 7.2 Covariates for the 2020 NSDUH DU-Level Nonresponse Adjustment

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

[1] This effect is new for 2020 and used for only data from Quarter 4, when in-person and web modes were implemented.

Each level of a variable in the generalized exponential model was referred to as a covariate. Note that one level of a variable was treated as a reference level and was not included in the model (see Exhibit 4.1). For example, the group quarter variable had three levels. Non-group quarter was the reference level, so the proposed number of covariates for group quarter status was 2. For two-factor effects such as percent owner-occupied × percent Black or African American, each of the two variables had three levels, but only two levels were included in the model; thus, the proposed number of covariates of the two-factor effects was 4 (2 × 2). Different model groups contained different numbers of states; thus, covariates of states and interactions with states were model specific.

For the one-factor effects at the DU nonresponse step, state and population density were all kept in the model. College dorms and other group quarters often had to be collapsed or dropped for most of the model groups because of zero sample size or convergence problems. Most of the segment-level variables were kept in the model. For nonstate two-factor effects and state two-factor effects, most of the variables had to be collapsed or dropped because of zero sample size or convergence problems.

Table 7.3 presents the distributions for the design-based weight and unequal weighting effects (UWEs)[8] before and after the DU-level nonresponse adjustment. The UWEs increased slightly after the DU-level nonresponse adjustment for both quarters. The adjustment factor was much larger in Quarter 4 (the average adjustment factor was 9.02) than in Quarter 1 (the average

[8] UWEs measure weight variation and are defined as $1 + \left[(n-1)/n\right] * CV^2$, where CV = coefficient of variation of weights.

adjustment factor was 1.50) because the screening rate in Quarter 4, with many self-administered web screeners, was much lower than the FI screening rate in Quarter 1.

Table 7.3 Distribution for Design-Based Weight and Unequal Weighting Effects before and after DU-Level Nonresponse Adjustment, 2020 NSDUH

Quarter	Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
1	Design-Based Weight	126	1,199	2,463	3,101	9,187	2,287	52,827	1.31
	DUNR Adjustment Factor	0.32	1.17	1.36	1.63	5.11	1.50	35,304	N/A
	Weight after DUNR	166	1,870	3,467	4,590	18,136	3,422	35,304	1.40
4	Design-Based Weight	4	87	177	315	3,115	240	483,376	1.93
	DUNR Adjustment Factor	1.02	6.08	7.86	10.79	126.71	9.02	55,633	N/A
	Weight after DUNR	24	614	1,428	2,719	37,503	2,088	55,633	2.22

DUNR = dwelling unit-level nonresponse; N/A = not applicable; UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

7.3.2 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, screener dwelling unit (SDU) weights were adjusted for nonresponse and poststratification before person and pair weights were computed. Later, estimates for household variables (which were based on screener data) were used as control totals for weight adjustments at the person level 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 (e.g., age × gender) were used.

In addition, the screening process required only 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 methodology (see Appendix B). 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® (RTI International, 2013), and the probability of observing Hispanic or Latino

origin was modeled using PROC LOGISTIC in SAS® (SAS Institute Inc., 2017). 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 B). 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 7.3 displays the order in which demographic variables were imputed, along with explanatory variables used in the model or in hot-deck sorting.

Exhibit 7.3 Imputed Demographic Variables and Corresponding Explanatory or Auxiliary Sort Variables

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

Screener demographic variables had relatively low missing rates. For Quarters 1 and 4 of 2020, missing rates were 0.12 percent and 0.41 percent for race, 0.07 percent and 0.08 percent for Hispanicity, and 0.02 percent and 0.05 percent for gender, respectively.

Exhibit 7.4 provides the initial covariates for the DU-level poststratification adjustment. State three-factor effects were used in previous years, but for Quarters 1 and 4 of the 2020 NSDUH, they were not used because of small sample sizes.

Exhibit 7.4 Covariates for the 2020 NSDUH DU-Level Poststratification and Extreme Weight Adjustments

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Mode Specific
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 × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Gender	Model Specific	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

For the DU poststratification step, all main effects of state and demographic variables were kept in the model except that American Indian or Alaska Native had to be collapsed with Asian for Quarter 1 model group 6. All nonstate two-factor effects were kept in the model. For state two-factor effects, American Indian or Alaska Native had to be collapsed with Asian for some states because of convergence problems. For nonstate three-factor effects, variable collapsing or dropping was necessary for the age × race × Hispanicity, age × race × gender, and/or race × Hispanicity × gender interactions in some model groups.

Table 7.4 presents the weight distribution and UWE before and after implementing the DU-level poststratification adjustment. The distributions of the DU-level poststratification adjustment factors were similar, and UWE did not change much after the adjustment for Quarters 1 and 4.

Table 7.4 Weight Distribution before and after DU-Level Poststratification Adjustments

Quarter	Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
1	Weight before DUPS	166	1,870	3,467	4,590	18,136	3,422	35,304	1.40
	DUPS Adjustment Factor	0.14	0.90	1.02	1.15	5.00	1.07	35,296	N/A
	Weight after DUPS	45	1,675	3,381	4,813	48,748	3,628	35,296	1.55
4	Weight before DUPS	24	614	1,428	2,719	37,503	2,088	55,633	2.22
	DUPS Adjustment Factor	0.06	0.90	1.03	1.21	14.00	1.11	55,632	N/A
	Weight after DUPS	15	648	1,487	2,925	33,938	2,230	55,632	2.21

DUPS = dwelling unit-level poststratification; N/A = not applicable; UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

7.3.3 Weight Component #11: Dwelling Unit-Level Extreme Weight Adjustment

The product of Weight Components #1 through #10 was checked to determine whether 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. Table 7.5 shows the unweighted, weighted, and winsorized extreme weight percentages for Quarters 1 and 4. Because these rates were not high, the extreme weight adjustment was not necessary (see Appendix E for extreme weight percentage by state). 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).

Table 7.5 DU-Level Percentages of Extreme Weights and Outwinsors

	Before DU-Level Weight Adjustments			After DU-Level Weight Adjustments		
Quarter	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
1	1.02%	0.98%	0.19%	3.78%	6.74%	1.73%
4	5.40%	11.18%	3.50%	1.39%	3.92%	0.77%

DU = dwelling unit.

[1] 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 extreme weights and nonextreme weights.

[2] Outwinsor weight percentage = $100 * \sum_k | w_{ek} - b_k | \sum_k w_k$, where b_k denotes the cut-off point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

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.

8. Design Weight Components and Weight Calibration at the Person Level

The five weight components discussed in this chapter account for the person-level probability of selecting a person within a dwelling unit (DU) for the interview, person-level nonresponse, adjusting for coverage errors resulting from the last stages of the sample design, and extreme weight adjustment.

8.1 Design 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 2020 National Survey on Drug Use and Health (NSDUH); 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, and 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 zero, one, or two people from the DU. (Three ghost DUs were defined for each DU to allow for the selection of zero people and to avoid division by zero 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. A pair-sampling strategy has been implemented for NSDUH since 2002; this strategy 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.

8.2 Person-Level Adjustment Factors

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

This step poststratifies the selected people (including respondents and nonrespondents) to estimated control totals from the larger screener sample of people for various control variables at the segment, DU, and person levels. The control totals were derived from the poststratified DU-level weights for all screeners. 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.

Exhibit 8.1 provides the initial covariates for the selected person-level poststratification adjustment. State three-factor effects that were used in previous years were not used for Quarter 1 or 4 of the 2020 NSDUH because of small sample sizes.

Exhibit 8.1 Covariates for the 2020 NSDUH Selected Person-Level Poststratification

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Model Specific
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	5 × 3	8
Rent/Housing × % Hispanic or Latino	5 × 3	8
State × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Gender	Model Specific	Model Specific
State × % Black or African American	Model Specific	Model Specific
State × % Hispanic or Latino	Model Specific	Model Specific
State × % Owner-Occupied	Model Specific	Model Specific
State × Rent/Housing	Model Specific	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

For main effects, most model groups had college dorm and other group quarters collapsed, or both were dropped because of zero sample size. Almost all other main effects were kept in the models. For nonstate two-factor effects, variable collapsing or dropping was present in all segment variables, but all demographic variables were present except that Black or African American was collapsed with other for Quarter 1 model group 1. For state two-factor effects, variable collapsing or dropping was present in all segment variables. American Indian or Alaska Native was collapsed with Asian for several states. Variable collapsing or dropping was present in some nonstate three-factor effects.

Table 8.1 presents the weight distribution and unequal weighting effect (UWE) before and after implementing the selected person-level poststratification adjustments. The distributions of selected person-level poststratification adjustment factors were similar, and the UWE did not change much after the separate adjustment for Quarters 1 and 4 of 2020.

Table 8.1 Weight Distribution for Weights before and after Selected Person-Level Poststratification Adjustments, 2020 NSDUH

Quarter	Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
1	Weight before SELPS	77	3,347	7,040	14,800	198,702	11,169	24,304	2.17
	SELPS Adjustment Factor	0.04	0.79	0.96	1.16	7.10	1.02	24,304	N/A
	Weight after SELPS	25	3,041	6,841	15,003	137,933	11,373	24,304	2.30
4	Weight before SELPS	20	1,398	3,552	8,422	236,507	7,178	38,211	3.27
	SELPS Adjustment Factor	0.10	0.82	0.98	1.17	4.90	1.02	38,211	N/A
	Weight after SELPS	6	1,296	3,479	8,527	181,739	7,260	38,211	3.24

N/A = not applicable; SELPS = selected person-level poststratification; UWE = unequal weighting effect.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

8.2.2 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 of selected persons.

Demographic information for the main interview respondents was available from two sources—screener data and questionnaire data—whereas only screener data were available for the large screener sample of rostered individuals in all the screened DUs. However, to be consistent with respect to the data source, screener data for respondents and nonrespondents were used for the person-level nonresponse adjustment. Screener demographic variable imputation was described in Section 7.3.2. As expected, there were discrepancies in the screener demographic variables and the questionnaire demographic variables; however, the discrepancy rates were very low (0.77 percent for age group, 5.21 percent for race, 1.03 percent for Hispanicity, and 1.01 percent for gender). Questionnaire demographic variables were used for the person-level poststratification adjustment.

Exhibit 8.2 provides the initial covariates for the person-level nonresponse adjustment. This set of variables is the same as that used for selected person-level poststratification except that interview mode was added to the nonresponse adjustment. Interview mode is new to 2020 and was used for only Quarter 4, when in-person and web modes were implemented. State three-factor effects were used in previous years, but for Quarters 1 and 4 of the 2020 NSDUH, they were not used because of small sample sizes.

Exhibit 8.2 Covariates for the 2020 NSDUH Person-Level Nonresponse Adjustment

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Model Specific
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
Interview Mode[1]	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
% 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	5 × 3	8
Rent/Housing × % Hispanic or Latino	5 × 3	8
Age × Interview Mode[1]	5 × 2	4
Race (3 levels) × Interview Mode[1]	3 × 2	2
Hispanicity × Interview Mode[1]	2 × 2	1
Gender × Interview Mode[1]	2 × 2	1
State × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Gender	Model Specific	Model Specific
State × % Black or African American	Model Specific	Model Specific
State × % Hispanic or Latino	Model Specific	Model Specific
State × % Owner-Occupied	Model Specific	Model Specific
State × Rent/Housing	Model Specific	Model Specific
State × Interview Mode[1]	Model Specific	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

[1] This effect is new for 2020 and used for only data from Quarter 4, when in-person and web modes were implemented.

For main effects, several model groups had college dorm and other group quarters collapsed, or both were dropped because of zero sample size. American Indian or Alaska Native had to be collapsed with Asian for Quarter 1 model groups 1 and 2. Almost all other main effects were kept in the models. For nonstate two-factor effects, variable collapsing or dropping was

present in some segment variables and in the age × race and race × Hispanicity interactions. For state two-factor effects, variable collapsing or dropping was present in some segment variables and state × race interactions. Variable collapsing or dropping was present in some nonstate three-factor effects.

Table 8.2 presents the distribution for weights and UWE before and after person-level nonresponse adjustments. The nonresponse adjustment factor in Quarter 4 (the mean was 1.93) was slightly higher than in Quarter 1 (the mean was 1.60). The UWE did not change much after the nonresponse adjustment in both quarters.

Table 8.2 Weight Distribution for Weights before and after Person-Level Nonresponse Adjustments, 2020 NSDUH

Quarter	Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
1	Weight before PRNR	25	3,041	6,841	15,003	137,933	11,373	24,304	2.30
	PRNR Adjustment Factor	0.18	1.09	1.35	1.75	5.95	1.60	15,628	N/A
	Weight after PRNR	39	4,049	9,524	22,561	275,165	17,686	15,628	2.56
4	Weight before PRNR	6	1,296	3,479	8,527	181,739	7,260	38,211	3.24
	PRNR Adjustment Factor	0.35	1.07	1.32	2.23	10.00	1.93	20,656	N/A
	Weight after PRNR	15	2,366	6,612	16,235	322,402	13,430	20,656	3.17

N/A = not applicable; PRNR = person-level nonresponse; UWE = unequal weighting effect.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

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

This adjustment is used to calibrate the weighted respondent-sample data for various demographic domains to the specified control totals obtained from the U.S. Census Bureau's estimates of the civilian, noninstitutionalized population aged 12 or older for 2020 based on the 2010 census. See Chapter 6 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 the generalized exponential model 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.

Exhibit 8.3 provides the initial covariates for the person-level poststratification and extreme weight adjustments. This set of variables is similar to that used for DU-level poststratification except that age has 6 levels instead of 5, the 50+ age group was split into two groups of 50-65 and 65+, and educational attainment and its interactions with demographic variables were added to this final calibration step. State three-factor effects were used in previous years, but for Quarters 1 and 4 of the 2020 NSDUH, they were not used because of small sample sizes.

Exhibit 8.3 Covariates for the 2020 NSDUH Person-Level Poststratification and Extreme Weight Adjustments

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Model Specific
Age	6	5
Race (5 levels)	5	4
Gender	2	1
Hispanicity	2	1
Education	4	4
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
Age (4 levels) × Education	4 × 4	12
Race (3 levels) × Education	3 × 4	8
Gender × Education	2 × 4	4
Hispanicity × Education	2 × 4	4
State × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Gender	Model Specific	Model Specific
State × Education	Model Specific	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

For the person-level poststratification adjustment step, all main effects of state and demographic variables (from interviewing) were kept in all models. Most nonstate two-factor effects were kept in the models, except that for Quarter 1 model groups 4, 6, and 7, Black or African American had to be collapsed with other for Hispanic or Latino; for Quarter 1 model group 8, Black or African American had to be collapsed with other for all age levels; and for Quarter 4 model group 8, Black or African American had to be collapsed with other for 12-17. For state two-factor effects, American Indian or Alaska Native had to be collapsed with Asian for some states, and sometimes, Black or African American had to be collapsed with other. Variable collapsing or dropping was present in all nonstate three-factor effects.

Education main effects were kept in all model groups. Variable collapsing was present in education × age, race, gender, and Hispanicity for Quarter 1 model groups 6 and 8 and for Quarter 4 model groups 1 and 6. Education levels were collapsed for some states for Quarter 1 model groups 1 and 5.

Table 8.3 presents the weight distribution and UWE before and after implementing the person-level poststratification adjustment. The distributions of the person-level poststratification adjustment factors were similar, and the UWE moderately increased in both quarters.

Table 8.3 Weight Distribution for Weights before and after the Person-Level Poststratification Adjustment

Quarter	Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
1	Weight before PRPS	39	4,049	9,524	22,561	275,165	17,686	15,628	2.56
	PRPS Adjustment Factor	0.06	0.73	0.99	1.28	5.00	1.07	15,628	N/A
	Weight after PRPS	10	3,498	9,369	22,330	402,461	17,687	15,628	2.84
4	Weight before PRPS	15	2,366	6,612	16,235	322,402	13,430	20,656	3.17
	PRPS Adjustment Factor	0.08	0.65	0.94	1.28	5.00	1.07	20,656	N/A
	Weight after PRPS	5	1,994	5,986	15,417	432,841	13,430	20,656	3.78

N/A = not applicable; PRPS = person-level poststratification; UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

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

The weights for the product of Weight Components #1 through #15 were checked to determine whether the extreme weight adjustment step was needed, with extreme weights defined as described in Section 5.1. Table 8.4 shows the unweighted and weighted extreme weight percentages and outwinsors for Quarters 1 and 4. For Quarter 1, these rates were acceptably low, but the rates for Quarter 4 were slightly higher than the target (3 percent for unweighted, 15 percent for weighted, and 5 percent for outwinsor). The high extreme weight percentages in Quarter 4 were caused by mixed samples from Quarters 2 through 4 and by larger nonresponse adjustments at screening and interviewing due to low screening and interviewing response rates. The distribution of the 150 largest final analysis weights (product of Weight Components #1 to #15) was checked, and no obvious gaps or extremely large weights were observed. Thus, it was decided that the extreme weight adjustment was not necessary for Quarter 4. Weight Component #16 was set to 1 for each responding person for Quarters 1 and 4. Appendix E lists extreme weight percentages by state.

Table 8.4 Person-Level Percentages of Extreme Weights and Outwinsors

	Before Person-Level Weight Adjustments			After Person-Level Weight Adjustments		
Quarter	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
1	4.19%	11.14%	3.15%	2.94%	9.20%	2.22%
4	2.72%	10.83%	2.83%	4.14%	17.63%	5.12%

[1] 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 extreme weights and nonextreme weights.

[2] Outwinsor weight percentage = $100 * \sum_k | w_{ek} - b_k | \sum_k w_k$, where b_k denotes the cut-off point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

8.3 Analysis Weights for Combined Quarters 1 and 4

A conventional way to calculate overall analysis weights for the combined data from Quarters 1 and 4 would be to perform a poststratification adjustment for the combined data. In this poststratification adjustment, the nonresponse-adjusted weights from Quarters 1 and 4 would

be combined and benchmarked to the census population estimates. Because weights in demographic domains would not be controlled for each quarter separately, weight sums in demographic domains between two quarters could differ after the combined poststratification adjustment. Outcomes in certain demographic domains could be different between Quarters 1 and 4 because of the mode differences in data collection or effects of the coronavirus disease 2019 (COVID-19) pandemic. When weight sums shift between two quarters for certain demographic domains, survey estimates for Quarters 1 and 4 can be affected. Thus, the approach of performing poststratification for the combined data to create overall analysis weights for Quarters 1 and 4 was not ideal.

Because separate quarterly analysis weights were developed, a preferable alternative approach to calculate overall analysis weights for combined data for Quarters 1 and 4 of the 2020 NSDUH would be to combine the quarterly analysis weights and divide them by a factor of 2. This way, each quarter contributed half of the analysis weight to the combined weights. This approach also preserved quarterly weight sums for demographic domains (e.g., age group, gender, race, Hispanic origin) to ensure that the weight sums in the demographic domains would not shift between quarters.

Table 8.5 presents the final analysis weight distribution and UWE for the combined data from Quarters 1 and 4.

Table 8.5 Weight Distribution for Final Analysis Weights for Quarters 1 and 4, 2020, and Combined Data from Quarters 1 and 4, 2020

Quarter	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
1	10	3,498	9,369	22,330	402,461	17,687	15,628	2.84
4	5	1,994	5,986	15,417	432,841	13,430	20,656	3.78
1 and 4	3	1,258	3,636	9,167	216,420	7,632	36,284	3.31

UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

Table 8.6 shows the unweighted and weighted extreme weight percentages and outwinsors for combined data from Quarters 1 and 4.

Table 8.6 Person-Level Percentages of Extreme Weights and Outwinsors for Quarters 1 and 4, 2020, and Combined Data from Quarters 1 and 4, 2020

Quarter	After Person-Level Weight Adjustments		
	% Unweighted	% Weighted[1]	% Outwinsor[2]
1	2.94%	9.20%	2.22%
4	4.14%	17.63%	5.12%
1 and 4	2.99%	12.38%	3.17%

[1] 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 extreme weights and nonextreme weights.

[2] Outwinsor weight percentage = $100*\sum_k | w_{ek} - b_k | \sum_k w_k$, where b_k denotes the cut-off point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

9. Evaluation of Weight Calibration and Quality Control Measures

9.1 Quality Control Measures for Design Weights

Quality control (QC) measures are applied to every component of the dwelling unit (DU)- and person-level design weights. In addition to the QC measures outlined as follows, a sampling team member examines SAS® (SAS Institute Inc., 2017) programs for errors, warnings, and "uninitialized" variables in the log, and a different sampling team member reviews SAS code. The following QC measures are employed to ensure the accuracy of design-based weight calculations:

- For subsegmented segments, check that the subsegmenting adjustment factor is greater than 1 (i.e., the count for the entire segment is greater than the count for the subsegment). This check is also performed for segments that are subsegmented twice.
- Compare the DU eligibility indicator with the completed screener indicator. Make sure all screener-complete DUs are eligible.
- Compare the final screening result code (CBHSQ, in press) assigned to each DU with the DU eligibility and completed screener indicators to ensure that these variables are defined correctly.
- Check the subsampling rate for added DUs that are subsampled. Review the frequency distribution of the DU subsampling rates to check values and ensure that the correct number of DUs are adjusted.
- Check that the minimum and maximum values of the DU release weight factor are within the expected range and that there are no missing values.
- Check the household-level weight to ensure that there are no missing values and that the sum is close to the expected value.
- Compare the person-level indicators for eligible, selected, and complete. Make sure that all completed cases are selected and that all selected cases are eligible.
- Compare the final interview code with the person-level eligibility indicator to make sure that this variable is defined correctly.
- Make sure the probability of selection is nonmissing for all selected people.
- Check the maximum-of-two selected people adjustment to make sure the maximum value is 2.
- Check the person-level weight to ensure that there are no missing values and that the sum is close to the expected value.

9.2 Quality Control Measures for Weight Calibration

The National Survey on Drug Use and Health (NSDUH) weight calibration is a complex procedure with many steps. In addition to the QC measures outlined as follows, a weighting team member examines SAS programs for errors, warnings, and "uninitialized" variables in the log, then a different weighting team member reviews the programs. To ensure the accuracy of weight

calibration, the following QC measures are employed at every step of the DU- and person-level weight calibrations.

- Various documents are maintained to record every step of the calibration process. Statistics such as unequal weighting effect (UWE), extreme weight percentages, and the ratio of maximum weight and mean weight (MAX/MEAN) are recorded at each step of model enlargement.[9] Variable collapsing and dropping were also tracked to identify what domains were controlled.
- The target bounds for nonresponse adjustment steps are reviewed to ensure that they meet the expected criteria, (1, 3), (1, 5), and (1, 5), for high extreme, normal, and low extreme weights, respectively, and that center (C) is between the upper and lower bounds. For poststratification, the target bounds for Quarter 1 were (0.2, 3), (0.2, 5), and (0.3, 5) for high, normal, and low bounds, respectively. The upper bounds for DU-level nonresponse adjustment in Quarter 4 were higher because the screening rate was lower due to the addition of web mode in Quarter 4. To keep certain variables, the upper bounds had to be increased.
- Convergence of generalized exponential modeling at the final run is ensured.
- The weight sums before and after adjustment are compared; they should be the same or very close.
- The overall UWE before and after the adjustment is compared to ensure that it does not increase by more than 20 percent.
- The overall MAX/MEAN before and after the adjustment is compared to make sure there are no sharp increases.
- The unweighted extreme weight percentage, weighted extreme weight percentage, and outwinsor before and after adjustment are compared to make sure the increase rates are below 3 percent, 15 percent, and 5 percent, respectively.
- The weight distribution after adjustment is compared with that of the prior year to ensure that they are comparable. In 2020, because of several methodological differences, the distributions of the weights were not expected to be comparable with their counterparts in 2019.
- Slippage checks (Section 9.3.3) are done for all domains that were kept in the generalized exponential model (GEM) to ensure that the calibrated totals match the census control totals.

9.3 Evaluation of Calibration

During the weight calibration process, several QC criteria were implemented to assess model adequacy. This section describes the individual procedures and summarizes their results. All tables referred to in this chapter can be found in Appendices D, E, F, G, and H.

[9] A combined backward and forward selection method has been applied in fitting GEM adjustment models. Forward selection starts from the main effect model, then enlarges the model by adding two- and three-way interactions. This is referred to as model enlargement. Within each model enlargement, backward selection is used.

9.3.1 Response Rate

Table D.1 in Appendix D displays the final sample sizes for the "selected," "eligible" (after the implicit unknown eligibility adjustment [see Section 7.2]), and "completed" categories at the DU level and for the "selected" and "respondents" categories at the person level from the 2020 NSDUH for the national and state levels. Table D.1 also shows the weighted eligibility rates and weighted response rates[10] for DU screeners and person-level interviews.

Table 9.1 compares the national response rates for the 2020 NSDUH for Quarter 1, Quarter 4, and Quarters 1 and 4 combined, and for the 2019 NSDUH. The screener response rate was low for Quarter 4 of 2020 because most of the screening was conducted via the web. The overall eligibility rates are comparable for 2020 and 2019; the overall 2020 interview response rate was 3.5 percentage points lower than the 2019 rate.

Table 9.1 Comparison of Overall Weighted Response Rates

Domain	Quarter 1, 2020	Quarter 4, 2020	Quarters 1 and 4, 2020	2019
Dwelling Unit Level				
Eligibility Rate	86.71%	83.54%	85.13%	85.46%
Screener Response Rate	67.76%	11.13%	40.00%	70.50%
Person Level				
Interview Response Rate	63.07%	59.71%	61.39%	64.90%

9.3.2 Percentages of Extreme Weights

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 the resulting extreme weights. As explained in Chapter 4, the percentages of extreme weights were calculated for some domains of interest before 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 E.1 in Appendix E and Tables F.1 and F.2 in Appendix F present percentages of extreme weights at the DU and person levels for the combined data from Quarters 1 and 4 at the national and individual state levels. Unweighted percentages are based on the actual counts of DUs 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, whereas 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.

[10] Screening and interview response rates were computed using the American Association for Public Opinion Research's (AAPOR's) Response Rate 1 and Response Rate 2, respectively. See AAPOR's standard definitions report (AAPOR, 2016) for more information.

For the 2020 NSDUH sample, domains for extreme weight definitions were defined as follows for various weight adjustments via the GEM (see Chapter 4):

- DU-level adjustment (DU-level nonresponse adjustment, DU-level poststratification adjustment)
  - State sampling region (SSR)
- Person-level adjustment (selected person poststratification adjustment, person nonresponse adjustment, person poststratification adjustment)
  - SSR and age group[11]
  - State and age group
  - SSR
  - State

9.3.3 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, before and after poststratification. The slippage rate is checked at the end of each weight adjustment to make sure that the calibrated weight matches the control totals for domains specified in the GEM.

Tables G.1 and G.2 in Appendix G display national-level domain-specific weight sums 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 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 on another domain when a DU belongs to both domains.

Because weight calibration was conducted separately for Quarters 1 and 4 with different census control totals, the slippage rates are displayed separately for each quarter.

9.3.4 Weight Adjustment Summary Statistics

Tables H.1 to H.3 in Appendix H display summary statistics on the product of weight components before and after all stages of adjustment, for the DU and person levels. Note that these tables have before and after categories for all adjustments except for the DU poststratification (in Exhibit 1.1); this is because the before and after statistics are the same and are, therefore, displayed only as the category after. Also note 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 before poststratification based on the questionnaire data (e.g., see Table H.3, under the heading "After res.per.nr") would

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

be only slightly different from what would be obtained after the nonresponse adjustment (e.g., see Table H.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 that in the res.per.ps tables.

9.3.5 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 generalized exponential modeling (for nonresponse or poststratification), enlarging a simple model (such as the one with only main effects) could further reduce 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 (with main effects only) 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 the more complex model could be fit. The point estimates and SEs are shown in Tables 9.2a to 9.8b. The "a" tables correspond to Quarter 1 of 2020, and the "b" tables correspond to Quarter 4 of 2020.

Two estimates of SE for the survey-weighted prevalence estimates are shown in the tables. SE1 is a ratio-adjusted estimator computed under the DESCRIPT procedure in SUDAAN® (RTI International, 2013). Also called the "naïve Taylor series SE," SE1 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 et al., 2000) is designed to provide an estimate of the variance that adjusts for the random calibration factors to sampling weights via the GEM. This "sandwich variance," adjusting for the poststratification variability, is denoted by SE2. Also referred to as the variance estimate from a bias-corrected estimating function (BCEF) (Singh & Folsom, 2000), SE2 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 and tend to have smaller variances than naïve Taylor series variance.

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. The variance estimates of these selected outcomes in Tables 9.2a to 9.8b 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 9.2a to 9.8b, there are cases in which the estimated 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 several factor effects). Therefore, the evidence does not favor the view that fitting a large number of parameters in the GEM creates instability in estimates.

Table 9.2a 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, Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime											
Total	Point Estimates	54.55	54.73	51.92	52.71	54.86	56.35	53.50	53.85	59.19	58.71
	SE1	0.70	0.77	2.78	3.22	2.73	2.82	2.75	3.06	4.01	4.16
	SE2	0.61	0.61	2.45	2.64	2.57	2.35	2.62	2.56	3.87	3.38
12-17	Point Estimates	8.93	8.85	9.18	10.23	5.88	6.00	2.48	2.45	12.83	12.77
	SE1	0.66	0.66	2.15	2.45	1.92	1.99	1.32	1.32	3.61	3.53
	SE2	0.66	0.70	2.14	2.43	1.88	1.86	1.33	1.32	3.60	3.42
18-25	Point Estimates	44.30	44.63	37.95	37.18	38.75	40.86	40.84	42.60	44.68	46.47
	SE1	1.34	1.39	3.61	4.02	4.57	4.88	5.65	5.55	6.61	6.56
	SE2	1.30	1.26	3.54	4.19	4.53	5.10	5.54	4.96	6.49	5.67
26-34	Point Estimates	59.11	58.32	56.98	56.24	55.58	57.88	59.11	59.09	65.16	66.48
	SE1	1.44	1.48	3.83	4.02	6.35	6.48	5.88	6.53	5.82	5.64
	SE2	1.34	1.26	3.89	4.22	6.20	6.22	6.00	5.84	5.84	5.51
35+	Point Estimates	61.88	62.30	59.85	61.08	62.81	64.20	61.80	62.14	66.97	65.60
	SE1	0.89	0.99	3.52	3.89	3.26	3.15	3.80	4.38	5.08	5.29
	SE2	0.83	0.85	3.29	3.97	3.15	2.85	3.59	3.41	4.87	4.40
Alcohol Lifetime											
Total	Point Estimates	80.50	80.33	75.51	76.17	81.63	81.76	78.20	79.53	80.99	80.94
	SE1	0.56	0.62	2.12	2.47	1.87	1.90	2.59	2.46	3.01	3.36
	SE2	0.47	0.44	1.77	2.14	1.77	1.51	2.33	1.63	2.93	2.67
12-17	Point Estimates	26.90	26.81	24.34	25.60	24.18	23.54	20.47	19.75	25.02	25.71
	SE1	1.02	1.02	2.66	2.66	4.88	4.87	3.80	3.75	4.35	4.42
	SE2	1.02	1.01	2.74	2.91	4.85	4.69	3.82	3.66	4.36	4.38
18-25	Point Estimates	80.06	81.12	79.95	78.64	74.49	75.69	78.61	81.76	81.74	82.38
	SE1	0.99	1.08	3.00	3.53	3.26	3.59	5.13	3.94	5.61	5.80
	SE2	0.96	1.18	3.02	3.66	3.24	3.77	5.12	3.93	5.55	5.15
26-34	Point Estimates	88.64	88.37	87.64	87.74	87.01	89.04	79.38	79.12	96.16	95.28
	SE1	1.00	1.05	3.06	3.17	3.27	2.80	5.93	5.85	2.00	2.54
	SE2	0.97	0.92	3.07	2.85	3.31	2.80	5.97	5.39	2.01	2.55
35+	Point Estimates	86.27	85.89	79.10	80.07	88.33	87.94	85.91	87.76	85.26	85.08
	SE1	0.70	0.80	2.85	3.38	2.35	2.37	4.02	3.78	3.77	4.21
	SE2	0.61	0.58	2.19	2.69	2.23	2.04	3.59	2.28	3.68	3.54

(continued)

Table 9.2a 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, Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime									
Total	Point Estimates	50.58	49.32	60.23	61.02	58.94	59.01	46.99	47.34
	SE1	2.71	2.98	2.66	2.66	3.75	4.13	2.69	3.01
	SE2	2.29	2.05	2.63	2.34	3.48	3.12	2.26	2.29
12-17	Point Estimates	12.80	12.50	16.19	16.57	11.41	12.17	10.30	8.70
	SE1	3.57	3.47	4.32	4.59	2.45	2.55	3.42	3.06
	SE2	3.57	3.50	4.31	4.50	2.44	2.50	3.55	2.84
18-25	Point Estimates	44.31	42.90	52.11	49.28	35.23	35.89	46.77	48.21
	SE1	6.71	6.20	7.97	7.94	7.70	8.25	5.54	5.85
	SE2	6.66	6.15	8.03	7.64	7.59	6.81	5.51	5.51
26-34	Point Estimates	50.90	50.18	64.46	65.92	61.52	55.30	46.17	45.16
	SE1	5.11	5.43	6.23	6.27	7.15	7.96	7.15	7.48
	SE2	5.16	5.08	6.27	6.24	6.96	7.46	6.27	5.21
35+	Point Estimates	56.04	54.91	67.18	68.30	68.35	69.77	53.84	54.47
	SE1	3.77	4.36	2.93	2.83	4.16	5.08	2.95	3.35
	SE2	3.26	3.10	2.92	2.68	4.02	4.57	2.67	2.81
Alcohol Lifetime									
Total	Point Estimates	77.68	76.03	83.50	82.99	81.62	82.21	79.50	80.13
	SE1	2.62	3.32	1.84	1.99	3.06	3.41	2.82	2.79
	SE2	2.24	2.63	1.86	1.77	2.78	2.40	2.21	1.89
12-17	Point Estimates	30.18	30.46	34.84	35.19	22.14	21.65	28.89	28.78
	SE1	4.01	4.55	3.09	3.40	4.60	4.33	5.83	5.60
	SE2	4.06	4.18	3.10	3.31	4.56	4.29	5.96	5.41
18-25	Point Estimates	69.54	73.38	81.71	82.53	81.36	86.71	87.30	86.93
	SE1	6.23	5.93	5.08	5.52	3.75	2.51	3.31	3.49
	SE2	5.96	4.69	5.21	5.04	3.76	2.85	3.11	3.26
26-34	Point Estimates	78.69	77.60	94.66	96.30	92.96	91.61	83.65	85.73
	SE1	5.55	6.32	2.36	1.81	4.69	6.78	5.35	4.87
	SE2	5.43	4.65	2.34	1.72	4.45	7.88	4.97	4.06
35+	Point Estimates	84.46	81.85	88.16	86.82	86.55	87.07	85.73	86.16
	SE1	3.28	4.48	2.72	2.93	3.24	3.86	2.80	3.07
	SE2	3.03	4.00	2.67	2.41	3.05	2.71	2.22	2.17

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.2b 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, Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime											
Total	Point Estimates	50.17	50.36	47.35	47.98	51.34	50.15	51.23	53.00	54.46	56.15
	SE1	0.63	0.68	2.33	2.51	2.91	3.34	2.60	2.74	2.58	2.67
	SE2	0.57	0.55	2.11	2.07	2.82	2.55	2.52	2.38	2.58	2.13
12-17	Point Estimates	5.74	5.63	3.61	2.58	5.71	6.35	10.66	11.79	10.47	8.39
	SE1	0.73	0.78	2.05	1.49	3.43	3.84	3.99	4.69	4.60	3.91
	SE2	0.71	0.78	2.04	1.44	3.43	3.83	3.99	4.12	4.62	3.80
18-25	Point Estimates	32.38	32.12	22.83	21.95	38.11	34.83	23.54	26.31	35.55	36.15
	SE1	1.19	1.21	4.21	4.16	5.49	5.51	4.71	4.82	4.76	4.48
	SE2	1.17	1.14	4.17	3.64	5.48	5.29	4.71	4.30	4.73	4.48
26-34	Point Estimates	53.25	53.70	59.31	59.26	55.80	56.24	51.20	50.85	52.14	49.64
	SE1	1.28	1.32	4.49	4.28	5.61	6.02	6.65	5.71	5.32	5.29
	SE2	1.26	1.13	4.47	3.84	5.59	5.33	6.53	5.49	5.31	4.85
35+	Point Estimates	59.01	59.27	55.42	56.71	57.51	56.27	62.36	64.29	65.55	67.66
	SE1	0.83	0.92	3.08	3.31	3.86	4.28	3.70	3.61	3.41	3.31
	SE2	0.79	0.77	2.87	3.02	3.76	3.33	3.67	3.40	3.42	3.09
Alcohol Lifetime											
Total	Point Estimates	78.46	78.73	78.15	78.09	82.03	80.99	81.14	82.12	79.21	80.65
	SE1	0.54	0.57	1.82	2.03	2.31	2.55	2.28	2.31	2.30	2.33
	SE2	0.44	0.40	1.56	1.28	2.12	1.71	2.15	1.72	2.21	1.78
12-17	Point Estimates	18.38	18.84	18.56	22.10	17.79	18.06	29.55	31.78	20.17	16.07
	SE1	1.29	1.38	4.72	5.82	4.83	4.87	6.69	8.47	6.51	5.69
	SE2	1.27	1.25	4.67	5.47	4.86	4.68	6.65	7.26	6.48	5.22
18-25	Point Estimates	67.49	69.57	68.12	69.88	67.15	65.55	61.26	62.66	68.22	69.65
	SE1	1.39	1.34	3.77	3.49	5.56	6.36	5.95	5.78	5.61	5.77
	SE2	1.36	1.15	3.80	3.82	5.47	6.04	6.01	6.01	5.61	5.78
26-34	Point Estimates	85.10	86.15	87.65	89.78	84.66	82.96	83.42	85.08	92.71	92.91
	SE1	1.00	0.96	2.89	2.53	3.94	4.16	6.40	4.61	2.29	2.27
	SE2	0.98	0.89	2.95	2.97	3.98	3.89	6.22	4.03	2.33	2.33
35+	Point Estimates	87.41	87.14	86.29	84.79	90.85	90.10	91.78	92.22	88.33	88.76
	SE1	0.59	0.66	2.18	2.70	2.41	2.80	2.13	2.30	2.55	2.65
	SE2	0.55	0.49	2.04	1.58	2.29	2.00	2.06	1.64	2.54	2.42

(continued)

Table 9.2b 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, Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime									
Total	Point Estimates	49.03	49.34	49.40	49.64	53.51	52.92	46.64	45.19
	SE1	2.34	2.36	2.57	2.80	2.69	2.97	2.41	2.58
	SE2	2.23	1.72	2.46	1.95	2.64	2.58	2.18	2.26
12-17	Point Estimates	2.07	2.20	2.85	2.38	8.02	6.87	1.10	0.93
	SE1	1.11	1.25	1.66	1.38	3.55	3.06	0.70	0.64
	SE2	1.09	1.24	1.65	1.40	3.57	2.93	0.69	0.63
18-25	Point Estimates	25.17	26.38	31.73	32.85	39.00	39.83	30.31	31.14
	SE1	3.78	3.39	3.12	3.17	4.99	4.97	5.26	5.87
	SE2	3.85	3.25	3.12	3.21	5.01	5.06	5.23	5.25
26-34	Point Estimates	48.51	49.30	48.14	50.40	51.94	53.24	52.98	53.20
	SE1	4.01	4.25	6.22	5.50	4.16	5.37	5.26	5.10
	SE2	4.15	3.83	6.10	5.35	4.06	4.78	5.25	4.95
35+	Point Estimates	58.90	59.39	58.44	59.06	62.52	60.91	56.77	53.80
	SE1	2.84	3.14	3.34	3.46	3.74	4.06	3.05	3.63
	SE2	2.80	2.27	3.27	2.72	3.73	3.74	2.96	3.22
Alcohol Lifetime									
Total	Point Estimates	77.24	77.64	77.66	78.24	81.07	80.25	71.69	72.82
	SE1	2.23	2.21	2.09	2.25	2.02	2.30	2.87	2.81
	SE2	2.06	1.64	2.06	1.69	2.03	1.89	2.52	2.01
12-17	Point Estimates	14.82	16.91	14.55	14.16	17.10	14.69	11.55	10.76
	SE1	3.03	3.56	5.10	5.28	4.55	4.16	4.25	4.04
	SE2	3.03	3.57	5.12	5.26	4.57	3.79	4.25	4.01
18-25	Point Estimates	68.33	68.87	67.27	70.60	70.77	70.13	55.34	63.62
	SE1	7.10	6.75	5.19	5.94	4.72	4.97	7.10	6.84
	SE2	7.27	5.78	5.13	4.84	4.69	4.98	7.24	5.65
26-34	Point Estimates	80.02	79.45	80.67	82.01	87.73	84.31	81.84	83.42
	SE1	4.40	4.63	4.12	3.46	3.20	4.86	4.85	4.51
	SE2	4.47	4.29	4.16	3.74	3.20	4.30	4.76	3.77
35+	Point Estimates	85.53	86.33	86.41	87.65	89.80	89.38	83.42	82.81
	SE1	2.59	2.65	2.49	2.31	2.43	2.54	2.63	2.71
	SE2	2.29	1.89	2.46	2.26	2.46	2.47	2.52	2.24

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

Table 9.3a 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, Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime											
Total	Point Estimates	46.20	45.94	46.21	45.43	45.61	44.86	47.79	48.87	50.21	50.53
	SE1	0.71	0.75	2.58	2.74	2.48	2.76	3.67	3.51	4.03	4.31
	SE2	0.61	0.56	2.07	1.77	2.34	2.25	3.23	2.28	3.97	3.81
12-17	Point Estimates	15.76	15.72	17.63	18.69	13.26	13.20	17.13	16.40	19.49	20.13
	SE1	0.79	0.79	2.27	2.32	3.88	3.87	3.10	3.09	2.65	2.68
	SE2	0.78	0.82	2.24	2.12	3.81	3.57	3.19	3.40	2.62	2.50
18-25	Point Estimates	53.39	54.02	51.68	52.26	53.71	55.27	58.07	60.40	63.71	65.27
	SE1	1.39	1.48	3.92	4.37	4.48	5.20	5.70	4.87	6.47	6.81
	SE2	1.35	1.36	3.89	4.40	4.51	5.16	5.68	4.54	6.51	6.61
26-34	Point Estimates	58.33	57.53	56.96	55.53	54.66	56.82	64.61	63.56	67.63	67.44
	SE1	1.51	1.65	4.35	5.04	6.80	6.94	7.11	7.36	7.45	7.23
	SE2	1.36	1.36	4.22	5.07	6.68	6.00	7.18	7.28	7.37	6.91
35+	Point Estimates	46.35	46.02	46.55	45.38	46.41	44.55	46.65	48.01	48.19	48.25
	SE1	0.92	1.00	3.35	3.67	3.06	3.39	5.21	5.27	4.96	5.34
	SE2	0.82	0.76	2.57	2.60	2.82	2.51	4.66	3.44	4.89	4.59
Cocaine Lifetime											
Total	Point Estimates	14.66	14.38	16.21	14.76	17.44	16.65	13.76	14.77	15.99	15.90
	SE1	0.47	0.48	1.70	1.65	1.72	1.72	1.58	1.56	2.62	2.63
	SE2	0.43	0.39	1.49	1.40	1.68	1.63	1.52	1.43	2.50	1.85
12-17	Point Estimates	0.72	0.78	1.40	1.41	1.60	1.63	0.44	0.40	0.71	0.70
	SE1	0.19	0.21	0.78	0.81	1.39	1.44	0.43	0.40	0.70	0.70
	SE2	0.19	0.20	0.79	0.79	1.38	1.39	0.44	0.41	0.70	0.68
18-25	Point Estimates	9.68	10.07	12.50	12.88	10.81	11.93	8.45	8.18	6.17	5.37
	SE1	0.72	0.76	2.82	3.16	2.47	2.73	3.71	3.95	2.67	2.30
	SE2	0.71	0.90	2.75	2.78	2.47	2.71	3.70	3.67	2.65	2.14
26-34	Point Estimates	18.99	17.69	18.62	15.37	14.39	14.68	22.34	23.13	22.80	21.28
	SE1	1.17	1.12	3.47	3.16	4.21	4.25	6.70	7.18	4.90	5.16
	SE2	1.12	1.06	3.46	3.54	4.25	4.15	6.64	6.65	4.90	5.38
35+	Point Estimates	16.58	16.36	18.56	16.93	20.86	19.47	14.83	16.17	18.49	18.82
	SE1	0.65	0.67	2.25	2.12	2.48	2.38	2.33	2.27	3.82	3.90
	SE2	0.61	0.55	1.99	1.85	2.33	1.97	2.26	2.20	3.63	2.64

(continued)

Table 9.3a 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, Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime									
Total	Point Estimates	45.28	44.68	49.28	49.62	43.26	45.16	39.45	38.43
	SE1	3.07	3.12	3.19	3.62	4.59	4.60	2.69	2.78
	SE2	2.70	2.46	3.24	3.16	4.23	3.54	2.16	2.01
12-17	Point Estimates	21.81	19.92	18.70	19.62	16.49	16.96	19.14	18.03
	SE1	4.36	4.05	3.54	3.98	3.75	3.79	4.04	3.90
	SE2	4.34	4.00	3.54	3.69	3.71	3.88	4.11	3.60
18-25	Point Estimates	48.64	50.75	60.12	61.24	39.92	42.29	51.77	49.95
	SE1	7.05	6.42	9.87	9.88	5.96	6.02	6.11	5.70
	SE2	6.95	5.54	9.80	9.33	5.82	4.83	5.66	4.67
26-34	Point Estimates	52.67	51.14	59.60	60.69	67.34	62.15	40.49	40.32
	SE1	6.59	7.73	5.31	5.84	8.51	10.01	5.92	6.20
	SE2	6.44	6.44	5.23	5.42	8.32	9.24	5.08	4.52
35+	Point Estimates	45.78	45.11	48.97	49.22	42.15	45.65	40.10	38.99
	SE1	3.35	3.70	3.39	4.08	5.50	5.85	3.41	3.67
	SE2	2.94	3.09	3.44	3.28	5.26	5.13	2.85	2.76
Cocaine Lifetime									
Total	Point Estimates	15.48	15.33	10.55	11.78	14.19	14.64	9.42	8.97
	SE1	1.83	1.67	1.73	2.20	3.56	3.32	0.95	0.91
	SE2	1.69	1.64	1.77	1.98	3.39	3.05	0.88	0.84
12-17	Point Estimates	0.50	0.36	0.00	0.00	1.62	1.46	1.01	1.14
	SE1	0.49	0.35	0.00	0.00	1.09	0.98	1.00	1.12
	SE2	0.50	0.36	0.00	0.00	1.12	1.07	1.00	1.09
18-25	Point Estimates	13.78	17.00	7.28	7.33	7.64	6.78	5.84	5.77
	SE1	3.61	3.91	2.47	2.20	4.10	3.64	1.98	1.98
	SE2	3.49	3.72	2.44	1.93	4.05	3.32	1.97	2.03
26-34	Point Estimates	24.00	19.75	16.08	18.71	26.52	20.86	6.30	6.90
	SE1	6.70	5.15	4.67	5.40	6.92	6.64	2.22	2.58
	SE2	6.38	4.26	4.77	5.64	6.83	6.16	2.06	2.12
35+	Point Estimates	15.62	15.84	11.40	12.74	14.32	16.37	12.58	11.58
	SE1	2.06	2.10	2.42	3.05	4.63	4.49	1.98	1.78
	SE2	2.03	2.29	2.45	2.71	4.45	4.19	1.85	1.51

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.3b 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, Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime											
Total	Point Estimates	45.48	45.43	48.13	47.99	43.74	44.58	48.23	48.98	52.71	54.61
	SE1	0.65	0.70	2.33	2.65	2.83	3.08	2.63	2.80	2.68	3.07
	SE2	0.58	0.57	2.11	2.05	2.71	2.53	2.50	2.52	2.67	2.65
12-17	Point Estimates	9.25	9.12	9.50	9.86	7.29	7.19	17.66	20.75	9.03	6.61
	SE1	0.91	0.98	3.44	3.95	3.29	3.38	4.80	7.63	3.68	2.99
	SE2	0.89	0.87	3.43	3.58	3.31	3.35	4.80	6.11	3.61	2.86
18-25	Point Estimates	43.48	45.09	39.13	39.74	42.04	39.55	44.68	46.41	44.37	45.84
	SE1	1.30	1.37	4.56	4.66	5.40	5.59	6.51	6.15	5.50	5.60
	SE2	1.27	1.23	4.50	4.67	5.42	5.48	6.51	5.84	5.47	5.53
26-34	Point Estimates	54.83	55.26	64.72	66.30	54.46	53.17	56.18	55.21	59.08	58.70
	SE1	1.38	1.44	4.35	4.24	5.42	6.05	6.40	5.66	4.50	4.68
	SE2	1.30	1.32	4.39	4.41	5.39	5.59	6.30	5.22	4.53	4.46
35+	Point Estimates	48.79	48.34	51.21	50.41	45.98	47.93	51.43	52.06	60.22	61.81
	SE1	0.87	0.96	3.19	3.57	3.68	4.02	3.51	3.82	3.72	4.33
	SE2	0.79	0.75	2.98	2.60	3.48	3.20	3.40	3.48	3.72	3.78
Cocaine Lifetime											
Total	Point Estimates	14.39	13.98	18.59	18.34	15.15	15.54	15.68	17.12	11.94	11.94
	SE1	0.47	0.49	1.85	2.03	1.95	2.11	2.10	2.65	2.00	2.06
	SE2	0.44	0.41	1.77	1.74	1.86	1.72	2.05	2.10	2.02	2.12
12-17	Point Estimates	0.09	0.06	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.43
	SE1	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.44
	SE2	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.44
18-25	Point Estimates	8.34	8.22	8.34	6.21	6.97	7.67	6.66	7.78	10.16	10.10
	SE1	0.66	0.65	2.62	1.96	1.89	2.12	2.33	2.88	3.46	3.38
	SE2	0.66	0.58	2.61	1.53	1.90	2.08	2.34	2.95	3.45	3.36
26-34	Point Estimates	16.37	15.70	21.41	20.47	22.82	23.28	14.56	15.28	15.67	14.26
	SE1	0.99	0.99	4.14	3.89	5.46	6.38	3.65	3.71	4.41	4.09
	SE2	0.97	0.91	4.06	3.90	5.44	6.10	3.66	3.70	4.42	4.26
35+	Point Estimates	17.07	16.61	22.57	22.80	16.57	17.01	19.91	21.70	13.33	13.33
	SE1	0.67	0.70	2.68	3.00	2.64	2.85	3.11	3.87	2.70	2.85
	SE2	0.64	0.59	2.61	2.53	2.56	2.37	3.04	3.07	2.71	2.82

(continued)

Table 9.3b 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, Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime									
Total	Point Estimates	43.85	43.90	45.76	44.65	47.95	47.02	31.77	31.02
	SE1	2.77	2.72	2.98	3.05	2.46	2.79	2.25	2.46
	SE2	2.62	2.45	2.92	2.50	2.47	2.57	2.03	2.06
12-17	Point Estimates	8.23	7.89	5.00	4.06	9.91	8.35	1.84	1.67
	SE1	1.93	2.00	2.01	1.67	4.15	3.58	1.33	1.30
	SE2	1.90	2.01	2.01	1.67	4.17	3.36	1.34	1.28
18-25	Point Estimates	40.24	42.24	42.58	41.79	42.63	41.76	31.34	32.92
	SE1	6.31	6.03	5.75	6.67	4.85	5.12	4.95	5.91
	SE2	6.32	5.65	5.84	5.67	4.87	5.24	4.90	4.62
26-34	Point Estimates	60.17	62.79	51.93	54.05	58.11	56.70	35.65	37.32
	SE1	4.89	4.54	6.60	5.90	4.61	5.36	5.88	5.92
	SE2	5.00	4.08	6.53	5.92	4.61	5.01	5.81	5.56
35+	Point Estimates	45.12	44.19	49.89	48.74	51.55	50.75	36.20	34.06
	SE1	3.57	3.75	3.81	4.03	3.59	3.79	2.92	3.24
	SE2	3.22	3.07	3.77	3.54	3.58	3.48	2.66	2.95
Cocaine Lifetime									
Total	Point Estimates	15.38	15.94	13.36	11.93	10.82	10.29	10.81	9.78
	SE1	2.14	2.10	1.64	1.59	1.45	1.51	1.17	1.18
	SE2	2.10	1.94	1.66	1.49	1.43	1.47	1.16	1.06
12-17	Point Estimates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-25	Point Estimates	5.81	5.95	8.37	8.86	7.62	5.84	6.48	5.94
	SE1	1.98	2.09	2.50	2.65	2.38	1.87	2.39	2.81
	SE2	2.02	2.10	2.48	2.21	2.38	2.01	2.39	2.66
26-34	Point Estimates	17.38	19.88	11.09	11.58	12.20	13.09	10.66	9.44
	SE1	2.41	2.80	3.46	3.34	3.26	4.07	2.72	2.51
	SE2	2.54	2.72	3.45	3.55	3.24	3.76	2.75	2.45
35+	Point Estimates	18.46	18.81	16.32	14.21	12.51	11.76	13.75	12.38
	SE1	2.91	2.89	2.28	2.29	2.06	2.13	1.90	1.88
	SE2	2.85	2.69	2.31	2.23	2.06	2.06	1.87	1.70

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

Table 9.4a 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, Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year											
Total	Point Estimates	19.73	19.72	17.20	16.25	20.18	21.17	15.37	15.96	25.25	26.11
	SE1	0.56	0.59	1.68	1.80	2.63	2.61	2.57	2.77	3.10	3.40
	SE2	0.51	0.50	1.47	1.52	2.55	2.31	2.45	1.95	3.10	3.13
12-17	Point Estimates	5.02	4.93	4.44	4.82	2.36	2.37	1.93	1.89	5.85	5.74
	SE1	0.54	0.52	1.25	1.35	1.31	1.36	1.22	1.21	1.96	2.01
	SE2	0.53	0.48	1.26	1.34	1.30	1.35	1.23	1.23	1.94	1.81
18-25	Point Estimates	25.73	25.50	19.21	19.73	20.76	21.47	22.68	22.25	28.33	29.10
	SE1	1.09	1.15	2.72	3.41	2.99	3.05	7.39	6.48	6.03	6.08
	SE2	1.07	1.12	2.55	3.38	3.00	3.16	7.24	5.67	5.96	5.52
26-34	Point Estimates	27.81	26.89	18.72	14.70	30.28	32.12	21.81	20.39	31.30	31.35
	SE1	1.39	1.40	3.13	2.75	6.97	7.36	4.71	4.17	5.30	5.29
	SE2	1.30	1.28	3.00	2.84	6.85	6.67	4.62	3.59	5.39	5.88
35+	Point Estimates	18.82	19.08	18.31	17.63	20.21	21.13	14.53	15.79	26.03	27.18
	SE1	0.74	0.80	2.36	2.56	2.99	2.99	2.60	3.19	3.98	4.48
	SE2	0.69	0.67	2.17	2.58	2.93	2.67	2.50	2.08	4.03	4.48
Alcohol Past Year											
Total	Point Estimates	65.60	65.55	63.37	63.57	70.09	70.40	66.62	69.02	66.69	67.15
	SE1	0.70	0.74	2.33	2.49	2.80	2.77	3.61	3.26	3.77	4.13
	SE2	0.59	0.57	1.98	2.28	2.61	2.37	3.36	2.76	3.70	3.54
12-17	Point Estimates	21.42	21.30	19.48	20.90	16.16	15.98	18.12	17.41	17.50	17.19
	SE1	0.99	1.00	2.30	2.52	4.18	4.23	3.25	3.19	4.05	4.09
	SE2	0.98	0.93	2.40	2.83	4.11	3.99	3.29	3.22	3.98	3.44
18-25	Point Estimates	73.71	75.24	72.99	72.19	68.15	70.12	70.71	73.63	76.32	77.38
	SE1	1.09	1.21	3.49	4.18	3.51	3.61	4.60	3.93	6.29	6.49
	SE2	1.07	1.30	3.53	4.32	3.55	3.73	4.60	4.39	6.25	5.82
26-34	Point Estimates	78.28	77.54	77.72	77.17	78.45	80.23	74.51	76.68	85.26	85.44
	SE1	1.29	1.42	3.79	4.20	4.52	4.53	6.72	6.47	4.82	4.80
	SE2	1.20	1.17	3.73	4.49	4.46	4.36	6.81	6.02	4.82	4.66
35+	Point Estimates	67.38	67.20	64.22	64.58	75.02	74.76	70.98	73.81	67.66	68.08
	SE1	0.93	1.01	3.04	3.30	3.56	3.45	5.09	4.46	5.21	5.62
	SE2	0.82	0.79	2.38	2.76	3.29	2.95	4.75	3.80	5.15	5.11

(continued)

Table 9.4a 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, Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year									
Total	Point Estimates	20.84	20.68	22.32	24.98	26.56	26.86	15.31	14.85
	SE1	2.20	1.90	3.43	3.75	4.29	4.77	1.74	1.89
	SE2	2.06	1.67	3.44	3.27	4.10	3.84	1.74	1.70
12-17	Point Estimates	7.54	7.77	13.47	13.74	9.00	9.91	7.54	5.86
	SE1	2.93	3.07	3.77	4.06	2.60	2.77	3.41	3.04
	SE2	2.93	3.05	3.74	3.80	2.55	2.75	3.50	2.80
18-25	Point Estimates	33.06	30.30	21.33	20.45	22.97	21.49	27.73	26.94
	SE1	5.20	5.46	6.23	5.86	5.99	6.07	5.05	5.35
	SE2	5.21	5.68	6.19	5.65	6.00	5.55	5.03	4.83
26-34	Point Estimates	31.93	31.70	30.88	33.35	34.05	25.44	16.09	15.66
	SE1	6.75	6.43	5.32	6.01	7.44	6.83	5.68	6.20
	SE2	6.52	5.88	5.47	5.87	7.36	7.06	5.15	4.97
35+	Point Estimates	17.77	17.87	21.72	25.57	27.78	30.23	13.76	13.58
	SE1	2.37	2.57	3.84	4.32	6.31	7.15	2.81	2.88
	SE2	2.33	2.36	3.85	3.68	6.00	5.68	2.77	2.68
Alcohol Past Year									
Total	Point Estimates	61.54	60.71	66.93	66.47	66.02	67.41	66.13	66.65
	SE1	2.75	2.99	2.42	2.63	3.97	4.39	3.05	3.19
	SE2	2.34	2.13	2.38	2.31	3.65	2.91	2.47	2.19
12-17	Point Estimates	24.18	24.18	29.62	30.35	14.78	15.04	24.95	24.58
	SE1	4.14	4.94	2.99	3.17	4.41	4.29	5.79	5.56
	SE2	4.09	3.87	3.00	3.09	4.42	4.33	5.89	5.64
18-25	Point Estimates	61.75	67.82	80.26	81.02	77.87	83.65	78.94	79.84
	SE1	7.04	6.13	5.58	6.05	2.93	2.01	3.61	3.89
	SE2	6.71	5.14	5.67	5.47	3.08	3.12	3.68	3.37
26-34	Point Estimates	60.93	60.71	84.79	86.52	82.51	79.87	72.85	73.12
	SE1	5.92	7.31	3.74	4.19	5.47	7.44	6.49	6.33
	SE2	5.62	5.09	3.77	4.23	5.28	7.53	5.70	4.74
35+	Point Estimates	66.03	63.95	65.27	64.44	66.77	68.53	68.87	69.43
	SE1	3.26	3.77	3.57	3.74	5.19	6.22	3.71	4.23
	SE2	2.88	2.89	3.50	3.19	4.92	4.64	3.36	3.14

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.4b 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, Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year											
Total	Point Estimates	17.19	17.09	14.45	14.56	16.12	15.53	20.04	20.11	17.43	16.61
	SE1	0.50	0.54	1.81	2.03	2.02	2.15	2.67	2.76	2.06	2.21
	SE2	0.47	0.45	1.71	1.69	1.92	1.74	2.51	2.24	2.00	2.01
12-17	Point Estimates	3.08	2.82	0.00	0.00	0.60	0.59	4.32	6.31	9.71	7.74
	SE1	0.49	0.46	0.00	0.00	0.61	0.60	2.27	3.91	4.53	3.83
	SE2	0.48	0.45	0.00	0.00	0.61	0.62	2.28	3.01	4.55	3.74
18-25	Point Estimates	18.11	17.71	12.81	10.97	19.81	20.56	12.78	14.99	18.20	17.82
	SE1	0.95	0.98	3.66	3.26	4.46	4.64	3.17	4.03	4.38	4.46
	SE2	0.94	0.97	3.64	2.50	4.37	4.48	3.20	3.84	4.34	4.34
26-34	Point Estimates	26.91	26.26	22.24	21.69	32.71	33.82	31.57	29.27	20.05	19.54
	SE1	1.27	1.31	4.39	4.25	6.25	7.00	6.36	5.62	4.04	4.00
	SE2	1.25	1.17	4.31	4.12	6.25	6.52	6.28	5.42	4.08	4.30
35+	Point Estimates	16.79	16.89	14.85	15.54	14.12	12.94	21.03	20.97	18.07	16.95
	SE1	0.68	0.75	2.57	2.94	2.68	2.61	3.57	3.74	2.71	3.11
	SE2	0.64	0.60	2.43	2.35	2.56	2.23	3.39	3.08	2.59	2.90
Alcohol Past Year											
Total	Point Estimates	62.52	62.82	63.81	64.48	67.45	65.18	68.93	68.99	70.47	71.66
	SE1	0.66	0.70	2.34	2.51	2.61	2.89	2.61	2.97	2.85	2.89
	SE2	0.59	0.55	2.06	1.90	2.49	2.16	2.56	2.43	2.77	2.31
12-17	Point Estimates	15.24	15.79	15.68	19.98	15.28	15.18	27.76	30.55	16.56	12.95
	SE1	1.19	1.30	4.14	5.57	4.81	4.83	6.70	8.49	5.99	5.16
	SE2	1.16	1.16	4.13	5.24	4.84	4.67	6.63	7.23	5.98	4.83
18-25	Point Estimates	61.36	63.76	62.67	65.35	58.96	55.76	56.81	59.39	66.49	67.74
	SE1	1.39	1.35	3.93	3.57	6.06	6.85	6.94	6.43	5.53	5.70
	SE2	1.35	1.20	3.98	3.81	6.00	6.74	7.04	6.14	5.53	5.73
26-34	Point Estimates	73.71	74.74	72.65	73.77	78.41	76.73	79.21	80.28	85.58	86.08
	SE1	1.32	1.31	3.81	4.04	4.52	4.83	6.32	4.78	3.44	3.31
	SE2	1.27	1.17	3.78	3.99	4.53	4.55	6.19	4.39	3.48	3.48
35+	Point Estimates	66.81	66.51	68.71	68.38	72.40	70.06	74.76	73.69	77.21	77.19
	SE1	0.88	0.97	3.21	3.44	3.32	3.77	3.34	4.06	3.36	3.43
	SE2	0.82	0.77	2.98	2.77	3.15	2.73	3.30	3.24	3.35	3.13

(continued)

Table 9.4b 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, Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year									
Total	Point Estimates	17.94	18.04	22.88	23.42	20.92	21.23	17.12	17.44
	SE1	1.79	1.71	2.80	3.31	2.15	2.32	1.99	2.14
	SE2	1.80	1.39	2.60	1.83	2.11	2.13	1.81	1.76
12-17	Point Estimates	2.07	2.20	2.12	2.08	5.32	4.50	1.10	0.93
	SE1	1.11	1.25	1.47	1.33	2.88	2.47	0.70	0.64
	SE2	1.09	1.24	1.47	1.37	2.89	2.37	0.69	0.63
18-25	Point Estimates	17.05	18.69	19.09	16.91	23.20	23.89	13.86	19.08
	SE1	3.13	3.15	2.97	2.48	4.16	4.62	3.54	5.09
	SE2	3.18	3.00	2.91	2.93	4.17	4.45	3.51	4.97
26-34	Point Estimates	23.86	23.63	29.81	27.56	30.34	32.63	27.46	25.55
	SE1	3.60	3.43	6.03	5.37	4.98	6.08	5.10	5.29
	SE2	3.73	3.58	5.90	5.04	4.90	5.47	5.06	5.02
35+	Point Estimates	18.66	18.56	24.62	26.66	20.35	20.48	17.96	17.84
	SE1	2.58	2.62	3.51	4.32	2.98	3.13	2.91	3.08
	SE2	2.48	1.99	3.28	2.57	2.96	2.89	2.65	2.35
Alcohol Past Year									
Total	Point Estimates	60.76	62.53	60.80	59.92	68.24	67.24	56.60	57.78
	SE1	2.27	2.43	2.97	3.20	2.34	2.66	2.85	2.86
	SE2	2.17	2.25	2.84	2.37	2.31	2.35	2.66	2.31
12-17	Point Estimates	13.73	16.11	13.90	13.77	15.16	12.87	7.91	7.34
	SE1	3.03	3.59	5.04	5.25	4.44	3.97	3.28	3.06
	SE2	3.05	3.60	5.06	5.18	4.46	3.67	3.27	2.99
18-25	Point Estimates	62.29	64.16	61.85	64.33	67.78	66.88	48.92	58.61
	SE1	6.71	6.42	5.40	6.26	4.59	4.90	6.47	6.55
	SE2	6.91	5.49	5.35	4.72	4.58	4.89	6.42	5.44
26-34	Point Estimates	70.03	69.71	71.87	74.80	79.78	77.41	64.78	68.01
	SE1	4.62	4.76	5.45	4.11	4.43	5.44	6.70	6.26
	SE2	4.76	4.58	5.45	4.21	4.44	4.90	6.40	5.01
35+	Point Estimates	63.97	66.28	63.86	62.26	72.59	71.99	64.88	63.68
	SE1	3.32	3.63	3.92	4.34	2.99	3.21	3.50	3.56
	SE2	3.00	3.07	3.78	3.45	3.00	3.18	3.44	3.03

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

Table 9.5a 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, Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year											
Total	Point Estimates	17.83	17.69	21.08	20.79	17.29	16.80	21.93	21.80	24.78	25.02
	SE1	0.52	0.52	1.68	1.63	2.13	2.17	3.53	3.43	3.51	3.62
	SE2	0.46	0.43	1.59	1.52	2.12	2.19	3.27	2.45	3.36	2.76
12-17	Point Estimates	12.74	12.72	13.82	14.49	11.85	11.75	13.10	12.04	18.04	18.78
	SE1	0.70	0.70	1.68	1.57	3.99	3.99	2.66	2.52	2.64	2.67
	SE2	0.70	0.67	1.71	1.54	3.89	3.55	2.69	2.73	2.61	2.48
18-25	Point Estimates	36.49	37.05	37.18	39.66	35.71	35.67	43.81	44.21	53.72	55.90
	SE1	1.27	1.39	3.51	4.24	2.85	2.90	6.06	5.64	6.02	6.41
	SE2	1.24	1.43	3.29	4.22	2.87	3.00	6.15	5.92	6.07	6.31
26-34	Point Estimates	28.81	27.80	32.29	28.81	29.12	29.00	43.47	41.02	34.86	33.82
	SE1	1.50	1.44	4.62	4.16	6.33	6.23	8.04	7.67	7.33	7.14
	SE2	1.38	1.22	4.58	4.02	6.39	5.79	7.81	6.56	7.31	6.97
35+	Point Estimates	12.50	12.40	15.92	15.92	12.89	12.09	14.60	14.62	18.12	18.10
	SE1	0.57	0.58	1.52	1.60	1.92	1.94	3.37	3.41	3.81	3.65
	SE2	0.53	0.51	1.45	1.51	1.96	2.25	3.23	2.79	3.76	3.24
Cocaine Past Year											
Total	Point Estimates	1.97	1.87	2.49	2.57	2.50	2.48	2.72	3.06	3.13	2.83
	SE1	0.17	0.17	0.55	0.70	0.70	0.69	0.94	1.13	1.31	1.33
	SE2	0.16	0.15	0.53	0.61	0.69	0.66	0.93	1.00	1.26	1.11
12-17	Point Estimates	0.55	0.61	1.34	1.37	1.60	1.63	0.00	0.00	0.00	0.00
	SE1	0.18	0.20	0.78	0.81	1.39	1.44	0.00	0.00	0.00	0.00
	SE2	0.18	0.19	0.79	0.79	1.38	1.39	0.00	0.00	0.00	0.00
18-25	Point Estimates	4.67	4.94	8.26	8.48	5.39	6.34	3.97	3.91	3.14	2.24
	SE1	0.53	0.60	2.53	3.03	2.37	2.78	2.08	2.14	1.56	1.10
	SE2	0.52	0.56	2.50	2.67	2.40	2.76	2.10	2.05	1.57	1.17
26-34	Point Estimates	3.96	3.36	3.42	3.46	3.53	3.44	3.86	3.61	6.20	4.77
	SE1	0.69	0.57	1.45	1.45	2.22	2.21	2.36	2.21	2.99	2.57
	SE2	0.67	0.59	1.44	1.40	2.21	2.35	2.36	2.26	3.01	2.78
35+	Point Estimates	1.20	1.13	1.26	1.34	1.98	1.80	2.62	3.21	2.91	2.91
	SE1	0.18	0.17	0.62	0.73	0.86	0.79	1.13	1.55	1.81	1.95
	SE2	0.17	0.15	0.60	0.65	0.85	0.74	1.10	1.29	1.75	1.62

(continued)

Table 9.5a 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, Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year									
Total	Point Estimates	17.84	17.81	17.03	17.22	17.35	18.37	11.67	10.81
	SE1	2.25	2.20	2.53	2.83	3.50	3.32	1.83	1.51
	SE2	2.03	1.63	2.53	2.34	3.21	2.68	1.71	1.35
12-17	Point Estimates	18.19	16.35	15.26	16.42	13.37	13.82	12.87	12.37
	SE1	4.37	4.19	3.47	4.08	3.68	3.72	3.43	3.07
	SE2	4.35	4.09	3.47	3.70	3.61	3.67	3.51	3.09
18-25	Point Estimates	34.72	35.05	31.39	34.25	29.84	28.04	26.09	26.75
	SE1	5.55	5.08	5.70	6.22	6.45	5.94	4.68	5.12
	SE2	5.61	4.53	5.75	6.73	6.25	4.81	4.71	5.07
26-34	Point Estimates	32.81	35.71	27.50	28.12	28.76	22.28	14.02	11.30
	SE1	7.03	6.93	4.50	5.02	7.18	6.62	3.74	2.79
	SE2	6.82	6.12	4.44	4.66	7.15	6.88	3.82	3.18
35+	Point Estimates	11.47	10.51	11.83	11.81	13.28	16.42	7.64	6.93
	SE1	1.91	1.76	2.62	2.88	4.99	5.12	1.85	1.56
	SE2	1.84	1.81	2.63	2.38	4.57	3.95	1.78	1.63
Cocaine Past Year									
Total	Point Estimates	3.71	3.61	1.05	0.83	1.87	1.66	0.66	0.69
	SE1	1.08	1.02	0.51	0.38	0.89	0.79	0.28	0.29
	SE2	0.99	0.80	0.50	0.34	0.87	0.72	0.28	0.29
12-17	Point Estimates	0.00	0.00	0.00	0.00	0.94	0.84	1.01	1.14
	SE1	0.00	0.00	0.00	0.00	0.89	0.80	1.00	1.12
	SE2	0.00	0.00	0.00	0.00	0.90	0.82	1.00	1.09
18-25	Point Estimates	6.15	6.15	2.85	2.49	3.27	3.48	3.42	3.61
	SE1	2.13	2.15	2.18	1.77	2.89	2.69	1.89	1.91
	SE2	2.09	2.21	2.13	1.36	2.86	2.57	1.87	1.90
26-34	Point Estimates	9.51	8.35	2.22	2.03	8.90	5.03	0.21	0.11
	SE1	4.27	4.52	1.47	1.40	5.04	2.97	0.21	0.11
	SE2	4.04	3.82	1.48	1.45	4.99	2.87	0.21	0.13
35+	Point Estimates	2.41	2.46	0.55	0.38	0.29	0.73	0.11	0.12
	SE1	0.81	0.82	0.55	0.37	0.30	0.75	0.11	0.12
	SE2	0.77	0.80	0.55	0.37	0.29	0.55	0.11	0.14

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.5b 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, Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year											
Total	Point Estimates	18.10	18.16	21.47	22.14	19.16	18.71	24.17	24.00	23.50	23.46
	SE1	0.48	0.52	1.92	2.17	2.17	2.15	2.31	2.58	2.35	2.69
	SE2	0.45	0.43	1.86	1.80	2.06	1.86	2.20	2.15	2.38	2.67
12-17	Point Estimates	7.71	7.54	5.67	6.07	7.23	7.12	16.05	16.79	8.50	6.19
	SE1	0.82	0.86	2.52	3.13	3.30	3.38	4.05	4.73	3.61	2.93
	SE2	0.80	0.80	2.53	3.02	3.31	3.36	4.05	4.26	3.56	2.80
18-25	Point Estimates	30.63	31.99	29.92	30.85	33.36	30.49	36.75	40.31	36.19	37.98
	SE1	1.16	1.25	4.38	4.57	4.88	4.75	6.01	5.97	5.05	5.28
	SE2	1.12	1.11	4.34	4.40	4.92	4.67	6.01	5.83	5.05	5.07
26-34	Point Estimates	28.32	28.19	38.38	38.61	35.63	35.08	36.44	33.87	29.71	28.81
	SE1	1.16	1.24	4.31	4.60	6.86	7.25	5.52	4.71	4.80	4.65
	SE2	1.12	1.23	4.19	4.34	6.84	6.93	5.41	4.26	4.80	4.75
35+	Point Estimates	14.89	14.78	17.73	18.56	15.25	15.09	20.07	19.78	22.61	21.90
	SE1	0.63	0.67	2.65	2.96	2.31	2.39	3.31	3.72	3.22	3.70
	SE2	0.60	0.56	2.64	2.41	2.15	2.03	3.18	3.00	3.25	3.65
Cocaine Past Year											
Total	Point Estimates	1.84	1.86	2.60	2.49	1.80	1.63	2.71	2.84	1.26	1.62
	SE1	0.14	0.15	0.62	0.62	0.63	0.56	0.92	0.96	0.43	0.69
	SE2	0.14	0.14	0.61	0.62	0.62	0.54	0.91	0.90	0.42	0.58
12-17	Point Estimates	0.09	0.06	0.00	0.00	0.00	0.00	0.00	0.00	1.03	0.43
	SE1	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.44
	SE2	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	1.04	0.44
18-25	Point Estimates	3.53	3.66	6.17	4.13	2.41	2.84	3.75	5.05	3.18	3.25
	SE1	0.42	0.43	2.38	1.67	1.27	1.47	1.77	2.42	2.17	2.18
	SE2	0.42	0.41	2.38	1.22	1.28	1.45	1.80	2.51	2.17	2.24
26-34	Point Estimates	4.03	3.84	2.25	3.13	7.55	6.49	3.97	3.80	2.35	2.09
	SE1	0.48	0.48	0.87	1.39	3.51	3.36	2.01	1.99	1.42	1.30
	SE2	0.48	0.47	0.90	1.37	3.50	3.20	2.03	2.06	1.44	1.62
35+	Point Estimates	1.28	1.33	2.36	2.37	0.81	0.70	2.60	2.61	0.75	1.37
	SE1	0.17	0.18	0.86	0.85	0.45	0.36	1.32	1.36	0.44	0.93
	SE2	0.17	0.18	0.86	0.85	0.45	0.35	1.30	1.22	0.43	0.70

(continued)

Table 9.5b 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, Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year									
Total	Point Estimates	19.20	19.76	17.34	16.29	17.50	16.47	12.10	12.26
	SE1	1.77	1.88	1.87	1.81	2.18	2.29	1.54	1.60
	SE2	1.78	1.82	1.87	1.66	2.16	2.06	1.46	1.44
12-17	Point Estimates	7.26	6.78	5.00	4.06	5.07	4.40	1.84	1.67
	SE1	1.79	1.84	2.01	1.67	2.70	2.35	1.33	1.30
	SE2	1.76	1.82	2.01	1.67	2.71	2.34	1.34	1.28
18-25	Point Estimates	27.07	24.66	34.41	32.18	28.66	26.68	16.53	19.84
	SE1	4.59	3.79	5.28	6.00	4.21	4.72	3.79	4.82
	SE2	4.59	3.68	5.41	5.56	4.21	4.56	3.58	3.74
26-34	Point Estimates	35.16	36.10	31.00	27.48	29.90	27.47	15.97	16.80
	SE1	4.23	4.00	5.34	4.51	5.32	5.16	3.59	3.86
	SE2	4.20	3.92	5.36	4.96	5.32	5.15	3.62	3.44
35+	Point Estimates	15.71	16.61	12.80	12.64	14.19	13.90	11.93	11.28
	SE1	2.37	2.57	2.45	2.56	2.59	2.84	2.34	2.27
	SE2	2.34	2.41	2.44	2.37	2.57	2.56	2.23	2.14
Cocaine Past Year									
Total	Point Estimates	2.79	3.16	2.05	1.89	1.05	0.90	0.77	0.90
	SE1	0.57	0.67	0.66	0.60	0.51	0.41	0.36	0.48
	SE2	0.56	0.61	0.65	0.53	0.51	0.40	0.35	0.49
12-17	Point Estimates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-25	Point Estimates	2.59	2.25	5.74	5.66	2.03	2.08	1.38	1.86
	SE1	0.94	0.82	2.24	2.34	1.17	1.24	0.85	1.51
	SE2	0.95	0.83	2.24	2.01	1.16	1.49	0.85	1.55
26-34	Point Estimates	7.43	8.21	1.13	1.37	0.76	0.72	1.49	1.25
	SE1	2.24	2.59	0.85	0.99	0.53	0.52	1.02	0.83
	SE2	2.31	2.46	0.84	1.00	0.53	0.52	1.03	0.84
35+	Point Estimates	2.15	2.52	1.78	1.57	1.08	0.85	0.59	0.76
	SE1	0.79	0.96	0.84	0.70	0.75	0.56	0.50	0.67
	SE2	0.77	0.85	0.83	0.68	0.74	0.52	0.48	0.75

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

Table 9.6a 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, Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month											
Total	Point Estimates	16.28	16.01	13.51	12.52	17.79	18.59	12.18	12.40	21.58	22.44
	SE1	0.54	0.56	1.73	1.92	2.48	2.49	2.56	2.68	2.94	3.25
	SE2	0.49	0.47	1.51	1.58	2.36	2.05	2.38	1.81	2.93	2.95
12-17	Point Estimates	1.93	1.94	1.14	1.12	2.11	2.14	0.00	0.00	0.71	0.70
	SE1	0.41	0.40	0.74	0.75	1.29	1.35	0.00	0.00	0.70	0.70
	SE2	0.38	0.35	0.75	0.74	1.29	1.34	0.00	0.00	0.70	0.68
18-25	Point Estimates	17.39	16.73	9.70	9.74	16.55	16.97	17.38	16.74	18.06	17.60
	SE1	1.01	1.01	2.30	2.84	3.06	3.26	8.57	7.40	5.10	4.84
	SE2	1.00	1.01	2.21	2.65	3.09	3.43	8.42	6.51	5.00	4.34
26-34	Point Estimates	22.32	20.84	15.25	11.66	24.79	25.88	14.55	14.06	25.73	25.36
	SE1	1.22	1.17	2.95	2.56	6.09	6.67	4.68	3.91	4.11	3.86
	SE2	1.15	1.19	2.81	2.82	5.97	6.09	4.46	2.71	4.29	4.81
35+	Point Estimates	16.70	16.76	15.68	14.96	18.44	19.30	12.41	12.98	24.20	25.68
	SE1	0.73	0.78	2.36	2.71	3.03	3.04	2.67	3.11	3.84	4.37
	SE2	0.68	0.65	2.17	2.59	2.90	2.48	2.55	2.16	3.86	4.27
Alcohol Past Month											
Total	Point Estimates	51.14	51.01	50.89	50.21	56.64	56.98	53.98	54.66	52.68	53.16
	SE1	0.75	0.78	2.85	2.97	3.34	3.19	3.78	3.41	4.19	4.62
	SE2	0.63	0.61	2.38	2.63	3.24	2.96	3.50	2.74	4.14	4.20
12-17	Point Estimates	9.92	9.88	8.74	9.11	10.49	10.49	7.71	7.24	8.92	8.63
	SE1	0.66	0.67	1.74	1.82	3.16	3.18	2.37	2.20	2.69	2.70
	SE2	0.66	0.63	1.75	1.80	3.10	2.93	2.39	2.19	2.65	2.29
18-25	Point Estimates	53.35	55.28	53.96	54.10	45.81	47.49	47.90	50.36	58.50	61.02
	SE1	1.29	1.41	4.00	4.83	4.57	4.73	5.51	5.24	6.77	7.28
	SE2	1.29	1.36	3.92	5.01	4.58	4.53	5.51	5.28	6.80	6.90
26-34	Point Estimates	61.56	61.13	58.69	57.71	64.17	64.68	62.21	62.74	70.01	70.19
	SE1	1.47	1.58	4.87	5.10	5.62	5.56	6.78	6.47	5.13	5.05
	SE2	1.35	1.37	4.80	5.33	5.59	5.43	6.58	4.83	5.15	5.06
35+	Point Estimates	54.15	53.68	54.55	53.51	62.16	62.26	59.85	60.43	53.89	54.08
	SE1	0.98	1.05	3.51	3.78	4.09	3.79	5.80	5.65	5.52	5.94
	SE2	0.86	0.80	2.76	3.00	4.01	3.70	5.50	4.81	5.48	5.46

(continued)

Table 9.6a 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, Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month									
Total	Point Estimates	17.08	16.50	18.91	21.35	24.51	24.57	12.40	12.00
	SE1	2.10	1.79	3.16	3.54	4.43	4.90	1.65	1.73
	SE2	2.02	1.78	3.17	3.06	4.24	3.93	1.63	1.64
12-17	Point Estimates	1.89	1.58	4.32	4.72	3.85	4.64	4.75	4.52
	SE1	0.96	0.79	1.91	2.06	1.96	2.34	3.18	3.05
	SE2	0.98	0.82	1.91	2.21	1.96	2.45	3.09	2.72
18-25	Point Estimates	21.86	19.49	14.44	13.26	20.27	18.15	19.92	19.46
	SE1	4.85	4.66	5.40	4.98	5.79	5.80	4.62	4.68
	SE2	4.75	4.42	5.37	4.61	5.81	5.31	4.58	4.74
26-34	Point Estimates	27.73	24.72	27.58	30.39	31.49	20.29	10.04	7.94
	SE1	6.59	6.40	5.22	5.82	7.48	6.00	3.78	3.26
	SE2	6.38	6.50	5.38	5.73	7.42	6.83	3.34	2.79
35+	Point Estimates	15.63	15.85	19.82	23.21	26.32	29.11	12.77	12.74
	SE1	2.34	2.58	3.63	4.29	6.48	7.28	2.85	2.89
	SE2	2.33	2.44	3.64	3.74	6.16	5.72	2.79	2.68
Alcohol Past Month									
Total	Point Estimates	47.04	46.71	52.41	51.87	51.04	53.67	47.61	49.43
	SE1	3.46	3.39	2.56	2.80	3.05	3.41	2.63	2.78
	SE2	2.85	2.11	2.52	2.40	2.82	2.56	1.99	1.82
12-17	Point Estimates	16.17	15.14	14.60	15.34	8.35	8.12	8.09	7.84
	SE1	3.05	3.29	2.98	3.12	3.76	3.59	3.25	3.10
	SE2	3.03	3.18	2.95	2.94	3.77	3.60	3.29	3.11
18-25	Point Estimates	46.61	49.73	66.06	66.30	56.68	65.79	51.34	55.60
	SE1	6.57	5.48	6.74	6.64	4.54	5.11	5.87	6.31
	SE2	6.31	5.27	6.74	6.13	4.93	5.99	6.11	5.52
26-34	Point Estimates	45.68	45.99	60.70	62.27	62.47	62.10	57.03	56.74
	SE1	6.05	7.50	5.85	6.33	6.64	7.41	5.57	5.80
	SE2	5.93	5.98	5.75	5.78	6.44	6.25	4.53	5.06
35+	Point Estimates	51.05	50.27	53.06	52.00	52.87	55.50	51.30	53.43
	SE1	4.19	4.08	3.62	3.86	4.34	5.26	3.39	3.79
	SE2	3.52	2.60	3.54	2.99	4.13	4.19	2.89	2.42

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.6b 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, Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month											
Total	Point Estimates	14.14	13.89	12.36	12.17	14.51	14.21	16.85	16.44	14.26	13.51
	SE1	0.47	0.51	1.67	1.88	1.96	2.07	2.49	2.60	1.91	2.08
	SE2	0.44	0.43	1.59	1.70	1.85	1.68	2.37	2.10	1.85	1.84
12-17	Point Estimates	1.05	0.86	0.00	0.00	0.00	0.00	1.04	0.90	4.06	3.34
	SE1	0.27	0.21	0.00	0.00	0.00	0.00	1.06	0.93	3.02	2.51
	SE2	0.25	0.21	0.00	0.00	0.00	0.00	1.07	0.94	3.04	2.47
18-25	Point Estimates	11.53	11.09	9.04	7.76	10.89	13.65	9.35	10.81	12.17	11.75
	SE1	0.77	0.75	2.98	2.69	3.53	4.39	2.76	3.45	3.60	3.59
	SE2	0.77	0.78	2.98	1.83	3.49	4.34	2.79	3.39	3.54	3.46
26-34	Point Estimates	21.14	20.02	17.46	15.96	32.01	33.40	21.38	19.03	13.73	13.88
	SE1	1.17	1.19	4.02	3.83	6.20	6.99	4.81	4.39	3.63	3.77
	SE2	1.15	1.03	3.93	3.74	6.21	6.49	4.73	4.23	3.67	3.86
35+	Point Estimates	14.86	14.85	13.49	13.82	13.30	12.21	19.50	19.11	16.44	15.12
	SE1	0.65	0.71	2.41	2.76	2.62	2.56	3.47	3.60	2.55	2.93
	SE2	0.60	0.58	2.30	2.41	2.49	2.19	3.32	3.00	2.44	2.79
Alcohol Past Month											
Total	Point Estimates	48.78	49.04	52.01	52.50	51.54	50.67	60.90	60.13	49.44	49.02
	SE1	0.65	0.69	2.23	2.50	2.96	3.02	2.62	3.03	3.14	3.34
	SE2	0.58	0.57	2.01	2.15	2.80	2.41	2.60	2.62	3.08	3.00
12-17	Point Estimates	6.27	6.62	3.88	5.28	10.02	10.10	19.91	20.84	6.89	5.31
	SE1	0.80	0.91	1.67	2.57	4.50	4.54	6.42	6.57	3.12	2.61
	SE2	0.79	0.82	1.66	2.51	4.52	4.27	6.38	6.10	3.09	2.41
18-25	Point Estimates	45.42	47.75	42.06	44.82	44.02	42.91	43.97	45.45	46.99	48.79
	SE1	1.34	1.41	4.17	4.41	5.55	6.02	6.41	5.97	5.58	5.77
	SE2	1.31	1.26	4.08	4.19	5.54	6.02	6.47	5.33	5.59	5.84
26-34	Point Estimates	59.51	60.66	62.63	63.96	58.40	55.63	66.16	65.94	66.50	66.38
	SE1	1.35	1.37	4.11	4.31	5.36	6.15	6.22	5.06	5.55	5.51
	SE2	1.31	1.22	4.13	3.68	5.38	5.77	6.13	4.86	5.55	5.57
35+	Point Estimates	52.92	52.58	58.18	57.89	55.94	55.50	68.80	67.13	53.63	51.23
	SE1	0.89	0.96	3.06	3.42	4.16	4.23	3.35	4.23	3.99	4.44
	SE2	0.82	0.82	2.87	3.22	3.86	3.19	3.33	3.51	3.92	4.15

(continued)

Table 9.6b 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, Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month									
Total	Point Estimates	13.49	13.59	17.81	17.64	16.52	17.04	14.30	14.01
	SE1	1.65	1.61	2.64	3.11	2.22	2.45	1.89	2.00
	SE2	1.64	1.35	2.46	1.88	2.21	2.29	1.72	1.74
12-17	Point Estimates	1.07	1.26	1.70	1.47	0.41	0.33	0.21	0.10
	SE1	0.82	0.96	1.39	1.17	0.40	0.32	0.21	0.10
	SE2	0.81	0.96	1.40	1.23	0.40	0.32	0.20	0.12
18-25	Point Estimates	12.12	11.74	11.92	10.30	16.76	17.49	7.12	10.08
	SE1	3.36	3.15	2.34	2.10	4.00	4.59	2.26	3.38
	SE2	3.39	2.91	2.36	2.12	4.06	4.47	2.26	3.50
26-34	Point Estimates	14.57	13.57	17.63	15.22	22.27	23.75	21.55	18.62
	SE1	2.86	2.59	4.96	4.23	3.96	4.46	4.06	3.92
	SE2	2.92	2.81	4.86	4.22	3.99	4.36	4.01	3.93
35+	Point Estimates	14.95	15.46	20.85	21.73	17.25	17.64	16.49	16.07
	SE1	2.29	2.40	3.45	4.22	2.99	3.20	2.89	3.00
	SE2	2.20	1.88	3.24	2.77	2.99	3.00	2.66	2.40
Alcohol Past Month									
Total	Point Estimates	49.28	51.40	44.72	44.05	53.44	52.36	43.18	43.61
	SE1	2.28	2.30	2.82	2.97	2.47	2.78	2.51	2.71
	SE2	2.18	2.11	2.69	2.31	2.44	2.28	2.34	2.19
12-17	Point Estimates	8.44	9.16	4.21	3.38	3.18	2.55	2.05	1.86
	SE1	2.56	2.94	2.68	2.20	2.48	2.00	1.36	1.32
	SE2	2.56	2.96	2.68	2.19	2.49	1.96	1.36	1.30
18-25	Point Estimates	41.26	46.35	46.94	49.94	49.20	48.09	34.31	41.25
	SE1	4.76	5.26	5.48	6.40	4.86	5.29	6.11	7.02
	SE2	5.04	4.62	5.43	4.93	4.95	5.42	6.00	5.86
26-34	Point Estimates	62.64	62.75	56.41	59.56	63.40	60.40	50.26	53.41
	SE1	4.60	4.95	5.94	5.47	4.58	5.35	5.92	5.74
	SE2	4.74	4.77	5.83	5.42	4.63	5.19	5.71	4.94
35+	Point Estimates	52.58	54.87	46.68	45.23	58.49	57.67	50.66	48.80
	SE1	3.41	3.34	3.75	3.95	3.30	3.55	3.37	3.78
	SE2	3.18	2.86	3.64	3.23	3.25	3.23	3.27	3.28

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

Table 9.7a 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, Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month											
Total	Point Estimates	11.45	11.40	14.48	13.73	10.91	10.74	15.97	15.74	18.50	19.14
	SE1	0.41	0.41	1.39	1.21	1.99	1.99	3.31	3.31	3.26	3.44
	SE2	0.36	0.34	1.25	1.00	1.86	1.77	3.09	2.43	3.14	2.69
12-17	Point Estimates	7.43	7.43	9.91	10.17	5.09	5.17	8.55	8.10	9.95	10.85
	SE1	0.56	0.56	1.70	1.65	1.84	1.91	1.99	1.90	3.32	3.76
	SE2	0.55	0.54	1.72	1.79	1.80	1.75	2.02	1.90	3.30	3.52
18-25	Point Estimates	23.91	24.29	24.11	25.41	26.63	26.02	35.82	35.58	38.05	41.28
	SE1	1.16	1.19	3.48	3.89	3.53	3.50	7.25	6.54	4.84	5.19
	SE2	1.14	1.41	3.38	4.18	3.57	3.57	7.34	6.41	4.93	5.44
26-34	Point Estimates	19.93	19.15	22.59	19.65	18.99	18.87	29.62	27.06	27.84	28.18
	SE1	1.32	1.29	4.08	4.14	5.95	5.78	9.94	9.37	7.09	6.79
	SE2	1.23	1.11	3.93	3.70	5.90	5.29	9.64	7.32	7.07	6.57
35+	Point Estimates	7.71	7.74	11.04	10.42	7.68	7.44	10.46	10.54	14.02	14.12
	SE1	0.45	0.47	1.54	1.58	1.97	1.93	2.71	2.85	3.48	3.45
	SE2	0.41	0.38	1.39	1.19	1.84	1.75	2.60	2.33	3.43	2.92
Cocaine Past Month											
Total	Point Estimates	0.77	0.71	1.16	1.34	1.64	1.59	0.41	0.37	2.24	2.02
	SE1	0.12	0.11	0.43	0.54	0.56	0.56	0.34	0.29	1.26	1.29
	SE2	0.11	0.10	0.42	0.49	0.56	0.55	0.34	0.29	1.21	1.04
12-17	Point Estimates	0.06	0.09	0.00	0.00	0.23	0.22	0.00	0.00	0.00	0.00
	SE1	0.04	0.07	0.00	0.00	0.24	0.23	0.00	0.00	0.00	0.00
	SE2	0.04	0.04	0.00	0.00	0.24	0.24	0.00	0.00	0.00	0.00
18-25	Point Estimates	1.59	1.76	2.92	2.98	4.01	4.52	0.00	0.00	2.14	1.38
	SE1	0.32	0.37	1.36	1.54	2.28	2.45	0.00	0.00	1.35	0.78
	SE2	0.32	0.35	1.31	1.44	2.29	2.44	0.00	0.00	1.35	0.83
26-34	Point Estimates	1.12	0.96	2.05	2.64	2.45	2.15	0.89	0.82	3.12	2.38
	SE1	0.32	0.26	1.06	1.32	1.87	1.73	0.98	0.92	1.97	1.63
	SE2	0.32	0.24	1.06	1.25	1.85	1.75	0.99	0.95	1.97	1.61
35+	Point Estimates	0.63	0.54	0.74	0.88	1.29	1.18	0.44	0.38	2.37	2.34
	SE1	0.15	0.14	0.55	0.69	0.60	0.56	0.33	0.28	1.76	1.89
	SE2	0.14	0.12	0.54	0.61	0.62	0.59	0.33	0.27	1.71	1.56

(continued)

Table 9.7a 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, Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month									
Total	Point Estimates	10.93	10.98	11.59	11.93	11.69	12.27	6.70	6.14
	SE1	1.40	1.11	1.95	2.04	2.14	2.39	1.04	0.82
	SE2	1.23	0.86	1.97	1.67	2.02	1.99	1.00	0.74
12-17	Point Estimates	11.89	11.60	5.14	5.31	6.71	7.69	8.66	8.06
	SE1	3.69	3.78	1.88	2.04	3.13	3.41	2.65	2.41
	SE2	3.68	3.73	1.86	1.87	3.11	3.47	2.73	2.44
18-25	Point Estimates	26.30	26.26	20.81	23.40	22.18	18.00	13.26	15.05
	SE1	6.05	5.39	4.27	4.85	7.10	5.91	3.38	3.76
	SE2	6.04	4.66	4.42	5.63	6.91	4.68	3.20	3.23
26-34	Point Estimates	21.76	22.88	21.65	22.55	22.70	18.04	6.00	4.74
	SE1	5.00	5.26	4.45	4.73	6.49	5.40	3.46	2.52
	SE2	4.86	5.11	4.40	4.61	6.50	5.75	3.16	2.09
35+	Point Estimates	5.69	5.22	8.22	8.42	8.18	10.63	5.10	4.24
	SE1	1.22	1.03	2.38	2.45	2.90	3.73	1.36	1.00
	SE2	1.24	1.14	2.39	2.06	2.67	2.70	1.28	1.06
Cocaine Past Month									
Total	Point Estimates	1.30	1.49	0.49	0.37	0.00	0.00	0.33	0.33
	SE1	0.51	0.53	0.38	0.28	0.00	0.00	0.22	0.22
	SE2	0.49	0.50	0.38	0.28	0.00	0.00	0.22	0.22
12-17	Point Estimates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-25	Point Estimates	1.73	1.96	0.61	0.82	0.00	0.00	2.51	2.50
	SE1	1.23	1.30	0.63	0.86	0.00	0.00	1.69	1.68
	SE2	1.23	1.35	0.63	0.83	0.00	0.00	1.67	1.67
26-34	Point Estimates	2.40	1.61	0.42	0.22	0.00	0.00	0.00	0.00
	SE1	1.99	1.19	0.42	0.22	0.00	0.00	0.00	0.00
	SE2	2.03	1.22	0.43	0.23	0.00	0.00	0.00	0.00
35+	Point Estimates	1.13	1.56	0.55	0.38	0.00	0.00	0.00	0.00
	SE1	0.67	0.87	0.55	0.37	0.00	0.00	0.00	0.00
	SE2	0.65	0.79	0.55	0.37	0.00	0.00	0.00	0.00

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.7b 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, Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month											
Total	Point Estimates	12.35	12.28	15.12	14.91	14.63	14.45	17.18	17.19	16.35	15.12
	SE1	0.41	0.42	1.48	1.50	2.13	2.18	2.14	2.40	2.12	1.96
	SE2	0.39	0.38	1.49	1.33	2.07	1.88	2.05	1.99	2.16	1.92
12-17	Point Estimates	4.32	4.35	5.53	5.95	4.84	5.01	9.52	8.66	7.18	5.57
	SE1	0.60	0.68	2.52	3.12	2.87	3.08	3.69	3.55	3.40	2.87
	SE2	0.60	0.66	2.53	3.02	2.88	3.02	3.67	3.37	3.39	2.75
18-25	Point Estimates	20.96	21.83	21.90	22.46	26.98	24.29	24.60	28.70	23.87	25.15
	SE1	1.04	1.10	4.12	4.04	5.12	4.78	5.57	5.91	3.89	4.19
	SE2	1.01	1.01	4.09	3.72	5.11	4.67	5.58	5.65	3.89	4.06
26-34	Point Estimates	19.26	19.42	27.64	27.99	30.30	30.58	26.25	24.31	20.47	19.41
	SE1	1.06	1.16	3.97	4.25	6.59	7.22	5.93	4.98	4.24	3.99
	SE2	1.04	1.18	3.95	4.25	6.58	7.02	5.81	4.48	4.21	3.97
35+	Point Estimates	10.30	9.98	11.95	11.40	10.90	10.92	14.76	14.66	15.78	13.61
	SE1	0.54	0.55	2.11	2.06	2.22	2.30	2.97	3.46	3.01	2.70
	SE2	0.51	0.48	2.12	1.91	2.14	2.02	2.88	2.80	3.05	2.62
Cocaine Past Month											
Total	Point Estimates	0.55	0.61	0.46	0.41	0.84	0.73	0.96	1.00	0.38	0.73
	SE1	0.07	0.08	0.26	0.26	0.36	0.33	0.52	0.53	0.27	0.58
	SE2	0.07	0.07	0.25	0.24	0.35	0.31	0.52	0.49	0.27	0.48
12-17	Point Estimates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-25	Point Estimates	0.73	0.77	0.46	0.14	0.91	1.04	0.89	1.03	0.03	0.01
	SE1	0.16	0.18	0.33	0.10	0.88	1.00	0.89	1.03	0.03	0.01
	SE2	0.16	0.17	0.32	0.10	0.88	0.94	0.90	1.04	0.03	0.01
26-34	Point Estimates	1.28	1.31	0.47	0.36	3.71	3.01	0.10	0.09	0.97	0.78
	SE1	0.27	0.29	0.39	0.33	2.07	1.91	0.10	0.09	0.98	0.79
	SE2	0.27	0.25	0.39	0.33	2.08	1.83	0.10	0.09	0.99	0.94
35+	Point Estimates	0.43	0.51	0.52	0.53	0.37	0.32	1.31	1.35	0.39	0.95
	SE1	0.09	0.10	0.39	0.40	0.28	0.24	0.80	0.79	0.30	0.85
	SE2	0.08	0.09	0.38	0.37	0.28	0.24	0.79	0.74	0.30	0.68

(continued)

Table 9.7b 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, Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month									
Total	Point Estimates	13.44	13.60	11.17	9.82	11.16	10.10	8.31	7.90
	SE1	1.20	1.29	1.69	1.44	1.72	1.64	1.37	1.34
	SE2	1.19	1.29	1.71	1.40	1.70	1.48	1.32	1.47
12-17	Point Estimates	5.40	5.02	3.15	2.29	1.11	1.02	0.21	0.10
	SE1	1.40	1.47	1.80	1.37	0.70	0.65	0.21	0.10
	SE2	1.37	1.47	1.79	1.43	0.70	0.65	0.20	0.12
18-25	Point Estimates	18.52	16.21	23.70	20.34	20.37	20.37	9.32	10.85
	SE1	3.64	2.90	3.68	3.63	3.87	4.72	2.99	3.66
	SE2	3.67	2.91	3.76	3.73	3.86	4.42	2.91	3.09
26-34	Point Estimates	25.79	26.68	14.54	11.98	23.51	23.30	11.70	11.33
	SE1	4.05	4.33	4.75	3.57	4.80	5.05	3.43	3.55
	SE2	4.02	4.24	4.76	3.86	4.86	4.88	3.42	3.06
35+	Point Estimates	10.79	11.09	9.07	8.46	7.91	6.68	8.63	7.73
	SE1	1.48	1.48	2.18	2.02	2.02	1.79	2.14	2.00
	SE2	1.46	1.52	2.17	1.87	2.03	1.69	2.06	2.19
Cocaine Past Month									
Total	Point Estimates	1.67	2.01	0.51	0.64	0.53	0.46	0.31	0.25
	SE1	0.44	0.56	0.23	0.28	0.46	0.35	0.17	0.14
	SE2	0.42	0.50	0.22	0.24	0.45	0.32	0.17	0.14
12-17	Point Estimates	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-25	Point Estimates	1.13	0.75	1.50	1.84	0.48	0.99	0.31	0.26
	SE1	0.65	0.44	0.82	1.01	0.48	0.99	0.20	0.19
	SE2	0.65	0.44	0.81	0.93	0.48	1.13	0.20	0.19
26-34	Point Estimates	3.54	4.09	1.13	1.37	0.00	0.00	1.30	1.04
	SE1	1.31	1.55	0.85	0.99	0.00	0.00	0.99	0.79
	SE2	1.33	1.46	0.84	1.00	0.00	0.00	1.00	0.81
35+	Point Estimates	1.56	2.00	0.26	0.35	0.73	0.52	0.10	0.09
	SE1	0.63	0.83	0.21	0.26	0.71	0.51	0.10	0.09
	SE2	0.61	0.73	0.21	0.24	0.70	0.46	0.10	0.09

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

Table 9.8a 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 in the Past Year and Serious Mental Illness in the Past Year: Among Adults Aged 18 or Older; Quarter 1, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode											
Total	Point Estimates	8.57	8.51	7.68	6.95	6.98	6.34	7.73	8.02	11.16	10.86
	SE1	0.38	0.41	1.20	1.12	0.79	0.66	1.51	1.68	1.23	1.33
	SE2	0.37	0.38	1.20	1.08	0.80	0.72	1.46	1.34	1.22	1.21
18-25	Point Estimates	18.04	18.39	14.74	16.96	14.86	13.06	22.50	21.55	25.02	25.59
	SE1	1.01	1.14	3.28	3.73	3.58	3.35	3.89	3.29	6.16	6.76
	SE2	1.00	1.13	3.23	3.30	3.61	3.59	3.96	3.32	6.18	6.39
26-34	Point Estimates	10.45	10.18	9.66	7.74	7.30	6.42	11.52	12.61	8.02	8.10
	SE1	1.01	1.04	2.81	2.34	2.83	2.49	4.92	5.73	2.93	3.00
	SE2	0.98	0.93	2.75	2.26	2.83	2.45	5.00	5.59	2.96	3.06
35+	Point Estimates	6.35	6.26	5.71	4.76	5.75	5.29	4.20	4.45	9.29	8.74
	SE1	0.43	0.46	1.26	1.21	1.03	0.79	1.27	1.42	1.64	1.76
	SE2	0.43	0.44	1.28	1.27	1.00	0.85	1.23	1.16	1.63	1.67
Serious Mental Illness											
Total	Point Estimates	5.52	5.50	4.66	4.02	4.85	4.66	6.00	6.70	6.55	6.34
	SE1	0.28	0.30	0.71	0.67	0.67	0.61	1.27	1.50	1.38	1.31
	SE2	0.27	0.26	0.67	0.57	0.66	0.65	1.21	1.18	1.38	1.32
18-25	Point Estimates	9.89	10.23	9.30	10.21	6.93	7.08	12.92	14.24	11.79	13.19
	SE1	0.71	0.82	1.68	2.19	1.75	1.99	3.46	3.44	3.79	4.88
	SE2	0.69	0.82	1.66	2.12	1.77	2.29	3.48	3.47	3.79	4.65
26-34	Point Estimates	8.41	8.06	5.29	4.18	4.02	3.92	12.15	13.71	7.19	7.15
	SE1	0.85	0.87	1.95	1.55	2.16	2.14	5.17	6.02	2.69	2.76
	SE2	0.82	0.75	1.97	1.67	2.15	2.11	5.27	5.76	2.72	2.92
35+	Point Estimates	4.03	4.02	3.55	2.76	4.70	4.44	3.43	3.70	5.42	4.85
	SE1	0.34	0.36	1.04	0.89	0.93	0.79	1.23	1.37	1.76	1.64
	SE2	0.33	0.30	1.04	0.87	0.91	0.82	1.18	1.13	1.77	1.70

(continued)

Table 9.8a 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 in the Past Year and Serious Mental Illness in the Past Year: Among Adults Aged 18 or Older; Quarter 1, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode									
Total	Point Estimates	6.45	5.78	11.36	11.07	7.79	6.84	7.52	7.52
	SE1	1.31	1.11	1.89	1.99	1.43	1.17	1.10	1.26
	SE2	1.27	1.03	1.84	1.62	1.38	1.21	1.08	1.36
18-25	Point Estimates	19.63	19.86	20.02	20.16	17.84	16.85	18.66	20.21
	SE1	4.31	4.38	6.31	6.47	3.17	3.11	3.27	4.09
	SE2	4.28	4.38	6.29	5.89	3.13	3.51	3.42	4.01
26-34	Point Estimates	8.94	5.86	14.73	15.76	12.69	10.15	7.62	8.00
	SE1	4.12	2.77	3.92	4.22	4.34	3.40	3.16	3.16
	SE2	4.11	2.43	3.97	3.96	4.11	3.54	3.06	3.27
35+	Point Estimates	3.66	3.27	8.81	8.40	5.00	4.34	5.02	4.64
	SE1	1.49	1.28	1.83	1.81	1.41	1.07	1.23	1.37
	SE2	1.44	1.20	1.83	1.68	1.41	1.20	1.23	1.45
Serious Mental Illness									
Total	Point Estimates	5.31	4.18	8.37	8.34	5.64	4.86	3.21	3.13
	SE1	1.26	1.01	1.79	1.87	1.61	1.61	0.85	0.84
	SE2	1.26	1.07	1.72	1.46	1.51	1.32	0.91	0.86
18-25	Point Estimates	10.80	10.28	16.30	16.50	14.60	13.41	5.09	6.01
	SE1	3.41	3.36	4.83	5.29	4.57	4.53	2.14	2.51
	SE2	3.45	3.49	4.80	4.64	4.41	3.96	2.16	2.30
26-34	Point Estimates	6.66	3.80	15.23	15.41	15.14	11.66	3.67	3.63
	SE1	3.16	2.11	4.24	4.27	5.58	5.76	1.55	1.58
	SE2	3.06	1.90	4.26	3.87	5.48	6.01	1.55	1.55
35+	Point Estimates	4.04	3.13	5.11	5.30	2.10	1.92	2.67	2.37
	SE1	1.50	1.17	1.63	1.70	1.14	1.04	0.84	0.79
	SE2	1.47	1.11	1.61	1.46	1.13	0.89	0.92	0.85

Note: Major Depressive Episode is defined as in the 4th 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 *Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition—Research Version—Axis I Disorders*, which is based on DSM-IV. SMI includes people with diagnoses resulting in serious functional impairment.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 1, 2020.

Table 9.8b 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 in the Past Year and Serious Mental Illness in the Past Year: Among Adults Aged 18 or Older; Quarter 4, 2020

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode											
Total	Point Estimates	8.05	8.33	6.24	6.25	8.50	9.58	8.56	8.92	8.69	8.73
	SE1	0.37	0.41	1.17	1.23	1.91	2.46	1.51	1.69	1.93	1.89
	SE2	0.36	0.36	1.13	0.91	1.91	2.30	1.51	1.60	1.90	1.80
18-25	Point Estimates	14.38	15.74	10.35	9.97	14.09	17.34	19.08	21.14	13.32	13.38
	SE1	0.84	0.92	2.62	2.45	3.94	5.60	4.18	4.88	3.38	3.39
	SE2	0.85	0.89	2.63	2.39	3.92	5.16	4.16	4.55	3.38	3.54
26-34	Point Estimates	9.33	9.53	5.11	4.91	7.99	7.40	13.74	13.93	5.79	6.63
	SE1	0.73	0.76	2.21	2.20	2.60	2.64	3.22	3.29	1.84	2.13
	SE2	0.72	0.74	2.23	2.09	2.59	2.72	3.31	3.59	1.84	2.23
35+	Point Estimates	6.59	6.68	5.68	5.82	7.77	8.79	5.46	5.66	8.51	8.33
	SE1	0.46	0.50	1.51	1.61	2.34	3.05	1.99	2.07	2.59	2.51
	SE2	0.45	0.43	1.44	1.08	2.33	2.81	1.94	1.91	2.56	2.36
Serious Mental Illness											
Total	Point Estimates	5.08	5.33	4.65	4.57	6.08	6.85	5.14	5.31	4.63	4.68
	SE1	0.32	0.35	1.12	1.21	1.68	2.15	1.03	1.16	1.07	1.06
	SE2	0.31	0.31	1.08	0.91	1.68	2.00	1.01	1.05	1.06	0.87
18-25	Point Estimates	7.49	8.57	5.31	5.43	4.69	4.80	7.19	8.84	7.12	7.31
	SE1	0.58	0.63	1.64	1.66	2.11	2.10	2.31	2.98	2.54	2.61
	SE2	0.58	0.63	1.64	1.55	2.08	2.09	2.29	2.87	2.57	2.69
26-34	Point Estimates	6.64	6.77	6.06	6.36	3.07	3.09	10.85	10.15	6.16	6.90
	SE1	0.65	0.73	2.30	2.64	1.36	1.42	2.37	2.25	1.86	2.13
	SE2	0.64	0.84	2.33	3.00	1.37	1.50	2.41	2.43	1.86	2.22
35+	Point Estimates	4.28	4.39	4.15	3.94	6.86	7.89	3.43	3.57	3.90	3.72
	SE1	0.38	0.42	1.28	1.26	2.13	2.75	1.38	1.46	1.21	1.22
	SE2	0.37	0.35	1.22	0.81	2.13	2.56	1.34	1.28	1.21	1.01

(continued)

Table 9.8b 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 in the Past Year and Serious Mental Illness in the Past Year: Among Adults Aged 18 or Older; Quarter 4, 2020 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode									
Total	Point Estimates	5.77	6.26	9.13	8.80	6.09	5.55	7.42	8.08
	SE1	0.98	1.07	1.61	1.49	1.24	1.19	1.16	1.43
	SE2	0.97	0.94	1.57	1.35	1.25	1.13	1.12	1.38
18-25	Point Estimates	13.18	14.27	15.16	14.17	16.27	15.12	13.23	15.37
	SE1	2.73	2.74	3.92	3.34	3.35	3.31	2.77	3.29
	SE2	2.72	2.63	3.85	2.99	3.39	2.98	2.86	3.30
26-34	Point Estimates	8.90	9.22	10.37	11.38	9.62	8.79	9.55	9.37
	SE1	1.81	2.03	2.98	3.43	2.61	2.43	2.68	2.63
	SE2	1.81	1.99	3.00	3.56	2.60	2.37	2.73	2.50
35+	Point Estimates	3.81	4.12	7.77	7.27	3.37	3.25	5.68	6.30
	SE1	1.18	1.31	1.84	1.72	1.42	1.41	1.42	1.76
	SE2	1.15	1.02	1.82	1.62	1.41	1.33	1.34	1.68
Serious Mental Illness									
Total	Point Estimates	3.94	3.97	5.88	6.04	4.35	3.90	4.55	5.17
	SE1	0.97	0.81	1.20	1.15	1.07	1.00	0.96	1.25
	SE2	0.96	0.76	1.17	1.10	1.05	0.93	0.94	1.20
18-25	Point Estimates	6.55	7.81	7.71	8.19	4.88	3.86	7.59	9.84
	SE1	2.05	2.13	2.45	2.45	1.94	1.59	2.18	3.02
	SE2	2.03	2.04	2.42	2.32	1.93	1.49	2.26	2.64
26-34	Point Estimates	5.19	5.20	8.41	9.96	7.41	6.84	4.19	3.79
	SE1	1.59	1.68	2.46	2.90	2.22	2.08	1.41	1.39
	SE2	1.58	1.60	2.44	3.05	2.21	2.01	1.41	1.38
35+	Point Estimates	3.21	2.98	5.02	4.80	3.54	3.29	3.97	4.52
	SE1	1.24	1.00	1.45	1.32	1.40	1.30	1.19	1.55
	SE2	1.21	0.91	1.43	1.29	1.37	1.22	1.15	1.51

Note: Major Depressive Episode is defined as in the 4th 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 *Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition—Research Version—Axis I Disorders*, which is based on DSM-IV. SMI includes people with diagnoses resulting in serious functional impairment.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarter 4, 2020.

10. Break-Off Analysis Weights

Because of the coronavirus disease 2019 (COVID-19) pandemic, Quarter 4 of 2020 marked the first time that the National Survey on Drug Use and Health (NSDUH) used web-based interviewing. However, the number of adult web respondents in Quarter 4 who provided usable information on their substance use but did not complete the mental health or later questions (i.e., "break-offs") raised concerns about the 2020 mental health estimates for adults. Specifically, mental health estimates for adults could be biased if the characteristics of adult respondents who broke off the interview without completing the mental health questions differed from the characteristics of respondents who completed these questions. To reduce the potential for bias, a set of break-off analysis weights was developed for analyzing unimputed outcome variables in the mental health module and subsequent modules for Quarters 1 and 4 separately and for Quarters 1 and 4 combined.

Interviewees who broke off by the end of the mental health and adult depression modules were treated as nonrespondents in analysis of unimputed variables in the mental health, adult depression, and subsequent modules. The main person-level analysis weights for adult respondents who did not break off were poststratified (and adjusted for break-offs) to the sums of main person-level analysis weights for all adult respondents. This adjustment was done separately for Quarters 1 and 4. The break-off analysis weights for "break-off adult respondents" were set to zero, and their weights were redistributed among the weights for the "non-break-off adult respondents" during the poststratification adjustment. The break-off analysis weights for respondents aged 12-17 were the same as the main analysis weights because very few youths broke off the interview.

For Quarter 1, because relatively few adult respondents broke off, a weighting class adjustment was performed. Weighting classes were defined by state and five-level age groups. Within each weighting class, the adjustment factor was the ratio of the total weight of all cases to the total weight of non-break-off cases. The Quarter 1 analysis weights for non-break-off cases were then multiplied by this ratio to get the break-off analysis weights. The break-off weights for the break-off cases were set to zero.

For Quarter 4, because there were far more break-offs among adult respondents, the main analysis weights of the non-break-off adult respondents were poststratified to the main analysis weights for all adult respondents using generalized exponential modeling. In addition to the same demographic totals used in the poststratification adjustment models for the main analysis weights, three outcome variables were added to the control totals for the additional break-off poststratification adjustment: past month alcohol use, past month cigarette use, and any lifetime prescription pain reliever use (i.e., use or misuse). The break-off weights for the break-off cases were set to zero.

The break-off analysis weights for Quarters 1 and 4 combined are the sum of the Quarter 1 break-off analysis weights and the Quarter 4 break-off analysis weights divided by 2. Table 10.1 shows the distribution and unequal weighting effect of the final analysis weights (ANALWT), the break-off weight adjustment, and the break-off analysis weights (ANALWTMH) for adults for Quarter 1, Quarter 4, and Quarters 1 and 4 combined.

Table 10.1 Weight Distribution of Final Analysis Weight, Break-Off Weight Adjustment, and Break-Off Weight: Among Adults Aged 18 or Older

Quarter	Weight	Minimum	25th Percentile	Median	75th Percentile	Maximum	Mean	*n*	UWE
1	**ANALWT**	24	4,740	12,778	28,027	402,461	21,496	11,697	2.51
	Adjustment	1.00	1.00	1.00	1.00	1.03	1.00	11,691	N/A
	ANALWTMH	24	4,740	12,778	28,070	402,461	21,507	11,691	2.51
4	**ANALWT**	7	2,015	6,095	15,757	432,841	13,826	18,257	3.82
	Adjustment	0.17	0.94	1.06	1.19	5.00	1.09	17,237	N/A
	ANALWTMH	2	2,072	6,460	16,550	429,287	14,644	17,237	3.69
1 and 4	**ANALWT**	3	1,358	4,110	10,343	216,420	8,411	29,954	3.17
	ANALWTMH	1	1,400	4,273	10,762	214,643	8,709	28,928	3.10

ANALWT = person-level analysis weights; ANALWTMH = break-off analysis weights; N/A = not applicable; UWE = unequal weighting effect.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

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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 (e.g., selected dwelling units or selected persons). The distance minimized under the generalized exponential model (GEM), subject to calibration constraints, is given by the distance function below:

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

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 where $\ell_k < c_k < u_k$. 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 model parameters λ from GEM which is a p-dimensional vector with p as the number of predictor variables; 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 $k = 1,\ldots,n$,

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

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 $\ell_k = L,\ u_k = U$, and $c_k = 1$ for all *k*. This new GEM was introduced by Folsom and Singh (2000).

A.2 Generalized Exponential Model 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

$b_k = \text{median}\{d_k\} \pm 3 * \text{IQR}$ 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, let L_1 and U_1 be user-specified lower and upper bounds for high extreme weights, L_2 and U_2 the lower and upper bounds for nonextreme weights, and L_3 and U_3 the lower and upper bounds for low extreme weights. The sample is first divided into two parts: the nonextreme weight subsample and the extreme weight subsample. For nonextreme weights, the following are set: $L_2 = 1,\ C_2 = \rho^{-1},$ and $U_2 = U > \rho^{-1}$, where ρ is the overall response propensity. For extreme weights with high weights, $\ell_k = L_1 m_k,\ c_k = \rho^{-1} m_k,$ and $u_k = U_1 m_k$, where $m_k = b_k / d_k$ and $1 \le L_1 < \rho^{-1} = C_1 < U_1$ are prescribed numbers. Similarly, for extreme weights with low weights, $\ell_k = L_3 m_k,\ c_k = \rho^{-1} m_k,\ u_k = U_3 m_k$, and $1 \le L_3 < \rho^{-1} = C_3 < U_3$.

For the poststratification adjustment, the following weights are set: for nonextreme weights, $\ell_k = L_2,\ c_k = C_2 = 1,$ and $u_k = U_2$; for high extreme weights, $\ell_k = L_1 m_k,\ c_k = m_k,$ and $u_k = U_1 m_k$; and similarly, for low extreme weights, $\ell_k = L_3 m_k,\ c_k = m_k,$ 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 1 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, $\ell_k = L$, $u_k = U$, and $c_k = C = 1$, such that $L < 1 < U$. 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 1.

[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: Imputation Methodology

The adjustments of (1) dwelling unit 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 2020 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]

The predictive mean neighborhood (PMN) methodology was used for the 2020 NSDUH weighting process to impute "race" and "Hispanic or Latino origin" for the screener demographic information, as well as the questionnaire data (Singh et al., 2002). Because there was not a good set of predictors for PMN modeling, the unweighted sequential hot-deck method was used to impute gender.

B.1 Unweighted Hot-Deck Methodology

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).

   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
2	1	1

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

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, 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.

B.2 Predictive Mean Neighborhood

The unweighted sequential hot-deck method 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 method, 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 univariate and multivariate 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 PMN 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® (SAS Institute Inc., 2017) and SUDAAN® (RTI International, 2013), whereas 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 2020 NSDUH editing and imputation report (Center for Behavioral Health Statistics and Quality, 2022a).

Appendix C: Practical Aspects of Implementing the Generalized Exponential Model for NSDUH

After specifying the generalized exponential model (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 unequal weighting effect (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 the 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.

C.1 Practical Guidelines in Using the Generalized Exponential Model

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 to satisfy the control total.

In general, domains with small sample sizes may cause problems during generalized exponential modeling and prevent the model from converging. For the 2020 National Survey on Drug Use and Health (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 C.2 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 nonstate two-factor effects were added first, 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 nonstate 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 characteristics 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 6), 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, an adaptive approach was used to choose the bounds starting from the 2003 NSDUH; that is, starting with loose bounds of (0.1, 10), generalized exponential modeling was performed 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 of 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 the GEM for nonresponse and poststratification were as follows: 3 percent for 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, 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.

C.2 Variable Collapsing Guide

For this application, "collapsing" implies combining the "levels" of variables with other levels explicitly present in the model, whereas "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 2020 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.

Convergence problems in the 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 quintiles) with the 5th quintile set as reference. If the 4th quintile needed to be collapsed, it would be collapsed with the 3rd or the 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; 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), whereas in nonstate-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.

Appendix D: Evaluation of Calibration Weights: Response Rates

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Table D.1 2020 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 Response Rate	Selected Persons	Respondents	WT1-12[1]	WT1-13[2]
United States	642,549	536,203	90,937	85.13%	40.00%	62,515	36,284	61.35%	61.39%
Alabama	9,978	7,781	1,091	79.47%	41.58%	744	442	58.44%	59.59%
Alaska	9,262	7,208	1,127	79.49%	37.42%	767	467	64.36%	65.38%
Arizona	10,095	8,059	1,356	84.68%	38.52%	907	532	65.11%	63.50%
Arkansas	8,393	6,320	901	75.37%	44.30%	663	406	66.55%	67.67%
California	33,918	30,403	4,721	91.18%	36.29%	3,897	2,193	57.85%	58.12%
Colorado	9,475	7,734	1,579	85.75%	38.72%	1,065	635	59.74%	61.23%
Connecticut	10,576	9,425	1,413	90.63%	33.86%	933	546	61.03%	63.06%
Delaware	10,111	8,202	1,534	84.97%	33.99%	968	584	66.75%	66.26%
District of Columbia	12,837	10,975	2,094	85.29%	27.86%	672	448	68.37%	68.56%
Florida	30,867	23,871	3,818	77.16%	41.96%	2,467	1,521	63.77%	63.37%
Georgia	12,927	10,650	1,483	83.48%	44.38%	1,144	692	61.75%	62.68%
Hawaii	9,594	8,221	1,628	88.25%	43.85%	1,173	642	59.75%	58.99%
Idaho	8,609	7,085	1,391	83.89%	45.48%	1,063	625	62.33%	62.18%
Illinois	23,603	20,469	3,328	88.18%	32.40%	2,464	1,372	58.96%	58.92%
Indiana	9,827	8,143	1,200	85.26%	40.04%	873	517	61.28%	63.40%
Iowa	8,707	7,326	1,449	84.03%	47.17%	932	542	62.50%	65.50%
Kansas	7,828	6,340	1,210	82.84%	46.07%	854	533	62.81%	64.03%
Kentucky	10,432	8,547	1,342	83.69%	44.87%	889	538	68.63%	68.99%
Louisiana	8,622	6,825	895	83.14%	43.41%	641	358	60.46%	60.24%
Maine	9,521	7,633	1,652	79.88%	44.53%	946	498	60.32%	60.96%
Maryland	10,444	9,155	1,543	88.63%	36.16%	1,046	636	67.02%	68.32%
Massachusetts	9,984	8,778	1,342	89.04%	39.49%	953	517	58.03%	58.38%
Michigan	24,119	20,233	3,280	84.83%	44.39%	2,148	1,264	62.56%	63.22%
Minnesota	9,245	8,028	1,753	88.30%	44.24%	1,212	698	63.29%	62.47%
Mississippi	9,010	7,138	869	78.51%	39.66%	631	352	62.74%	61.71%

(continued)

Table D.1 2020 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 Response Rate	Selected Persons	Respondents	WT1-12[1]	WT1-13[2]
Missouri	9,313	7,571	1,317	82.69%	45.71%	868	491	63.04%	61.54%
Montana	8,435	6,841	1,480	82.63%	41.54%	868	511	63.94%	64.74%
Nebraska	9,859	8,289	1,428	86.98%	44.64%	1,046	659	69.16%	69.18%
Nevada	10,422	9,262	1,138	91.97%	34.54%	873	497	61.25%	61.20%
New Hampshire	9,869	8,379	1,745	83.10%	44.08%	1,154	592	52.52%	53.51%
New Jersey	13,892	12,355	1,898	90.19%	36.34%	1,434	752	54.84%	52.56%
New Mexico	9,498	7,544	1,258	80.44%	41.24%	897	545	64.30%	63.55%
New York	29,787	26,227	4,527	88.88%	33.27%	3,372	1,859	55.49%	54.91%
North Carolina	15,093	12,292	1,938	81.41%	35.67%	1,259	783	67.28%	66.36%
North Dakota	8,936	7,091	1,523	78.02%	43.08%	1,006	591	61.60%	61.74%
Ohio	22,679	19,301	3,167	87.62%	41.82%	2,132	1,261	64.74%	64.77%
Oklahoma	9,692	7,962	1,219	83.12%	46.43%	871	506	65.45%	65.18%
Oregon	9,473	8,287	1,842	89.66%	50.38%	1,130	651	64.98%	64.90%
Pennsylvania	22,870	19,958	3,237	88.73%	35.56%	2,192	1,262	62.20%	60.80%
Rhode Island	9,969	7,859	1,216	72.43%	36.70%	819	442	56.46%	54.05%
South Carolina	10,128	7,914	1,214	81.02%	38.16%	852	500	64.43%	64.78%
South Dakota	8,038	6,384	1,424	82.16%	48.51%	998	600	64.08%	65.78%
Tennessee	9,380	7,775	1,168	84.99%	44.18%	840	469	60.09%	60.21%
Texas	29,128	23,999	3,228	83.81%	39.53%	2,702	1,579	60.75%	60.55%
Utah	8,150	6,946	1,210	88.63%	44.13%	1,190	680	60.03%	61.33%
Vermont	9,821	8,397	2,117	86.06%	42.78%	1,273	723	57.44%	57.63%
Virginia	14,271	11,752	2,145	80.68%	44.72%	1,277	758	63.52%	64.75%
Washington	9,227	7,955	1,584	86.81%	46.26%	1,002	560	59.25%	59.75%
West Virginia	9,585	7,533	1,193	78.47%	40.82%	719	420	62.92%	63.75%
Wisconsin	9,189	7,397	1,626	80.27%	48.59%	936	575	66.34%	66.55%
Wyoming	7,861	6,384	1,096	84.23%	44.62%	753	460	63.69%	62.60%

[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, Quarters 1 and 4, 2020.

Appendix E: Evaluation of Calibration Weights: Dwelling Unit-Level Percentages of Extreme Weights and Outwinsors

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Table E.1 2020 NSDUH Dwelling Unit-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States

Domain	*n*	Before nr (WT1*...*WT8)			After nr and before ps (WT1*...*WT9)			After ps (WT1*...*WT10)		
		% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
United States	97,034	1.71%	3.05%	1.42%	9.16%	6.54%	1.85%	8.13%	5.91%	1.53%
Alabama	1,172	0.00%	0.00%	0.00%	14.51%	14.51%	3.96%	10.58%	12.21%	3.06%
Alaska	1,214	0.16%	0.09%	0.07%	16.89%	15.86%	4.69%	9.72%	8.79%	2.61%
Arizona	1,462	1.30%	0.34%	1.78%	8.48%	3.12%	0.17%	7.80%	2.13%	0.52%
Arkansas	966	1.76%	3.48%	2.07%	9.32%	7.34%	2.77%	8.80%	6.58%	1.44%
California	5,121	1.05%	1.81%	0.60%	10.84%	7.11%	2.69%	9.69%	6.18%	1.37%
Colorado	1,687	1.48%	3.20%	1.03%	12.45%	19.52%	7.81%	9.01%	12.98%	3.16%
Connecticut	1,485	8.35%	23.47%	15.89%	10.44%	8.58%	3.31%	9.90%	17.37%	6.07%
Delaware	1,642	0.00%	0.00%	0.00%	8.28%	0.27%	0.17%	7.86%	3.69%	0.49%
District of Columbia	2,212	0.86%	1.91%	1.16%	6.74%	4.16%	1.44%	7.69%	9.89%	3.17%
Florida	4,120	0.58%	2.92%	0.19%	11.67%	10.08%	2.03%	10.39%	7.49%	1.52%
Georgia	1,615	0.00%	0.00%	0.00%	17.40%	16.06%	4.94%	10.09%	6.66%	1.10%
Hawaii	1,708	4.92%	8.22%	2.38%	4.92%	1.14%	0.13%	5.50%	2.37%	0.46%
Idaho	1,475	3.73%	8.42%	5.09%	9.90%	7.67%	3.04%	9.36%	8.82%	3.37%
Illinois	3,562	1.29%	2.22%	0.95%	9.43%	5.96%	0.85%	7.94%	3.95%	1.10%
Indiana	1,284	3.04%	6.20%	3.01%	7.55%	3.61%	0.23%	7.09%	2.26%	0.56%
Iowa	1,535	0.85%	1.99%	1.21%	5.86%	1.41%	0.33%	7.23%	7.08%	1.78%
Kansas	1,285	0.00%	0.00%	0.00%	8.25%	5.30%	1.24%	7.16%	4.62%	1.04%
Kentucky	1,424	0.00%	0.00%	0.00%	9.27%	6.69%	2.68%	6.39%	2.87%	0.71%
Louisiana	962	0.00%	0.00%	0.00%	12.16%	11.05%	3.64%	8.94%	5.77%	0.66%
Maine	1,774	0.00%	0.00%	0.00%	9.30%	5.27%	1.48%	8.62%	3.82%	0.75%
Maryland	1,648	5.46%	14.63%	6.31%	8.68%	6.65%	0.88%	11.10%	15.80%	5.30%
Massachusetts	1,443	0.00%	0.00%	0.00%	13.37%	15.76%	3.34%	11.23%	14.27%	4.07%
Michigan	3,483	0.98%	2.13%	1.33%	7.61%	4.49%	1.05%	6.75%	4.00%	1.21%
Minnesota	1,848	2.49%	5.76%	1.23%	5.14%	0.00%	0.00%	5.90%	3.21%	0.58%
Mississippi	942	0.00%	0.00%	0.00%	11.68%	9.85%	2.48%	11.15%	11.10%	3.47%

(continued)

Table E.1 2020 NSDUH Dwelling Unit-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States (continued)

Domain	*n*	Before nr (WT1*...*WT8)			After nr and before ps (WT1*...*WT9)			After ps (WT1*...*WT10)		
		% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
Missouri	1,406	0.00%	0.00%	0.00%	11.81%	8.20%	3.16%	8.53%	7.03%	1.60%
Montana	1,590	1.26%	0.51%	1.63%	15.85%	28.48%	12.58%	13.77%	24.90%	7.31%
Nebraska	1,525	5.38%	12.30%	2.50%	7.34%	4.14%	0.59%	7.80%	7.54%	2.14%
Nevada	1,195	3.93%	11.61%	6.08%	4.94%	0.56%	0.00%	6.19%	4.49%	0.96%
New Hampshire	1,864	0.00%	0.00%	0.00%	6.38%	0.00%	0.00%	7.56%	3.93%	0.73%
New Jersey	2,045	0.00%	0.00%	0.00%	11.00%	8.38%	2.63%	9.54%	8.41%	3.26%
New Mexico	1,331	0.00%	0.00%	0.00%	6.46%	4.19%	0.46%	6.16%	2.89%	0.43%
New York	4,802	1.54%	3.12%	1.50%	6.87%	3.10%	0.50%	6.62%	4.13%	1.26%
North Carolina	2,069	0.00%	0.00%	0.00%	7.30%	3.36%	0.36%	6.62%	1.15%	0.19%
North Dakota	1,599	2.38%	5.52%	2.56%	5.50%	3.11%	0.36%	7.82%	8.40%	2.75%
Ohio	3,355	0.00%	0.00%	0.00%	7.21%	3.50%	0.76%	7.21%	3.28%	0.52%
Oklahoma	1,297	2.70%	5.45%	1.40%	7.40%	5.00%	2.04%	8.17%	6.77%	1.84%
Oregon	1,946	7.91%	22.97%	12.02%	9.15%	9.83%	1.28%	6.99%	8.20%	2.97%
Pennsylvania	3,436	1.14%	1.75%	1.27%	6.55%	2.29%	0.77%	6.32%	1.95%	0.58%
Rhode Island	1,295	3.55%	8.00%	3.53%	13.28%	11.91%	4.99%	9.96%	15.26%	4.16%
South Carolina	1,296	0.00%	0.00%	0.00%	6.56%	0.61%	0.04%	6.56%	0.63%	0.05%
South Dakota	1,518	0.00%	0.00%	0.00%	11.73%	8.44%	2.80%	7.18%	3.54%	0.68%
Tennessee	1,253	0.00%	0.00%	0.00%	7.58%	2.04%	0.57%	7.18%	1.64%	0.33%
Texas	3,494	1.06%	1.85%	1.42%	10.50%	9.10%	3.35%	9.90%	7.68%	2.23%
Utah	1,266	8.69%	26.63%	13.36%	4.42%	0.00%	0.00%	5.13%	2.74%	0.44%
Vermont	2,229	7.81%	20.25%	11.03%	8.88%	5.77%	1.08%	7.31%	7.03%	1.75%
Virginia	2,280	2.81%	5.87%	1.08%	6.62%	2.89%	0.75%	7.68%	6.96%	1.82%
Washington	1,687	0.00%	0.00%	0.00%	6.46%	1.46%	0.20%	6.58%	1.81%	0.19%
West Virginia	1,292	3.17%	0.61%	3.14%	13.78%	11.47%	2.15%	10.60%	8.40%	1.50%
Wisconsin	1,709	0.00%	0.00%	0.00%	5.79%	4.67%	0.51%	5.09%	1.01%	0.09%
Wyoming	1,186	0.84%	0.16%	1.35%	19.73%	15.80%	6.58%	8.60%	3.62%	0.74%

nr = nonresponse adjustment; ps = poststratification adjustment.

[1] 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 extreme weights and nonextreme weights.

[2] Outwinsor weight percentage = $100*\sum_k | w_{ek} - b_k | \sum_k w_k$, where b_k denotes the cut-off point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

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

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Table F.1 2020 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	62,515	2.22%	8.27%	2.16%	2.16%	7.11%	1.60%
Alabama	744	3.49%	11.61%	2.80%	2.55%	8.63%	2.31%
Alaska	767	2.87%	9.47%	3.12%	2.09%	6.52%	1.01%
Arizona	907	2.65%	15.94%	5.18%	2.43%	6.14%	0.69%
Arkansas	663	1.81%	5.95%	0.76%	1.51%	6.78%	1.00%
California	3,897	2.95%	10.07%	2.85%	0.95%	3.15%	0.72%
Colorado	1,065	4.04%	20.45%	5.17%	3.57%	9.79%	2.04%
Connecticut	933	3.11%	10.65%	4.40%	2.68%	10.76%	3.99%
Delaware	968	1.65%	6.81%	1.59%	1.34%	3.67%	0.97%
District of Columbia	672	2.98%	12.98%	5.37%	4.76%	17.92%	4.73%
Florida	2,467	2.43%	8.73%	1.89%	1.09%	3.71%	0.86%
Georgia	1,144	2.62%	10.95%	3.03%	2.01%	7.50%	1.41%
Hawaii	1,173	1.11%	5.59%	2.07%	1.88%	6.97%	1.55%
Idaho	1,063	1.03%	4.85%	1.46%	1.32%	5.12%	0.58%
Illinois	2,464	2.64%	9.07%	2.20%	3.00%	10.58%	2.56%
Indiana	873	1.49%	3.95%	0.87%	3.78%	11.66%	3.24%
Iowa	932	2.68%	11.55%	3.77%	1.93%	5.79%	1.15%
Kansas	854	1.05%	2.40%	0.39%	1.76%	5.15%	0.75%
Kentucky	889	1.01%	3.74%	0.87%	1.24%	5.40%	1.04%
Louisiana	641	4.21%	15.90%	3.69%	2.81%	8.73%	1.43%
Maine	946	0.74%	3.94%	0.71%	1.06%	6.49%	2.45%
Maryland	1,046	2.10%	8.56%	2.46%	2.29%	10.90%	2.21%
Massachusetts	953	2.41%	10.57%	3.41%	4.72%	15.45%	5.30%
Michigan	2,148	2.19%	7.97%	1.80%	1.26%	4.51%	0.97%
Minnesota	1,212	1.98%	4.40%	0.98%	2.81%	7.01%	1.70%
Mississippi	631	2.69%	9.61%	2.53%	1.90%	8.07%	1.54%

(continued)

Table F.1 2020 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	868	2.65%	7.53%	1.79%	1.61%	6.38%	1.16%
Montana	868	4.84%	22.07%	6.64%	2.53%	6.72%	1.76%
Nebraska	1,046	2.39%	10.44%	2.53%	1.72%	6.02%	1.12%
Nevada	873	2.52%	6.99%	1.12%	2.98%	10.72%	2.67%
New Hampshire	1,154	0.78%	1.69%	0.32%	0.61%	3.79%	1.18%
New Jersey	1,434	3.21%	11.45%	3.28%	2.51%	11.31%	2.79%
New Mexico	897	2.12%	6.37%	1.89%	3.68%	11.52%	2.34%
New York	3,372	1.99%	6.92%	2.09%	2.31%	8.67%	1.90%
North Carolina	1,259	0.87%	2.34%	0.70%	0.87%	2.33%	0.43%
North Dakota	1,006	2.29%	7.21%	1.69%	0.99%	2.22%	0.29%
Ohio	2,132	1.31%	5.04%	1.26%	1.31%	6.14%	1.25%
Oklahoma	871	2.07%	7.31%	1.46%	2.87%	11.43%	2.16%
Oregon	1,130	2.65%	7.13%	1.88%	3.36%	11.35%	3.91%
Pennsylvania	2,192	1.78%	7.34%	2.03%	2.60%	7.91%	1.54%
Rhode Island	819	4.52%	20.38%	5.69%	4.03%	25.17%	7.81%
South Carolina	852	0.70%	3.28%	0.64%	0.47%	1.50%	0.46%
South Dakota	998	1.30%	2.75%	0.62%	2.51%	6.53%	1.47%
Tennessee	840	2.02%	9.75%	1.69%	1.67%	7.93%	1.23%
Texas	2,702	2.15%	7.39%	1.83%	1.85%	6.80%	1.17%
Utah	1,190	1.26%	6.61%	1.29%	1.18%	5.24%	1.10%
Vermont	1,273	3.14%	11.80%	2.94%	5.73%	25.56%	11.65%
Virginia	1,277	2.11%	7.03%	1.82%	3.99%	11.05%	2.62%
Washington	1,002	1.00%	4.19%	0.83%	1.80%	5.17%	0.87%
West Virginia	719	1.53%	7.55%	1.34%	1.81%	12.01%	2.94%
Wisconsin	936	0.64%	2.60%	0.33%	1.18%	5.94%	0.63%
Wyoming	753	4.78%	15.38%	5.17%	3.19%	17.00%	7.30%

ps = poststratification adjustment.

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

[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 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 cut-off point for defining the extreme weight.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

Table F.2 2020 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	36,284	2.34%	7.49%	1.65%	3.42%	11.73%	2.60%	3.43%	11.83%	2.63%	2.99%	12.38%	3.17%
Alabama	442	2.94%	9.39%	2.05%	5.20%	15.01%	5.96%	4.98%	14.17%	5.83%	3.62%	10.80%	4.20%
Alaska	467	2.14%	6.85%	1.19%	4.50%	14.07%	3.76%	4.50%	14.07%	3.70%	3.21%	13.67%	2.72%
Arizona	532	2.63%	6.29%	0.69%	4.51%	19.97%	3.46%	4.51%	19.97%	3.43%	3.01%	11.59%	3.22%
Arkansas	406	3.20%	11.20%	1.83%	3.69%	17.55%	5.47%	3.69%	17.55%	5.50%	4.43%	17.41%	3.62%
California	2,193	1.50%	4.41%	0.94%	2.51%	6.81%	1.05%	2.60%	7.17%	1.14%	2.42%	10.37%	2.58%
Colorado	635	3.46%	9.88%	2.13%	2.99%	16.76%	3.40%	2.99%	16.76%	3.56%	1.57%	7.76%	1.37%
Connecticut	546	4.95%	12.95%	4.26%	4.76%	13.99%	5.74%	4.76%	13.99%	5.47%	5.68%	24.39%	9.15%
Delaware	584	1.03%	2.77%	1.18%	1.88%	6.61%	0.75%	1.88%	6.61%	0.74%	2.23%	10.06%	2.53%
District of Columbia	448	4.69%	16.27%	4.25%	5.13%	24.01%	5.97%	5.13%	24.01%	5.91%	3.35%	13.88%	3.48%
Florida	1,521	1.84%	6.60%	1.19%	1.58%	3.89%	0.85%	1.58%	3.89%	0.86%	2.10%	10.16%	2.83%
Georgia	692	1.73%	7.72%	1.60%	2.17%	5.15%	1.34%	2.46%	5.97%	1.44%	2.17%	7.36%	2.30%
Hawaii	642	1.71%	5.67%	1.76%	3.58%	17.72%	4.00%	3.58%	17.65%	4.01%	4.05%	22.86%	6.36%
Idaho	625	1.28%	6.13%	0.31%	3.84%	18.94%	4.97%	4.00%	19.68%	5.31%	2.72%	13.69%	3.70%
Illinois	1,372	2.70%	9.17%	2.02%	3.35%	12.46%	3.09%	3.35%	12.46%	3.05%	1.60%	8.81%	1.56%
Indiana	517	4.06%	13.71%	3.79%	3.09%	7.02%	1.22%	2.90%	6.68%	1.10%	2.13%	8.14%	2.27%
Iowa	542	2.03%	5.43%	1.48%	2.40%	8.20%	1.75%	2.40%	8.20%	1.78%	2.95%	10.65%	2.29%
Kansas	533	1.88%	6.37%	0.91%	2.81%	8.18%	1.39%	2.81%	8.18%	1.38%	4.32%	19.74%	5.04%
Kentucky	538	1.67%	3.92%	0.66%	4.28%	15.11%	4.91%	4.46%	15.38%	4.98%	2.23%	12.75%	2.99%
Louisiana	358	3.07%	12.00%	2.14%	4.47%	19.05%	4.01%	4.47%	19.05%	4.05%	5.31%	20.35%	4.90%
Maine	498	2.01%	10.24%	3.58%	1.81%	9.16%	1.35%	1.81%	9.16%	1.36%	1.61%	5.37%	1.41%
Maryland	636	2.67%	10.69%	2.46%	2.67%	7.73%	1.95%	2.67%	7.73%	1.97%	2.83%	18.62%	6.12%
Massachusetts	517	4.26%	15.75%	4.25%	4.45%	13.86%	4.07%	3.87%	12.63%	4.23%	5.03%	17.26%	6.23%
Michigan	1,264	1.74%	6.03%	1.35%	4.27%	13.56%	3.38%	4.51%	14.08%	3.39%	2.37%	11.30%	1.99%
Minnesota	698	3.30%	5.30%	1.51%	3.01%	8.85%	1.89%	3.01%	8.85%	1.87%	4.30%	14.55%	3.94%
Mississippi	352	3.69%	12.41%	2.93%	3.41%	10.11%	1.96%	3.98%	12.86%	2.71%	4.26%	16.62%	5.87%

(continued)

Table F.2 2020 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	491	1.22%	5.55%	0.95%	4.68%	12.62%	2.39%	4.68%	12.62%	2.36%	2.44%	13.02%	2.72%
Montana	511	1.37%	4.16%	0.78%	5.68%	30.34%	11.09%	5.68%	30.34%	11.04%	4.50%	21.68%	5.41%
Nebraska	659	1.67%	7.32%	1.27%	1.21%	4.15%	1.13%	1.06%	3.84%	1.12%	1.97%	9.96%	2.83%
Nevada	497	4.63%	13.82%	2.44%	4.83%	19.39%	4.32%	4.83%	19.39%	4.28%	6.44%	29.54%	7.50%
New Hampshire	592	1.18%	6.56%	2.17%	4.39%	21.35%	5.68%	4.22%	20.91%	5.62%	3.72%	15.86%	3.20%
New Jersey	752	2.39%	9.25%	2.09%	5.72%	21.88%	4.06%	5.45%	21.54%	4.11%	4.26%	18.60%	4.19%
New Mexico	545	4.04%	13.35%	2.38%	2.75%	8.59%	2.63%	2.57%	8.32%	2.63%	4.04%	21.19%	5.73%
New York	1,859	2.31%	8.62%	2.27%	5.33%	19.10%	3.56%	5.33%	19.10%	3.68%	3.66%	16.55%	4.91%
North Carolina	783	0.64%	0.99%	0.19%	3.19%	11.00%	1.61%	3.45%	11.72%	1.51%	2.81%	12.51%	2.32%
North Dakota	591	0.68%	1.08%	0.12%	1.52%	5.48%	1.10%	1.52%	5.48%	1.10%	3.05%	15.08%	5.04%
Ohio	1,261	1.35%	5.24%	1.16%	2.14%	8.47%	1.49%	2.30%	8.93%	1.52%	2.06%	8.60%	2.19%
Oklahoma	506	2.77%	11.58%	2.40%	3.56%	11.98%	3.49%	3.56%	11.98%	3.43%	2.77%	10.29%	2.52%
Oregon	651	3.23%	9.70%	3.55%	4.45%	16.45%	5.39%	4.61%	16.91%	5.43%	3.38%	16.03%	5.16%
Pennsylvania	1,262	2.22%	7.06%	1.25%	3.80%	15.22%	3.77%	3.65%	14.92%	3.67%	2.61%	13.66%	3.76%
Rhode Island	442	4.07%	23.44%	6.34%	3.39%	12.84%	3.61%	3.39%	12.84%	3.61%	3.39%	17.53%	6.06%
South Carolina	500	0.40%	1.76%	0.63%	1.20%	6.12%	0.91%	1.20%	6.12%	0.94%	2.80%	18.46%	5.91%
South Dakota	600	2.67%	6.57%	1.21%	4.33%	14.09%	3.17%	4.33%	14.09%	3.19%	2.50%	8.49%	2.18%
Tennessee	469	1.49%	6.34%	1.03%	2.77%	10.43%	2.97%	2.77%	10.43%	2.83%	1.49%	7.20%	3.02%
Texas	1,579	1.65%	6.52%	1.31%	3.48%	13.53%	2.52%	3.42%	13.44%	2.54%	2.60%	9.72%	1.25%
Utah	680	1.62%	7.01%	0.87%	3.24%	15.97%	4.24%	3.38%	16.53%	4.43%	3.38%	15.07%	3.66%
Vermont	723	5.95%	24.08%	9.70%	1.94%	8.40%	3.66%	1.80%	8.18%	3.59%	2.77%	10.67%	4.05%
Virginia	758	4.88%	13.94%	3.60%	5.01%	14.60%	2.98%	5.01%	14.60%	2.98%	3.30%	10.89%	2.24%
Washington	560	1.43%	3.23%	0.52%	2.32%	6.71%	1.46%	2.32%	6.71%	1.48%	4.11%	13.47%	2.85%
West Virginia	420	1.90%	13.04%	2.98%	2.62%	6.25%	0.77%	2.62%	6.25%	0.73%	2.14%	6.12%	1.18%
Wisconsin	575	1.57%	8.29%	0.74%	3.13%	10.49%	2.93%	3.48%	11.01%	2.98%	1.91%	7.14%	1.28%
Wyoming	460	3.26%	19.86%	8.46%	4.35%	11.79%	2.63%	4.13%	11.46%	2.63%	3.70%	14.73%	7.75%

nr = nonresponse adjustment; ps = poststratification adjustment.

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

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

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

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

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, Quarters 1 and 4, 2020.

Appendix G: Evaluation of Calibration Weights: Slippage Rates

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Table G.1 2020 NSDUH Quarter 1 Slippage Rates

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		15,628	276,394,830	276,418,654	276,418,654	-0.01	0.00
Age	**12-17**	3,931	25,162,749	24,983,946	24,983,946	0.72	0.00
	18-25	3,626	33,030,096	33,610,045	33,610,045	-1.73	0.00
	26-34	2,258	40,896,005	40,519,606	40,519,606	0.93	0.00
	35-49	3,153	61,267,395	60,992,821	60,992,821	0.45	0.00
	50-64	1,412	61,638,685	62,377,088	62,377,088	-1.18	0.00
	65+	1,248	54,399,900	53,935,149	53,935,149	0.86	0.00
Race	**White**	11,402	202,433,660	213,185,573	213,185,573	-5.04	0.00
	Black or African American	1,985	37,584,596	35,751,800	35,751,800	5.13	0.00
	American Indian or Alaska Native	575	8,868,482	3,379,524	3,379,524	162.42	0.00
	Asian	925	19,535,440	17,686,521	17,686,521	10.45	0.00
	Two or More Races	741	7,972,652	6,415,237	6,415,237	24.28	0.00
Hispanicity	**Hispanic or Latino**	2,869	49,018,139	48,046,945	48,046,945	2.02	0.00
	Non-Hispanic or Latino	12,759	227,376,692	228,371,709	228,371,709	-0.44	0.00
Gender	**Male**	7,577	133,965,267	134,143,549	134,143,549	-0.13	0.00
	Female	8,051	142,429,563	142,275,105	142,275,105	0.11	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, Quarter 1, 2020.

Table G.2 2020 NSDUH Quarter 4 Slippage Rates

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		20,656	277,405,296	277,405,296	277,405,296	0.00	0.00
Age	**12-17**	2,399	24,893,672	24,981,459	24,981,459	-0.35	0.00
	18-25	5,289	33,398,380	33,383,993	33,383,992	0.04	0.00
	26-34	3,983	40,706,447	40,532,139	40,532,139	0.43	0.00
	35-49	4,896	61,189,892	61,027,594	61,027,594	0.27	0.00
	50-64	2,060	62,376,307	62,328,816	62,328,817	0.08	-0.00
	65+	2,029	54,840,598	55,151,296	55,151,297	-0.56	-0.00
Race	**White**	16,027	208,531,478	213,609,969	213,609,969	-2.38	0.00
	Black or African American	1,782	35,670,679	35,975,603	35,975,604	-0.85	-0.00
	American Indian or Alaska Native	291	4,769,248	3,412,081	3,412,081	39.78	0.00
	Asian	1,376	17,827,722	17,834,172	17,834,172	-0.04	0.00
	Two or More Races	1,180	10,606,169	6,573,470	6,573,471	61.35	-0.00
Hispanicity	**Hispanic or Latino**	2,622	48,664,631	48,712,927	48,712,927	-0.10	0.00
	Non-Hispanic or Latino	18,034	228,740,665	228,692,369	228,692,369	0.02	0.00
Gender	**Male**	9,185	133,877,695	134,638,294	134,638,294	-0.56	0.00
	Female	11,471	143,527,601	142,767,002	142,767,002	0.53	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, Quarter 4, 2020.

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Appendix H: Evaluation of Calibration Weights: Weight Summary Statistics

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Table H.1 2020 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 and 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	97,034	3	72	178	1,131	4,594	2.44	12	399	1,043	1,884	18,751	1.81	8	408	1,058	1,960	24,374	1.91
Alaska	1,214	7	15	48	155	177	1.65	28	173	210	239	945	1.20	17	154	210	289	2,006	1.38
Alabama	1,172	30	97	1,197	1,223	1,245	1.62	362	1,219	1,516	1,867	7,604	1.27	150	1,156	1,511	2,091	12,939	1.44
Arkansas	966	17	54	160	1,076	1,647	1.86	210	664	1,182	1,485	5,405	1.30	67	732	1,171	1,627	6,015	1.37
Arizona	1,462	47	114	417	1,517	4,594	2.08	410	999	1,806	2,622	12,614	1.78	210	1,038	1,775	2,530	13,607	1.67
California	5,121	7	210	1,557	1,737	3,132	1.63	26	1,916	2,543	3,126	11,511	1.23	17	1,957	2,691	3,438	13,918	1.28
Colorado	1,687	44	88	230	1,212	1,237	1.87	62	553	1,221	1,333	11,033	2.02	38	550	1,098	1,899	12,436	1.95
Connecticut	1,485	10	49	99	1,037	1,076	2.46	139	449	619	1,360	4,208	1.67	36	456	703	1,268	10,165	1.86
District of Columbia	2,212	5	16	26	65	154	1.60	34	83	116	184	738	1.61	11	74	119	199	1,940	1.77
Delaware	1,642	7	24	61	152	183	1.56	37	164	235	312	761	1.30	21	158	232	312	1,333	1.33
Florida	4,120	34	138	1,445	1,470	4,458	1.75	456	1,416	1,846	2,359	9,275	1.27	218	1,467	2,067	2,690	11,921	1.31
Georgia	1,615	17	126	1,916	1,951	1,999	1.69	276	1,525	2,373	2,622	9,829	1.31	149	1,752	2,390	3,283	14,101	1.39
Hawaii	1,708	5	17	40	348	514	2.31	24	117	220	516	1,439	1.58	18	128	215	428	1,771	1.58
Iowa	1,535	10	49	139	915	1,078	2.02	66	296	831	1,176	4,583	1.46	54	364	827	1,104	5,926	1.62
Idaho	1,475	12	27	48	504	519	2.22	83	205	361	588	2,596	1.41	49	235	412	655	3,276	1.45
Illinois	3,562	45	112	228	930	1,299	1.70	427	923	1,296	1,706	6,492	1.26	192	913	1,291	1,725	11,617	1.35
Indiana	1,284	51	134	346	1,692	1,882	1.83	360	1,253	1,957	2,456	7,615	1.31	100	1,306	2,061	2,807	11,591	1.34
Kansas	1,285	18	69	159	874	892	1.86	122	472	921	1,148	2,765	1.26	94	554	931	1,259	4,557	1.34
Kentucky	1,424	20	74	171	1,351	1,387	2.05	288	592	1,328	1,666	6,294	1.36	105	677	1,271	1,830	8,262	1.39
Louisiana	962	37	103	1,538	1,579	1,604	1.60	600	1,460	1,619	1,808	13,002	1.58	250	1,261	1,765	2,378	14,934	1.41
Massachusetts	1,443	38	133	262	1,461	1,499	1.76	325	1,120	1,745	2,070	6,882	1.37	212	1,137	1,758	2,208	13,533	1.48
Maryland	1,648	38	81	139	1,547	1,603	2.31	237	612	1,300	2,077	5,208	1.49	112	574	1,095	2,125	11,908	1.77
Maine	1,774	12	31	88	342	460	1.79	50	215	402	442	1,808	1.25	27	210	355	452	1,591	1.27
Michigan	3,483	21	70	176	1,201	1,228	1.96	121	614	1,220	1,525	5,773	1.34	109	662	1,231	1,549	7,861	1.40
Minnesota	1,848	41	106	212	1,336	1,355	2.01	250	574	1,180	1,800	3,414	1.31	94	602	1,105	1,866	6,829	1.42
Missouri	1,406	49	117	347	1,732	1,765	1.81	348	999	1,977	2,317	8,216	1.30	139	1,000	1,936	2,386	12,240	1.39

(continued)

Table H.1 2020 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 and 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	942	18	50	253	952	975	1.75	264	895	1,159	1,350	4,420	1.30	72	759	1,170	1,556	7,617	1.45
Montana	1,590	9	23	75	221	336	1.67	52	145	221	254	3,060	2.08	18	154	244	316	3,287	1.95
North Carolina	2,069	58	120	258	1,593	1,889	1.86	301	1,134	2,011	2,674	7,223	1.29	125	1,135	2,057	2,926	14,904	1.34
North Dakota	1,599	4	12	27	174	226	2.05	34	61	171	235	690	1.47	12	78	177	265	1,238	1.53
Nebraska	1,525	8	31	91	556	569	2.03	85	204	551	688	2,465	1.50	21	212	478	727	4,750	1.66
New Hampshire	1,864	7	27	65	281	557	1.83	29	126	282	446	1,031	1.33	30	145	283	447	1,862	1.43
New Jersey	2,045	6	108	354	1,235	1,263	1.73	452	1,049	1,501	2,117	7,769	1.29	210	995	1,469	2,124	11,643	1.41
New Mexico	1,331	9	35	79	606	625	2.05	141	322	521	863	2,671	1.36	46	325	583	889	3,198	1.39
Nevada	1,195	13	32	103	941	3,005	2.43	206	357	835	1,756	4,846	1.66	62	402	862	1,450	5,864	1.58
New York	4,802	33	134	233	1,121	1,378	1.76	290	914	1,505	1,963	5,629	1.29	164	871	1,501	2,052	14,708	1.44
Ohio	3,355	9	100	218	1,316	1,698	1.88	68	789	1,513	1,908	6,348	1.28	124	898	1,447	1,871	6,669	1.29
Oklahoma	1,297	22	73	203	1,249	1,408	1.89	232	565	1,283	1,506	6,028	1.47	129	618	1,154	1,644	8,369	1.47
Oregon	1,946	23	67	132	1,531	1,984	2.65	108	313	536	1,604	3,293	1.76	106	350	646	1,320	7,810	1.77
Pennsylvania	3,436	41	109	188	1,275	1,414	1.90	301	852	1,509	1,949	5,875	1.31	132	824	1,497	2,039	10,945	1.40
Rhode Island	1,295	7	26	41	237	848	1.85	64	186	239	319	1,089	1.61	34	180	267	381	3,019	1.77
South Carolina	1,296	4	91	210	1,390	1,452	1.93	76	814	1,748	2,030	4,443	1.29	15	881	1,599	2,227	8,910	1.37
South Dakota	1,518	10	22	68	239	246	1.72	60	143	265	292	1,356	1.25	39	136	277	330	1,515	1.30
Tennessee	1,253	52	127	333	2,155	2,186	1.84	358	1,288	2,429	3,007	8,791	1.31	98	1,252	2,267	3,028	12,716	1.40
Texas	3,494	22	164	476	2,368	3,270	1.83	397	1,784	2,565	3,408	18,751	1.39	278	1,902	2,805	3,983	24,374	1.42
Utah	1,266	14	34	66	1,103	1,171	2.74	90	277	515	1,276	2,501	1.58	67	360	614	1,282	4,482	1.59
Virginia	2,280	29	116	208	1,490	3,853	2.08	216	676	1,517	2,078	7,078	1.46	134	684	1,293	1,956	10,694	1.57
Vermont	2,229	3	12	21	162	166	2.15	12	60	120	171	525	1.54	8	52	94	165	1,280	1.77
Washington	1,687	53	146	325	1,842	1,884	1.88	249	791	1,950	2,505	6,789	1.36	214	1,004	1,741	2,549	9,191	1.35
Wisconsin	1,709	24	117	257	1,590	1,629	2.00	143	677	1,343	1,818	6,913	1.40	142	717	1,379	2,011	6,622	1.36
West Virginia	1,292	16	47	418	423	502	1.57	133	484	495	694	1,778	1.25	40	437	576	747	3,468	1.27
Wyoming	1,186	6	13	180	184	189	1.69	55	155	187	224	976	1.37	18	128	187	254	1,469	1.45

nr = nonresponse adjustment; ps = poststratification adjustment.

[1] WT1*…*WT8 are design-based weight components.

[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, Quarters 1 and 4, 2020.

Table H.2 2020 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	62,515	10	940	2,393	5,414	118,253	2.73	3	873	2,319	5,488	90,869	2.80
Alaska	767	22	269	555	873	8,715	2.04	29	285	543	945	6,251	1.94
Alabama	744	208	1,916	3,560	6,875	53,101	2.12	57	1,711	3,225	7,222	56,687	2.39
Arkansas	663	72	1,180	2,355	4,370	29,688	2.14	76	1,040	2,225	4,803	39,701	2.37
Arizona	907	279	2,192	3,910	7,409	68,534	2.64	153	1,930	3,834	8,479	55,576	2.50
California	3,897	31	3,356	6,213	10,722	82,634	1.82	6	3,375	6,083	11,113	69,366	1.78
Colorado	1,065	61	1,356	2,620	5,493	67,939	3.16	72	1,296	2,596	5,550	31,428	2.34
Connecticut	933	59	831	1,617	3,473	29,876	2.65	31	617	1,500	3,681	45,369	3.39
District of Columbia	672	18	239	507	1,062	19,869	3.01	14	215	472	1,090	10,125	2.77
Delaware	968	27	249	505	1,067	14,196	2.54	9	226	472	1,052	8,494	2.43
Florida	2,467	379	2,575	5,048	10,027	118,253	2.03	99	2,460	4,863	9,675	90,869	2.08
Georgia	1,144	292	2,872	5,731	10,393	71,310	1.95	206	2,869	5,807	10,189	77,482	1.86
Hawaii	1,173	25	232	466	1,158	22,333	3.20	15	235	515	1,146	10,938	2.89
Iowa	932	72	836	1,734	3,163	49,301	2.72	78	816	1,713	3,494	22,103	2.26
Idaho	1,063	52	395	773	1,620	21,984	2.67	17	319	826	1,819	13,325	2.48
Illinois	2,464	194	1,529	2,728	4,876	44,714	2.06	73	1,427	2,714	5,152	58,442	2.18
Indiana	873	128	2,536	4,385	7,406	37,429	1.80	47	2,298	3,927	7,693	65,741	2.15
Kansas	854	122	1,033	1,865	3,343	22,173	1.92	81	921	1,851	3,396	28,481	2.16
Kentucky	889	151	1,372	2,924	5,195	51,519	2.13	64	1,303	2,644	5,267	40,806	2.23
Louisiana	641	424	2,008	3,989	7,829	50,632	1.99	126	1,988	3,818	7,692	54,176	2.07
Massachusetts	953	276	1,771	3,782	6,480	63,413	2.32	95	1,541	3,378	6,831	62,708	2.62
Maryland	1,046	130	1,385	2,669	5,318	42,107	2.49	62	1,266	2,598	5,451	64,455	2.84
Maine	946	37	371	696	1,449	13,181	2.57	11	324	677	1,368	24,026	2.86
Michigan	2,148	153	1,353	2,520	4,347	55,524	2.41	49	1,268	2,546	4,397	41,040	2.35
Minnesota	1,212	133	1,089	1,989	4,501	40,494	2.62	51	967	1,891	4,591	61,166	3.02
Missouri	868	140	2,057	3,380	7,045	52,333	2.18	62	2,013	3,545	7,642	63,286	2.31

(continued)

Table H.2 2020 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	631	113	1,317	2,540	4,234	38,859	2.25	27	1,240	2,293	4,718	39,932	2.50
Montana	868	18	305	578	1,091	20,035	3.44	5	272	592	1,255	10,032	2.63
North Carolina	1,259	210	2,322	4,382	9,202	55,272	1.97	142	2,245	4,260	8,980	54,777	2.11
North Dakota	1,006	12	174	324	690	5,683	2.31	3	153	329	783	5,320	2.42
Nebraska	1,046	24	406	905	1,893	20,707	2.55	7	369	878	1,973	14,333	2.40
New Hampshire	1,154	32	306	570	1,279	14,288	2.83	14	290	579	1,163	19,799	2.84
New Jersey	1,434	216	1,648	2,944	5,818	64,269	2.32	225	1,449	3,072	6,216	65,033	2.60
New Mexico	897	96	618	1,103	2,185	16,859	2.34	46	555	1,003	2,221	30,474	2.87
Nevada	873	137	837	1,771	3,682	31,425	2.31	72	751	1,635	3,667	42,712	2.72
New York	3,372	297	1,790	3,170	5,950	73,042	2.07	166	1,675	3,088	6,207	51,341	2.14
Ohio	2,132	165	1,615	3,191	6,068	48,776	1.95	137	1,656	3,158	6,098	55,635	1.96
Oklahoma	871	158	1,115	2,260	4,636	42,606	2.32	132	1,085	2,171	4,769	39,863	2.43
Oregon	1,130	142	717	1,615	3,677	32,947	2.53	115	711	1,695	3,828	33,248	2.54
Pennsylvania	2,192	225	1,558	2,722	5,880	99,351	2.57	68	1,352	2,617	6,047	63,273	2.60
Rhode Island	819	47	323	618	1,205	13,949	2.79	11	224	563	1,177	19,603	3.78
South Carolina	852	37	1,604	3,445	6,917	43,833	2.16	20	1,360	3,241	6,458	39,041	2.22
South Dakota	998	39	244	409	896	8,567	2.50	15	212	405	766	9,646	2.67
Tennessee	840	156	2,108	4,367	9,751	74,808	2.27	65	1,950	4,233	9,473	61,702	2.21
Texas	2,702	281	3,718	6,402	11,652	78,076	1.78	281	3,522	6,605	11,597	65,330	1.80
Utah	1,190	102	755	1,494	2,639	18,534	2.06	50	708	1,514	2,899	18,305	2.03
Virginia	1,277	215	1,828	3,525	6,261	58,566	2.10	140	1,685	3,353	7,158	47,780	2.25
Vermont	1,273	10	99	222	503	6,855	3.11	8	95	199	445	11,887	4.46
Washington	1,002	216	1,965	3,902	8,360	68,319	2.12	232	1,718	4,096	8,964	42,299	2.07
Wisconsin	936	258	1,655	3,015	5,904	45,389	2.16	100	1,496	2,956	6,454	58,395	2.53
West Virginia	719	45	594	1,059	2,136	21,961	2.56	48	597	1,063	2,244	34,333	3.33
Wyoming	753	28	189	407	736	7,171	2.36	25	153	331	677	12,078	3.51

ps = poststratification adjustment.

[1] WT1*...*WT12 and WT1*...*WT13 used demographic variables from screener data.

[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, Quarters 1 and 4, 2020.

Table H.3 2020 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	36,284	7	974	2,540	5,915	90,869	2.69	8	1,480	3,897	9,489	161,201	2.88	8	1,480	3,897	9,489	161,201	2.88	3	1,258	3,636	9,167	216,420	3.31
Alaska	467	34	305	571	1,004	6,251	1.94	75	476	895	1,537	11,287	1.98	75	476	895	1,537	11,287	1.98	25	373	747	1,520	13,041	2.39
Alabama	442	57	1,678	3,274	7,142	56,687	2.49	57	2,333	4,764	11,660	80,110	2.46	57	2,333	4,764	11,660	80,110	2.46	31	1,907	4,586	11,010	96,663	2.79
Arkansas	406	83	1,220	2,451	5,039	39,701	2.40	83	1,727	3,461	7,737	78,872	2.55	83	1,727	3,461	7,737	78,872	2.55	17	1,695	3,248	7,760	59,510	2.66
Arizona	532	222	2,062	4,164	9,194	55,576	2.47	243	2,963	5,913	15,557	90,236	2.52	243	2,963	5,913	15,557	90,236	2.52	93	2,029	5,635	13,970	113,382	2.72
California	2,193	7	3,554	6,392	11,475	69,366	1.75	8	5,552	10,400	19,226	138,491	1.91	8	5,552	10,400	19,226	138,491	1.91	5	4,773	9,587	18,494	201,230	2.34
Colorado	635	72	1,484	2,810	5,938	31,428	2.18	72	2,335	4,339	8,997	80,787	2.74	72	2,335	4,339	8,997	80,787	2.74	21	2,005	3,993	9,164	99,017	2.86
Connecticut	546	31	637	1,527	3,821	45,369	3.40	152	943	2,452	6,667	57,950	3.14	152	943	2,452	6,667	57,950	3.14	30	729	2,320	5,925	113,638	4.06
District of Columbia	448	28	256	516	1,109	10,125	2.52	33	329	748	1,598	11,560	2.72	33	329	748	1,598	11,560	2.72	23	305	648	1,463	15,209	2.88
Delaware	584	12	231	516	1,189	8,494	2.36	13	384	940	1,810	11,084	2.24	13	384	940	1,810	11,084	2.24	5	302	778	1,963	23,919	2.78
Florida	1,521	99	2,583	5,112	10,132	90,869	2.04	316	4,035	8,147	15,446	84,082	2.08	316	4,035	8,147	15,446	84,082	2.08	153	3,538	7,545	15,261	159,384	2.52
Georgia	692	206	3,103	6,013	10,395	77,482	1.86	275	4,738	9,239	17,013	85,800	1.89	275	4,738	9,239	17,013	85,800	1.89	193	4,226	9,159	16,393	141,677	2.11
Hawaii	642	15	285	561	1,312	9,235	2.58	15	463	991	1,950	21,639	3.01	15	463	991	1,950	21,639	3.01	6	365	843	2,026	30,365	3.81
Iowa	542	112	928	1,980	4,237	22,103	2.08	212	1,544	2,944	6,203	41,408	2.20	212	1,544	2,944	6,203	41,408	2.20	61	1,301	2,818	6,179	56,077	2.43
Idaho	625	17	328	871	1,873	13,325	2.55	45	554	1,241	2,947	42,750	3.21	45	554	1,241	2,947	42,750	3.21	10	424	1,254	2,750	44,278	3.30
Illinois	1,372	73	1,550	2,962	5,547	41,527	2.06	78	2,571	4,779	9,851	71,916	2.19	78	2,571	4,779	9,851	71,916	2.19	16	2,315	4,935	9,373	80,721	2.40
Indiana	517	47	2,373	4,347	8,067	65,741	2.17	236	3,953	6,759	14,053	65,772	2.04	236	3,953	6,759	14,053	65,772	2.04	99	3,507	6,545	13,453	143,604	2.44
Kansas	533	91	1,032	1,896	3,592	28,481	2.13	96	1,299	2,668	5,905	38,224	2.26	96	1,299	2,668	5,905	38,224	2.26	19	959	2,156	5,357	70,326	3.39
Kentucky	538	76	1,641	3,089	6,431	30,665	2.00	86	2,227	4,207	9,390	77,343	2.25	86	2,227	4,207	9,390	77,343	2.25	17	2,012	4,009	8,093	86,265	2.71
Louisiana	358	132	2,292	4,360	8,458	54,176	2.01	308	3,018	6,756	14,306	91,136	2.23	308	3,018	6,756	14,306	91,136	2.23	62	2,532	6,004	12,630	100,862	2.62
Massachusetts	517	107	1,721	3,636	7,499	62,708	2.56	107	2,936	6,264	14,245	112,177	2.54	107	2,936	6,264	14,245	112,177	2.54	39	2,747	5,819	14,149	116,472	2.86
Maryland	636	105	1,479	2,819	6,202	64,455	2.75	298	2,375	4,380	9,539	75,296	2.47	298	2,375	4,380	9,539	75,296	2.47	170	2,141	4,520	9,386	138,081	3.11
Maine	498	14	368	770	1,575	24,026	2.96	14	674	1,239	3,004	21,026	2.50	14	674	1,239	3,004	21,026	2.50	3	613	1,246	2,850	20,779	2.65
Michigan	1,264	130	1,532	2,814	4,766	38,096	2.20	192	2,156	4,038	7,703	76,332	2.38	192	2,156	4,038	7,703	76,332	2.38	65	2,044	4,092	7,775	85,596	2.69
Minnesota	698	51	1,095	2,040	5,041	42,015	2.82	186	1,810	3,621	7,757	91,782	2.76	186	1,810	3,621	7,757	91,782	2.76	47	1,504	3,431	7,103	70,397	3.05
Missouri	491	299	2,357	4,054	8,006	63,286	2.16	380	3,414	6,083	13,389	87,103	2.20	380	3,414	6,083	13,389	87,103	2.20	126	2,629	6,107	13,800	137,803	2.72

(continued)

Table H.3 2020 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	352	27	1,412	2,450	5,518	39,932	2.36	126	1,866	3,954	8,687	48,198	2.39	126	1,866	3,954	8,687	48,198	2.39	25	1,617	3,485	7,904	77,273	2.84
Montana	511	17	322	667	1,354	10,032	2.52	41	450	944	1,907	23,057	3.50	41	450	944	1,907	23,057	3.50	8	428	958	2,061	21,381	3.18
North Carolina	783	142	2,639	4,807	9,724	50,550	1.95	300	3,431	7,259	14,950	84,327	2.09	300	3,431	7,259	14,950	84,327	2.09	65	3,340	7,228	14,138	135,092	2.35
North Dakota	591	16	164	371	813	5,320	2.39	16	266	591	1,356	12,601	2.52	16	266	591	1,356	12,601	2.52	6	224	538	1,371	12,991	2.84
Nebraska	659	10	442	959	2,240	14,333	2.27	21	626	1,424	3,129	16,863	2.25	21	626	1,424	3,129	16,863	2.25	10	525	1,347	3,383	38,458	2.74
New Hampshire	592	23	314	592	1,161	19,799	3.03	39	503	1,009	2,339	27,127	3.36	39	503	1,009	2,339	27,127	3.36	8	469	941	2,363	28,993	3.31
New Jersey	752	225	1,609	3,227	6,266	52,040	2.33	349	2,336	5,000	12,929	99,897	2.88	349	2,336	5,000	12,929	99,897	2.88	136	2,047	4,780	11,313	143,930	3.40
New Mexico	545	46	600	1,099	2,396	30,474	2.69	46	819	1,709	3,765	30,366	2.81	46	819	1,709	3,765	30,366	2.81	27	656	1,382	3,561	55,832	3.92
Nevada	497	72	782	1,770	4,090	31,186	2.56	72	1,202	2,660	6,617	67,147	2.76	72	1,202	2,660	6,617	67,147	2.76	19	774	1,984	5,667	64,073	3.44
New York	1,859	239	1,724	3,164	6,474	51,341	2.02	266	2,379	5,066	10,628	96,508	2.46	266	2,379	5,066	10,628	96,508	2.46	68	2,239	5,057	10,708	160,876	2.77
Ohio	1,261	138	1,841	3,630	6,755	55,635	1.85	173	2,677	5,842	10,096	66,779	1.88	173	2,677	5,842	10,096	66,779	1.88	49	2,705	5,547	9,962	88,637	2.07
Oklahoma	506	146	1,304	2,629	5,278	39,863	2.30	158	1,840	3,916	7,800	45,139	2.27	158	1,840	3,916	7,800	45,139	2.27	65	1,700	3,800	8,245	64,178	2.35
Oregon	651	115	901	2,003	4,448	33,248	2.38	146	1,335	2,979	6,668	46,908	2.49	146	1,335	2,979	6,668	46,908	2.49	72	1,301	2,927	6,933	68,230	2.77
Pennsylvania	1,262	102	1,507	2,831	6,400	63,273	2.54	102	2,333	4,799	10,242	137,583	2.74	102	2,333	4,799	10,242	137,583	2.74	24	2,080	4,556	10,198	122,222	2.90
Rhode Island	442	11	231	554	1,177	14,190	3.53	12	466	1,023	2,767	23,459	2.62	12	466	1,023	2,767	23,459	2.62	3	357	938	2,476	50,573	3.86
South Carolina	500	63	1,676	3,869	6,964	39,041	2.10	66	2,882	6,312	11,383	59,893	2.04	66	2,882	6,312	11,383	59,893	2.04	66	2,297	5,495	10,822	136,105	2.98
South Dakota	600	15	239	411	791	9,646	2.75	30	326	609	1,377	18,577	2.88	30	326	609	1,377	18,577	2.88	6	247	577	1,407	13,826	2.92
Tennessee	469	213	2,407	4,527	9,839	61,702	2.07	224	3,652	7,412	16,694	161,201	2.36	224	3,652	7,412	16,694	161,201	2.36	46	3,131	7,139	16,602	216,420	2.67
Texas	1,579	281	3,971	7,157	12,024	65,330	1.70	283	5,880	10,881	19,665	145,846	1.92	283	5,880	10,881	19,665	145,846	1.92	83	5,271	10,362	19,491	163,245	2.03
Utah	680	86	792	1,706	3,063	14,774	1.90	86	1,286	2,614	4,846	28,728	2.17	86	1,286	2,614	4,846	28,728	2.17	17	982	2,403	4,938	42,007	2.42
Virginia	758	140	1,849	3,637	7,635	47,780	2.25	257	2,899	5,564	12,535	88,744	2.16	257	2,899	5,564	12,535	88,744	2.16	151	2,561	5,444	12,509	123,939	2.32
Vermont	723	12	88	195	498	11,887	4.57	12	136	360	823	7,406	3.38	12	136	360	823	7,406	3.38	4	126	329	760	11,952	3.62
Washington	560	261	2,004	4,775	9,979	39,172	1.93	314	3,486	7,211	16,137	71,510	2.02	314	3,486	7,211	16,137	71,510	2.02	128	2,879	6,429	14,842	94,416	2.36
Wisconsin	575	100	1,678	3,421	6,747	58,395	2.49	204	2,220	4,977	11,122	80,637	2.45	204	2,220	4,977	11,122	80,637	2.45	208	2,182	4,921	10,069	87,256	2.62
West Virginia	420	76	654	1,193	2,350	34,333	3.43	76	1,164	2,217	4,244	22,230	2.07	76	1,164	2,217	4,244	22,230	2.07	24	709	1,617	4,130	32,843	3.10
Wyoming	460	25	165	326	672	12,078	3.82	25	214	492	1,235	11,709	2.76	25	214	492	1,235	11,709	2.76	5	139	474	1,228	10,303	3.19

nr = nonresponse adjustment; ps = poststratification adjustment.

[1] WT1*...*WT13 and WT1*...*WT14 used demographic variables from screener data.

[2] WT1*...*WT14 and WT1*...*WT15 used demographic variables from questionnaire data.

[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, Quarters 1 and 4, 2020.

Table H.4 2020 NSDUH Dwelling Unit-Level Weight Summary Statistics, by Segment-Level Variables: United States

Domain	*n*	Before res.du.nr (WT1*...*WT8)[1]						After res.du.nr and 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]
Total	97,034	3	72	178	1,131	4,594	2.44	12	399	1,043	1,884	18,751	1.81	8	408	1,058	1,960	24,374	1.91
Quarter																			
Quarter 1	40,718	63	607	1,241	1,564	4,594	1.30	83	935	1,734	2,295	9,068	1.40	23	838	1,690	2,406	24,374	1.55
Quarter 4	56,316	3	40	86	153	1,557	1.94	12	307	714	1,360	18,751	2.22	8	324	744	1,462	16,969	2.21
% Hispanic or Latino																			
50-100%	5,320	7	94	558	1,581	2,436	1.92	113	1,003	1,815	2,598	11,455	1.40	34	1,069	1,941	2,870	17,574	1.52
10-<50%	21,516	4	79	188	1,217	3,270	2.37	26	565	1,299	2,238	18,751	1.68	11	580	1,322	2,369	16,969	1.76
<10%	70,198	3	67	171	1,077	4,594	2.49	12	342	887	1,760	13,002	1.88	8	352	912	1,785	24,374	1.96
% Black or African American																			
50-100%	5,320	5	67	136	1,211	2,419	2.39	34	500	1,532	2,460	13,002	1.64	14	570	1,548	2,648	14,934	1.75
10-<50%	16,183	4	78	178	1,355	2,647	2.27	26	592	1,363	2,186	11,328	1.59	11	623	1,390	2,328	16,969	1.71
<10%	75,531	3	71	181	1,107	4,594	2.48	12	358	933	1,806	18,751	1.88	8	371	953	1,853	24,374	1.95
% Owner-Occupied																			
50-100%	73,945	6	75	181	1,141	4,594	2.41	24	401	1,018	1,818	12,614	1.79	12	409	1,023	1,886	24,374	1.87
10-<50%	18,755	3	67	169	1,123	3,132	2.56	12	334	1,089	2,085	9,259	1.77	8	363	1,127	2,181	14,708	1.92
<10%	4,334	4	64	185	1,208	2,647	2.36	26	516	1,512	2,509	18,751	1.91	15	555	1,469	2,644	17,574	1.92
Population Density																			
Large MSA	40,718	5	91	225	1,288	4,594	2.20	26	694	1,477	2,260	18,751	1.61	11	717	1,467	2,359	24,374	1.69
Small MSA	49,239	3	50	154	914	3,005	2.64	12	268	721	1,585	11,455	1.92	8	285	739	1,618	14,101	2.03
Non-MSA	7,077	7	92	219	925	3,853	2.38	28	314	840	1,670	11,033	2.00	17	330	846	1,755	16,443	2.04
Group Quarters																			
Group	204	77	242	502	1,240	1,698	1.45	170	710	1,406	3,506	7,181	1.93	61	396	1,177	2,362	6,368	1.80
Non-Group	96,830	3	72	178	1,131	4,594	2.44	12	399	1,042	1,883	18,751	1.81	8	408	1,058	1,959	24,374	1.91

MSA = metropolitan statistical area; nr = nonresponse adjustment; ps = poststratification adjustment.

[1] WT1*…*WT8 are design-based weight components.

[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, Quarters 1 and 4, 2020.

Table H.5 2020 NSDUH Selected Person-Level Weight Summary Statistics, by Demographic Variables: United 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]
Total	62,515	10	940	2,393	5,414	118,253	2.73	3	873	2,319	5,488	90,869	2.80
Quarter													
Quarter 1	24,304	38	1,673	3,520	7,400	99,351	2.17	12	1,521	3,420	7,502	68,967	2.30
Quarter 4	38,211	10	699	1,776	4,211	118,253	3.27	3	648	1,739	4,264	90,869	3.24
Age													
12-17	14,313	12	501	1,246	2,392	28,946	2.07	3	457	1,175	2,363	20,319	2.19
18-25	15,223	10	608	1,527	2,951	37,241	2.15	7	559	1,429	2,945	43,358	2.28
26-34	9,684	27	1,256	3,030	5,752	59,359	2.02	9	1,151	2,864	5,712	50,219	2.08
35-49	12,896	37	1,402	3,467	6,432	65,074	1.99	13	1,364	3,403	6,553	44,625	1.98
50+	10,399	171	4,139	9,470	15,208	118,253	1.69	34	4,065	9,249	15,434	90,869	1.71
Race													
White	48,676	12	951	2,404	5,409	82,634	2.67	12	906	2,354	5,468	90,869	2.70
Black or African American	6,202	19	1,510	3,350	7,093	118,253	2.56	10	1,351	3,312	7,209	77,482	2.63
Other	7,637	10	616	1,661	4,070	73,042	3.28	3	513	1,502	4,014	68,967	3.68
Hispanicity													
Hispanic or Latino	9,946	12	1,211	2,831	5,965	99,351	2.65	3	1,064	2,745	6,262	68,967	2.66
Non-Hispanic or Latino	52,569	10	895	2,318	5,311	118,253	2.75	7	839	2,245	5,336	90,869	2.83
Gender													
Male	30,350	10	951	2,409	5,422	78,076	2.72	5	889	2,327	5,459	69,366	2.81
Female	32,165	12	930	2,375	5,398	118,253	2.74	3	856	2,309	5,513	90,869	2.79
Population Density													
Large MSA	26,622	18	1,568	3,301	6,796	118,253	2.39	6	1,459	3,263	6,985	77,482	2.42
Small MSA	31,906	10	621	1,726	4,219	77,889	2.98	3	578	1,667	4,216	90,869	3.12
Non-MSA	3,987	22	769	2,146	5,120	60,716	3.02	21	763	2,137	5,058	61,969	3.07

MSA = metropolitan statistical area; nr = nonresponse adjustment; ps = poststratification adjustment.

[1] WT1*…*WT8 are design-based weight components.

[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, Quarters 1 and 4, 2020.

Table H.6 2020 NSDUH Respondent Person-Level Weight Summary Statistics, by Demographic Variables: United States

Domain	*n*	Before res.per.nr (WT1*...*WT13)[1]						After res.per.nr (WT1*...*WT15)[1]						*n*	Before res.per.ps (WT1*...*WT15)[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]
Total	36,284	7	974	2,540	5,915	90,869	2.69	8	1,480	3,897	9,489	161,201	2.88	36,284	8	1,480	3,897	9,489	161,201	2.88	3	1,258	3,636	9,167	216,420	3.31
Quarter																										
Quarter 1	15,628	12	1,497	3,337	7,322	65,741	2.31	20	2,025	4,762	11,281	137,583	2.56	15,628	20	2,025	4,762	11,281	137,583	2.56	5	1,749	4,685	11,165	201,230	2.84
Quarter 4	20,656	7	740	2,001	4,852	90,869	3.06	8	1,183	3,306	8,117	161,201	3.17	20,656	8	1,183	3,306	8,117	161,201	3.17	3	997	2,993	7,709	216,420	3.78
Age																										
12-17	6,337	10	509	1,346	2,538	19,163	2.07	12	1,023	2,451	4,822	60,592	2.49	6,330	12	1,024	2,460	4,833	60,592	2.49	3	886	2,355	4,900	63,776	2.69
18-25	8,978	7	562	1,446	2,968	43,358	2.24	8	830	2,133	4,683	59,171	2.59	8,915	8	832	2,126	4,673	59,171	2.60	3	657	1,967	4,814	63,662	2.78
26-34	6,169	14	1,133	2,809	5,480	50,219	2.12	14	1,547	3,887	8,408	72,815	2.43	6,241	14	1,543	3,875	8,353	72,815	2.44	6	1,262	3,629	8,384	91,405	2.64
35-49	8,061	13	1,376	3,460	6,685	44,625	1.95	14	1,950	4,993	10,149	97,789	2.21	8,049	14	1,950	5,003	10,185	97,789	2.23	5	1,661	4,578	10,065	93,018	2.37
50+	6,739	34	4,039	9,075	15,214	90,869	1.72	37	5,548	12,907	23,065	161,201	1.89	6,749	37	5,513	12,778	22,995	161,201	1.90	31	4,715	11,164	22,552	216,420	2.26
Race																										
White	28,333	12	1,014	2,573	5,915	90,869	2.59	12	1,537	3,939	9,472	161,201	2.79	27,429	12	1,519	3,915	9,424	161,201	2.78	4	1,420	3,885	9,434	216,420	3.14
Black or African American	3,600	10	1,568	3,645	7,683	77,482	2.53	19	2,254	5,466	11,910	137,583	2.66	3,767	12	2,101	5,245	11,747	137,583	2.72	3	1,732	5,042	11,859	154,907	2.92
Other	4,351	7	558	1,631	4,199	63,164	3.53	8	935	2,620	6,965	96,067	3.69	5,088	8	1,075	2,980	7,843	107,084	3.46	5	519	1,787	5,351	201,230	5.18
Hispanicity																										
Hispanic or Latino	5,393	11	1,196	3,033	6,600	63,362	2.61	12	1,785	4,827	11,284	138,491	2.75	5,491	12	1,766	4,787	11,170	138,491	2.76	3	1,218	4,197	10,627	196,135	3.42
Non-Hispanic or Latino	30,891	7	941	2,463	5,794	90,869	2.70	8	1,431	3,760	9,114	161,201	2.89	30,793	8	1,431	3,763	9,131	161,201	2.89	3	1,260	3,568	8,896	216,420	3.26
Gender																										
Male	16,782	14	1,004	2,570	5,926	69,366	2.68	15	1,606	4,066	10,037	138,491	2.84	16,762	15	1,599	4,060	10,020	137,583	2.83	4	1,356	3,887	9,720	201,230	3.26
Female	19,502	7	948	2,512	5,893	90,869	2.69	8	1,378	3,743	9,001	161,201	2.90	19,522	8	1,384	3,747	9,004	161,201	2.91	3	1,182	3,455	8,763	216,420	3.34
Population Density																										
Large MSA	15,250	7	1,630	3,558	7,440	77,482	2.35	8	2,492	5,507	12,036	161,201	2.52	15,250	8	2,492	5,507	12,036	161,201	2.52	3	2,123	5,132	11,669	201,230	2.90
Small MSA	18,647	10	652	1,891	4,573	90,869	2.93	12	1,018	2,831	7,279	112,177	3.10	18,647	12	1,018	2,831	7,279	112,177	3.10	3	860	2,654	7,193	163,245	3.56
Non-MSA	2,387	21	795	2,282	5,600	58,395	2.92	23	1,217	3,504	8,710	97,789	3.13	2,387	23	1,217	3,504	8,710	97,789	3.13	8	1,014	3,200	8,377	216,420	3.81

MSA = metropolitan statistical area; nr = nonresponse adjustment; ps = poststratification adjustment.

[1] WT1*...*WT13 and WT1*...*WT15 used demographic variables from screener data.

[2] WT1*...*WT15 and WT1*...*WT15 used demographic variables from questionnaire data.

[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, Quarters 1 and 4, 2020.

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