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Substance Abuse and Mental Health Services Administration

2024 National Survey on Drug Use and Health (NSDUH) Methodological Resource Book

Section 11: Person-Level Sampling Weight Calibration

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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 2024 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 2024 NSDUH person-level weighting. The constrained exponential modeling method used in the surveys before 1999 was modified, and the generalized exponential model (GEM) 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.

Details on implementation and evaluation of the GEM are described in Chapters 3 to 10 and in the appendices.

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[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.

1. Introduction

The 2024 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 2024 NSDUH person-level analysis weights involved two steps. The first step was to calculate design weights reflecting the 2024 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 2024 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 2024 NSDUH, the NSDUH person-level weighting process, and the weight adjustment methodology. The impact of multimode data collection 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 the 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). Chapter 10 discusses break-off analysis weights, which have been included beginning with the 2020 NSDUH.

Ten appendices also are included. Appendix A presents technical details about the GEM, Appendix B contains information on the methodology for imputing screener demographic variables, Appendix C discusses the practical aspects of implementing the GEM for NSDUH, and Appendix D lists the imputed DU eligibility rates for each state. The remaining six appendices contain various tables on measures such as weighted response rates, percentages of extreme weights, slippage rates, weight summary statistics, and comparison of estimates and standard errors for selected outcomes.

1.1 Sample Design

The respondent universe for the 2024 NSDUH was the civilian, noninstitutionalized population aged 12 years or older residing within the 50 states and the District of Columbia. Multimode

data collection (in person or via the web) has been used since the 2020 NSDUH, was used for 2024, and will be used for future NSDUHs.

A coordinated sample design was developed for the 2014 through 2017 NSDUHs. A large reserve sample of area clusters was selected at the time the 2014 through 2017 NSDUH sample was selected. This reserve sample was used to field the 2018 through 2024 NSDUHs. Thus, the 2018 through 2024 NSDUH designs simply continue the coordinated design. The coordinated sample design is state based, with an independent, multistage area probability sample within each state and the District of Columbia. The 2014-2024 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 for the 2014 through 2024 NSDUHs was census tracts. The selection began with the construction of an area sample frame that contained one record for each census tract in the United States. If necessary, census tracts were aggregated within SSRs until each first-stage sampling unit met the minimum size requirement. In California, Florida, Georgia, Illinois, Michigan, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Texas, and Virginia, this minimum size requirement was 250 DUs in urban areas and 200 DUs in rural areas. In the remaining states and the District of Columbia, the minimum requirement was 150 DUs in urban areas and 100 DUs in rural areas. In each SSR, 48 census tracts were systematically selected with probabilities proportionate to a composite size measure and with minimum replacement (Chromy, 1979).

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

With the transition to a hybrid field enumeration and ABS frame in 2022, the third stage of selection was eliminated for secondary sampling units (SSUs) using the ABS frame. For 2024 NSDUH, the third stage of selection was also eliminated for field enumeration segments to improve the precision of estimates by reducing intracluster correlation.

Once the DU frames were constructed, a sample of DUs was selected within each segment at the fourth stage of selection. Then, at the fifth stage of selection, within sample DUs, 0, 1, or 2 people were selected for the NSDUH interview using a pair sampling strategy developed by Chromy and Penne (2002).

Similar to NSDUHs dating back to 1999, the 2014 through 2024 surveys provide sufficient sample sizes to support state and national estimates. Furthermore, NSDUH was redesigned in 2014 to a more cost-efficient sample allocation, which increased the sample size in the largest states while maintaining adequate sample sizes in smaller states to support reliable state estimates based on small area estimation methodology. Reliable direct state estimates are also possible (in any state) by pooling multiple years of data.

The target national sample size for the 2024 NSDUH was 67,507 people, and the achieved sample for the 2024 NSDUH was 70,241 people, with 27,976 interviews completed via web and 42,265 interviews completed in person. The completed interviews corresponded to 56,588 responding DUs out of 203,737[3] DUs screened.

For more details on the 2024 NSDUH sample design, please see *2024 National Survey on Drug Use and Health (NSDUH) Methodological Resource Book, Section 2: Sample Design and Experience Report* (Center for Behavioral Health Statistics and Quality [CBHSQ], 2025). The person pair weighting process is described in *2024 National Survey on Drug Use and Health (NSDUH) Methodological Resource Book, Section 12: Questionnaire Dwelling Unit-Level and Person Pair-Level Sampling Weight Calibration* (CBHSQ, 2026b).

1.2 Person-Level Weighting Process

For the 2024 NSDUH, two survey modes (in-person and web data collection) continued to be employed. In the 2021 NSDUH, two sets of analysis weights were developed. One set was the same as the analysis weights used in 2020 and prior NSDUHs. The alternative was adding mode indicators in the final poststratification adjustment (Weight Component #15) to reduce the bias caused by interview mode. Starting with the 2022 NSDUH, only one set of analysis weights, with mode indicator in the final poststratification adjustment, was developed. The targets were 30 percent and 70 percent of population estimates for the web and in-person interview modes, respectively, at the national level.

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

[3] The number of DUs that completed the screening was 203,743 (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 203,737.

(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 2024 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.

Exhibit 1.1 Summary of NSDUH Sample Weight Components

Dwelling Unit Level

	2014-2024 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[1]	#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

	2014-2024 Weight Adjustment Components	Corresponding 2005-2013 Weight Adjustment Components
#9	Dwelling Unit Nonresponse Adjustment ***(res.sdu.nr)***[2]	#8
#10	Dwelling Unit Poststratification Adjustment ***(res.sdu.ps)***[2]	#9
#11	Dwelling Unit Extreme Weight Adjustment ***(res.sdu.ev)***[2]	#10

Person Level

	2014-2024 Design Weight Component	Corresponding 2005-2013 Design Weight Component
#12	Inverse Probability of Selecting a Person within a Dwelling Unit	#11

	2014-2024 Weight Adjustment Components	Corresponding 2005-2013 Weight Adjustment Components
#13	Selecting Person-Level Poststratification Adjustment to Screener Data Controls ***(sel.per.ps)***[2]	#12
#14	Person-Level Nonresponse Adjustment ***(res.per.nr)***[2]	#13
#15	Person-Level Poststratification Adjustment ***(res.per.ps)***[2]	#14
#16	Person-Level Extreme Weight Adjustment ***(res.per.ev)***[2]	#15

[1] The step of selecting segments from census block groups was eliminated beginning with the 2024 NSDUH; thus, this weight is set to be 6 because only 8 segments were used out of 48 selected segments in the 2024 NSDUH. This weight will be removed and all weight components renumbered starting with the 2025 NSDUH.

[2] 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.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

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, 2026c). 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 percentage 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.

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

In Quarter 4 of 2020, the Substance Abuse and Mental Health Services Administration (SAMHSA) approved the addition of web data collection to the National Survey on Drug use and Health (NSDUH) to minimize the impact of the coronavirus disease 2019 (COVID-19) pandemic on respondent sample size (Center for Behavioral Health Statistics and Quality, 2022). Multimode data collection has continued since the 2021 NSDUH. Throughout each quarter, respondents had the option of participating via web as long as they had not already participated in person.

Web data collection was expected to result in a much lower overall response rate than in-person data collection; therefore, each quarter, a very large sample of dwelling units (DUs) was selected and released to web data collection. Because the NSDUH area segments were not designed to support as large of a sample as was required, supplemental samples were selected from available DUs in area segments from prior NSDUH samples.

The general methodology and procedures described in Sections 1.2 and 1.3 were applied to develop the person-level weights for the 2024 NSDUH. In addition to those general procedures, the person-level weighting process for the 2024 NSDUH was adjusted from processes for previous NSDUHs to reflect multimode data collection. Six modifications have been made to the person-level weighting since the 2020 NSDUH:

1. An implicit unknown eligibility adjustment has been used since the 2020 NSDUH, when DUs selected for web data collection did not respond at the screening stage and their eligibility status was unknown.
2. Separate analysis weights were developed for Quarters 1 and 4 of 2020; however, since 2021, data from Quarters 1 through 4 were combined to develop analysis weights, and more quarter interactions were included in the adjustment models.
3. As in Quarter 4 of the 2020 NSDUH, the 2021-2024 NSDUHs had the screening and interview modes added to the DU- and person-level nonresponse adjustments, respectively.
4. Like the 2020 NSDUH, the 2021-2024 NSDUHs had educational attainment added to the person-level poststratification adjustment models to correct the imbalance of education-level distributions in the sample.
5. Like the 2020 NSDUH, the 2021-2024 NSDUHs had break-off analysis weights developed for adult respondents (with otherwise unusable interviews) who did not complete the full interview.
6. Besides the regular analysis weights, an alternative set of analysis weights has been developed since the 2021 NSDUH by recalibrating the person-level poststratification adjustment with the addition of a mode indicator variable—web or in person—while setting the target for web interviews to be 30 percent of population estimates and for in-person interviews to be 70 percent of population estimates. Break-off analysis weights were also developed for the alternative analysis weights. However, starting with the 2022 NSDUH, only one set of analysis weights similar to the alternative set

of analysis weights and break-off analysis weights used for the 2021 NSDUH was developed.

These six modifications are discussed in Sections 2.1 through 2.6.

2.1 Implicit Unknown Eligibility Adjustment

When data are collected in person, field interviewers can identify ineligible sample DUs (e.g., vacancies) to allow the ineligible DUs to be excluded from the sample before weighting. For web data collection, however, DU members need to initiate the screening process. Consequently, web 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 Combined Quarters 1 through 4 Analysis Weights

For the 2020 NSDUH, Quarter 1 and Quarter 4 analysis weights were developed separately, because Quarter 1 data collection was all in person, Quarter 4 data collection was mainly web based, and nonresponse patterns differed between Quarters 1 and 4. State three-factor effects were not included so that weight adjustment models could converge with smaller quarterly sample sizes.

For the 2021-2024 NSDUHs, data from Quarters 1 through 4 were combined. State three-factor (e.g., state × age × sex) effects were included, and quarter interaction with state and demographic variables was added to adjustment models.

The analysis weights (ANALWT2) are the product of 16 weight components discussed in Chapters 7 and 8.

2.3 Addition of Data Collection Mode to the Nonresponse Adjustments

Multimode data collection continued to be used for the 2024 NSDUH. Response propensity is correlated with data collection mode; that is, web data collection tends to have lower response rates than in-person data collection. To correct the potential bias caused by mode differences, screener mode was added as a predictor variable in the DU-level nonresponse adjustment model, and interview mode was added to the 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, data from Quarter 4 of

2020 (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 the 2019 NSDUH[4] and data from Quarter 1 of 2020. Similar patterns can be seen in the 2021-2024 data,[5] where the web survey data show a higher percentage of college graduates and a lower percentage of adults with a high school education or less than data from the in-person survey.

Table 2.1 Unweighted Educational Attainment Distributions: Among Adults Aged 18 or Older; Percentages, 2019-2020 and 2023-2024

Educational Attainment	2019	2020		2023		2024	
		Quarter 1	Quarter 4	In Person	Web	In Person	Web
Less Than High School	11.7	12.4	6.3	13.4	6.0	13.4	6.2
High School Graduate	26.2	24.7	18.6	31.7	19.2	32.1	20.7
Some College or Associate's Degree	33.6	33.4	30.1	30.1	27.2	29.7	25.9
College Graduate	28.5	29.5	45.0	24.8	47.7	24.7	47.3

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2019, Quarters 1 and 4 of 2020, 2023 and 2024.

Table 2.2 shows the weighted distributions from prior NSDUH years and the American Community Survey (ACS). The educational attainment distributions for the 2019 NSDUH and the corresponding ACS distributions were similar and tended to be consistent over time,[6] although educational attainment was not controlled in the poststratification adjustment models. The educational attainment distributions for in-person data collection from Quarter 1 of 2020 aligned well with the 2019 NSDUH and 2019 ACS distributions. For Quarter 4 of 2020, the educational attainment distribution had a higher percentage of college graduates and a lower percentage of those with a high school education or less compared with previous NSDUH years. This pattern continued for 2024.[7] Compared with previous NSDUH years, a higher percentage of college graduates and a lower percentage of those with a high school education or less completed interview via the web, whereas a higher percentage of those with a high school education or less completed the interview in person.

[4] Educational attainment distributions for NSDUHs before 2019 followed a similar pattern.
[5] Educational attainment distributions for the 2021-2022 NSDUHs are not shown to save space.
[6] Educational attainment distributions for NSDUH and the corresponding ACS distributions before 2019 follow a similar pattern.
[7] Educational attainment distributions for 2021-2023 follow the same pattern as those for Quarter 4 of 2020.

Table 2.2 NSDUH and ACS Weighted Educational Attainment Distributions: Among Adults Aged 18 or Older; Percentages, 2019-2020, and 2023-2024

Educational Attainment	*2019 ACS*[1]	2019	2020		*2023 ACS*[1]	2024	
		NSDUH[2]	Q1[2] NSDUH	Q4[2] NSDUH		In Person[2]	Web[2]
Less Than High School	*11.5*	12.0	11.9	8.4	*10.2*	13.4	5.5
High School Graduate	*27.6*	24.3	23.4	19.5	*26.9*	27.9	18.5
Some College or Associate's Degree	*30.3*	30.8	30.7	28.8	*29.0*	28.8	24.4
College Graduate	*30.6*	32.9	34.0	43.3	*33.9*	30.0	51.6

ACS = American Community Survey; Q = quarter.

[1] Educational attainment distribution from the 2019 ACS was used to calculate the control totals for the Quarter 4, 2020. Educational attainment distributions from the 2023 ACS were used to calculate the control totals for the 2024 person-level poststratification.

[2] Weighted distributions for the 2019 NSDUH were based on final analysis weights. Weighted distributions for Quarters 1 and 4 of 2020 and for 2023 and 2024 were 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, 2019, and Quarters 1 and 4 of 2020, 2023 and 2024; U.S. Census Bureau, American Community Survey, 2019 and 2023.

To correct the imbalance in educational attainment distribution, the educational attainment variable and its interaction with age, race, Hispanicity, and sex 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 for the first time for the 2020 NSDUH and continue to be used 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 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.

For the 2024 NSDUH, 4.87 percent (unweighted) of adults aged 18 or older who responded to the web survey broke off after the start of the mental health module and before the end of the adult depression modules, and the corresponding unweighted percentage of adults who responded to the in-person survey was only 0.1 percent. In comparison, 0.43 percent of adolescents aged 12 to 17 who responded to the web survey broke off by the end of the depression modules, and the corresponding percentage of adolescents who responded to the in-person survey was 0.01 percent.

For years prior to 2019, 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 for Quarter 4 of 2020 and 2021-2024 during the mental health and adult depression modules for adults aged 18 or older might not be random occurrences. Web 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[8] 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 break-off adjustment was not performed for adolescents aged 12 to 17 because only a few adolescents broke off the interview.

Break-off analysis weights were developed for the analysis weights (ANALWT2). Chapter 10 discusses in greater detail how the break-off analysis weights were developed.

2.6 Alternative Analysis Weights

The 2024 NSDUH continued to use multimode data collection. Analysis has demonstrated the existence of a mode effect in NSDUH data collection, with respondents to the web survey reporting less use of most substances and fewer mental health issues. There is also concern that changing proportions of web and in-person responses may cause estimates from different years to be not comparable.

For the 2021 NSDUH, 54.57 percent of surveys were completed via the web, and 45.43 percent were completed in person. A comparability study was conducted to explore the sensitivity of a set of estimates to different proportions of web and in-person data. Comparisons were made of relative differences between alternative estimates and current estimates computed with 2021 NSDUH analysis weights. The study concluded that adjusting the weight noticeably alters the estimates. On the basis of expected future proportions of completed surveys by mode, SAMHSA approved adjusting the analysis weights for the 2021 NSDUH to 30 percent for web and 70 percent for in person as a balanced attempt to reduce the extent of change to the 2021 estimates and to match the expected proportions for 2022 and future NSDUHs. Table 2.3 shows that the actual proportion of completed surveys by mode is getting closer to the target of 30 percent for web and 70 percent for in person.

[8] The regular person-level analysis weight ANALWT2 was used to analyze imputed adult mental health outcome variables.

Table 2.3 Surveys Completed via the Web and In Person; Numbers and Percentages, 2021-2024

Mode	2021		2022		2023		2024	
	Number	%	Number	%	Number	%	Number	%
Web	38,120	54.57	30,248	42.38	24,424	36.09	27,976	39.83
In Person	31,730	45.43	41,121	57.62	43,255	63.91	42,265	60.17

For the 2021 NSDUH, two sets of analysis weights were developed: the original analysis weights (ANALWT1) and the alternative analysis weights (ANALWT2). An interview mode indicator was added as a main effect when the target weight for web mode was 30 percent of the population estimate and the target weight for the in-person mode was 70 percent of the population estimate. The original analysis weights (ANALWT1) and the alternative analysis weights (ANALWT2) were created for 2021. ANALWT1 was used to generate published estimates for the 2021 NSDUH, and ANALWT2 was used to compare 2021 NSDUH estimates with estimates from future NSDUHs.

Starting with the 2022 NSDUH, only one set of analysis weights, ANALWT2, was created and is being used to generate published estimates. Estimates produced using ANALWT2 for the 2021-2024 NSDUHs can be compared with each other and with estimates from future NSDUHs.

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 $(\mathrm{L}_k, \mathrm{U}_k)$ 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 National Survey on Drug Use and Health 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., $\mathrm{L}_k = 1$ in the nonresponse step). If the percentage of extreme weights (see Section 5.1 for details) 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 5.3 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 2024 National Survey on Drug Use and Health (NSDUH), the initial set of predictor variables was identical to the set used for the 2023 NSDUH. Exhibit 4.1 shows the definitions and levels of the predictor variables used in the 2024 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, sex, race, Hispanicity, and relation to householder (i.e., the head of the household). For poststratification, predictors typically used were state, age, race, sex, 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 had been the same since 1999. Since 2020, two additional sets of variables have been added to the weight calibration. Here are the details:

1. Screening mode (web vs. in person) was added to the DU-level nonresponse adjustment for Quarter 4 of 2020 and for 2021-2024, and interview mode (web vs. in person) was added to the person-level nonresponse adjustment for Quarter 4 of 2020 and for 2021-2024. See Section 2.3 for details.
2. The educational attainment variable and its two-way interactions with age, race, Hispanicity, sex, and state were added to the person-level poststratification adjustments for Quarters 1 and 4 of 2020 and thereafter. See Section 2.4 for details.

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]

Sex
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 or Native Hawaiian or Pacific Islander, 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: In Person

Interview Mode
1: Web,[1] 2: In Person

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, 2024.

As in previous survey years,[9] the 2024 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 2024 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.

[9] 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 2024 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 $\pm$2.5 × IQR, which was conservative when compared with the commonly used standard of the median $\pm$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 × IQR (see Section 5.1 for details). 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	220.90	1,333.24	1.0000	1.00	5.00	1.0000	5.0000	1.1378	655.11
2	0	671.19	495.50	858.74	1.000	1.00	5.00	1.0000	5.0000	1.4735	989.01
3	0	743.88	556.36	931.40	1.000	1.00	5.00	1.0000	5.0000	1.3235	984.50
4	0	660.85	554.05	909.94	1.000	1.00	5.00	1.0000	5.0000	2.1374	1,412.52
5	0	785.59	690.06	864.57	1.000	1.00	5.00	1.0000	5.0000	1.2383	972.80
6	0	663.66	536.23	824.72	1.000	1.00	5.00	1.0000	5.0000	1.1486	762.26
7	0	774.84	530.38	1,002.3	1.000	1.00	5.00	1.0000	5.0000	1.1243	871.11
8	0	1,066.54	751.39	1,422.6	1.000	1.00	5.00	1.0000	5.0000	1.2771	1,362.07
9	0	742.36	530.38	1,002.3	1.000	1.00	5.00	1.0000	5.0000	1.2667	940.35
10	0	660.27	500.37	860.71	1.000	1.00	5.00	1.0000	5.0000	1.4735	972.92
11	1	941.42	703.87	904.13	0.960	1.24	2.70	1.1909	2.5930	1.3009	1,224.67
12	1	928.17	692.05	862.17	0.928	1.24	2.70	1.1518	2.5080	1.2582	1,167.84
13	1	928.17	692.05	862.17	0.928	1.24	2.70	1.1518	2.5080	1.2582	1,167.84
14	1	1,343.00	842.37	1,334.8	0.993	1.24	2.70	1.2325	2.6836	1.3685	1,837.86
15	1	863.38	564.80	783.66	0.907	1.24	2.70	1.1255	2.4507	1.1939	1,030.80
16	1	898.12	692.05	862.17	0.960	1.24	2.70	1.1904	2.5919	1.2644	1,135.56
17	1	898.12	692.05	862.17	0.960	1.24	2.70	1.1904	2.5919	1.2644	1,135.56
18	1	2,134.50	703.87	904.13	0.423	1.24	2.70	0.5252	1.1437	0.9048	1,931.33
19	1	941.42	703.87	904.13	0.960	1.24	2.70	1.1909	2.5930	1.3009	1,224.67
20	1	2,134.50	703.87	904.13	0.423	1.24	2.70	0.5252	1.1437	0.9048	1,931.33
21	2	678.72	723.05	819.85	1.065	1.00	5.00	1.0653	5.3265	1.4830	1,006.53
22	2	549.91	571.61	774.02	1.039	1.00	5.00	1.0395	5.1973	1.5777	867.58
23	2	549.57	555.16	798.62	1.010	1.00	5.00	1.0102	5.0508	1.1225	616.90
24	2	687.58	690.06	864.57	1.003	1.00	5.00	1.0036	5.0180	1.1679	803.04
25	2	538.18	539.52	739.42	1.002	1.00	5.00	1.0025	5.0125	1.2177	655.34
26	2	549.57	555.16	798.62	1.010	1.00	5.00	1.0102	5.0508	1.1225	616.90
27	2	532.41	564.80	783.66	1.060	1.00	5.00	1.0608	5.3042	1.1898	633.43
28	2	549.91	571.61	774.02	1.039	1.00	5.00	1.0395	5.1973	1.5777	867.58
29	2	549.91	571.61	774.02	1.039	1.00	5.00	1.0395	5.1973	1.5777	867.58
30	2	693.58	713.94	841.60	1.029	1.00	5.00	1.0294	5.1468	5.1466	3,569.54

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

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, sex, 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 2020 census coverage measurement program. Starting with the 2021 National Survey on Drug Use and Health (NSDUH), the control totals used for poststratification were based on the 2020 decennial census.

For the 2024 NSDUH, 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 2024, the U.S. census estimates for February 1 and March 1, 2024, were averaged, resulting in a population estimate appropriate for February 15, 2024 (i.e., the midpoint of Quarter 1, 2024).

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

Exhibit 6.1 Definition of Levels for Variables for Poststratification Adjustment

Age (Years)[1]
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
Sex
1: Male, 2: Female
Hispanicity
1: Hispanic or Latino, 2: Non-Hispanic or Latino
State
50 States and the District of Columbia

[1] In the dwelling unit-level poststratification adjustment, age groups 50-64 and 65+ were collapsed to 50+.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

In addition to the geographic and demographic variables listed earlier, educational attainment for adults aged 18 or older was added to the person-level poststratification models for the 2024 NSDUH. The control totals for educational attainment were calculated using the population estimates received from the U.S. Census Bureau and the educational attainment distributions from the 2023 American Community Survey (ACS).

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 target population estimates received from the U.S. Census Bureau.

The educational attainment control totals for the 2024 NSDUH are based on 2023 ACS public use file (PUF) and were calculated using a cell distribution method. Table 6.1 shows an example of calculating 2024 NSDUH control totals for educational attainment using this method. The educational attainment distributions for each cell were formed by the intersection of every level of state, age group, race, sex, and Hispanicity (total of 2,488 cells: 51 states by 4 age groups by 3 race categories by 2 sex categories by 2 Hispanicity categories) using data from the 2023 ACS PUF. These educational attainment distributions for each cell were then multiplied by the 2024 NSDUH target population estimates in that cell to estimate cell control totals for educational attainment. For cells with zero counts or cells with any missing educational attainment category in the 2023 ACS PUF, average educational attainment distributions for the whole state were used. Cell educational attainment control totals were then aggregated to six domains, as shown in Exhibit 6.2.

Table 6.1 Example of Calculating 2024 NSDUH Control Totals for Educational Attainment Using the Cell Distribution Method for Connecticut

State	Age Group	Race	Hispanicity	Sex	Educational Attainment	Cell Population Count of 2024 NSDUH	Cell Educational Attainment Distribution from 2023 ACS	Cell Control Totals
Connecticut	18-25	White	Hispanic or Latino	Male	Less than high school	35,476	20.38%	7,230
					High school graduate		47.67%	16,910
					Some college		16.08%	5,705
					College graduate		15.87%	5,631

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024. U.S. Census Bureau, American Community Survey, 2023.

Exhibit 6.2 Educational Attainment, by Domain at the Census Division Level

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

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

The 2024 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[10]) 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 (CBGs) from census tracts, (3) the selection of segments within each sampled CBG, 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 shows the sample sizes at these five stages of selection for each of the nine model groups, corresponding to the nine census divisions. Specific details of the sample design and sample selection procedures can be found in the *2024 National Survey on Drug Use and Health (NSDUH) Methodological Resource Book, Section 2: Sample Design and Experience Report* (Center for Behavioral Health Statistics and Quality [CBHSQ], 2025).

Table 7.1 Sample Size, by Model Group for Each Stage of Sampling; 2024

Model Group	Eligible and Selected Dwelling Units	Completed Dwelling Units	Eligible Persons	Selected Persons	Completed Persons
1	91,923	18,754	38,515	11,058	5,573
2	110,466	19,367	42,995	13,784	6,758
3	130,415	29,188	61,493	19,463	9,801
4	78,927	19,397	39,585	13,125	6,858
5	194,586	39,795	84,098	24,339	12,809
6	47,107	13,929	28,791	9,171	4,584
7	64,711	15,090	32,230	11,385	6,279
8	99,604	23,208	50,053	16,558	8,583
9	109,933	25,015	57,556	18,287	8,996
Total	927,672	203,743	435,316	137,170	70,241

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

The final DU- and person-level sampling weights for the 2024 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

[10] 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.

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 2024 NSDUH are the product of all 16 weight components, as illustrated in Exhibit 1.1.

As in the previous survey years, the 2024 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 census divisions were used. Exhibit 7.1 shows the U.S. Census Bureau divisions and model groups used in the 2024 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

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

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 CBG within each census tract.
3. The probability of selecting the segment within each CBG for field enumeration CBGs.[11]
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 2024 Sample Design and Experience Report (CBHSQ, 2025).

7.2 Implicit Unknown Eligibility Assignment

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 data collection, adult DU members aged 18 or older needed to initiate the screening process for eligibility to be confirmed. For the 2024 NSDUH, eligibility status was unknown for DUs that did not initiate the screening interview and that were not visited by an FI. If a DU's eligibility was unknown for 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

[11] The step of selecting segments from census block groups was eliminated beginning with the 2024 NSDUH; thus, this weight is set to be 1. This weight will be removed and all weight components renumbered starting with the 2025 NSDUH.

historical state-level DU eligibility rates were obtained from the combined data from Quarters 2 through 4 of 2019 and Quarter 1 of 2020.[12] 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 D.1 in Appendix D shows that the imputed DU unknown eligibility rates were similar to the historical DU eligibility rates. The overall rates were 85.19 percent (imputed) and 85.21 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).

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. Before Quarter 4 of 2020, an FI visited each selected DU to obtain this roster information. Beginning in Quarter 4 of 2020 and continuing through 2024, an eligible member of the selected DU provided roster information by web or in person. 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) for responding DUs were adjusted to the weights of all eligible DUs 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 was new for 2020 and continued to be used thereafter as in-person and web modes were implemented.

[12] Data collected after Quarter 1 of 2020 were not included in the historical state-level DU eligibility rate calculations because of the presence of unknown DU eligibility.

Exhibit 7.2 Covariates for the Dwelling Unit-Level Nonresponse Adjustment; 2024

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

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

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; binary

variables GQ1, GQ2, and GQ3 corresponding to college dorm, other group quarter, and non-group quarter were created. Non-group quarter was the reference level, so only GQ1 and GQ2 were included in the model, and 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 segment-level variables were usually 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, and population density levels had to be collapsed for some models. For nonstate two-factor effects, state two-factor effects, and state three-factor effects, most of the variables had to be collapsed or dropped because of zero sample size or convergence problems.

Table 7.2 presents the distributions for the design-based weight and unequal weighting effects (UWEs)[13] before and after the DU-level nonresponse adjustment. The UWEs increased from 1.40 to 1.75, and the average adjustment factor is 4.62.

Table 7.2 Distribution for Design-Based Weight and Unequal Weighting Effects before and after DU-Level Nonresponse Adjustment; 2024

Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
Design-Based Weight	5	80	141	192	1,042	142	927,672	1.40
DUNR Adjustment Factor	0.73	2.67	4.26	6.29	12.87	4.62	203,743	N/A
Weight after DUNR	8	213	489	912	4,997	646	203,743	1.75

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, 2024.

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

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

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 × sex) 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, sex, 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 sex 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 non-Hispanic Black or African American people in segments, percentage of Hispanic or Latino people in segments, percentage of owner-occupied dwelling units in segments, 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 non-Hispanic Black or African American people in segments, percentage of Hispanic or Latino people in segments, percentage of owner-occupied dwelling units in segments, segment-combined median rent and housing value, age
Sex	Hot deck	Census division, imputation-revised Hispanic or Latino origin, imputation-revised race, and a random sort number

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Screener demographic variables had relatively low missing rates. Missing rates were 3.93 percent for race, 0.14 percent for Hispanicity, and 0.13 percent for sex.

Exhibit 7.4 provides the initial covariates for the DU-level poststratification adjustment.

Exhibit 7.4 Covariates for the Dwelling Unit-Level Poststratification and Extreme Weight Adjustments; 2024

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Model Specific
Quarter	4	3
Age	5	4
Race (5 levels)	5	4
Sex	2	1
Hispanicity	2	1
Two-Factor Effects		
Age × Race (3 levels)	5 × 3	8
Age × Hispanicity	5 × 2	4
Age × Sex	5 × 2	4
Race (3 levels) × Hispanicity	3 × 2	2
Race (3 levels) × Sex	3 × 2	2
Hispanicity × Sex	2 × 2	1
Quarter × Age	4 × 5	12
Quarter × Race (5 levels)	4 × 5	12
Quarter × Hispanicity	4 × 2	3
Quarter × Sex	4 × 2	3
State × Quarter	Model Specific	Model Specific
State × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Sex	Model Specific	Model Specific
Three-Factor Effects		
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8
Age × Race (3 levels) × Sex	5 × 3 × 2	8
Age × Hispanicity × Sex	5 × 2 × 2	4
Race (3 levels) × Hispanicity × Sex	3 × 2 × 2	2
State × Age × Race (3 levels)	Model Specific	Model Specific
State × Age × Hispanicity	Model Specific	Model Specific
State × Age × Sex	Model Specific	Model Specific
State × Race (3 levels) × Hispanicity	Model Specific	Model Specific
State × Race (3 levels) × Sex	Model Specific	Model Specific
State × Hispanicity × Sex	Model Specific	Model Specific

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

For the DU poststratification step, all factor effects are usually kept in all models; occasionally, variable collapsing occurs in three-way factor effects such as the state × age × race interactions.

Table 7.3 presents the weight distribution and UWE before and after implementing the DU-level poststratification adjustment. The mean of the DU-level poststratification adjustment factors was 1.01 and UWE did not change much after the adjustment.

Table 7.3 Weight Distribution and Unequal Weighting Effects for Weights before and after DU-Level Poststratification Adjustments; 2024

Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
Weight before DUPS	8	213	489	912	4,997	646	203,743	1.75
DUPS Adjustment Factor	0.14	0.88	0.97	1.11	5.41	1.01	203,737	N/A
Weight after DUPS	3	209	471	901	6,921	643	203,737	1.84

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, 2024.

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 7.4 shows the unweighted, weighted, and winsorized extreme weight percentages before and after DU-level weight adjustment. Because these rates are all within the target (3 percent for unweighted, 15 percent for weighted, and 5 percent for outwinsor), the extreme weight adjustment was not necessary (see Appendix F 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 7.4 DU-Level Percentages of Extreme Weights and Outwinsors; 2024

Before DU-Level Weight Adjustments			After DU-Level Weight Adjustments		
% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
4.29	5.70	0.90	0.62	1.58	0.28

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, 2024.

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 2024 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 weights for 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.

For main effects, most model groups had college dorm and other group quarters collapsed because the sample size was zero. Almost all other main effects were kept in the models. For

nonstate two-factor effects, collapsing or dropping was present in most segment-level interactions, and most nonsegment-level interactions were kept. Variable collapsing or dropping was present in all state two-factor effects and in all nonstate and state three-factor effects.

Exhibit 8.1 Covariates for the Selected Person-Level Poststratification; 2024

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

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

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 weights before and after selected person-level poststratification adjustment were similar, except the maximum weight after selected person-level poststratification was smaller, and the UWE was slightly decreased.

Table 8.1 Weight Distribution and Unequal Weighting Effects for Weights before and after Selected Person-Level Poststratification Adjustments; 2024

Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
Weight before SELPS	5	476	1,123	2,496	60,845	2,091	137,170	2.79
SELPS Adjustment Factor	0.08	0.91	1.00	1.10	5.28	1.01	137,170	N/A
Weight after SELPS	2	470	1,120	2,527	55,429	2,101	137,170	2.78

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, 2024.

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 is described in Section 7.3.2. As expected, there were discrepancies in the screener demographic variables and the questionnaire demographic variables. The discrepancy rates were very low for age group (0.89 percent), Hispanicity (1.95 percent), and sex (1.02 percent). For race, the discrepancy rate was 10.61 percent. 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, the two-factor effect of interview mode and state, and demographic variables were added to the nonresponse adjustment.

Exhibit 8.2 Covariates for the Person-Level Nonresponse Adjustment; 2024

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Model Specific
Quarter	4	3
Age	5	4
Race (5 levels)	5	4
Sex	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	2	1
Two-Factor Effects		
Age × Race (3 levels)	5 × 3	8
Age × Hispanicity	5 × 2	4
Age × Sex	5 × 2	4
Race (3 levels) × Hispanicity	3 × 2	2
Race (3 levels) × Sex	3 × 2	2
Hispanicity × Sex	2 × 2	1
Quarter × Age	4 × 5	12
Quarter × Race (5 levels)	4 × 5	12
Quarter × Hispanicity	4 × 2	3
Quarter × Sex	4 × 2	3
Quarter × Interview Mode	4 × 2	3
% 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	5 × 2	4
Race (3 levels) × Interview Mode	3 × 2	2
Hispanicity × Interview Mode	2 × 2	1
Sex × Interview Mode	2 × 2	1
State × Quarter	Model Specific	Model Specific
State × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Sex	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	Model Specific	Model Specific
Three-Factor Effects		
Age × Race (3 levels) × Hispanicity	5 × 3 × 2	8
Age × Race (3 levels) × Sex	5 × 3 × 2	8
Age × Hispanicity × Sex	5 × 2 × 2	4
Race (3 levels) × Hispanicity × Sex	3 × 2 × 2	2
State × Age × Race (3 levels)	Model Specific	Model Specific
State × Age × Hispanicity	Model Specific	Model Specific
State × Age × Sex	Model Specific	Model Specific
State × Race (3 levels) × Hispanicity	Model Specific	Model Specific
State × Race (3 levels) × Sex	Model Specific	Model Specific
State × Hispanicity × Sex	Model Specific	Model Specific

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

For main effects, most model groups had college dorm and other group quarters collapsed because the sample size was zero. Almost all other main effects were kept in the models. For nonstate two-factor effects, collapsing or dropping was present in most segment-level interactions, and most nonsegment-level interactions were kept. Variable collapsing or dropping was present in all state two-factor effects and in all nonstate and state three-factor effects.

Table 8.2 presents the distribution for weights and UWE before and after person-level nonresponse adjustments. The mean of the nonresponse adjustment factor is 1.96. The UWE increased from 2.77 to 3.26 after nonresponse adjustment.

Table 8.2 Weight Distribution and Unequal Weighting Effects for Weights before and after Person-Level Nonresponse Adjustments; 2024

Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
Weight before PRNR	4	476	1,129	2,545	55,429	2,116	70,241	2.77
PRNR Adjustment Factor	0.40	1.16	1.59	2.44	13.23	1.96	70,241	N/A
Weight after PRNR	4	773	1,965	4,810	111,332	4,104	70,241	3.26

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, 2024.

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 2024 based on the 2020 census and the 2023 American Community Survey. 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 (1) to control the resulting UWE and thereby reduce the potential variance inflation that could result from this weight adjustment, and (2) to 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+; educational attainment and its interactions with demographic variables were added; and interview mode was added as a main effect, where the targets were 30 percent and 70 percent of population estimates for the web and in-person interview modes, respectively.

Exhibit 8.3 Covariates for the Person-Level Poststratification and Extreme Weight Adjustments; 2024

Variables	Levels	Proposed
One-Factor Effects		
Intercept	1	1
State	Model Specific	Model Specific
Age	6	5
Race (5 levels)	5	4
Sex	2	1
Hispanicity	2	1
Education	4	3
Interview Mode	2	1
Two-Factor Effects		
Age × Race (3 levels)	6 × 3	10
Age × Hispanicity	6 × 2	5
Age × Sex	6 × 2	5
Race (3 levels) × Hispanicity	3 × 2	2
Race (3 levels) × Sex	3 × 2	2
Hispanicity × Sex	2 × 2	1
Quarter × Age	4 × 6	15
Quarter × Race (5 levels)	4 × 5	12
Quarter × Hispanicity	4 × 2	3
Quarter × Sex	4 × 2	3
Age (4 levels) × Education	4 × 4	12
Race (3 levels) × Education	3 × 4	8
Sex × Education	2 × 4	4
Hispanicity × Education	2 × 4	4
State × Quarter	Model Specific	Model Specific
State × Age	Model Specific	Model Specific
State × Race (5 levels)	Model Specific	Model Specific
State × Hispanicity	Model Specific	Model Specific
State × Sex	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) × Sex	6 × 3 × 2	10
Age × Hispanicity × Sex	6 × 2 × 2	5
Race (3 levels) × Hispanicity × Sex	3 × 2 × 2	2
State × Age × Race (3 levels)	Model Specific	Model Specific
State × Age × Hispanicity	Model Specific	Model Specific
State × Age × Sex	Model Specific	Model Specific
State × Race (3 levels) × Hispanicity	Model Specific	Model Specific
State × Race (3 levels) × Sex	Model Specific	Model Specific
State × Hispanicity × Sex	Model Specific	Model Specific

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

For the person-level poststratification adjustment step, main effects of state and demographic variables (from interviewing) and nonstate two-factor effects were usually kept in all models. For state two-factor effects, some race categories had to be collapsed in some model groups.

Variable collapsing or dropping is usually present in nonstate and state three-factor effects except the state × age × sex and state × Hispanicity × sex interactions.

Education main effects were kept in all model groups. Variable collapsing is occasionally present in the two-factor effects, such as the education × Hispanicity interaction. Table 8.3 presents the weight distribution and UWE before and after implementing the person-level poststratification adjustment. The mean of the poststratification adjustment factor is 1.06. The UWE increased from 3.26 to 3.49.

Table 8.3 Weight Distribution and Unequal Weighting Effects for Weights before and after Person-Level Poststratification Adjustment; 2024

Weight	Min	25th Percentile	Median	75th Percentile	Max	Mean	Sample Size	UWE
Weight before PRPS	4	773	1,965	4,810	111,332	4,104	70,241	3.26
PRPS Adjustment Factor	0.07	0.70	1.00	1.31	5.00	1.06	70,241	N/A
Weight after PRPS	2	652	1,831	4,744	135,594	4,104	70,241	3.49

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, 2024.

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 that after person-level poststratification adjustment, the unweighted and weighted extreme weight percentages and outwinsors are all within the target (3 percent for unweighted, 15 percent for weighted, and 5 percent for outwinsor). 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. Weight Component #16 was set to 1 for each responding person. Appendix F lists extreme weight percentages by state.

Table 8.4 Person-Level Percentages of Extreme Weights and Outwinsors; 2024

Weights	% Unweighted	% Weighted[1]	% Outwinsor[2]
Before Person-Level Weight Adjustments	1.28	3.83	0.82
After Person-Level Weight Adjustments	2.23	8.89	1.86

[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, 2024.

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 (Center for Behavioral Health Statistics and Quality, forthcoming) 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.[14] Variable collapsing and dropping were also tracked to identify what domains were controlled.
- The target bounds are reviewed to ensure that they meet the expected criteria. For nonresponse adjustment, target bounds were (1, 3), (1, 5), and (1, 5), for high extreme, normal, and low extreme weights, respectively, and center (C) was between the upper and lower bounds. For poststratification, the target bounds were (0.2, 3), (0.2, 5), and (0.3, 5) for high, normal, and low bounds, respectively. However, the upper bounds for DU-level nonresponse adjustment were set to 10 because the screening rate was lower due to use of the web mode.
- 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 and 2021, because of several methodological differences, the distributions of the weights were not expected to be comparable with their counterparts in prior years. However, the weight distribution for 2024 is comparable with that of 2021-2023, and future years.
- 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 E, F, G, H, I, and J.

[14] A combined backward and forward selection method has been applied in fitting generalized exponential model 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 E.1 in Appendix E 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 2024 NSDUH for the national and state levels. Table E.1 also shows the weighted eligibility rates and weighted response rates[15] for DU screeners and person-level interviews.

Table 9.1 compares the national response rates for the 2021-2024 NSDUHs; 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 because most of the screening was conducted via the web. The 2024 overall eligibility rate was similar to rates in 2021-2023 and a few percentage points higher than the rates in 2020 and 2019; the overall 2024 interview response rate was a little higher than the 2021-2023 rates and 10 to 13 percentage points lower than the 2019 and 2020 rates.

Table 9.1 Comparison of Overall Weighted Response Rates; 2019-2024

Domain	2019	2020 Quarter 1	2020 Quarter 4	2020 Quarters 1 and 4	2021	2022	2023	2024
Dwelling Unit Level								
Eligibility Rate	85.46%	86.71%	83.54%	85.13%	90.40%	92.10%	92.24%	92.50%
Screener Response Rate	70.50%	67.76%	11.13%	40.00%	22.21%	25.46%	24.36%	29.91%
Person Level								
Interview Response Rate	64.90%	63.07%	59.71%	61.39%	46.30%	47.44%	50.50%	51.56%

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2019-2024.

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 5, 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 F.1 in Appendix F and Tables G.1 and G.2 in Appendix G present percentages of extreme weights at the DU and person levels for the combined data from Quarters 1 to 4 at the national and individual state levels. Unweighted percentages are based on the actual counts of DUs and

[15] 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.

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.

For the 2024 NSDUH sample, domains for extreme weight definitions were defined as follows for various weight adjustments via the GEM (see Chapter 5):

- 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, in which web and in-person interviews were adjusted to 30 percent and 70 percent of population estimates, respectively)
  - SSR and age group[16]
  - 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.

Table H.1 in Appendix H displays national-level domain-specific weight sums before and after poststratification. This table also presents 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.

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

9.3.4 Weight Adjustment Summary Statistics

Tables I.1 to I.3 in Appendix I 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 I.3, under the heading "After res.per.nr") would be only slightly different from what would be obtained after the nonresponse adjustment (e.g., see Table I.3, under the heading "Before res.per.ps"). The sample size (*n*) for the demographic domains from the 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 the tables in Appendix J.

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 the 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 Appendix J 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 Appendix J, 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.

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 used web interviewing. The number of adult web respondents 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 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.

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. 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.

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 and mode 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.

Table 10.1 shows the distribution and unequal weighting effect of the final main analysis weights (ANALWT2), the break-off weight adjustment, and the break-off analysis weights (ANALWT2MH).

Table 10.1 Weight Distribution of Final Analysis Weight, Break-Off Weight Adjustment, and Break-Off Weight: Among Adults Aged 18 or Older; 2024

Weight	Minimum	25% Percentile	Median	75% Percentile	Maximum	Mean	*n*	UWE
Analysis Weight (ANALWT2)	2	765	2,145	5,564	135,594	4,662	56,256	3.28
Break-Off Weight Adjustment	0.16	0.99	1.03	1.07	4.87	1.03	54,965	N/A
Break-Off Weight (ANALWT2MH)	1	795	2,237	5,776	104,566	4,772	54,965	3.15

N/A = not applicable; UWE = unequal weighting effect.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

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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 people). The distance minimized under the generalized exponential model (GEM), subject to calibration constraints, is given by the following distance function:

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

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 ($x_1, \ldots, x_p$). Then, the calibration constraints for the aforementioned minimization problem are

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

The solution for the aforementioned minimization problem, if it exists, is given by model parameters λ from the 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 ≤ *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 (Equation 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: $L_2 = 1,\ C_2 = \rho^{-1},\ \text{and}\ U_2 = U > \rho^{-1}$, where ρ is the overall response propensity. For extreme weights with high weights, $\ell_k = L_1 m_k,\ c_k = \rho^{-1} m_k,\ \text{and}\ u_k = U_1 m_k$, 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, $\ell_k = L_2,\ c_k = C_2 = 1,\ \text{and}\ u_k = U_2$; for high extreme weights, $\ell_k = L_1 m_k,\ c_k = m_k,\ \text{and}\ u_k = U_1 m_k$; and similarly, for low extreme weights, $\ell_k = L_3 m_k,\ c_k = m_k,\ \text{and}\ u_k = U_3 m_k$. 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* × *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 2002.

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 2024 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., sex, Hispanic or Latino origin, and race) was missing. Therefore, some form of imputation was required for cases with missing data.[2]

The predictive mean neighborhood (PMN) methodology was used for the 2024 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 sex.

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:

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

(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
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 *2024 National Survey on Drug Use and Health (NSDUH)*

Methodological Resource Book, Section 10: Editing and Imputation Report (Center for Behavioral Health Statistics and Quality, 2026a).

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 2024 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 2024 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: Dwelling Unit Eligibility Imputation Summary

Table D.1 Unknown DU Eligibility Imputation Summary: Among People Aged 12 or Older; 2024

State	Unknown Eligibility DU Count	Imputed Eligible DU Count	Imputed DU Eligibility Rate	Historical DU Eligibility Rate
Overall	434,603	370,229	85.19%	85.21%
Alabama	1,368	1,073	78.44%	80.55%
Alaska	7,745	6,097	78.72%	79.14%
Arizona	7,968	6,484	81.38%	80.92%
Arkansas	3,389	2,632	77.66%	78.21%
California	24,315	22,624	93.05%	92.92%
Colorado	9,168	7,382	80.52%	81.25%
Connecticut	9,164	8,339	91.00%	91.07%
Delaware	10,364	8,423	81.27%	81.22%
District of Columbia	4,892	4,295	87.80%	87.75%
Florida	16,016	12,673	79.13%	79.06%
Georgia	2,821	2,422	85.86%	85.16%
Hawaii	7,303	6,291	86.14%	86.03%
Idaho	2,514	2,120	84.33%	83.70%
Illinois	24,710	21,889	88.58%	88.82%
Indiana	6,550	5,554	84.79%	84.48%
Iowa	5,040	4,338	86.07%	86.59%
Kansas	5,771	4,772	82.69%	82.62%
Kentucky	5,672	4,738	83.53%	83.43%
Louisiana	3,750	3,045	81.20%	80.70%
Maine	10,966	8,340	76.05%	76.34%
Maryland	3,823	3,455	90.37%	90.21%
Massachusetts	9,878	9,027	91.38%	91.50%
Michigan	15,117	13,035	86.23%	86.39%
Minnesota	6,214	5,536	89.09%	88.47%
Mississippi	3,878	3,198	82.47%	82.13%
Missouri	5,348	4,522	84.55%	84.30%
Montana	11,106	9,152	82.41%	82.53%
Nebraska	5,398	4,668	86.48%	86.05%
Nevada	4,399	4,076	92.66%	92.23%
New Hampshire	6,509	5,437	83.53%	83.17%
New Jersey	11,290	10,253	90.81%	90.46%
New Mexico	6,150	5,047	82.07%	81.58%
New York	32,813	29,000	88.38%	88.37%
North Carolina	8,517	6,980	81.95%	83.24%
North Dakota	8,900	7,235	81.29%	81.42%
Ohio	7,978	6,992	87.64%	87.28%
Oklahoma	6,687	5,657	84.60%	84.81%
Oregon	3,033	2,750	90.67%	90.20%

Table D.1 Unknown DU Eligibility Imputation Summary: Among People Aged 12 or Older; 2024 (continued)

State	Unknown Eligibility DU Count	Imputed Eligible DU Count	Imputed DU Eligibility Rate	Historical DU Eligibility Rate
Pennsylvania	24,080	21,416	88.94%	89.09%
Rhode Island	6,964	5,615	80.63%	81.04%
South Carolina	6,234	4,997	80.16%	80.47%
South Dakota	7,493	5,963	79.58%	79.77%
Tennessee	1,569	1,321	84.19%	84.71%
Texas	18,580	15,729	84.66%	84.76%
Utah	3,267	2,801	85.74%	86.88%
Vermont	7,828	6,206	79.28%	78.76%
Virginia	7,887	6,649	84.30%	83.57%
Washington	3,009	2,647	87.97%	87.76%
West Virginia	9,262	7,494	80.91%	81.39%
Wisconsin	6,327	5,212	82.38%	81.77%
Wyoming	5,579	4,628	82.95%	82.84%

DU = dwelling unit.
NOTE: The historical state-level DU eligibility rates were based on NSDUH data from Quarters 2, 3, and 4 of 2019, and Quarter 1 of 2020.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Appendix E: Evaluation of Calibration Weights: Response Rates

Table E.1 Weighted Response Rates: United States, District of Columbia, and the 50 States; 2024

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	1,009,122	927,672	203,743	92.50%	21.91%	137,170	70,241	51.54%	51.56%
Alabama	13,149	11,872	4,064	90.46%	34.08%	2,648	1,254	43.74%	44.13%
Alaska	14,203	12,273	2,474	85.94%	19.38%	1,728	1,004	61.38%	61.32%
Arizona	15,912	14,298	2,773	89.69%	19.33%	1,919	1,052	53.89%	55.00%
Arkansas	11,380	10,099	2,948	88.93%	28.95%	2,097	1,106	55.20%	55.19%
California	60,943	58,762	11,515	96.30%	19.10%	9,319	4,517	47.31%	47.20%
Colorado	16,054	14,060	3,120	87.47%	21.71%	2,009	987	52.90%	52.89%
Connecticut	16,618	15,686	2,828	94.40%	18.04%	1,636	843	51.51%	51.73%
Delaware	21,089	18,962	3,792	89.56%	19.73%	2,320	1,096	48.16%	48.33%
District of Columbia	27,224	26,149	4,341	95.96%	16.82%	1,683	993	59.44%	59.55%
Florida	51,789	47,599	9,154	91.94%	18.76%	5,768	3,020	52.10%	52.18%
Georgia	15,804	15,220	3,252	96.31%	21.31%	2,588	1,441	50.40%	50.56%
Hawaii	14,863	13,293	2,751	89.30%	18.31%	2,006	1,010	52.92%	53.44%
Idaho	12,420	11,750	3,517	94.38%	29.50%	2,500	1,202	44.19%	44.12%
Illinois	46,020	42,895	7,857	93.26%	18.43%	5,806	2,851	47.97%	48.35%
Indiana	12,675	11,334	2,549	89.45%	22.63%	1,905	1,037	57.93%	57.89%
Iowa	12,248	11,217	3,239	91.66%	28.76%	1,961	1,028	53.36%	53.43%
Kansas	11,078	9,855	2,724	88.72%	27.06%	2,123	1,208	57.60%	57.55%
Kentucky	13,684	12,270	3,236	89.75%	26.42%	1,961	1,097	58.93%	57.43%
Louisiana	11,557	10,512	2,867	90.94%	27.37%	1,984	990	48.32%	48.76%
Maine	17,670	14,950	2,971	84.58%	19.41%	1,714	850	54.01%	53.36%
Maryland	13,389	12,866	2,830	96.01%	22.05%	2,039	943	45.39%	44.77%
Massachusetts	15,999	14,956	2,377	93.43%	15.64%	1,606	853	54.42%	53.58%
Michigan	33,921	31,004	7,280	91.41%	23.47%	4,424	2,353	53.17%	52.91%
Minnesota	13,458	12,614	3,125	93.74%	24.65%	2,015	994	50.22%	50.13%
Mississippi	11,930	10,652	3,294	89.46%	31.11%	2,426	1,238	51.30%	51.11%
Missouri	13,114	11,894	3,041	90.89%	25.88%	1,874	977	55.67%	55.46%

Table E.1 Weighted Response Rates: United States, District of Columbia, and the 50 States; 2024 (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]
Montana	16,431	14,304	2,760	87.03%	19.16%	1,715	854	53.77%	54.09%
Nebraska	10,819	9,970	2,600	92.19%	26.11%	1,987	972	50.52%	51.20%
Nevada	13,236	12,684	3,088	95.84%	24.04%	2,307	1,254	51.00%	51.73%
New Hampshire	15,183	13,918	3,067	91.48%	21.88%	1,931	871	48.70%	48.71%
New Jersey	22,719	21,500	4,153	94.62%	19.38%	3,125	1,543	49.98%	50.13%
New Mexico	13,653	12,377	2,533	90.57%	19.82%	1,688	919	55.74%	57.13%
New York	57,163	52,758	8,920	92.11%	16.21%	6,572	3,177	51.21%	51.31%
North Carolina	24,669	22,840	5,027	92.56%	21.89%	2,923	1,582	52.12%	52.17%
North Dakota	14,531	12,561	2,324	86.19%	17.60%	1,491	815	56.16%	56.10%
Ohio	33,438	32,009	7,847	95.81%	24.51%	5,157	2,447	46.27%	46.30%
Oklahoma	11,929	10,601	2,817	88.95%	26.52%	1,948	1,058	57.98%	57.63%
Oregon	13,832	13,355	4,089	96.51%	30.36%	2,482	1,259	49.17%	49.32%
Pennsylvania	39,291	36,208	6,294	92.10%	17.10%	4,087	2,038	53.26%	54.04%
Rhode Island	17,933	16,208	3,795	90.23%	22.50%	2,308	1,160	50.90%	52.27%
South Carolina	14,932	13,451	2,851	89.97%	21.03%	1,754	921	50.60%	50.79%
South Dakota	12,502	10,816	2,344	86.46%	21.45%	1,674	864	57.17%	57.29%
Tennessee	12,914	12,313	3,335	95.35%	27.25%	2,136	995	40.37%	40.49%
Texas	36,988	33,499	6,458	90.54%	18.93%	5,356	3,125	59.91%	59.67%
Utah	8,484	7,769	2,949	91.38%	37.57%	2,905	1,459	49.72%	49.30%
Vermont	18,164	16,205	3,716	89.14%	22.73%	1,863	996	57.21%	58.10%
Virginia	22,221	20,698	5,078	93.34%	24.59%	3,270	1,729	52.88%	52.44%
Washington	12,866	12,250	4,186	95.29%	34.02%	2,752	1,206	44.30%	44.92%
West Virginia	18,790	16,801	3,470	89.37%	20.35%	1,994	1,084	52.85%	52.82%
Wisconsin	14,537	13,173	3,655	90.34%	27.32%	2,171	1,113	52.61%	52.95%
Wyoming	13,706	12,362	2,468	90.47%	20.25%	1,515	856	57.75%	58.48%

[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, 2024.

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

Table F.1 Dwelling Unit-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States; 2024

Domain		Before nr (WT1*...*WT8)			After nr and before ps (WT1*...*WT9)			After ps (WT1*...*WT10)		
	n	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
United States	203,743	4.29%	5.70%	0.90%	1.25%	2.26%	0.39%	0.62%	1.58%	0.28%
Alabama	4,064	0.00%	0.00%	0.00%	0.12%	0.39%	0.07%	0.49%	1.57%	0.16%
Alaska	2,474	7.11%	9.64%	1.04%	0.00%	0.00%	0.00%	0.93%	2.58%	0.43%
Arizona	2,773	0.00%	0.00%	0.00%	2.16%	4.20%	0.47%	0.18%	0.77%	0.20%
Arkansas	2,948	6.07%	6.47%	0.41%	0.75%	1.75%	0.43%	0.44%	1.42%	0.25%
California	11,515	4.89%	7.07%	1.73%	1.99%	2.80%	0.46%	0.36%	0.99%	0.07%
Colorado	3,120	10.32%	13.59%	1.36%	0.19%	0.51%	0.19%	1.19%	3.60%	0.62%
Connecticut	2,828	10.33%	10.17%	1.12%	3.29%	4.90%	0.82%	3.22%	9.69%	2.37%
Delaware	3,792	4.03%	5.67%	1.14%	1.21%	2.66%	0.24%	0.18%	0.66%	0.09%
District of Columbia	4,341	3.46%	7.62%	1.45%	0.67%	1.72%	0.13%	0.48%	2.05%	0.32%
Florida	9,154	2.94%	5.06%	0.37%	0.90%	1.56%	0.28%	0.01%	0.04%	0.01%
Georgia	3,252	0.00%	0.00%	0.00%	0.95%	2.11%	0.03%	0.15%	0.48%	0.05%
Hawaii	2,751	3.93%	7.49%	1.91%	0.40%	0.75%	0.04%	1.05%	3.17%	0.66%
Idaho	3,517	3.41%	3.95%	0.44%	0.51%	1.69%	0.19%	0.23%	0.90%	0.16%
Illinois	7,857	0.09%	0.19%	0.02%	1.62%	3.79%	0.85%	0.42%	1.23%	0.11%
Indiana	2,549	4.63%	5.71%	0.27%	5.53%	10.49%	1.15%	0.67%	2.10%	0.33%
Iowa	3,239	14.57%	18.07%	3.46%	2.87%	6.92%	1.91%	0.86%	2.50%	0.45%
Kansas	2,724	11.27%	15.46%	2.23%	1.62%	3.23%	0.24%	0.62%	1.58%	0.15%
Kentucky	3,236	3.52%	2.97%	0.17%	1.73%	4.36%	0.43%	0.80%	3.32%	1.08%
Louisiana	2,867	6.98%	7.01%	0.82%	2.20%	2.87%	0.24%	0.31%	1.07%	0.15%
Maine	2,971	1.35%	2.21%	0.46%	1.82%	1.63%	0.11%	0.74%	1.78%	0.33%
Maryland	2,830	9.58%	8.87%	1.10%	0.18%	0.42%	0.03%	0.07%	0.28%	0.05%
Massachusetts	2,377	6.98%	6.84%	0.98%	0.00%	0.00%	0.00%	1.05%	3.44%	0.64%
Michigan	7,280	2.18%	3.24%	0.37%	1.58%	3.32%	0.52%	0.41%	1.41%	0.25%
Minnesota	3,125	0.00%	0.00%	0.00%	0.13%	0.32%	0.11%	0.64%	1.83%	0.46%
Mississippi	3,294	6.38%	6.71%	0.64%	3.04%	8.02%	1.60%	0.36%	1.13%	0.16%
Missouri	3,041	19.89%	24.55%	3.41%	0.00%	0.00%	0.00%	0.23%	0.63%	0.10%

Table F.1 Dwelling Unit-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States; 2024 (continued)

Domain		Before nr (WT1*...*WT8)			After nr and before ps (WT1*...*WT9)			After ps (WT1*...*WT10)		
	n	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]	% Unweighted	% Weighted[1]	% Outwinsor[2]
Montana	2,760	7.25%	7.84%	0.44%	0.22%	0.62%	0.12%	1.16%	3.34%	0.70%
Nebraska	2,600	0.00%	0.00%	0.00%	2.96%	6.40%	2.44%	0.85%	2.15%	0.46%
Nevada	3,088	0.19%	0.41%	0.16%	1.17%	2.65%	0.10%	0.39%	1.35%	0.15%
New Hampshire	3,067	2.58%	3.57%	0.45%	0.49%	0.13%	0.03%	0.78%	1.87%	0.29%
New Jersey	4,153	2.50%	4.28%	0.84%	0.43%	0.89%	0.29%	0.79%	1.98%	0.14%
New Mexico	2,533	0.47%	0.69%	0.17%	0.99%	1.87%	0.10%	1.22%	4.02%	1.05%
New York	8,920	2.17%	4.29%	0.90%	2.02%	3.13%	0.51%	0.44%	1.25%	0.10%
North Carolina	5,027	9.17%	14.63%	3.50%	0.62%	1.30%	0.16%	0.44%	1.56%	0.28%
North Dakota	2,324	4.48%	5.98%	1.65%	2.75%	2.70%	0.48%	1.76%	5.22%	0.91%
Ohio	7,847	4.82%	6.12%	0.76%	0.00%	0.00%	0.00%	0.04%	0.18%	0.02%
Oklahoma	2,817	0.00%	0.00%	0.00%	5.86%	9.34%	1.71%	0.67%	2.18%	0.31%
Oregon	4,089	0.59%	0.92%	0.02%	0.20%	0.64%	0.15%	0.32%	1.26%	0.24%
Pennsylvania	6,294	8.34%	9.68%	1.79%	0.49%	1.02%	0.16%	0.65%	1.34%	0.13%
Rhode Island	3,795	3.19%	4.52%	0.31%	0.58%	1.66%	0.56%	1.48%	5.01%	1.12%
South Carolina	2,851	1.58%	2.80%	0.32%	0.00%	0.00%	0.00%	0.18%	0.71%	0.10%
South Dakota	2,344	1.75%	1.76%	0.10%	0.21%	0.47%	0.14%	1.11%	2.84%	0.60%
Tennessee	3,335	0.00%	0.00%	0.00%	0.27%	0.56%	0.06%	0.27%	0.94%	0.19%
Texas	6,458	1.77%	3.02%	0.57%	0.94%	1.39%	0.24%	0.76%	1.85%	0.26%
Utah	2,949	12.72%	19.79%	2.22%	3.32%	5.75%	1.17%	0.98%	2.44%	0.28%
Vermont	3,716	5.71%	7.60%	0.56%	0.00%	0.00%	0.00%	1.32%	4.45%	1.17%
Virginia	5,078	4.29%	5.26%	0.69%	0.04%	0.12%	0.01%	1.52%	4.14%	1.35%
Washington	4,186	0.12%	0.19%	0.01%	0.91%	1.88%	0.76%	0.62%	1.75%	0.22%
West Virginia	3,470	2.45%	3.95%	0.78%	0.89%	1.39%	0.55%	0.09%	0.29%	0.03%
Wisconsin	3,655	9.03%	11.37%	1.96%	2.16%	4.68%	0.87%	0.90%	3.11%	0.92%
Wyoming	2,468	4.62%	4.84%	0.14%	4.82%	7.93%	5.66%	0.53%	1.13%	0.13%

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, 2024.

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

Table G.1 Selected Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States; 2024

Domain		Before sel.per.ps[1] (WT1*...*WT12)			After sel.per.ps[1] (WT1*...*WT13)		
	n	% Unweighted	% Weighted[2]	% Outwinsor[3]	% Unweighted	% Weighted[2]	% Outwinsor[3]
United States	137,170	1.28%	3.83%	0.82%	1.03%	2.93%	0.47%
Alabama	2,648	0.79%	1.95%	0.40%	0.94%	2.39%	0.48%
Alaska	1,728	1.62%	5.80%	1.04%	0.58%	1.48%	0.26%
Arizona	1,919	1.35%	4.42%	0.74%	0.89%	2.39%	0.24%
Arkansas	2,097	1.67%	4.50%	0.97%	1.38%	2.65%	0.35%
California	9,319	1.39%	3.94%	0.70%	1.24%	3.46%	0.48%
Colorado	2,009	1.54%	4.71%	0.87%	0.70%	2.35%	0.16%
Connecticut	1,636	2.81%	11.69%	2.91%	1.34%	4.11%	0.78%
Delaware	2,320	0.52%	1.82%	0.21%	0.26%	1.43%	0.23%
District of Columbia	1,683	0.71%	1.74%	0.32%	0.77%	3.19%	0.52%
Florida	5,768	0.21%	0.42%	0.08%	0.03%	0.07%	0.01%
Georgia	2,588	0.43%	1.84%	0.40%	0.50%	1.57%	0.26%
Hawaii	2,006	1.15%	4.57%	1.05%	0.95%	2.51%	0.32%
Idaho	2,500	1.12%	3.25%	0.50%	0.64%	2.51%	0.29%
Illinois	5,806	0.62%	3.31%	0.70%	0.43%	3.20%	0.66%
Indiana	1,905	2.36%	7.43%	1.61%	2.10%	6.46%	1.34%
Iowa	1,961	1.22%	3.80%	0.96%	0.66%	1.99%	0.36%
Kansas	2,123	2.68%	7.85%	1.71%	1.51%	5.52%	0.84%
Kentucky	1,961	1.22%	3.89%	1.28%	1.84%	6.22%	1.41%
Louisiana	1,984	2.47%	9.48%	1.62%	1.81%	5.87%	0.84%
Maine	1,714	2.28%	4.52%	1.20%	1.11%	2.44%	0.49%
Maryland	2,039	0.34%	0.60%	0.06%	0.29%	1.11%	0.21%
Massachusetts	1,606	1.18%	3.86%	0.86%	0.75%	3.61%	0.59%
Michigan	4,424	0.81%	3.00%	0.72%	0.84%	2.62%	0.59%
Minnesota	2,015	2.43%	7.68%	1.62%	1.74%	5.10%	0.90%
Mississippi	2,426	1.94%	5.78%	1.22%	1.90%	5.11%	0.83%
Missouri	1,874	0.53%	1.21%	0.17%	0.53%	1.97%	0.25%

Table G.1 Selected Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States; 2024 (continued)

Domain		Before sel.per.ps[1] (WT1*...*WT12)			After sel.per.ps[1] (WT1*...*WT13)		
	n	% Unweighted	% Weighted[2]	% Outwinsor[3]	% Unweighted	% Weighted[2]	% Outwinsor[3]
Montana	1,715	0.58%	2.56%	0.84%	0.99%	2.84%	0.27%
Nebraska	1,987	2.26%	6.57%	1.50%	2.62%	8.70%	1.31%
Nevada	2,307	1.04%	4.73%	1.37%	0.91%	3.64%	0.41%
New Hampshire	1,931	1.66%	3.02%	0.59%	0.83%	2.25%	0.31%
New Jersey	3,125	1.12%	3.53%	0.88%	0.54%	1.53%	0.18%
New Mexico	1,688	2.25%	8.05%	2.73%	2.90%	11.25%	3.00%
New York	6,572	1.26%	3.76%	0.86%	0.67%	2.27%	0.34%
North Carolina	2,923	0.48%	2.08%	0.48%	0.44%	1.37%	0.11%
North Dakota	1,491	1.95%	5.73%	0.85%	1.07%	3.13%	0.32%
Ohio	5,157	0.43%	1.25%	0.19%	0.10%	0.34%	0.09%
Oklahoma	1,948	2.00%	6.49%	1.55%	1.39%	4.81%	0.46%
Oregon	2,482	1.05%	3.98%	1.01%	0.32%	1.43%	0.12%
Pennsylvania	4,087	2.10%	5.92%	1.57%	2.52%	6.84%	1.28%
Rhode Island	2,308	2.21%	7.10%	1.80%	2.56%	7.35%	1.22%
South Carolina	1,754	0.68%	2.66%	0.32%	0.46%	1.05%	0.10%
South Dakota	1,674	2.39%	6.60%	1.70%	3.41%	10.70%	1.77%
Tennessee	2,136	0.75%	2.37%	0.54%	0.75%	1.33%	0.21%
Texas	5,356	1.25%	3.50%	0.69%	0.71%	1.74%	0.17%
Utah	2,905	1.00%	4.40%	1.12%	0.90%	3.68%	0.34%
Vermont	1,863	2.36%	6.72%	2.19%	1.61%	3.78%	1.19%
Virginia	3,270	0.67%	3.09%	0.58%	0.64%	2.75%	0.44%
Washington	2,752	2.91%	9.83%	1.70%	2.54%	8.63%	1.66%
West Virginia	1,994	0.45%	1.05%	0.18%	0.90%	3.08%	0.15%
Wisconsin	2,171	1.75%	5.93%	1.62%	1.29%	3.03%	0.60%
Wyoming	1,515	0.33%	1.54%	0.24%	0.66%	3.24%	0.16%

per = person level; ps = poststratification adjustment; sel = selected.

[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, 2024.

Table G.2 Respondent Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States; 2024

Domain		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)		
	n	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]
United States	70,241	1.14%	3.14%	0.52%	2.30%	8.97%	1.72%	2.32%	9.06%	1.76%	2.23%	8.89%	1.86%
Alabama	1,254	1.20%	2.69%	0.49%	1.12%	2.55%	0.32%	1.12%	2.55%	0.33%	1.99%	8.87%	2.58%
Alaska	1,004	1.00%	3.56%	0.53%	3.49%	13.83%	2.94%	3.39%	13.40%	2.93%	4.28%	17.50%	4.82%
Arizona	1,052	0.95%	2.72%	0.22%	3.04%	13.61%	3.01%	3.14%	13.95%	3.23%	2.47%	12.48%	1.64%
Arkansas	1,106	1.27%	1.70%	0.11%	1.63%	6.18%	1.13%	1.90%	7.60%	1.23%	1.36%	7.68%	1.11%
California	4,517	0.86%	2.54%	0.38%	2.17%	9.05%	1.54%	2.17%	9.03%	1.56%	1.28%	7.50%	1.52%
Colorado	987	0.91%	2.59%	0.31%	1.82%	8.90%	1.67%	1.82%	8.90%	1.63%	2.43%	11.95%	2.00%
Connecticut	843	1.07%	3.62%	0.81%	4.98%	20.51%	5.95%	5.22%	21.04%	6.08%	6.88%	34.87%	11.52%
Delaware	1,096	0.27%	0.51%	0.03%	3.92%	17.92%	3.52%	4.01%	18.57%	3.92%	1.64%	6.42%	0.87%
District of Columbia	993	1.01%	3.41%	0.75%	3.22%	14.46%	3.47%	3.12%	14.07%	3.72%	1.71%	7.86%	1.90%
Florida	3,020	0.10%	0.18%	0.01%	0.96%	4.16%	0.88%	0.96%	4.16%	0.88%	1.29%	5.00%	0.59%
Georgia	1,441	0.35%	2.46%	0.47%	1.53%	9.45%	1.97%	1.53%	9.62%	2.03%	1.18%	6.76%	1.01%
Hawaii	1,010	0.89%	2.72%	0.22%	2.67%	8.58%	1.20%	2.67%	8.58%	1.20%	0.79%	2.13%	0.36%
Idaho	1,202	0.92%	6.22%	0.99%	3.41%	15.80%	3.31%	3.33%	15.87%	3.31%	1.50%	11.05%	1.57%
Illinois	2,851	0.63%	4.92%	1.37%	3.44%	20.08%	4.48%	3.44%	20.06%	4.58%	2.14%	9.62%	1.71%
Indiana	1,037	1.64%	5.34%	0.76%	3.28%	11.99%	2.27%	3.28%	11.99%	2.21%	1.06%	4.12%	0.49%
Iowa	1,028	0.88%	2.89%	0.59%	0.97%	4.88%	1.03%	0.88%	5.05%	1.57%	0.78%	3.85%	1.09%
Kansas	1,208	1.32%	4.30%	0.66%	2.90%	10.20%	1.58%	2.90%	10.20%	1.64%	1.49%	5.76%	1.96%
Kentucky	1,097	1.46%	4.13%	0.83%	3.19%	11.39%	3.04%	3.19%	11.39%	3.02%	4.19%	16.26%	4.44%
Louisiana	990	2.02%	5.78%	0.94%	2.12%	7.91%	1.61%	2.22%	8.21%	1.64%	1.82%	8.11%	1.46%
Maine	850	1.65%	3.66%	0.75%	2.59%	12.15%	2.75%	2.59%	12.15%	2.75%	7.76%	38.78%	12.58%
Maryland	943	0.11%	0.15%	0.00%	1.38%	6.08%	0.66%	1.38%	6.08%	0.67%	2.65%	9.14%	1.70%
Massachusetts	853	1.64%	4.74%	0.44%	2.70%	9.52%	1.21%	2.81%	9.71%	1.24%	5.39%	25.02%	7.35%
Michigan	2,353	0.85%	2.28%	0.44%	1.36%	6.05%	1.38%	1.36%	6.05%	1.39%	0.85%	3.34%	0.39%
Minnesota	994	2.52%	6.53%	1.12%	1.51%	4.53%	0.64%	1.61%	4.78%	0.62%	2.11%	7.82%	1.18%
Mississippi	1,238	1.94%	4.97%	0.99%	2.91%	9.67%	2.27%	2.75%	9.25%	2.15%	3.47%	11.91%	2.65%

Table G.2 Respondent Person-Level Percentages of Extreme Weights and Outwinsors: United States, District of Columbia, and the 50 States; 2024 (continued)

Domain		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)		
	n	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]	% Unweighted	% Weighted[3]	% Outwinsor[4]
Missouri	977	0.20%	1.31%	0.06%	1.33%	5.89%	0.99%	1.43%	6.54%	1.17%	1.02%	4.25%	0.64%
Montana	854	2.22%	5.13%	0.66%	4.80%	16.49%	3.01%	4.80%	16.49%	2.96%	2.46%	6.92%	0.67%
Nebraska	972	2.98%	10.98%	1.97%	2.47%	9.10%	1.25%	2.57%	9.57%	1.38%	0.51%	3.58%	0.56%
Nevada	1,254	0.96%	5.52%	0.79%	2.79%	16.56%	3.87%	2.79%	16.56%	3.86%	3.43%	14.21%	2.62%
New Hampshire	871	1.49%	2.46%	0.26%	0.57%	2.35%	0.38%	0.57%	2.35%	0.38%	2.64%	12.81%	2.32%
New Jersey	1,543	1.23%	2.85%	0.35%	2.14%	7.44%	1.52%	2.20%	7.67%	1.56%	1.94%	9.02%	1.36%
New Mexico	919	3.26%	12.27%	3.92%	2.72%	13.28%	2.22%	2.50%	12.89%	2.25%	1.96%	7.42%	1.03%
New York	3,177	0.85%	2.62%	0.39%	1.98%	8.96%	1.77%	1.95%	8.91%	1.77%	3.75%	14.70%	3.22%
North Carolina	1,582	0.63%	2.29%	0.19%	2.59%	11.14%	2.23%	2.59%	11.07%	2.22%	2.02%	7.74%	1.86%
North Dakota	815	1.10%	3.18%	0.42%	3.07%	10.80%	2.33%	3.07%	10.80%	2.34%	2.09%	7.92%	1.40%
Ohio	2,447	0.16%	0.58%	0.14%	1.27%	5.93%	0.88%	1.35%	6.27%	0.95%	0.78%	3.65%	0.61%
Oklahoma	1,058	1.80%	4.18%	0.41%	1.04%	3.40%	0.40%	1.13%	3.59%	0.41%	1.89%	7.91%	1.84%
Oregon	1,259	0.40%	1.52%	0.15%	1.51%	7.17%	1.31%	1.51%	7.17%	1.30%	1.83%	9.26%	1.16%
Pennsylvania	2,038	2.26%	7.03%	1.30%	2.65%	10.30%	1.69%	2.55%	10.17%	1.70%	0.59%	2.74%	0.38%
Rhode Island	1,160	2.67%	6.98%	1.30%	3.45%	13.01%	2.52%	3.36%	12.58%	2.56%	5.43%	30.33%	10.15%
South Carolina	921	0.65%	1.63%	0.14%	3.47%	14.35%	2.90%	3.47%	14.35%	2.95%	4.02%	13.37%	2.31%
South Dakota	864	3.47%	9.61%	1.59%	3.82%	17.49%	3.55%	3.82%	17.49%	3.45%	1.39%	5.07%	0.92%
Tennessee	995	1.01%	2.09%	0.14%	1.61%	3.98%	0.65%	1.61%	3.98%	0.66%	2.61%	10.72%	3.65%
Texas	3,125	0.67%	1.41%	0.11%	1.82%	5.75%	0.98%	1.89%	5.96%	1.03%	1.12%	4.67%	0.74%
Utah	1,459	1.30%	5.87%	0.73%	2.19%	10.15%	1.84%	2.19%	10.05%	1.90%	3.02%	14.62%	2.76%
Vermont	996	2.11%	4.40%	1.32%	3.31%	12.40%	2.71%	3.41%	12.81%	2.78%	8.43%	46.77%	21.02%
Virginia	1,729	0.81%	3.83%	0.82%	2.14%	11.59%	2.48%	2.31%	12.03%	2.56%	2.37%	10.59%	2.65%
Washington	1,206	3.07%	11.57%	2.74%	1.99%	8.24%	0.98%	2.07%	8.42%	0.98%	1.66%	8.80%	1.43%
West Virginia	1,084	0.55%	1.32%	0.09%	1.75%	6.16%	0.79%	1.75%	6.16%	0.82%	1.57%	6.61%	0.80%
Wisconsin	1,113	1.35%	2.38%	0.42%	2.88%	15.54%	3.05%	2.88%	15.54%	3.06%	2.16%	11.41%	1.76%
Wyoming	856	0.82%	5.27%	0.70%	2.10%	8.25%	1.25%	2.10%	8.25%	1.24%	2.69%	17.29%	3.38%

nr = nonresponse adjustment; per = person level; ps = poststratification adjustment; res = respondent.

[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, 2024.

Appendix H: Evaluation of Calibration Weights: Slippage Rates

Table H.1 Slippage Rates: United States; 2024

Domain		*n*	Initial Total (I)[1]	Final Total (F)[2]	Census Total (C)	(I-C)/C%	(F-C)/C%
Total		70,241	288,242,413	288,242,414	288,242,413	0.00	0.00
Quarter	**Quarter 1**	17,354	71,774,206	71,774,207	71,774,206	0.00	0.00
	Quarter 2	20,345	71,977,771	71,977,770	71,977,771	0.00	-0.00
	Quarter 3	17,987	72,167,825	72,167,825	72,167,825	0.00	0.00
	Quarter 4	14,555	72,322,611	72,322,612	72,322,611	0.00	0.00
Age Group	**12-17**	13,985	25,939,475	25,951,528	25,951,528	-0.05	0.00
	18-25	16,744	34,817,377	34,946,088	34,946,088	-0.37	-0.00
	26-34	11,278	41,127,944	40,982,773	40,982,773	0.35	0.00
	35-49	15,379	64,488,370	64,821,240	64,821,240	-0.51	0.00
	50-64	6,137	60,498,770	61,676,417	61,676,417	-1.91	0.00
	65+	6,718	61,370,476	59,864,367	59,864,367	2.52	0.00
Race	**White**	48,054	203,086,833	218,448,442	218,448,442	-7.03	-0.00
	Black or African American	9,482	37,469,849	37,969,274	37,969,274	-1.32	0.00
	American Indian/Alaska Native	4,678	17,219,145	3,787,587	3,787,586	354.62	0.00
	Asian	3,832	20,087,527	20,425,073	20,425,072	-1.65	0.00
	Two or More Races	4,195	10,379,059	7,612,039	7,612,039	36.35	0.00
Hispanicity	**Hispanic or Latino**	14,200	56,380,330	54,635,763	54,635,762	3.19	0.00
	Non-Hispanic or Latino	56,041	231,862,083	233,606,651	233,606,651	-0.75	0.00
Sex	**Male**	32,547	141,001,725	141,000,726	141,000,725	0.00	0.00
	Female	37,694	147,240,688	147,241,688	147,241,688	-0.00	0.00

[1] WT1*...*WT14 (before person poststratification).
[2] WT1*...*WT15 (after person poststratification).
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Appendix I: Evaluation of Calibration Weights: Weight Summary Statistics

Table I.1 Dwelling Unit-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States; 2024

Domain		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]					
	n	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	203,743	5	83	141	192	1,042	1.35	8	213	489	912	4,997	1.75	3	209	471	901	6,921	1.84
Alaska	2,474	16	17	19	22	34	1.04	27	57	92	134	242	1.29	9	59	97	146	538	1.40
Alabama	4,064	155	157	166	195	212	1.01	156	353	536	638	1,684	1.23	40	300	508	661	2,409	1.29
Arkansas	2,948	108	109	114	124	146	1.01	126	270	370	542	1,243	1.23	39	264	360	535	2,323	1.28
Arizona	2,773	152	157	209	228	320	1.04	156	403	1,015	1,488	3,069	1.39	53	452	986	1,455	5,805	1.43
California	11,515	153	192	198	242	837	1.11	209	774	1,046	1,500	4,159	1.26	58	700	1,073	1,501	5,560	1.32
Colorado	3,120	133	152	154	161	276	1.04	140	511	687	971	2,259	1.25	29	460	680	979	4,078	1.36
Connecticut	2,828	70	87	91	100	139	1.02	194	339	462	637	973	1.14	78	296	433	619	3,474	1.40
District of Columbia	4,341	5	10	11	16	34	1.20	8	31	77	110	289	1.54	3	27	67	104	620	1.65
Delaware	3,792	15	19	20	23	90	1.11	20	48	108	149	332	1.30	6	51	99	146	459	1.35
Florida	9,154	138	144	183	217	653	1.08	157	388	974	1,549	4,755	1.40	58	378	949	1,482	3,782	1.40
Georgia	3,252	244	246	266	312	368	1.01	245	324	1,309	1,976	3,618	1.47	51	348	1,168	1,892	6,600	1.57
Hawaii	2,751	18	24	35	40	123	1.12	57	81	155	270	624	1.35	17	91	151	252	1,075	1.43
Iowa	3,239	111	112	113	113	149	1.01	166	294	418	471	1,164	1.14	109	288	383	482	2,518	1.18
Idaho	3,517	53	53	61	62	128	1.02	53	74	189	271	721	1.51	14	78	190	287	1,332	1.55
Illinois	7,857	71	85	114	138	366	1.11	71	172	478	1,028	3,341	1.66	15	170	459	961	4,511	1.70
Indiana	2,549	195	197	226	246	284	1.02	204	774	866	1,167	2,649	1.22	99	714	960	1,302	5,647	1.27
Kansas	2,724	97	99	106	113	250	1.04	139	284	363	489	1,878	1.28	45	275	374	517	2,500	1.30
Kentucky	3,236	129	140	155	162	175	1.01	168	382	561	736	1,574	1.21	60	345	519	717	4,065	1.33
Louisiana	2,867	159	161	179	183	227	1.02	175	415	550	831	2,260	1.34	47	392	537	792	4,063	1.38
Massachusetts	2,377	146	146	185	186	259	1.02	157	768	1,121	1,442	2,560	1.21	74	768	1,103	1,589	6,226	1.31
Maryland	2,830	147	186	192	195	288	1.02	175	288	842	1,253	2,066	1.36	96	298	793	1,165	3,719	1.43
Maine	2,971	33	34	36	38	77	1.01	79	127	174	211	390	1.13	29	139	182	236	716	1.18
Michigan	7,280	117	119	133	145	246	1.02	135	288	478	759	1,717	1.31	34	287	475	764	4,152	1.38
Minnesota	3,125	168	169	170	196	243	1.01	195	510	702	855	1,892	1.14	51	484	679	864	3,098	1.20
Missouri	3,041	177	178	200	201	296	1.04	279	556	755	1,067	2,156	1.18	157	554	785	1,088	3,125	1.20

Table I.1 Dwelling Unit-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States; 2024 (continued)

Domain		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]					
	n	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	3,294	92	93	109	119	139	1.02	101	217	317	435	1,258	1.33	29	209	314	445	1,616	1.35
Montana	2,760	27	27	28	33	86	1.13	40	105	145	207	540	1.26	10	104	149	226	1,253	1.32
North Carolina	5,027	166	185	193	237	524	1.08	193	499	820	1,489	2,743	1.33	52	420	741	1,263	5,765	1.44
North Dakota	2,324	21	22	22	27	54	1.03	33	92	117	191	388	1.22	20	87	125	186	895	1.36
Nebraska	2,600	72	73	76	81	83	1.00	81	203	262	331	774	1.23	37	194	258	352	1,123	1.25
New Hampshire	3,067	36	39	40	47	83	1.02	49	157	194	221	300	1.06	32	149	187	223	736	1.10
New Jersey	4,153	127	139	151	167	491	1.04	185	553	726	1,022	1,825	1.19	73	510	736	1,033	3,154	1.25
New Mexico	2,533	59	60	71	80	127	1.02	72	247	362	441	866	1.19	23	212	314	425	2,720	1.36
Nevada	3,088	86	87	94	104	207	1.02	87	145	356	623	1,246	1.51	18	151	287	619	2,016	1.62
New York	8,920	80	111	126	156	625	1.12	123	513	777	1,136	2,918	1.25	40	532	802	1,126	3,715	1.28
Ohio	7,847	140	145	154	157	304	1.01	167	282	668	890	1,873	1.28	40	278	644	872	3,268	1.30
Oklahoma	2,817	119	120	133	153	177	1.02	133	296	436	741	1,761	1.36	28	282	457	735	3,650	1.49
Oregon	4,089	113	114	121	136	199	1.01	142	219	426	556	1,360	1.24	61	213	404	533	2,335	1.29
Pennsylvania	6,294	110	138	140	167	518	1.04	140	664	811	1,031	2,115	1.13	78	613	776	999	4,175	1.18
Rhode Island	3,795	23	24	25	31	85	1.04	34	85	103	158	477	1.23	14	73	101	149	886	1.36
South Carolina	2,851	141	148	150	191	301	1.03	150	396	695	1,216	1,867	1.33	80	382	658	1,091	4,358	1.40
South Dakota	2,344	26	26	29	30	38	1.01	64	96	123	170	324	1.16	20	104	142	191	728	1.22
Tennessee	3,335	206	218	225	248	270	1.01	211	355	841	1,167	2,378	1.32	106	385	804	1,174	5,998	1.41
Texas	6,458	293	297	314	358	1,042	1.03	622	1,189	1,645	2,295	4,997	1.18	163	1,088	1,586	2,277	6,921	1.26
Utah	2,949	109	111	122	140	223	1.07	111	181	304	525	1,380	1.46	38	182	315	532	2,155	1.46
Virginia	5,078	123	156	161	184	244	1.03	123	171	558	1,037	2,127	1.59	27	174	521	971	3,520	1.72
Vermont	3,716	13	14	16	19	34	1.05	22	50	65	91	209	1.21	9	46	66	93	576	1.32
Washington	4,186	197	198	245	281	415	1.03	226	440	647	856	2,703	1.40	113	429	657	891	3,286	1.39
Wisconsin	3,655	154	156	172	181	303	1.03	157	432	618	822	1,955	1.28	32	401	584	820	3,932	1.35
West Virginia	3,470	36	41	43	50	91	1.04	47	109	231	301	650	1.29	11	108	178	299	916	1.38
Wyoming	2,468	15	16	19	21	29	1.04	17	36	90	144	265	1.41	10	41	83	142	474	1.49

du = dwelling unit; nr = nonresponse adjustment; ps = poststratification adjustment; res = respondent.

[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, 2024.

Table I.2 Selected Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States; 2024

Domain		Before sel.per.ps (WT1*...*WT12)[1]						After sel.per.ps (WT1*...*WT13)[1]					
	n	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]
United States	137,170	5	476	1,123	2,496	60,845	2.79	2	470	1,120	2,527	55,429	2.78
Alaska	1,728	15	110	219	436	3,245	2.26	13	109	215	432	3,076	2.22
Alabama	2,648	53	553	1,013	1,928	13,072	2.15	33	539	1,014	1,978	13,536	2.10
Arkansas	2,097	54	426	726	1,411	10,190	2.13	12	429	735	1,506	13,606	2.17
Arizona	1,919	78	1,035	1,953	3,941	38,269	2.41	51	1,014	1,984	4,039	34,349	2.37
California	9,319	58	1,352	2,459	4,585	34,011	1.90	59	1,354	2,512	4,634	36,269	1.89
Colorado	2,009	32	865	1,716	3,384	18,061	1.85	27	853	1,727	3,427	17,261	1.85
Connecticut	1,636	101	676	1,203	2,364	24,406	2.37	52	670	1,216	2,249	21,786	2.30
District of Columbia	1,683	5	80	185	531	3,721	2.42	4	80	180	465	3,999	2.60
Delaware	2,320	7	116	233	469	4,582	2.43	4	113	232	466	5,075	2.45
Florida	5,768	58	1,036	2,082	4,265	30,380	2.26	68	1,036	2,093	4,354	30,854	2.26
Georgia	2,588	64	896	2,077	4,260	60,845	2.69	51	920	2,030	4,413	55,429	2.57
Hawaii	2,006	17	194	338	711	10,657	2.57	9	176	351	710	6,578	2.45
Iowa	1,961	129	586	943	1,539	14,886	1.89	86	566	953	1,557	10,389	1.93
Idaho	2,500	14	200	378	768	7,412	2.65	7	191	385	769	8,415	2.63
Illinois	5,806	16	393	1,041	2,196	33,107	2.85	11	386	1,046	2,242	34,729	2.96
Indiana	1,905	100	1,132	2,015	3,800	27,606	1.95	89	1,077	1,968	3,958	31,197	2.04
Kansas	2,123	62	432	732	1,384	10,780	2.04	31	430	730	1,400	10,278	2.09
Kentucky	1,961	76	672	1,269	2,630	23,370	2.07	16	654	1,249	2,568	27,158	2.07
Louisiana	1,984	77	679	1,281	2,384	19,201	1.98	37	660	1,268	2,517	15,288	1.98
Massachusetts	1,606	121	1,429	2,547	4,397	47,111	2.25	74	1,446	2,462	4,392	44,661	2.24
Maryland	2,039	117	760	1,488	3,110	22,885	2.37	102	741	1,441	3,117	37,363	2.52
Maine	1,714	45	255	446	817	8,437	2.28	37	260	437	788	7,217	2.14
Michigan	4,424	49	611	1,234	2,351	28,198	2.28	41	606	1,237	2,382	32,427	2.32
Minnesota	2,015	128	898	1,611	2,854	33,310	2.08	46	907	1,621	2,909	18,275	1.93
Missouri	1,874	256	1,146	1,916	3,713	23,407	1.86	248	1,142	1,904	3,576	24,596	1.84

Table I.2 Selected Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States; 2024 (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	2,426	41	354	643	1,158	9,870	2.24	16	352	643	1,152	10,129	2.25
Montana	1,715	17	160	313	653	10,884	2.66	13	161	308	628	7,251	2.51
North Carolina	2,923	92	966	1,904	4,047	49,586	2.30	97	976	1,935	4,045	33,318	2.27
North Dakota	1,491	22	182	323	581	4,199	1.81	21	180	310	567	2,968	1.77
Nebraska	1,987	37	335	599	1,090	6,967	1.79	33	325	602	1,094	8,711	1.84
New Hampshire	1,931	45	263	435	748	3,981	1.83	20	256	427	761	3,762	1.81
New Jersey	3,125	113	810	1,523	3,266	28,955	2.32	99	778	1,510	3,241	24,270	2.26
New Mexico	1,688	28	373	641	1,281	19,300	2.29	12	351	624	1,275	13,735	2.47
Nevada	2,307	29	305	673	1,529	25,644	2.56	19	306	691	1,540	12,935	2.42
New York	6,572	68	878	1,615	3,056	39,892	2.13	51	882	1,632	3,105	28,284	2.22
Ohio	5,157	53	694	1,147	2,409	25,460	2.13	65	692	1,164	2,465	18,865	2.12
Oklahoma	1,948	40	609	1,136	2,250	18,848	2.21	25	576	1,121	2,179	15,123	2.06
Oregon	2,482	84	452	786	1,731	28,871	2.54	59	472	821	1,817	16,363	2.46
Pennsylvania	4,087	107	984	1,638	2,959	34,580	2.13	117	962	1,647	2,967	30,150	2.23
Rhode Island	2,308	17	140	261	483	6,261	2.25	5	130	257	517	4,516	2.26
South Carolina	1,754	88	719	1,449	3,122	32,199	2.49	54	735	1,481	3,130	30,160	2.54
South Dakota	1,674	29	162	261	480	4,168	2.14	28	158	258	486	5,067	2.63
Tennessee	2,136	107	890	1,554	3,583	38,919	2.29	77	865	1,565	3,708	26,956	2.27
Texas	5,356	316	2,100	3,632	6,234	37,604	1.67	209	2,093	3,716	6,209	30,924	1.63
Utah	2,905	78	418	724	1,287	17,942	1.91	71	411	723	1,280	7,082	1.77
Virginia	3,270	27	493	1,194	2,598	43,035	2.85	28	486	1,168	2,670	37,347	2.97
Vermont	1,863	11	99	184	370	2,566	2.23	2	99	187	383	2,265	2.09
Washington	2,752	165	867	1,545	2,710	26,934	2.22	76	870	1,555	2,789	29,657	2.28
Wisconsin	2,171	48	750	1,379	2,672	28,791	2.48	21	734	1,394	2,769	25,803	2.37
West Virginia	1,994	13	213	410	902	7,620	2.59	14	217	420	913	7,876	2.57
Wyoming	1,515	12	91	204	389	3,619	2.36	10	91	201	406	3,389	2.51

per = person level; ps = poststratification adjustment; sel = selected.

[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 $1 + [(n-1)/n] * CV^2$, where CV = coefficient of variation of weights.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table I.3 Respondent Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States; 2024

Domain		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]					
	n	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	70,241	4	476	1,129	2,545	55,429	2.77	4	773	1,965	4,810	111,332	3.26	4	773	1,965	4,810	111,332	3.26	2	652	1,831	4,744	135,594	3.49
Alaska	1,004	13	119	230	474	3,076	2.09	13	177	353	729	7,434	2.46	13	177	353	729	7,434	2.46	2	127	309	661	8,289	2.97
Alabama	1,254	33	521	910	1,830	12,086	2.13	42	800	1,761	4,297	36,631	2.61	42	800	1,761	4,297	36,631	2.61	8	928	2,018	4,465	59,887	2.52
Arkansas	1,106	28	447	763	1,652	8,760	2.09	126	720	1,406	2,744	31,594	2.46	126	720	1,406	2,744	31,594	2.46	32	589	1,347	2,815	25,948	2.66
Arizona	1,052	51	994	1,964	3,999	32,948	2.39	119	1,319	3,120	7,540	80,445	2.88	119	1,319	3,120	7,540	80,445	2.88	42	1,115	3,015	7,928	62,632	2.84
California	4,517	90	1,336	2,453	4,515	32,428	1.89	123	2,353	4,470	9,078	89,251	2.33	123	2,353	4,470	9,078	89,251	2.33	20	1,682	4,356	9,310	120,683	2.63
Colorado	987	71	909	1,956	3,683	14,833	1.82	71	1,650	3,476	6,487	44,082	2.13	71	1,650	3,476	6,487	44,082	2.13	24	1,437	3,335	6,590	43,947	2.26
Connecticut	843	52	660	1,203	2,320	21,786	2.26	52	1,176	2,100	4,268	50,272	2.84	52	1,176	2,100	4,268	50,272	2.84	11	695	1,563	3,953	95,556	4.40
District of Columbia	993	4	82	187	476	3,999	2.55	4	105	261	742	6,840	3.12	4	105	261	742	6,840	3.12	3	111	306	741	9,207	2.88
Delaware	1,096	9	122	243	495	3,112	2.20	10	218	474	924	10,951	2.88	10	218	474	924	10,951	2.88	3	237	506	1,037	6,471	2.29
Florida	3,020	68	1,036	2,048	4,206	28,472	2.29	76	1,619	3,401	7,913	102,130	2.72	76	1,619	3,401	7,913	102,130	2.72	14	1,692	3,553	7,945	77,720	2.61
Georgia	1,441	51	817	1,825	3,848	55,429	2.74	68	1,037	2,817	7,249	111,332	3.64	68	1,037	2,817	7,249	111,332	3.64	22	1,277	2,957	7,733	92,670	3.21
Hawaii	1,010	9	177	361	802	6,578	2.42	45	327	678	1,461	13,139	2.59	45	327	678	1,461	13,139	2.59	15	341	676	1,421	14,423	2.61
Iowa	1,028	100	568	946	1,596	10,389	1.93	100	909	1,570	3,260	39,446	2.34	100	909	1,570	3,260	39,446	2.34	38	730	1,444	3,182	31,238	2.61
Idaho	1,202	31	181	371	694	8,415	2.68	32	263	584	1,600	18,233	3.41	32	263	584	1,600	18,233	3.41	12	248	587	1,575	17,487	3.51
Illinois	2,851	11	393	1,050	2,208	34,729	2.98	11	598	1,652	4,369	65,480	3.46	11	598	1,652	4,369	65,480	3.46	2	570	1,617	4,679	65,786	3.21
Indiana	1,037	89	1,111	2,098	4,192	24,488	1.97	91	1,885	3,807	7,368	61,845	2.09	91	1,885	3,807	7,368	61,845	2.09	18	1,806	3,788	7,546	40,788	2.05
Kansas	1,208	31	418	737	1,444	8,754	2.02	31	703	1,290	2,589	16,793	2.15	31	703	1,290	2,589	16,793	2.15	11	617	1,250	2,576	32,944	2.39
Kentucky	1,097	75	689	1,327	2,588	14,678	1.93	75	1,123	2,138	4,379	32,526	2.18	75	1,123	2,138	4,379	32,526	2.18	17	1,022	2,130	4,376	34,096	2.32
Louisiana	990	40	658	1,266	2,365	12,972	1.96	57	1,134	2,199	5,000	38,018	2.28	57	1,134	2,199	5,000	38,018	2.28	11	1,054	2,174	4,913	36,921	2.41
Massachusetts	853	74	1,399	2,445	4,506	36,290	2.25	90	2,017	4,366	9,124	70,110	2.44	90	2,017	4,366	9,124	70,110	2.44	41	1,161	3,164	7,716	118,745	3.83
Maryland	943	115	722	1,388	2,979	18,714	2.43	133	1,149	2,545	6,673	65,547	3.04	133	1,149	2,545	6,673	65,547	3.04	25	1,161	2,582	7,069	55,688	2.80
Maine	850	40	284	490	902	7,217	2.03	42	465	878	1,754	16,191	2.57	42	465	878	1,754	16,191	2.57	15	318	629	1,480	32,659	4.27
Michigan	2,353	47	626	1,254	2,410	16,652	2.21	64	1,002	2,121	4,208	58,878	2.69	64	1,002	2,121	4,208	58,878	2.69	16	953	2,078	4,375	39,685	2.63
Minnesota	994	46	931	1,655	3,185	16,742	1.86	184	1,589	2,948	6,208	37,907	2.25	184	1,589	2,948	6,208	37,907	2.25	57	1,404	2,774	5,964	51,964	2.56
Missouri	977	273	1,248	2,051	3,924	19,342	1.77	289	1,958	3,479	6,992	41,817	2.06	289	1,958	3,479	6,992	41,817	2.06	89	1,707	3,444	6,887	47,097	2.19

Table I.3 Respondent Person-Level Weight Summary Statistics: United States, District of Columbia, and the 50 States 2024 (continued)

Domain		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]					
	n	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	1,238	16	364	642	1,164	8,307	2.17	29	552	1,107	2,332	28,724	2.75	29	552	1,107	2,332	28,724	2.75	6	544	1,105	2,381	26,127	2.60
Montana	854	22	164	348	719	7,251	2.50	31	342	677	1,328	12,420	2.64	31	342	677	1,328	12,420	2.64	13	357	672	1,283	11,903	2.67
North Carolina	1,582	97	948	1,848	3,886	28,528	2.26	101	1,424	3,141	6,995	82,003	2.85	101	1,424	3,141	6,995	82,003	2.85	36	1,484	3,265	7,570	64,061	2.59
North Dakota	815	21	183	322	590	2,674	1.75	25	301	561	1,017	8,701	2.01	25	301	561	1,017	8,701	2.01	5	291	543	1,004	6,005	2.04
Nebraska	972	33	333	621	1,182	8,711	1.86	64	626	1,170	2,190	10,466	1.92	64	626	1,170	2,190	10,466	1.92	15	574	1,135	2,177	12,987	2.09
New Hampshire	871	38	269	448	889	3,762	1.77	39	532	951	1,737	10,498	2.03	39	532	951	1,737	10,498	2.03	9	258	587	1,557	22,012	3.33
New Jersey	1,543	134	794	1,530	3,321	24,270	2.30	183	1,437	3,066	6,456	67,543	2.55	183	1,437	3,066	6,456	67,543	2.55	47	1,117	2,687	5,782	75,253	3.30
New Mexico	919	12	363	625	1,346	13,735	2.53	12	564	1,094	2,415	29,577	2.73	12	564	1,094	2,415	29,577	2.73	4	440	1,039	2,369	20,917	3.00
Nevada	1,254	23	313	677	1,427	10,312	2.39	23	460	1,056	2,456	29,709	3.16	23	460	1,056	2,456	29,709	3.16	7	362	956	2,556	24,650	3.18
New York	3,177	56	891	1,699	3,324	25,163	2.21	66	1,605	3,403	6,773	66,503	2.36	66	1,605	3,403	6,773	66,503	2.36	10	1,038	2,708	6,480	79,501	3.01
Ohio	2,447	65	683	1,164	2,370	13,118	2.06	88	983	2,220	4,917	47,512	2.62	88	983	2,220	4,917	47,512	2.62	17	999	2,203	4,857	54,971	2.68
Oklahoma	1,058	25	579	1,171	2,346	14,475	2.06	27	1,126	2,226	4,270	24,307	1.95	27	1,126	2,226	4,270	24,307	1.95	5	1,035	2,155	4,038	45,889	2.25
Oregon	1,259	59	455	807	1,768	15,514	2.50	59	758	1,466	3,000	48,871	3.23	59	758	1,466	3,000	48,871	3.23	25	708	1,478	3,180	39,232	3.21
Pennsylvania	2,038	117	1,016	1,777	3,252	30,150	2.20	152	1,970	3,423	6,529	54,300	2.26	152	1,970	3,423	6,529	54,300	2.26	59	1,293	2,934	6,385	80,787	2.96
Rhode Island	1,160	8	128	246	542	4,496	2.35	8	202	469	1,030	9,605	2.69	8	202	469	1,030	9,605	2.69	2	91	284	919	16,917	4.57
South Carolina	921	54	740	1,466	2,978	23,596	2.44	68	1,116	2,454	5,384	67,999	3.24	68	1,116	2,454	5,384	67,999	3.24	45	1,204	2,653	6,088	104,566	3.08
South Dakota	864	28	164	276	554	5,067	2.48	43	301	514	1,053	10,404	2.54	43	301	514	1,053	10,404	2.54	15	265	511	1,111	10,345	2.47
Tennessee	995	77	813	1,362	2,932	21,908	2.33	107	1,216	2,668	6,649	72,550	3.38	107	1,216	2,668	6,649	72,550	3.38	21	1,451	3,182	7,117	76,993	2.94
Texas	3,125	209	2,103	3,826	6,396	28,545	1.63	229	3,383	6,196	10,976	55,835	1.71	229	3,383	6,196	10,976	55,835	1.71	46	3,019	6,056	11,150	60,360	1.87
Utah	1,459	71	409	710	1,250	7,082	1.77	74	568	1,100	2,546	19,329	2.25	74	568	1,100	2,546	19,329	2.25	15	488	1,043	2,483	18,788	2.47
Virginia	1,729	28	500	1,143	2,664	37,347	2.93	28	732	1,861	4,920	66,071	3.37	28	732	1,861	4,920	66,071	3.37	8	845	1,988	5,063	135,594	3.44
Vermont	996	7	111	211	417	2,265	2.01	23	190	348	684	7,303	2.39	23	190	348	684	7,303	2.39	5	89	201	506	15,065	5.27
Washington	1,206	76	874	1,534	2,886	29,657	2.41	164	1,438	3,088	6,505	57,130	2.67	164	1,438	3,088	6,505	57,130	2.67	67	1,337	2,875	6,612	68,224	2.91
Wisconsin	1,113	21	766	1,451	2,851	18,446	2.33	21	1,298	2,656	5,439	66,301	2.75	21	1,298	2,656	5,439	66,301	2.75	4	1,148	2,631	5,554	50,274	2.84
West Virginia	1,084	18	230	429	928	6,398	2.31	22	351	698	1,620	16,108	2.96	22	351	698	1,620	16,108	2.96	7	424	795	1,680	14,329	2.60
Wyoming	856	10	91	211	413	3,389	2.47	10	124	322	732	5,628	2.76	10	124	322	732	5,628	2.76	3	118	307	715	8,464	3.16

nr = nonresponse adjustment; per = person level; ps = poststratification adjustment; res = respondent.
[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 $1 + \lceil (n-1)/n \rceil * CV^2$, where CV = coefficient of variation of weights.
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table I.4 Dwelling Unit-Level Weight Summary Statistics, by Segment-Level Variables: United States; 2024

Domain		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]					
	n	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	203,743	5	83	141	192	1,042	1.35	8	213	489	912	4,997	1.75	3	209	471	901	6,921	1.84
Quarter																			
Quarter 1	51,426	5	91	145	185	518	1.32	11	223	485	897	4,159	1.70	5	220	468	894	6,905	1.80
Quarter 2	58,453	6	73	124	156	625	1.33	8	185	422	800	3,374	1.74	4	179	402	793	5,998	1.85
Quarter 3	50,690	6	87	153	193	837	1.38	10	214	503	917	4,755	1.80	3	211	479	901	6,177	1.84
Quarter 4	43,174	10	101	169	228	1,042	1.33	10	246	623	1,116	4,997	1.69	5	245	583	1,071	6,921	1.79
% Hispanic or Latino																			
50-100%	13,006	6	112	162	241	396	1.24	53	374	707	1,139	3,239	1.42	14	340	653	1,074	5,681	1.51
10-<50%	46,796	8	106	152	205	1,042	1.32	8	286	631	1,155	4,997	1.68	4	273	608	1,163	6,905	1.77
<10%	143,941	5	61	139	181	653	1.36	10	194	436	831	4,755	1.78	3	189	416	810	6,921	1.85
% Black or African American																			
50-100%	13,174	5	109	146	188	491	1.28	11	211	540	937	3,398	1.63	5	209	490	906	5,765	1.74
10-<50%	39,636	6	117	159	195	1,042	1.25	8	265	607	1,040	4,997	1.64	4	257	580	1,039	6,905	1.74
<10%	150,933	7	71	138	185	837	1.39	10	205	454	879	4,755	1.79	3	199	441	867	6,921	1.87
% Owner-Occupied																			
50-100%	154,546	7	82	141	186	837	1.34	10	214	473	875	4,755	1.75	3	210	458	866	6,921	1.83
10-<50%	43,107	6	81	144	195	1,042	1.39	8	197	507	997	4,997	1.76	4	195	491	983	5,681	1.84
<10%	6,090	5	91	145	193	524	1.37	17	335	720	1,470	3,356	1.60	12	335	678	1,374	6,177	1.70
Population Density																			
Large MSA	86,198	5	120	156	199	1,042	1.25	8	328	683	1,133	4,997	1.57	3	313	667	1,110	6,921	1.65
Small MSA	104,895	13	44	124	172	512	1.42	17	169	357	731	3,618	1.86	6	165	347	710	6,734	1.95
Non-MSA	12,650	13	41	119	169	611	1.48	38	252	438	801	4,581	1.79	12	246	427	774	5,940	1.83
Group Quarters																			
Group	366	10	78	104	109	262	1.29	87	415	610	707	2,378	1.44	50	314	461	657	2,708	1.52
Non-Group	203,377	5	83	141	192	1,042	1.35	8	213	489	913	4,997	1.75	3	209	471	901	6,921	1.84

du = dwelling unit; MSA = metropolitan statistical area; nr = nonresponse adjustment; ps = poststratification adjustment; res = respondent.

[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, 2024.

Table I.5 Selected Person-Level Weight Summary Statistics, by Demographic Variables: United States; 2024

Domain			Before sel.per.ps (WT1*...*WT12)[1]						After sel.per.ps (WT1*...*WT13)[1]					
		n	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]	Min	Q1[2]	Med	Q3[2]	Max	UWE[3]
Total		137,170	5	476	1,123	2,496	60,845	2.79	2	470	1,120	2,527	55,429	2.78
Quarter														
	Quarter 1	34,177	5	508	1,147	2,512	43,035	2.70	4	506	1,145	2,542	37,347	2.68
	Quarter 2	39,467	5	408	967	2,160	36,244	2.80	2	400	960	2,169	30,854	2.81
	Quarter 3	34,711	6	465	1,100	2,464	40,072	2.81	5	454	1,098	2,470	55,429	2.80
	Quarter 4	28,815	5	575	1,358	3,044	60,845	2.72	5	583	1,367	3,065	44,661	2.71
Age														
	12-17	31,211	5	255	588	1,127	11,974	2.03	4	251	584	1,136	11,457	2.00
	18-25	34,276	9	318	724	1,396	14,060	2.01	2	315	717	1,390	10,304	1.97
	26-34	20,960	35	657	1,447	2,745	23,665	1.80	7	646	1,437	2,734	14,385	1.80
	35-49	28,581	21	704	1,597	3,111	32,426	1.90	12	702	1,623	3,159	20,231	1.89
	50+	22,142	67	1,901	4,193	7,676	60,845	1.73	38	1,881	4,236	7,789	55,429	1.72
Race														
	White	101,679	5	503	1,172	2,581	60,845	2.70	4	503	1,172	2,604	55,429	2.68
	Black or African American	17,734	7	492	1,126	2,494	34,580	2.79	4	474	1,123	2,549	37,181	2.91
	Other	17,757	6	339	851	2,009	47,111	3.45	2	320	832	2,044	44,661	3.33
Hispanicity														
	Hispanic or Latino	27,725	7	486	1,148	2,382	49,586	2.65	2	476	1,147	2,422	55,429	2.68
	Non-Hispanic or Latino	109,445	5	473	1,115	2,530	60,845	2.82	4	469	1,112	2,560	44,661	2.80
Sex														
	Male	67,219	6	472	1,107	2,487	47,111	2.82	2	465	1,104	2,509	37,363	2.78
	Female	69,951	5	479	1,136	2,510	60,845	2.76	4	475	1,136	2,544	55,429	2.79
Population Density														
	Large MSA	59,926	5	704	1,515	3,194	60,845	2.45	4	699	1,518	3,244	44,661	2.44
	Small MSA	69,764	7	355	839	1,934	49,586	3.10	2	350	837	1,932	55,429	3.09
	Non-MSA	7,480	25	531	1,078	2,487	33,310	2.83	7	533	1,073	2,473	32,427	2.80

MSA = metropolitan statistical area; nr = nonresponse adjustment; per = person level; ps = poststratification adjustment; sel = selected.

[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, 2024.

Table I.6 Respondent Person-Level Weight Summary Statistics, by Demographic Variables: United States; 2024

Domain	Before res.per.nr (WT1*...*WT13)[1]							After res.per.nr (WT1*...*WT15)[1]						Before res.per.ps (WT1*...*WT15)[2]							Final Weight after res.per.ps (WT1*...*WT15)[2]					
	n	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	*n*	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]	Min	Q1[3]	Med	Q3[3]	Max	UWE[4]
Total	70,241	4	476	1,129	2,545	55,429	2.77	4	773	1,965	4,810	111,332	3.26	70,241	4	773	1,965	4,810	111,332	3.26	2	652	1,831	4,744	135,594	3.49
Quarter																										
Quarter 1	17,354	4	517	1,149	2,570	37,347	2.71	4	836	2,040	4,867	82,003	3.09	17,354	4	836	2,040	4,867	82,003	3.09	3	700	1,911	4,813	114,816	3.35
Quarter 2	20,345	4	408	977	2,217	30,150	2.79	5	649	1,661	4,124	80,445	3.28	20,345	5	649	1,661	4,124	80,445	3.28	2	537	1,544	4,078	104,566	3.56
Quarter 3	17,987	5	450	1,087	2,461	55,429	2.82	5	722	1,885	4,645	111,332	3.38	17,987	5	722	1,885	4,645	111,332	3.38	3	605	1,724	4,593	135,594	3.58
Quarter 4	14,555	6	592	1,388	3,080	39,714	2.67	6	978	2,445	5,903	104,973	3.12	14,555	6	978	2,445	5,903	104,973	3.12	5	870	2,327	5,864	120,683	3.31
Age																										
12-17	14,013	4	255	598	1,142	8,462	1.98	4	505	1,180	2,409	24,439	2.26	13,985	4	507	1,182	2,415	24,439	2.26	2	384	1,041	2,399	25,984	2.54
18-25	16,837	9	297	678	1,352	9,352	2.02	10	486	1,219	2,745	25,063	2.34	16,744	10	486	1,218	2,750	25,063	2.35	2	403	1,073	2,705	33,001	2.66
26-34	11,202	7	594	1,316	2,575	14,385	1.86	24	848	2,177	4,855	41,017	2.34	11,278	24	843	2,159	4,824	41,017	2.35	5	768	1,927	4,717	47,328	2.52
35-49	15,392	12	657	1,479	2,954	18,253	1.94	17	946	2,397	5,593	70,320	2.42	15,379	17	945	2,390	5,576	70,320	2.41	4	878	2,226	5,460	76,993	2.61
50+	12,797	38	1,733	3,860	7,363	55,429	1.77	58	2,364	5,927	12,821	111,332	2.22	12,855	55	2,361	5,916	12,811	111,332	2.22	15	2,272	5,497	12,494	135,594	2.37
Race																										
White	51,656	4	512	1,192	2,636	55,429	2.67	4	846	2,098	4,998	111,332	3.12	48,054	4	832	2,078	4,992	111,332	3.14	3	860	2,221	5,393	118,745	3.16
Black or African American	9,594	8	477	1,092	2,547	36,290	2.94	8	737	1,862	4,624	100,664	3.32	9,482	8	745	1,838	4,646	100,664	3.31	2	719	1,867	4,665	86,014	3.29
Other	8,991	6	314	824	2,007	37,347	3.26	8	492	1,355	3,741	89,251	4.20	12,705	8	609	1,645	4,141	89,251	3.76	2	245	713	2,194	135,594	6.11
Hispanicity																										
Hispanic or Latino	13,721	7	476	1,144	2,387	55,429	2.63	8	795	2,075	4,717	111,332	3.20	14,200	8	792	2,065	4,698	111,332	3.21	2	413	1,415	4,417	104,566	3.95
Non-Hispanic or Latino	56,520	4	476	1,123	2,591	39,714	2.80	4	769	1,943	4,833	105,791	3.27	56,041	4	769	1,944	4,838	105,791	3.27	2	727	1,923	4,812	135,594	3.39
Sex																										
Male	32,601	7	464	1,103	2,527	37,347	2.78	9	795	2,050	5,118	111,332	3.20	32,547	9	794	2,052	5,127	111,332	3.20	2	666	1,902	5,049	114,816	3.48
Female	37,640	4	488	1,149	2,560	55,429	2.77	4	753	1,902	4,565	104,973	3.30	37,694	4	754	1,901	4,557	104,973	3.30	2	642	1,771	4,503	135,594	3.48
Population Density																										
Large MSA	30,480	4	686	1,510	3,271	39,714	2.45	4	1,110	2,679	6,216	111,332	2.86	30,480	4	1,110	2,679	6,216	111,332	2.86	2	905	2,493	6,269	120,683	3.11
Small MSA	35,868	9	361	853	1,945	55,429	3.04	10	593	1,482	3,655	105,791	3.66	35,868	10	593	1,482	3,655	105,791	3.66	2	519	1,408	3,646	135,594	3.81
Non-MSA	3,893	7	579	1,133	2,606	29,657	2.79	33	913	1,979	4,594	74,272	2.99	3,893	33	913	1,979	4,594	74,272	2.99	7	747	1,882	4,384	75,782	3.13

MSA = metropolitan statistical area; nr = nonresponse adjustment; per = person-level; ps = poststratification adjustment; res = respondent.

[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, 2024.

Appendix J: Point Estimates, Ratio-Adjusted Standard Errors (SE1), and Sandwich Standard Errors (SE2) for Baseline and Final Models

Table J.1 Drug Estimates (United States and Eight Large States): Lifetime Licit Drug Estimates, Cigarettes and Alcohol; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime											
Total	Point Estimates	51.29	51.20	47.09	47.42	48.48	48.72	54.05	54.35	57.14	56.52
	SE1	0.38	0.38	1.14	1.16	1.63	1.62	1.74	1.71	1.89	1.90
	SE2	0.33	0.32	1.08	1.05	1.55	1.35	1.62	1.26	1.85	1.68
12-17	Point Estimates	6.22	6.21	4.83	4.57	7.83	7.78	3.89	3.75	6.23	6.16
	SE1	0.27	0.28	0.86	0.89	1.33	1.33	1.31	1.26	1.41	1.42
	SE2	0.27	0.26	0.86	0.86	1.32	1.37	1.31	1.23	1.38	1.36
18-25	Point Estimates	33.95	33.71	28.74	28.78	30.35	30.60	39.68	38.90	33.30	31.73
	SE1	0.63	0.65	2.02	2.08	2.64	2.67	2.84	2.84	2.71	2.75
	SE2	0.61	0.58	2.04	2.07	2.63	2.46	2.90	2.66	2.68	2.65
26-34	Point Estimates	51.73	51.15	41.05	41.20	50.70	49.02	52.61	52.56	54.68	53.16
	SE1	0.74	0.78	2.24	2.38	2.95	3.04	3.60	3.61	3.15	3.39
	SE2	0.72	0.70	2.28	2.32	2.95	2.85	3.56	3.47	3.17	3.36
35+	Point Estimates	60.72	60.75	57.97	58.53	55.57	56.15	64.31	64.76	68.67	68.51
	SE1	0.49	0.51	1.47	1.45	2.11	2.08	2.21	2.23	2.40	2.44
	SE2	0.47	0.45	1.45	1.39	2.04	1.90	2.17	1.89	2.37	2.27
Alcohol Lifetime											
Total	Point Estimates	79.28	79.23	78.75	79.00	80.58	80.34	81.93	81.67	83.21	83.39
	SE1	0.32	0.33	1.07	1.10	1.20	1.21	1.41	1.40	1.24	1.18
	SE2	0.25	0.24	0.86	0.82	1.06	0.90	1.27	0.82	1.19	0.93
12-17	Point Estimates	21.33	21.32	22.80	23.80	20.46	20.56	20.72	19.59	19.87	19.48
	SE1	0.55	0.58	2.58	2.77	1.78	1.81	2.31	2.52	1.94	1.91
	SE2	0.55	0.55	2.57	2.75	1.77	1.67	2.33	2.44	1.94	1.67
18-25	Point Estimates	72.73	73.84	71.77	73.29	72.40	75.38	75.15	74.33	75.67	75.62
	SE1	0.59	0.61	2.14	2.09	2.32	2.06	2.71	2.90	2.91	3.05
	SE2	0.58	0.53	2.14	2.03	2.30	1.93	2.64	2.32	2.93	2.84
26-34	Point Estimates	86.66	87.18	86.50	87.39	88.18	88.30	88.82	89.30	89.22	90.19
	SE1	0.51	0.51	1.75	1.58	2.04	2.13	2.02	1.96	1.89	1.84
	SE2	0.50	0.48	1.69	1.53	1.99	1.94	2.03	1.90	1.91	1.95
35+	Point Estimates	86.96	86.55	86.12	85.92	87.33	86.46	90.58	90.08	91.64	91.88
	SE1	0.38	0.40	1.17	1.24	1.60	1.68	1.37	1.43	1.43	1.39
	SE2	0.35	0.32	1.02	1.03	1.50	1.34	1.31	1.00	1.40	1.24

Table J.1 Drug Estimates (United States and Eight Large States): Lifetime Licit Drug Estimates, Cigarettes and Alcohol; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Lifetime									
Total	Point Estimates	46.35	47.01	57.88	56.88	53.02	52.49	44.38	44.27
	SE1	1.78	1.90	1.66	1.65	1.91	1.97	1.36	1.36
	SE2	1.69	1.65	1.62	1.50	1.86	1.73	1.30	1.26
12-17	Point Estimates	2.03	2.23	8.33	8.25	6.27	6.41	5.63	5.84
	SE1	0.90	1.02	1.40	1.46	1.62	1.61	0.80	0.85
	SE2	0.94	1.08	1.41	1.44	1.61	1.56	0.78	0.83
18-25	Point Estimates	29.06	29.29	36.26	35.56	37.67	35.98	30.89	30.84
	SE1	2.29	2.33	2.49	2.57	2.99	3.19	2.65	2.70
	SE2	2.17	2.21	2.50	2.60	2.96	2.74	2.56	2.39
26-34	Point Estimates	49.32	50.58	63.91	60.92	58.90	56.44	45.45	45.12
	SE1	3.02	3.36	2.76	2.74	3.57	3.76	2.91	2.94
	SE2	2.94	3.08	2.78	2.72	3.51	3.21	2.92	2.67
35+	Point Estimates	54.48	54.98	67.33	66.63	60.75	60.42	53.61	53.52
	SE1	2.38	2.56	2.14	2.12	2.49	2.55	1.95	2.02
	SE2	2.33	2.35	2.09	2.00	2.45	2.34	1.93	1.87
Alcohol Lifetime									
Total	Point Estimates	75.07	75.82	81.76	82.62	81.78	81.41	72.34	72.26
	SE1	1.70	1.76	1.32	1.27	1.59	1.70	1.44	1.41
	SE2	1.52	1.40	1.29	1.05	1.51	1.34	1.21	1.08
12-17	Point Estimates	22.38	23.70	22.36	22.38	19.31	19.87	17.73	17.53
	SE1	2.85	3.31	2.69	2.78	2.47	2.58	1.76	1.84
	SE2	2.84	3.13	2.68	2.69	2.46	2.55	1.76	1.74
18-25	Point Estimates	69.81	70.60	77.16	78.55	73.47	72.73	67.18	68.94
	SE1	2.25	2.49	3.03	2.99	2.96	3.18	2.44	2.72
	SE2	2.16	2.40	3.00	2.81	2.94	2.91	2.43	2.36
26-34	Point Estimates	82.23	82.91	87.10	89.21	89.38	88.87	80.35	81.02
	SE1	2.83	2.97	2.94	2.55	2.10	2.21	1.91	1.88
	SE2	2.77	2.47	2.90	2.39	2.11	2.20	1.96	1.86
35+	Point Estimates	80.99	81.63	89.66	90.30	90.01	89.18	80.65	80.09
	SE1	2.22	2.35	1.58	1.50	1.98	2.10	1.78	1.82
	SE2	2.15	2.18	1.59	1.43	1.93	1.81	1.62	1.49

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table J.2 Drug Estimates (United States and Eight Large States): Lifetime Illicit Drug Estimates, Marijuana and Cocaine; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime											
Total	Point Estimates	47.74	47.55	46.79	46.92	45.95	45.96	51.93	51.53	54.07	53.44
	SE1	0.39	0.40	1.40	1.48	1.63	1.60	2.09	2.08	1.95	1.95
	SE2	0.34	0.32	1.12	1.10	1.49	1.28	1.99	1.72	1.93	1.83
12-17	Point Estimates	13.02	12.96	12.11	12.19	12.33	12.46	8.80	7.93	12.83	12.35
	SE1	0.44	0.45	1.59	1.71	1.61	1.65	2.08	1.74	1.93	1.97
	SE2	0.43	0.43	1.57	1.68	1.60	1.65	2.08	1.69	1.89	1.89
18-25	Point Estimates	48.84	48.84	50.04	50.16	48.13	50.08	52.69	51.71	54.54	52.93
	SE1	0.67	0.69	2.16	2.22	3.11	3.15	2.77	2.88	3.21	3.32
	SE2	0.65	0.62	2.13	2.05	3.06	2.89	2.75	2.68	3.24	3.32
26-34	Point Estimates	57.09	57.41	54.85	55.03	54.30	53.89	63.24	63.74	64.76	64.63
	SE1	0.79	0.82	2.82	2.84	3.24	3.24	3.38	3.36	2.80	2.87
	SE2	0.77	0.74	2.70	2.47	3.25	3.11	3.33	3.20	2.82	2.81
35+	Point Estimates	50.30	49.95	49.14	49.30	47.89	47.67	55.63	54.90	57.18	56.64
	SE1	0.50	0.51	1.75	1.80	2.13	2.17	2.62	2.65	2.70	2.75
	SE2	0.45	0.43	1.43	1.33	1.97	1.81	2.59	2.42	2.65	2.61
Cocaine Lifetime											
Total	Point Estimates	14.77	14.71	15.94	16.01	16.84	16.87	16.86	16.79	12.74	12.34
	SE1	0.29	0.30	1.09	1.12	1.32	1.33	1.60	1.58	1.23	1.22
	SE2	0.27	0.25	0.99	0.97	1.27	1.11	1.57	1.32	1.23	1.15
12-17	Point Estimates	0.44	0.42	0.24	0.20	1.06	1.09	0.44	0.37	0.27	0.24
	SE1	0.08	0.08	0.17	0.15	0.64	0.66	0.44	0.38	0.17	0.17
	SE2	0.08	0.08	0.17	0.14	0.64	0.66	0.44	0.38	0.17	0.17
18-25	Point Estimates	6.45	6.37	6.61	6.51	5.30	5.97	8.35	7.65	4.56	4.13
	SE1	0.32	0.32	1.12	1.19	1.08	1.18	2.24	2.01	1.09	0.99
	SE2	0.31	0.30	1.11	1.19	1.07	1.10	2.22	2.07	1.08	0.98
26-34	Point Estimates	16.03	16.02	16.07	16.15	18.51	19.14	17.78	17.96	14.87	14.22
	SE1	0.57	0.59	1.82	1.84	2.02	2.18	3.26	3.28	2.51	2.43
	SE2	0.55	0.52	1.73	1.67	2.03	2.04	3.18	2.98	2.52	2.41
35+	Point Estimates	18.05	17.98	19.91	20.02	20.16	19.94	20.67	20.56	15.44	15.08
	SE1	0.40	0.41	1.45	1.50	1.76	1.73	2.25	2.26	1.79	1.79
	SE2	0.38	0.35	1.38	1.35	1.71	1.49	2.25	2.04	1.77	1.65

Table J.2 Drug Estimates (United States and Eight Large States): Lifetime Illicit Drug Estimates, Marijuana and Cocaine; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Lifetime									
Total	Point Estimates	45.53	45.27	49.03	49.36	47.36	47.44	35.96	36.02
	SE1	1.94	2.02	2.04	2.04	2.00	2.16	1.37	1.27
	SE2	1.78	1.68	2.00	1.81	1.99	1.81	1.24	1.11
12-17	Point Estimates	11.85	12.45	15.54	15.63	12.13	12.79	11.03	11.14
	SE1	2.04	2.43	2.25	2.31	2.10	2.33	1.47	1.55
	SE2	2.03	2.42	2.25	2.27	2.10	2.26	1.46	1.52
18-25	Point Estimates	53.18	53.06	54.81	55.66	44.62	43.64	36.36	36.61
	SE1	2.98	3.16	2.96	2.92	3.40	3.66	2.52	2.52
	SE2	2.90	3.02	2.93	2.68	3.36	3.52	2.49	2.28
26-34	Point Estimates	57.79	59.13	61.97	62.38	59.26	58.64	42.77	43.05
	SE1	3.80	3.70	4.43	4.28	3.81	4.03	2.59	2.65
	SE2	3.70	3.37	4.38	4.14	3.80	4.06	2.60	2.76
35+	Point Estimates	45.42	44.81	49.76	50.11	50.16	50.22	38.34	38.36
	SE1	2.31	2.44	2.45	2.45	2.64	2.75	1.81	1.72
	SE2	2.19	2.21	2.45	2.33	2.61	2.31	1.72	1.58
Cocaine Lifetime									
Total	Point Estimates	13.16	13.78	13.42	12.80	15.08	14.73	11.66	11.59
	SE1	1.27	1.40	1.09	1.06	1.50	1.57	1.03	1.02
	SE2	1.24	1.27	1.06	0.93	1.44	1.29	0.99	1.00
12-17	Point Estimates	0.00	0.00	0.08	0.09	0.00	0.00	0.86	0.92
	SE1	0.00	0.00	0.05	0.07	0.00	0.00	0.48	0.51
	SE2	0.00	0.00	0.05	0.07	0.00	0.00	0.49	0.50
18-25	Point Estimates	7.20	6.90	5.93	5.75	7.20	6.71	6.33	6.23
	SE1	1.48	1.52	1.36	1.27	1.48	1.44	1.33	1.35
	SE2	1.48	1.43	1.36	1.33	1.49	1.44	1.27	1.15
26-34	Point Estimates	20.48	21.40	17.95	16.28	15.14	14.38	11.08	11.17
	SE1	3.86	4.09	2.73	2.31	2.55	2.59	1.61	1.63
	SE2	3.71	3.43	2.75	2.49	2.54	2.52	1.63	1.61
35+	Point Estimates	14.21	15.02	15.62	15.10	18.45	18.08	14.79	14.68
	SE1	1.43	1.65	1.45	1.44	2.04	2.12	1.56	1.59
	SE2	1.44	1.58	1.42	1.28	1.98	1.78	1.55	1.53

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table J.3 Drug Estimates (United States and Eight Large States): Past Year Licit Drug Estimates, Cigarettes and Alcohol; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year											
Total	Point Estimates	16.39	16.35	11.38	11.82	13.59	13.69	18.15	18.24	19.06	18.59
	SE1	0.27	0.28	0.76	0.84	1.02	1.04	1.53	1.55	1.49	1.46
	SE2	0.24	0.23	0.76	0.80	1.01	1.00	1.42	1.08	1.44	1.15
12-17	Point Estimates	3.12	3.09	2.67	2.39	3.14	3.18	1.77	2.07	3.47	3.60
	SE1	0.21	0.21	0.78	0.75	0.95	0.91	0.70	0.88	0.90	0.95
	SE2	0.21	0.21	0.77	0.74	0.96	0.86	0.69	0.82	0.89	0.89
18-25	Point Estimates	18.07	17.74	13.45	13.18	14.20	14.04	19.85	19.19	17.62	16.46
	SE1	0.50	0.52	1.44	1.49	2.14	2.26	2.37	2.37	2.34	2.38
	SE2	0.49	0.47	1.45	1.47	2.13	2.18	2.36	2.65	2.31	2.11
26-34	Point Estimates	19.69	18.65	11.61	11.36	17.44	15.37	18.23	17.59	20.29	18.26
	SE1	0.60	0.59	1.56	1.53	2.25	2.15	2.40	2.09	2.79	2.55
	SE2	0.58	0.53	1.57	1.52	2.29	2.03	2.27	1.69	2.76	2.49
35+	Point Estimates	17.19	17.43	12.16	13.02	13.97	14.52	20.16	20.48	21.12	21.04
	SE1	0.38	0.40	1.09	1.24	1.41	1.44	2.14	2.21	2.05	2.01
	SE2	0.34	0.34	1.06	1.14	1.39	1.41	2.00	1.63	1.99	1.62
Alcohol Past Year											
Total	Point Estimates	62.27	61.99	63.59	63.64	65.14	64.48	65.13	64.51	63.99	63.89
	SE1	0.39	0.40	1.32	1.38	1.40	1.44	1.96	1.97	1.69	1.63
	SE2	0.33	0.32	1.10	1.09	1.32	1.21	1.87	1.60	1.64	1.37
12-17	Point Estimates	16.30	16.35	19.30	20.30	15.81	15.97	12.21	10.85	14.47	14.53
	SE1	0.51	0.54	2.47	2.70	1.61	1.66	2.38	2.20	1.81	1.82
	SE2	0.51	0.51	2.45	2.66	1.61	1.56	2.38	2.16	1.81	1.69
18-25	Point Estimates	65.65	66.85	65.37	66.68	64.67	67.24	68.52	67.39	67.72	67.84
	SE1	0.63	0.65	2.17	2.20	2.63	2.50	2.83	3.01	3.36	3.53
	SE2	0.61	0.57	2.15	2.12	2.58	2.23	2.78	2.56	3.40	3.23
26-34	Point Estimates	74.39	75.08	76.07	76.18	77.97	78.22	76.50	77.32	78.94	79.13
	SE1	0.66	0.67	2.03	2.07	2.52	2.53	2.68	2.71	2.50	2.61
	SE2	0.65	0.62	1.97	1.88	2.50	2.46	2.70	2.60	2.48	2.57
35+	Point Estimates	65.37	64.56	66.52	66.23	68.46	67.03	69.71	68.66	66.71	66.49
	SE1	0.52	0.54	1.72	1.82	1.82	1.88	2.44	2.56	2.02	1.95
	SE2	0.47	0.44	1.52	1.48	1.78	1.66	2.39	2.29	1.99	1.77

Table J.3 Drug Estimates (United States and Eight Large States): Past Year Licit Drug Estimates, Cigarettes and Alcohol; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Year									
Total	Point Estimates	13.89	14.77	24.07	22.66	17.70	17.50	14.30	14.31
	SE1	1.06	1.16	1.76	1.71	1.36	1.40	0.79	0.82
	SE2	1.00	0.93	1.71	1.55	1.33	1.31	0.73	0.72
12-17	Point Estimates	1.46	1.61	3.79	3.62	1.72	1.86	2.80	2.84
	SE1	0.85	0.95	1.02	1.06	0.68	0.75	0.76	0.81
	SE2	0.88	0.99	1.03	1.05	0.67	0.78	0.76	0.78
18-25	Point Estimates	16.50	16.69	21.43	21.02	19.26	18.14	15.68	15.80
	SE1	1.89	1.93	1.95	2.06	2.49	2.45	1.73	1.89
	SE2	1.86	1.81	1.95	2.04	2.50	2.44	1.68	1.88
26-34	Point Estimates	22.73	22.84	31.09	28.07	23.23	21.26	16.92	16.64
	SE1	2.87	2.94	2.94	2.53	2.94	2.84	2.05	2.05
	SE2	2.82	2.45	2.94	2.50	2.92	2.74	2.02	1.99
35+	Point Estimates	12.87	14.23	25.80	24.44	18.46	18.60	15.28	15.35
	SE1	1.43	1.63	2.37	2.37	2.00	2.08	1.35	1.39
	SE2	1.34	1.32	2.32	2.19	1.95	1.92	1.28	1.19
Alcohol Past Year									
Total	Point Estimates	61.52	61.28	62.16	63.23	64.19	64.18	57.51	56.87
	SE1	1.76	1.83	1.74	1.69	1.97	2.04	1.55	1.54
	SE2	1.55	1.47	1.69	1.33	1.91	1.66	1.38	1.34
12-17	Point Estimates	16.70	16.90	17.40	17.38	16.02	16.66	13.04	12.85
	SE1	2.49	2.83	2.33	2.35	2.31	2.42	1.58	1.68
	SE2	2.46	2.61	2.33	2.30	2.29	2.39	1.59	1.54
18-25	Point Estimates	65.39	66.49	71.09	72.43	65.27	65.22	60.45	61.68
	SE1	2.39	2.60	3.40	3.40	2.93	3.19	2.36	2.61
	SE2	2.28	2.44	3.35	3.10	2.93	3.05	2.33	2.34
26-34	Point Estimates	74.66	75.20	68.91	71.68	73.93	74.95	68.71	69.52
	SE1	3.22	3.48	3.67	3.16	3.50	3.58	2.52	2.54
	SE2	3.12	2.79	3.65	3.04	3.47	3.61	2.56	2.53
35+	Point Estimates	63.32	62.69	65.26	66.10	68.45	67.80	61.52	60.13
	SE1	2.33	2.44	2.31	2.26	2.64	2.69	1.97	1.97
	SE2	2.19	2.23	2.30	1.94	2.59	2.36	1.82	1.73

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table J.4 Drug Estimates (United States and Eight Large States): Past Year Illicit Drug Estimates, Marijuana and Cocaine; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year											
Total	Point Estimates	22.32	22.27	21.20	21.28	19.28	19.41	26.86	26.72	28.17	27.67
	SE1	0.32	0.33	1.06	1.10	1.10	1.14	1.92	1.88	1.73	1.78
	SE2	0.28	0.27	0.94	0.94	1.04	0.90	1.85	1.61	1.67	1.51
12-17	Point Estimates	10.48	10.38	8.78	8.70	9.35	9.54	7.08	6.14	11.49	11.42
	SE1	0.41	0.42	1.42	1.47	1.41	1.45	1.82	1.44	1.89	1.96
	SE2	0.40	0.40	1.40	1.42	1.40	1.45	1.81	1.39	1.85	1.88
18-25	Point Estimates	35.16	34.99	37.14	37.31	33.56	35.58	39.30	38.54	44.08	42.69
	SE1	0.63	0.65	2.25	2.43	2.59	2.82	2.91	3.05	3.28	3.44
	SE2	0.61	0.59	2.20	2.31	2.56	2.66	2.84	2.88	3.32	3.58
26-34	Point Estimates	33.90	34.22	32.90	33.10	31.07	30.83	42.86	43.69	41.95	41.38
	SE1	0.74	0.77	2.67	2.76	2.85	2.81	4.21	4.10	3.59	3.66
	SE2	0.72	0.69	2.57	2.52	2.82	2.73	4.15	3.73	3.57	3.42
35+	Point Estimates	19.02	18.91	17.13	17.20	15.95	15.89	24.00	23.63	24.61	24.15
	SE1	0.40	0.41	1.31	1.31	1.34	1.35	2.35	2.28	2.18	2.24
	SE2	0.37	0.35	1.24	1.18	1.30	1.11	2.30	1.98	2.12	1.89
Cocaine Past Year											
Total	Point Estimates	1.46	1.48	1.47	1.48	0.78	0.82	1.62	1.52	1.14	1.10
	SE1	0.07	0.08	0.23	0.25	0.14	0.15	0.34	0.31	0.30	0.30
	SE2	0.07	0.07	0.23	0.25	0.14	0.15	0.34	0.31	0.30	0.30
12-17	Point Estimates	0.30	0.28	0.24	0.20	0.05	0.04	0.44	0.37	0.06	0.01
	SE1	0.07	0.07	0.17	0.15	0.05	0.04	0.44	0.38	0.06	0.01
	SE2	0.07	0.07	0.17	0.14	0.05	0.04	0.44	0.38	0.06	0.01
18-25	Point Estimates	2.39	2.32	2.78	2.77	2.13	2.29	4.05	3.01	1.49	1.12
	SE1	0.19	0.19	0.63	0.67	0.84	0.90	1.70	1.20	0.57	0.44
	SE2	0.19	0.18	0.64	0.68	0.83	0.89	1.68	1.34	0.59	0.46
26-34	Point Estimates	3.19	3.20	4.53	4.42	2.28	2.09	4.50	4.41	2.21	2.26
	SE1	0.26	0.27	1.10	1.10	0.69	0.64	1.32	1.29	1.00	1.05
	SE2	0.26	0.26	1.10	1.08	0.69	0.64	1.31	1.20	1.00	1.04
35+	Point Estimates	1.07	1.11	0.66	0.72	0.37	0.44	0.72	0.76	1.00	1.00
	SE1	0.09	0.09	0.23	0.26	0.13	0.16	0.30	0.31	0.39	0.39
	SE2	0.09	0.09	0.23	0.25	0.13	0.15	0.29	0.29	0.39	0.38

Table J.4 Drug Estimates (United States and Eight Large States: Past Year Illicit Drug Estimates, Marijuana and Cocaine; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Year									
Total	Point Estimates	23.35	22.99	24.30	23.78	18.94	19.37	14.01	14.13
	SE1	1.57	1.63	1.54	1.57	1.60	1.79	0.91	0.94
	SE2	1.48	1.30	1.49	1.38	1.56	1.57	0.88	0.88
12-17	Point Estimates	10.59	11.42	13.10	13.34	10.89	11.54	8.86	9.00
	SE1	1.98	2.38	2.09	2.13	2.03	2.29	1.51	1.58
	SE2	1.95	2.36	2.09	2.09	2.03	2.23	1.50	1.55
18-25	Point Estimates	38.11	37.48	39.96	40.28	33.82	33.09	24.46	24.37
	SE1	2.86	3.03	2.97	2.91	2.96	3.10	2.25	2.25
	SE2	2.83	2.92	2.92	2.82	2.90	2.88	2.21	2.10
26-34	Point Estimates	40.47	41.83	40.14	39.19	33.11	32.56	20.07	20.30
	SE1	3.57	3.60	3.69	3.24	3.51	3.68	2.10	2.18
	SE2	3.52	3.31	3.65	3.18	3.51	3.63	2.11	2.27
35+	Point Estimates	18.13	17.55	19.51	18.94	14.60	15.28	11.04	11.22
	SE1	1.61	1.65	1.74	1.78	2.11	2.29	1.14	1.25
	SE2	1.58	1.47	1.72	1.67	2.05	2.00	1.15	1.19
Cocaine Past Year									
Total	Point Estimates	2.21	2.38	1.34	1.35	2.03	1.99	1.38	1.30
	SE1	0.36	0.44	0.40	0.38	0.62	0.63	0.29	0.27
	SE2	0.36	0.42	0.40	0.36	0.61	0.58	0.29	0.28
12-17	Point Estimates	0.00	0.00	0.03	0.04	0.00	0.00	0.73	0.77
	SE1	0.00	0.00	0.03	0.04	0.00	0.00	0.46	0.49
	SE2	0.00	0.00	0.03	0.04	0.00	0.00	0.47	0.47
18-25	Point Estimates	3.36	3.33	2.14	2.18	2.24	2.07	2.30	2.36
	SE1	1.02	1.04	0.93	0.95	0.52	0.48	0.70	0.77
	SE2	1.01	1.02	0.93	0.96	0.53	0.53	0.68	0.66
26-34	Point Estimates	3.57	3.63	2.00	1.92	2.95	2.31	2.45	2.35
	SE1	1.21	1.25	1.14	1.18	0.99	0.83	0.95	0.93
	SE2	1.21	1.23	1.14	1.15	0.99	0.81	0.94	0.94
35+	Point Estimates	1.95	2.22	1.24	1.25	2.08	2.16	1.02	0.90
	SE1	0.44	0.58	0.47	0.47	0.89	0.91	0.35	0.30
	SE2	0.44	0.54	0.46	0.43	0.89	0.84	0.35	0.31

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table J.5 Drug Estimates (United States and Eight Large States): Past Month Licit Drug Estimates, Cigarettes and Alcohol; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month											
Total	Point Estimates	13.09	13.11	8.33	8.96	11.20	11.30	14.33	14.34	16.25	15.82
	SE1	0.26	0.27	0.69	0.79	0.94	0.97	1.34	1.35	1.38	1.34
	SE2	0.24	0.23	0.68	0.75	0.94	0.93	1.24	1.01	1.34	1.08
12-17	Point Estimates	1.30	1.23	1.02	0.88	0.61	0.71	0.66	0.73	1.21	1.25
	SE1	0.14	0.14	0.46	0.44	0.26	0.31	0.35	0.42	0.66	0.70
	SE2	0.14	0.13	0.47	0.44	0.26	0.31	0.34	0.41	0.65	0.66
18-25	Point Estimates	9.95	9.59	7.72	7.60	7.94	8.02	8.66	8.17	10.94	9.57
	SE1	0.37	0.38	1.06	1.11	1.42	1.43	1.91	1.77	1.93	1.81
	SE2	0.37	0.36	1.06	1.11	1.43	1.45	1.89	1.85	1.92	1.68
26-34	Point Estimates	14.51	13.63	7.33	7.43	13.87	11.97	13.12	12.58	16.40	14.94
	SE1	0.52	0.51	1.22	1.25	1.92	1.74	2.09	1.68	2.56	2.38
	SE2	0.50	0.46	1.21	1.24	1.97	1.70	2.05	1.60	2.55	2.37
35+	Point Estimates	15.01	15.30	9.72	10.72	12.42	12.89	17.63	17.80	19.17	19.11
	SE1	0.37	0.39	1.03	1.19	1.34	1.41	1.87	1.92	2.04	1.98
	SE2	0.34	0.33	0.99	1.10	1.33	1.37	1.75	1.55	1.97	1.59
Alcohol Past Month											
Total	Point Estimates	46.85	46.60	48.13	48.26	49.26	48.19	48.95	48.15	51.94	51.71
	SE1	0.40	0.40	1.33	1.37	1.62	1.64	1.92	1.89	2.10	2.08
	SE2	0.35	0.33	1.14	1.08	1.54	1.38	1.83	1.58	2.02	1.74
12-17	Point Estimates	6.62	6.65	8.06	8.48	6.45	6.34	4.67	4.80	5.68	5.55
	SE1	0.34	0.36	1.52	1.71	1.21	1.22	1.36	1.36	1.08	1.03
	SE2	0.33	0.34	1.52	1.65	1.20	1.13	1.36	1.37	1.07	1.05
18-25	Point Estimates	46.17	47.47	44.43	45.57	40.03	41.16	53.33	51.98	45.70	46.14
	SE1	0.67	0.70	2.28	2.33	2.35	2.37	3.44	3.65	3.34	3.34
	SE2	0.65	0.59	2.23	2.16	2.33	2.26	3.35	2.84	3.40	3.17
26-34	Point Estimates	55.96	56.71	58.17	58.95	61.28	61.44	55.39	55.91	65.47	66.29
	SE1	0.76	0.79	2.38	2.49	3.45	3.37	3.93	3.89	2.87	2.94
	SE2	0.74	0.71	2.35	2.31	3.41	3.21	3.90	3.73	2.84	2.88
35+	Point Estimates	50.57	49.78	52.10	51.87	53.35	51.58	53.12	51.79	56.36	55.79
	SE1	0.54	0.56	1.87	1.93	2.00	2.06	2.35	2.41	2.74	2.77
	SE2	0.50	0.47	1.68	1.62	1.94	1.77	2.32	2.16	2.69	2.41

Table J.5 Drug Estimates (United States and Eight Large States): Past Month Licit Drug Estimates, Cigarettes and Alcohol; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Cigarettes Past Month									
Total	Point Estimates	9.90	10.55	19.22	18.09	14.99	14.85	11.10	11.09
	SE1	1.00	1.16	1.50	1.50	1.38	1.39	0.90	0.92
	SE2	0.96	1.03	1.45	1.32	1.35	1.30	0.83	0.82
12-17	Point Estimates	1.00	0.94	1.64	1.68	0.44	0.37	1.70	1.73
	SE1	0.74	0.73	0.82	0.82	0.34	0.30	0.65	0.69
	SE2	0.76	0.75	0.82	0.80	0.34	0.30	0.65	0.63
18-25	Point Estimates	7.50	7.23	13.20	12.62	9.87	8.94	9.44	9.28
	SE1	1.16	1.21	1.37	1.41	1.81	1.67	1.54	1.57
	SE2	1.19	1.27	1.37	1.49	1.82	1.72	1.50	1.59
26-34	Point Estimates	15.27	14.92	20.92	18.09	18.55	16.88	10.92	10.13
	SE1	2.39	2.43	2.43	2.13	2.77	2.59	1.85	1.73
	SE2	2.39	2.27	2.44	2.16	2.75	2.49	1.78	1.62
35+	Point Estimates	10.21	11.36	22.37	21.36	17.13	17.31	13.10	13.32
	SE1	1.35	1.62	2.09	2.17	2.04	2.12	1.44	1.49
	SE2	1.28	1.39	2.05	1.98	2.01	2.00	1.37	1.29
Alcohol Past Month									
Total	Point Estimates	46.87	46.65	46.51	47.67	48.60	48.79	40.29	39.76
	SE1	1.77	1.81	1.73	1.79	2.21	2.29	1.54	1.49
	SE2	1.59	1.51	1.71	1.50	2.11	1.87	1.40	1.36
12-17	Point Estimates	7.57	7.44	7.34	7.47	6.07	6.56	5.55	5.40
	SE1	2.06	2.20	1.69	1.74	1.42	1.59	1.00	1.03
	SE2	2.02	1.99	1.68	1.67	1.42	1.63	0.98	0.98
18-25	Point Estimates	46.05	46.95	49.57	51.36	48.39	48.86	41.59	43.40
	SE1	2.75	2.78	3.54	3.66	3.60	3.88	2.40	2.66
	SE2	2.67	2.70	3.50	3.51	3.57	3.57	2.31	2.29
26-34	Point Estimates	56.74	57.41	47.70	49.58	52.30	52.21	47.16	47.61
	SE1	2.99	3.29	3.55	3.55	3.86	3.84	2.72	2.81
	SE2	2.81	2.50	3.54	3.34	3.80	3.66	2.65	2.61
35+	Point Estimates	49.64	49.04	51.14	52.16	53.53	53.40	44.12	42.85
	SE1	2.36	2.45	2.35	2.39	3.01	3.11	2.03	2.02
	SE2	2.25	2.29	2.35	2.12	2.91	2.65	1.92	1.90

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table J.6 Drug Estimates (United States and Eight Large States): Past Month Illicit Drug Estimates, Marijuana and Cocaine; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month											
Total	Point Estimates	15.47	15.36	14.70	14.79	12.81	12.62	18.47	18.44	20.78	19.96
	SE1	0.26	0.27	0.93	0.97	0.94	0.95	1.63	1.61	1.48	1.45
	SE2	0.24	0.23	0.86	0.84	0.91	0.81	1.57	1.38	1.45	1.28
12-17	Point Estimates	6.04	5.99	5.27	5.35	4.27	4.40	4.04	3.89	6.38	6.55
	SE1	0.31	0.32	1.19	1.22	0.74	0.80	0.98	0.99	1.38	1.46
	SE2	0.31	0.31	1.17	1.16	0.73	0.78	0.99	0.98	1.34	1.42
18-25	Point Estimates	24.38	24.15	25.74	25.94	22.13	22.98	28.80	28.53	31.35	30.19
	SE1	0.55	0.57	2.24	2.33	2.21	2.28	2.68	2.75	3.11	3.24
	SE2	0.54	0.52	2.19	2.17	2.23	2.26	2.69	2.66	3.12	3.10
26-34	Point Estimates	23.58	23.57	20.53	20.30	22.81	22.28	30.74	30.80	31.32	30.88
	SE1	0.65	0.68	2.15	2.21	2.89	2.89	4.16	4.03	3.65	3.69
	SE2	0.64	0.62	2.09	2.08	2.88	2.79	4.07	3.63	3.65	3.45
35+	Point Estimates	13.33	13.21	12.53	12.70	10.43	10.15	16.01	15.84	18.56	17.55
	SE1	0.34	0.35	1.18	1.23	1.09	1.03	1.96	1.92	1.88	1.79
	SE2	0.32	0.30	1.14	1.11	1.07	0.94	1.92	1.74	1.83	1.54
Cocaine Past Month											
Total	Point Estimates	0.56	0.58	0.49	0.51	0.28	0.32	0.58	0.54	0.40	0.40
	SE1	0.05	0.05	0.10	0.12	0.09	0.11	0.21	0.18	0.20	0.21
	SE2	0.05	0.05	0.10	0.12	0.09	0.10	0.20	0.18	0.20	0.20
12-17	Point Estimates	0.07	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE1	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	SE2	0.03	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
18-25	Point Estimates	0.67	0.63	0.95	0.87	0.94	1.05	1.15	0.69	0.60	0.53
	SE1	0.10	0.09	0.37	0.35	0.53	0.59	0.88	0.60	0.43	0.37
	SE2	0.10	0.10	0.36	0.35	0.53	0.59	0.88	0.79	0.43	0.39
26-34	Point Estimates	1.10	1.04	1.85	1.78	0.12	0.06	1.26	1.37	0.16	0.15
	SE1	0.15	0.15	0.60	0.56	0.12	0.06	0.54	0.59	0.16	0.15
	SE2	0.15	0.14	0.61	0.56	0.12	0.07	0.54	0.58	0.16	0.16
35+	Point Estimates	0.49	0.54	0.15	0.22	0.24	0.29	0.41	0.41	0.47	0.48
	SE1	0.06	0.07	0.09	0.13	0.11	0.14	0.25	0.24	0.30	0.31
	SE2	0.06	0.06	0.09	0.12	0.11	0.13	0.25	0.22	0.30	0.30

Table J.6 Drug Estimates (United States and Eight Large States): Past Month Illicit Drug Estimates, Marijuana and Cocaine; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Marijuana Past Month									
Total	Point Estimates	15.43	15.12	16.46	15.89	13.38	13.91	9.69	9.72
	SE1	1.07	1.13	1.12	1.13	1.28	1.46	0.86	0.87
	SE2	1.03	0.93	1.09	1.05	1.23	1.28	0.84	0.80
12-17	Point Estimates	6.04	6.27	7.04	7.03	4.76	4.74	5.51	5.75
	SE1	1.81	2.18	1.54	1.55	1.43	1.46	1.10	1.18
	SE2	1.77	2.09	1.55	1.51	1.43	1.46	1.09	1.16
18-25	Point Estimates	28.14	27.24	29.02	29.16	24.37	23.58	14.37	14.43
	SE1	2.46	2.50	2.50	2.53	2.52	2.45	1.76	1.83
	SE2	2.44	2.42	2.49	2.42	2.50	2.34	1.71	1.78
26-34	Point Estimates	27.19	28.26	25.41	24.60	24.14	23.81	14.28	13.75
	SE1	2.56	2.64	3.50	3.31	3.14	3.29	1.98	1.88
	SE2	2.57	2.62	3.48	3.21	3.12	3.35	1.94	1.86
35+	Point Estimates	11.43	11.06	13.51	12.85	10.47	11.36	8.20	8.36
	SE1	1.22	1.25	1.32	1.36	1.63	1.91	1.14	1.23
	SE2	1.21	1.13	1.31	1.34	1.56	1.66	1.15	1.15
Cocaine Past Month									
Total	Point Estimates	0.92	1.12	0.57	0.51	0.91	0.91	0.64	0.57
	SE1	0.25	0.34	0.31	0.26	0.39	0.41	0.21	0.19
	SE2	0.25	0.33	0.31	0.23	0.38	0.39	0.21	0.21
12-17	Point Estimates	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.00
	SE1	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.00
	SE2	0.00	0.00	0.03	0.04	0.00	0.00	0.00	0.00
18-25	Point Estimates	1.29	1.12	0.18	0.16	0.37	0.34	0.62	0.59
	SE1	0.65	0.65	0.17	0.14	0.31	0.29	0.30	0.28
	SE2	0.66	0.67	0.17	0.15	0.31	0.31	0.30	0.29
26-34	Point Estimates	0.69	0.73	0.95	0.51	1.18	0.85	1.21	1.01
	SE1	0.32	0.36	0.88	0.43	0.70	0.51	0.60	0.56
	SE2	0.32	0.42	0.87	0.40	0.71	0.55	0.59	0.60
35+	Point Estimates	1.02	1.34	0.63	0.64	1.08	1.14	0.61	0.56
	SE1	0.35	0.50	0.33	0.33	0.55	0.60	0.27	0.24
	SE2	0.35	0.47	0.32	0.30	0.55	0.57	0.27	0.24

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2024.

Table J.7 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; 2024

Variables		United States		California		Florida		Illinois		Michigan	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode											
Total	Point Estimates	8.23	8.16	8.00	7.92	7.03	7.14	7.53	7.45	8.11	8.38
	SE1	0.20	0.19	0.64	0.62	0.77	0.75	0.80	0.80	0.81	0.84
	SE2	0.19	0.18	0.63	0.60	0.77	0.72	0.78	0.72	0.80	0.77
18-25	Point Estimates	15.78	15.86	14.83	14.82	15.63	17.01	16.43	16.34	15.05	14.07
	SE1	0.46	0.49	1.37	1.51	1.81	2.12	2.26	2.42	2.20	2.16
	SE2	0.46	0.46	1.41	1.45	1.82	1.92	2.25	2.45	2.21	2.14
26-34	Point Estimates	12.56	12.60	11.03	11.04	13.32	12.87	8.21	8.73	12.95	13.81
	SE1	0.53	0.54	1.47	1.48	2.86	2.81	1.91	2.04	2.21	2.31
	SE2	0.52	0.50	1.44	1.37	2.82	2.59	1.92	2.01	2.22	2.44
35+	Point Estimates	5.86	5.75	5.98	5.87	4.49	4.54	5.68	5.49	5.84	6.17
	SE1	0.23	0.22	0.75	0.73	0.86	0.83	0.95	0.90	0.93	0.96
	SE2	0.22	0.21	0.72	0.68	0.86	0.82	0.93	0.82	0.92	0.93
Serious Mental Illness											
Total	Point Estimates	5.60	5.57	4.85	4.87	3.58	3.69	5.53	5.56	4.76	4.85
	SE1	0.17	0.17	0.56	0.59	0.50	0.52	0.78	0.78	0.66	0.69
	SE2	0.17	0.16	0.56	0.57	0.49	0.46	0.77	0.75	0.65	0.64
18-25	Point Estimates	9.28	9.39	8.64	9.08	8.12	8.88	10.10	10.32	8.38	7.87
	SE1	0.37	0.40	1.22	1.36	1.25	1.40	1.94	2.10	1.72	1.76
	SE2	0.37	0.37	1.25	1.29	1.25	1.26	1.93	2.08	1.72	1.68
26-34	Point Estimates	9.46	9.47	7.95	7.77	8.73	8.56	7.20	7.49	7.74	8.07
	SE1	0.47	0.49	1.32	1.30	2.39	2.37	1.61	1.68	1.68	1.70
	SE2	0.46	0.45	1.29	1.24	2.36	2.24	1.62	1.70	1.69	1.74
35+	Point Estimates	4.06	3.99	3.40	3.38	1.90	1.98	4.31	4.23	3.49	3.61
	SE1	0.20	0.20	0.70	0.73	0.46	0.49	0.89	0.87	0.73	0.76
	SE2	0.20	0.19	0.70	0.71	0.46	0.45	0.89	0.88	0.72	0.72

Table J.7 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; 2024 (continued)

Variables		New York		Ohio		Pennsylvania		Texas	
		Baseline	Final	Baseline	Final	Baseline	Final	Baseline	Final
Major Depressive Episode									
Total	Point Estimates	6.62	7.09	10.32	10.13	10.23	9.83	6.92	6.72
	SE1	0.60	0.72	0.94	0.89	1.18	1.11	0.54	0.52
	SE2	0.59	0.66	0.93	0.80	1.16	1.05	0.50	0.48
18-25	Point Estimates	15.16	16.44	17.79	17.61	17.40	16.37	11.70	12.24
	SE1	2.13	2.35	2.10	2.05	2.33	2.34	1.41	1.53
	SE2	2.10	2.29	2.09	2.02	2.31	2.41	1.35	1.38
26-34	Point Estimates	8.84	8.76	14.44	14.44	12.78	12.79	14.85	14.07
	SE1	1.71	1.71	2.82	3.02	2.66	2.66	1.87	1.71
	SE2	1.68	1.62	2.83	2.87	2.66	2.69	1.82	1.71
35+	Point Estimates	4.48	5.02	8.05	7.85	8.47	8.07	3.84	3.67
	SE1	0.60	0.77	1.24	1.20	1.58	1.53	0.57	0.55
	SE2	0.59	0.70	1.23	1.11	1.55	1.38	0.56	0.54
Serious Mental Illness									
Total	Point Estimates	3.94	4.07	7.47	7.34	6.89	6.85	5.47	5.26
	SE1	0.53	0.59	0.88	0.84	1.13	1.13	0.50	0.48
	SE2	0.52	0.55	0.85	0.75	1.12	0.99	0.48	0.46
18-25	Point Estimates	7.54	8.38	12.31	12.72	9.31	8.78	7.89	8.08
	SE1	1.39	1.65	2.07	2.11	1.56	1.85	1.30	1.35
	SE2	1.39	1.62	2.07	2.13	1.54	1.72	1.24	1.21
26-34	Point Estimates	7.60	7.42	11.86	11.88	8.66	8.13	10.73	9.97
	SE1	1.64	1.63	2.62	2.60	2.18	2.09	1.67	1.59
	SE2	1.62	1.52	2.63	2.49	2.18	2.13	1.64	1.53
35+	Point Estimates	2.40	2.54	5.63	5.39	6.12	6.24	3.58	3.46
	SE1	0.50	0.59	1.09	1.02	1.40	1.44	0.51	0.52
	SE2	0.51	0.58	1.06	0.93	1.39	1.29	0.51	0.52

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 (MHSS) *Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition—Research Version—Axis I Disorders* (MHSS-SCID), which is based on 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, 2024.

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