2008-2010 National Survey on Drug Use and Health: Overview and Summary of Substate Region Estimation Methodology

Section A: Overview

A.1. Introduction

This report provides an overview and summary of the methodology used to produce model-based small area estimates of the prevalence of substance use and mental disorders in substate regions based on data from the combined 2008-2010 National Surveys on Drug Use and Health (NSDUHs). The estimates along with this report and other related information are available at http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx. An annual survey of the civilian, noninstitutionalized population aged 12 or older, NSDUH is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA). It collects information from persons residing in households, noninstitutionalized group quarters (e.g., shelters, rooming houses, dormitories), and civilians living on military bases. In 2008-2010, NSDUH collected data from 203,739 respondents aged 12 or older and was designed to obtain representative samples from the 50 States and the District of Columbia. The survey is planned and managed by SAMHSA's Center of Behavioral Health Statistics and Quality (CBHSQ). Data collection and analysis were conducted under contract with RTI International.[1]

This marks the fifth time that detailed estimates for substate regions (also referred to as planning regions, substate areas, or regions) in all 50 States and the District of Columbia have been presented by SAMHSA. The first report provided estimates for 12 measures or outcomes based on data from the 1999-2001 surveys (Office of Applied Studies [OAS], 2005c). The second report presented estimates for 22 measures based on the 2002-2004 NSDUHs (OAS, 2006). The third report presented estimates for 23 measures based on the 2004-2006 NSDUHs (OAS, 2008). The fourth report presented estimates for 21 measures based on the 2006-2008 NSDUHs (OAS, 2010). Additionally, after 2002, these reports included estimates for underage (12 to 20) alcohol use and underage binge alcohol use. These substate reports provide a more detailed perspective on the variations in substance use rates both within and across States than is possible with the State reports (e.g., Hughes, Muhuri, Sathe, & Spagnola, 2011, 2012). The 2008-2010 substate region estimates were produced for 25 measures and are available at http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx. Unlike prior years, a full report presenting the findings of the 2008-2010 substate estimates will not be produced. More information about what will be available is provided in Section A.2.

Estimates were generated for 383 substate regions representing collectively the 50 States and the District of Columbia (hereafter referred to as States). These regions were defined by officials from each State and were typically based on the substance abuse treatment planning regions specified by the States in their applications for the Substance Abuse Prevention and Treatment (SAPT) Block Grant administered by SAMHSA.

A.2. Format of the Report

Section A of this methodology document provides a brief background on the survey, how substate regions were formed, and the general methodological approach. A complete list of the

[1] RTI International is a trade name of Research Triangle Institute, Research Triangle Park, North Carolina.

25 substance use measures presented is given in *Section B*, which also provides further information on the small area estimation (SAE) methodology used to produce substate estimates. *Section C* includes the population estimates for persons aged 12 or older and the combined 2008, 2009, and 2010 NSDUH sample sizes and response rates for each substate region. Users may find the population estimates helpful in calculating the weighted average prevalence estimate for any combination of substate regions or to determine the number of people using a particular substance in a substate region. For example, the number of persons aged 12 or older who used marijuana in the past month in Alabama's Region 1 (49,204 persons) can be obtained by multiplying the prevalence rate from Table 3 in the 2008-2010 NSDUH Substate Regions: Excel Tables (see http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx) (4.5 percent—shown as 4.54 percent in the table) and the population estimate from Table C1 (1,083,792). *Section D* lists the references, and *Section E* provides a list of contributors to the production of the 2008-2010 substate small area estimates. In addition to the 2008-2010 NSDUH substate region estimates presented in Excel tables, the following files are available now at the above Web site:

- **NSDUH Short Report on Substance Use Disorders in Substate Regions**: This short report will present substate area findings on two outcomes based on the 2008-2010 NSDUHs: (1) illicit drug dependence or abuse and (2) alcohol dependence or abuse. The report will also announce the release of tables containing 2008-2010 substate area estimates for all 25 outcomes.

- **2008-2010 NSDUH National Maps of Prevalence Estimates, by Substate Region**: More information about these maps is provided in Section A.3.

- **2008-2010 NSDUH Substate Region Definitions**.

The following sets of tables and files will appear on the substate Web site later in 2012:

- **2008-2010 NSDUH Substate Region Shapefiles**: These shapefiles will include geographic boundaries of the substate regions along with SAE values (prevalence rates, the map group, and the upper and lower bounds found in the map legends) related to each substate region. They can be used for analysis and data display with Geographic Information Systems (GIS) software.

- **2008-2010 NSDUH Substate Region Estimates, by Age Group**: Tables of prevalence estimates for youths aged 12 to 17, young adults aged 18 to 25, adults aged 26 or older, and persons aged 18 or older for each measure for substate regions having sufficient precision.

- **2008-2010 NSDUH Substate Region Estimates Categorized into Seven Groups, by Age Group**: A table showing ranges of prevalence estimates for each outcome categorized into seven groups from lowest to highest estimate for age groups 12 to 17, 18 to 25, 26 or older, and 18 or older. Information from these tables can be used by users who wish to develop State or national maps similar to those produced for the 12 or older age group.

- **2008-2010 NSDUH State-Specific Substate Region Tables and Maps**: State-specific tables and maps showing substate region estimates for each State separately for persons aged 12 or

older. Note that the seven groups shown on each State-level map are based on estimates from all 362 substate regions across the United States as displayed in the national maps.

- **Comparison of 2006-2008 and 2008-2010 NSDUH Substate Region Estimates**: Tables showing the 2006-2008 and 2008-2010 substate area estimates and 95 percent Bayesian confidence intervals along with an indication of statistical significance of the difference (*p* value) are presented. For these tables, the 2006-2008 substate small area estimates were produced using the 2008-2010 substate region definitions. Note that the substate region estimates for 2006-2008 in all States were recalculated after removing erroneous (falsified) data for Pennsylvania and Maryland (for more details, see Section A.4). Hence, the 2006-2008 substate region estimates provided in these tables may not match the previously published small area estimates reported in OAS (2010). The revision of the data files due to the falsification issue presented an opportunity to revise the 2006-2008 definitions so that the 2006-2008 and 2008-2010 estimates can be compared for all substate areas. If they were not revised, then comparisons would not be possible in seven States that changed their substate region definitions since the release of the original 2006-2008 substate report. The updated 2006-2008 substate region definitions consist of the original 2006-2008 definitions for 43 States and the District of Columbia and revisions in the following seven States: Alaska, Arkansas, California, Georgia, North Carolina, Pennsylvania, and West Virginia. As they become available, these tables will be posted at http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx.

A.3. Substate Regions, Ranking of Regions, and Small Area Estimation Methods

The substate regions for each State were developed in a series of communications during the fall of 2011 between SAMHSA staff and State officials responsible for the SAPT Block Grant application. The goal of the project was to provide substate-level estimates showing the geographic distribution of substance use prevalence for regions that States would find useful for treatment planning purposes.[2] The final substate region boundaries were based on the State's recommendations, assuming that the NSDUH sample sizes were large enough to provide estimates with adequate precision. Most States defined regions in terms of counties or groups of counties. A few States defined the regions in terms of census tracts. Several States also requested estimates for aggregate planning regions along with the estimates for their substate planning regions. An aggregate planning region is made up of two or more substate planning regions. These substate region definitions are available in a document titled 2008-2010 NSDUH Substate Region Definitions (see http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx as listed above in Section A.2). A few of these States wanted the maps to be produced only for the aggregate regions instead of for their substate regions. For example, New York has 15 substate regions, and those 15 regions were combined to create 4 aggregate regions that are used in the

[2] These substate regions were defined by officials from each State, typically based on the substance abuse treatment planning regions specified by States in their applications for an SAPT Block Grant administered by SAMHSA. There is extensive variation in treatment planning regions across States. In some States, the planning regions are used more for administrative purposes rather than for planning purposes. Because the estimation method required a minimum NSDUH sample size of approximately 150 to provide adequate precision, planning regions with sample sizes that were much smaller than that were collapsed with adjacent regions until an adequate sample size was obtained.

maps. Hence, for each measure, maps were produced for 362 planning regions and not for 383 regions.

These 362 substate regions used in the maps were ranked from lowest to highest for each measure and were divided into 7 categories designed to represent distributions that are somewhat symmetric, like a normal distribution. Colors were assigned to all substate regions such that the third having the lowest prevalence are in blue (121 substate regions), the middle third are in white (120 substate regions), and the third with the highest prevalence are in red (121 substate regions). The only exceptions were the three perception-of-risk outcomes shown in Figure 4 (marijuana), Figure 11 (alcohol), and Figure 16 (cigarettes) of the national maps, which have the highest estimates represented in blue and the lowest represented in red. To further distinguish among the substate regions that display relatively higher prevalence, the "highest" third in red has been further subdivided into (a) dark red for the 16 substate regions with the highest estimates, (b) medium red for the 33 substate regions with the next highest estimates, and (c) light red for the 72 substate regions in the third highest group. The "lowest" third is categorized in a similar way using three distinct shades of blue. In some cases, a group (or category) could have more or fewer substate regions because two (or more) substate regions have the same estimate (to two decimal places). When such ties occurred at the "boundary" between two groups, all substate regions with the same estimate were assigned to the lower group. These national maps are available at http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx as listed above in Section A.2.

The 2008-2010 substate estimates and corresponding Bayesian confidence intervals are available in the 2008-2010 NSDUH Substate Regions: Excel Tables (see http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx as mentioned in Section A.2). These tables also contain a sort order number and a map-group indicator (= 1 for the Nation, = 2 for States, = 3 for census regions, = 4 if a region is part of the 362 mapping regions, and = 5 for all other substate/aggregate regions not included on the maps).

Estimates presented in the tables and maps (listed above) are based on hierarchical Bayes estimation methods that combine survey data with a national model. Applying this methodology to the State substance use measures has been shown to result in more precise estimates than using the sample-based results alone (Wright, 2002). The methodology used to produce estimates in these tables is the same as that used to produce State estimates from the NSDUH data since 1999 and has been used for prior substate reports (see Hughes et al., 2010; OAS, 2008). Sample data have been combined across 3 years (2008-2010) to improve the precision of substate region estimates. The estimate for each region is accompanied by a 95 percent Bayesian confidence interval (for more details, see Section B).

In addition to the substate region estimates, comparable estimates are provided for the 50 States and the District of Columbia using the same methodology. Because these estimates are based on 3 consecutive years of data, they are not directly comparable with the State estimates in earlier reports that are based on only 2 consecutive years. Estimates for the Nation and the four census regions also are presented. These regions, defined by the U.S. Census Bureau, are defined as follows:

Northeast Region - Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

Midwest Region - Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

South Region - Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

West Region - Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Because the SAE methods used here tend to borrow strength from both the national model and the State-level random effects, estimates for substate regions with sample sizes that were closer to the minimum (150) tend to be shrunk more toward the corresponding State prevalence estimate than substate regions with large sample sizes. This methodology tends to cluster the small sample substate estimates around their State means. Thus, relatively high estimates for small substate regions tend to shrink toward the State mean, while relatively low estimates tend to increase toward the State mean. On the other hand, for substate regions with large sample sizes, the methodology produces estimates that are close to the weighted average of the sample data. In addition, these estimates are design consistent so that, as the sample size for a substate region increases, the estimate approaches the true population value.

A.4. Comparability with Past Estimates

For the 2002 NSDUH, a number of methodological changes were introduced, including a $30 incentive for participating in the survey, additional training for interviewers to encourage adherence to survey protocols, a change in the survey name, and a shift to the 2000 decennial census (from the 1990 census) as a basis for population counts used in estimation. An unanticipated result of these changes was that the prevalence rates for 2002 were in general substantially higher than those for 2001. These rates were substantially higher than could be attributable to the usual year-to-year trend. Additional information on these methodological changes is available in OAS (2005a).

Because of the changes in the survey that took place in 2002, estimates for 2008-2010 are not comparable with estimates for 1999-2001, and it is not possible to separate the effect of the methodological changes from the true trends in substance use. Therefore, one should not conclude that any differences between estimates from 1999-2001 and 2008-2010 represent true changes. However, estimates from 2002-2004, 2004-2006, 2006-2008, and 2008-2010 are comparable for outcomes that were defined in a similar manner and for substate regions defined consistently across these time periods.

During regular data collection and processing checks for the 2011 NSDUH, data errors were identified. These errors were falsified cases submitted by field interviewers and affected the data for Pennsylvania (2006-2010) and Maryland (2008-2009). Cases with erroneous data were

removed from the data files, and the remaining cases were reweighted to provide representative estimates.

The errors had minimal impact on the national estimates and no effect on direct estimates for the other 48 States and the District of Columbia. The direct estimates for an area (e.g., a State or substate) are only based on its data. However, when model-based SAE techniques are used, as is the case for the 2008-2010 substate small area estimates, estimates for all substate regions and States may be affected, even though the errors were concentrated in only two States. This is because the model-based estimate for a given State/substate region is a combination of the direct estimate for that State/substate region and the estimate obtained from a national model. The national model, which has estimated parameter coefficients based on data from all States/substate regions, changed when the erroneous Pennsylvania and Maryland data were removed and the remaining cases were reweighted. As a result, the model-based estimates in all States changed, although the most notable changes occurred in Pennsylvania and Maryland because the direct estimates in those States changed, as did their estimates based on the national model. In reports that do not use model-based estimates, the only estimates affected were estimates for Pennsylvania, Maryland, the mid-Atlantic division, and the Northeast region.

In the tables that show the comparison of 2006-2008 and 2008-2010 substate region estimates (to be available on the SAMHSA Web site later in 2012), model-based substate and State estimates are based on the corrected data. As mentioned in Section A.2, the 2006-2008 substate small area estimates were revised after removing erroneous data for Pennsylvania and Maryland and using the updated substate region definitions used in producing 2008-2010 substate small area estimates. Hence, these 2006-2008 small area estimates may not match the previously published model-based estimates.

Section B: Substate Region Estimation Methodology

Substate region-level estimates of 25 binary (0,1) substance use and mental health measures using combined data from the 2008, 2009, and 2010 National Surveys on Drug Use and Health (NSDUHs) for persons aged 12 or older are presented in the 2008-2010 NSDUH Substate Regions: Excel Tables. Binary measures correspond to questions where a "yes" or "no" response is provided (in this case, "no" = 0 and "yes" = 1). Additionally, two binary (0, 1) estimates for underage (12 to 20) use of alcohol and binge alcohol use also are presented in the same tables. Substate-level small area estimates of serious mental illness, any mental illness, and having serious thoughts of suicide in the past year for adults aged 18 or older are presented for the first time.

The survey-weighted hierarchical Bayes (SWHB) methodology used in the production of State estimates from the 1999-2010 surveys also was used in the production of the 2008-2010 substate estimates. The SWHB methodology is described by Folsom, Shah, and Vaish (1999). A general model description is given in Section B.1. A brief discussion of the precision of the estimates and interpretation of the Bayesian confidence intervals (CIs) is given in Section B.2. Section B.3 lists the 25 substance use measures for which substate-level small area estimates were produced. The methodology used to select relevant predictors is described in Section B.4. The list of predictors used in the 2008-2010 substate-level small area estimation (SAE) modeling is given in Section B.5. Information on the updated population projections (obtained from Claritas) that were used for the first time in producing the 2007-2008 State small area estimates and the 2006-2008 substate small area estimates and how they were used to create SAE model predictors is given in Section B.6. Procedures used to implement the adjustment of NSDUH weights for the purpose of obtaining substate small area estimates is described briefly in Section B.7. The goals of the SAE modeling, the general model description, and the implementation of SAE modeling remain the same and are described in Appendix E of the 2001 State report (Wright, 2003). A short description of the calculation of the rate of first use of marijuana and underage drinking is included in Section B.8. Section B.9 discusses the criteria used to define illicit drug and alcohol dependence and abuse and needing but not receiving treatment. Section B.10 discusses the production of estimates for serious mental illness, any mental illness, serious thoughts of suicide, and major depressive episode (i.e., depression).

Small area estimates obtained using the SWHB methodology are design consistent (i.e., for States or substate areas with large sample sizes, the small area estimates are close to the corresponding robust design-based estimates). The substate small area estimates when aggregated by using the appropriate population totals result in national small area estimates that are very close to the national design-based estimates. However, for many reasons, including internal consistency, it is desirable to have national small area estimates exactly match the national design-based estimates. Beginning in 2002, exact benchmarking was introduced (see Appendix A, Section A.4, in Wright & Sathe, 2005). The 2008-2010 substate small area estimates have been benchmarked to the national design-based estimates.

B.1. General Model Description

The model described here to produce the 2008-2010 substate small area estimates is similar to the logistic mixed hierarchical Bayes (HB) model that was used to produce the 2006-2008 substate small area estimates (Office of Applied Studies [OAS], 2010). The following model was used:

$$\log[\pi_{aijk} / (1-\pi_{aijk})] = x'_{aijk}\beta_a + \eta_{ai} + \nu_{aij},$$

where π_{aijk} is the probability of engaging in the behavior of interest (e.g., using marijuana in the past month) for person-*k* belonging to age group-*a* in substate region-*j* of State-*i*. Let x_{aijk} denote a $p_a \times 1$ vector of auxiliary variables associated with age group-*a* (12 to 17, 18 to 25, 26 to 34, and 35 or older) and β_a denote the associated vector of regression parameters. The age group-specific vectors of auxiliary variables are defined for every block group in the Nation and also include person-level demographic variables, such as race/ethnicity and gender. The vectors of random effects $\eta_i = (\eta_{1i}, \cdots, \eta_{Ai})'$ and $\nu_{ij} = (\nu_{1ij}, \cdots, \nu_{Aij})'$ are assumed to be mutually independent with $\eta_i \sim N_A(0, D_\eta)$ and $\nu_{ij} \sim N_A(0, D_\nu)$, where *A* is the total number of individual age groups modeled (generally, $A = 4$). For HB estimation purposes, an improper uniform prior distribution is assumed for β_a, and proper Wishart prior distributions are assumed for D_η^{-1} and D_ν^{-1}. The HB solution for π_{aijk} involves a series of complex Markov Chain Monte Carlo (MCMC) steps to generate values of the desired fixed and random effects from the underlying joint distribution. The basic process is described in Folsom et al. (1999), Shah, Barnwell, Folsom, and Vaish (2000), and Wright (2003).

Once the required number of MCMC samples for the parameters of interest are generated and tested for convergence properties (see Raftery & Lewis, 1992), the small area estimates for each age group × race/ethnicity × gender cell within a block group can be obtained. These block group-level small area estimates then can be aggregated using the appropriate population estimate projections to form substate- and State-level small area estimates for the desired age group(s). These small area estimates then are benchmarked to the national design-based estimates (see Hughes et al., 2012).

B.2. Precision and Validation of the Estimates

The primary purpose of producing substate estimates is to give policy officials and data users a better perspective on the range of prevalence estimates within and across States. Because the data were collected in a consistent manner by field interviewers who adhered to the same procedures and administered the same questions across all States and substate regions, the results are comparable within and across the 50 States and the District of Columbia.

The 95 percent Bayesian CI associated with each estimate provides a measure of the accuracy of the estimate. It defines the range within which the true value can be expected to fall

95 percent of the time. For example, the estimated prevalence of past month use of marijuana in Region 1 in Alabama is 4.5 percent, and the 95 percent CI ranges from 3.4 to 6.1 percent. Therefore, the probability is 0.95 that the true value is within that range. The CI indicates the uncertainty due to both sampling variability and model bias. The key assumption underlying the validity of the CIs is that the State- and substate-level error (or bias correction) terms in the models behave like random effects with zero means and common variance components.

A comparison of the standard errors (SEs) among substate regions with small ($n \leq 500$), medium ($500 < n \leq 1{,}000$), and large ($n > 1{,}000$) sample sizes for certain measures shows that the small area estimates behave in predictable ways. Regardless of whether the substate region is from 1 of the 8 States with a large annual sample size (3,000 to 4,000) or 1 of the 43 other States ($n = 900$ annually), the sizes of the CIs are very similar and are primarily a function of the sample size of the substate region and the prevalence estimate of the measure. Substate regions with large sample sizes had the smallest SEs.

For past month use of alcohol, where the national prevalence for all persons aged 12 or older was 51.7 percent (for 2008-2010), the average relative standard error (RSE)[3] was about 5.1 percent, and the RSE for substate regions with a large sample size was about 3.3 percent. For substate regions with a medium sample size, the average RSE was 4.4 percent; for small sample sizes, the average RSE was 5.7 percent.

For past month use of marijuana (with a national prevalence of 6.6 percent), the average RSE was 10.0 percent for substate regions with large samples. For medium sample sizes, the average RSE was 13.1 percent, and for small samples, the RSE was 15.9 percent, whereas the overall national average RSE was 14.6 percent. Substance use measures with lower prevalences, such as past year use of cocaine (1.9 percent nationally), displayed larger average RSEs. For substate regions with large sample sizes, the average RSE was 16.9 percent. For those with medium sample sizes, the average RSE was 20.4 percent, and for those with small sample sizes, the average RSE was 22.9 percent.

The SAE methods used for producing the 2008-2010 substate region estimates were previously validated for the NSDUH State-by-age group small area estimates (Wright, 2002). This validation exercise used direct estimates from pairs of large sample States ($n = 7{,}200$) as internal benchmarks. These internal benchmarks were compared with small area estimates based on random subsamples ($n = 900$) that mimicked a single year small State sample. The associated age group-specific small area estimates were based on sample sizes targeted at $n = 300$. Therefore, validation of the State-by-age group small area estimates should lend some validity to the small sample size substate small area estimates reported here.

B.3. Variables Modeled

Substate-level small area estimates were produced for the following set of 25 binary (0, 1) substance use measures, using combined data from the 2008-2010 NSDUHs for persons aged 12 or older (or persons 18 or older for the four mental disorders):

[3] The RSE of an estimate is the posterior SE divided by the estimate itself. Note that the RSEs have been calculated based on the unbenchmarked small area estimates.

1. past month use of illicit drugs,
2. past year use of marijuana,
3. past month use of marijuana,
4. perception of great risk of smoking marijuana once a month,
5. average annual rate of first use of marijuana,
6. past month use of illicit drugs other than marijuana,
7. past year use of cocaine,
8. past year nonmedical use of pain relievers,
9. past month use of alcohol,
10. past month binge alcohol use,
11. perception of great risk of having five or more drinks of an alcoholic beverage once or twice a week,
12. past month use of tobacco products,
13. past month use of cigarettes,
14. perception of great risk of smoking one or more packs of cigarettes per day,
15. past year alcohol dependence or abuse,
16. past year alcohol dependence,
17. past year illicit drug dependence or abuse,
18. past year illicit drug dependence,
19. past year dependence or abuse of illicit drugs or alcohol,
20. needing but not receiving treatment for illicit drug use in the past year,
21. needing but not receiving treatment for alcohol use in the past year,
22. serious mental illness in the past year,
23. any mental illness in the past year,
24. serious thoughts of suicide in the past year, and
25. past year major depressive episode (i.e., depression).

In addition to the 25 measures listed above, estimates also have been produced for underage (aged 12 to 20) past month use of alcohol and underage past month binge alcohol use. Table B1 at the end of this section lists all outcomes and the years (2002-2004, 2004-2006, 2006-2008, and 2008-2010) for which substate-level small area estimates were produced going back to the 2002 NSDUH.

B.4. Selection of Independent Variables for the Models

No new variable selection was done. The same fixed-effect predictors that were used in producing the 2002-2004, 2004-2006, and 2006-2008 substate estimates were used to produce the 2008-2010 substate estimates. These are also the same predictors used to produce estimates for State SAE reports beginning with the 2002-2003 report up to and including the 2009-2010 report.

B.5. Predictors Used in Logistic Regression Models

Local area data used as potential predictor variables in the mixed logistic regression models were obtained from several sources, including Claritas, the U.S. Census Bureau, the Federal Bureau of Investigation (Uniform Crime Reports), Health Resources and Services Administration (Area Resource File), the Bureau of Labor Statistics, the Bureau of Economic Analysis, the Substance Abuse and Mental Health Services Administration (SAMHSA) (National Survey of Substance Abuse Treatment Services [N-SSATS]), and the National Center for Health Statistics (mortality data). The sources of data used in the modeling are provided in the following list.

- *Claritas*. This demographic data package contains data for 2008 with projections to 2012. The 2008, 2009, and 2010 projections were used. For more information on these data, see Section B.6.

- *U.S. Census Bureau*. The 2000 census (demographic and socioeconomic variables) and 2008 food stamp participation rates (county level) were used (http://www.census.gov/hhes/www/saipe/inputdata/cntyfs.xls).

- *Federal Bureau of Investigation*. Uniform Crime Report (UCR) arrest totals were obtained from http://www.icpsr.umich.edu/NACJD/ucr.html. The most current data used are from 2006, 2007, and 2008.

- *Health Resources and Services Administration*. Families below the Federal poverty-level rates from the 2000 census data were obtained from the Area Resource File (ARF) February 2005 release from the Bureau of Health Professions, Office of Research and Planning.

- *Bureau of Labor Statistics (BLS)*. The 2010 county-level unemployment rates were used (ftp://ftp.bls.gov/pub/special.requests/la/laucnty10.txt). The BLS uses results from the Current Population Survey (CPS) to provide county-level unemployment rates. The CPS is a monthly survey of households conducted by the Census Bureau for the BLS.

- *Bureau of Economic Analysis (BEA)*. The 2009 county-level per capita income rates were used (http://www.bea.gov/regional/index.htm). These county-level per capita income rates are produced by the Regional Income Division of the BEA.

- *National Center for Health Statistics*. Mortality data using International Classification of Diseases, 10th revision (ICD-10), 2002-2007, were used. The ICD-10 death rate data are from the National Center for Health Statistics at the Centers for Disease Control and Prevention.

- *SAMHSA, Center for Behavioral Health Statistics and Quality (CBHSQ), formerly the Office of Applied Studies (OAS)*. Data from the National Survey of Substance Abuse Treatment Services (N-SSATS), formerly known as Uniform Facility Data Set (UFDS), were used. The 2009-2010 data on drug and alcohol treatment rates were obtained.

For more information about the predictors defined from the above sources, see Appendix A, Section A.3, of the 2009-2010 State estimates report (Hughes et al., 2012).

B.6. Updated Claritas Data

For the State and substate reports published using the 2002 to 2007 NSDUH data, Claritas data obtained in 2002 were used to produce the small area estimates. In reports published using the 2008, 2009, and 2010 NSDUH data, Claritas data obtained in 2008 were used. The 2002 Claritas data had 2000 and 2002 population counts, as well as 2007 population projections. The 2008 Claritas data had 2008 population counts, as well as 2012 population projections. Claritas data are used for the following in the NSDUH SAE process:

- Creating demographic predictor variables (age group, race × ethnicity, and gender) at the block group, tract, and county levels (predictors such as percentage of the population aged 0 to 19 in a block group, percentage of males in a tract, etc.). There are 13 such variables defined for each of the census geographies (block group, tract, and county). See Section A.3 in the 2009-2010 SAE report for a complete list of these predictors (Hughes et al., 2012).

- Creating census block group-level population projections at the age group × race/ethnicity × gender level (4 age groups, 4 races/ethnicities, and 2 genders = 32 cells). These block group-level population projections are used in aggregating the block group-level small area estimates to produce age group-specific State or substate-level small area estimates.[4]

In the 2008 SAE process (and subsequent years), new Claritas data with 2008 population counts and 2012 population projections were used. The new Claritas data will be henceforth referred to as the 2008-2012 Claritas data, and the 2002 Claritas data will be referred to as the 2002-2007 Claritas data. The following main differences were observed between the two Claritas datasets:

[4] The four age groups are 12 to 17, 18 to 25, 26 to 34, and 35 or older; the four race/ethnicity groups are non-Hispanic white, non-Hispanic black, non-Hispanic other, and Hispanic; and the two genders are male and female.

1. The format of the race/ethnicity data was different for the two sets of Claritas data. To generate age group × race × Hispanicity × gender population estimates at the block group level using the 2002-2007 Claritas data, two separate population distributions (age × gender × race and race × Hispanicity) at the block group level had to be used. The assumption was made that each of the age × gender cells within a race group had the same Hispanicity distribution. Hence, the data were manipulated to get the desired four-way cross of demographic domains. The 2008-2012 Claritas data had age group × race × Hispanicity × gender population distributions, so no assumptions or manipulations to the data had to be made.

2. The 2007 (from the 2002-2007 Claritas data) and 2008 (from the 2008-2012 Claritas data) distributions of the population aged 20 to 24 in block groups were very different for the two datasets. Another difference was that there were more block groups that had a 0 population estimate for some of the 32 cells in 2008 as compared with the 32 cells in 2007.

3. In prior State and substate reports when creating the 32 cells using the 2002-2007 Claritas data, the population from the two or more races' category was distributed among the black, white, and other race categories. Starting in 2008 and subsequent years, a decision was made to merge the two or more races' category with the other race category. This was based on a decision to discontinue creating a sample variable that split the two or more races' respondents into black, white, or other. Because the two or more races' respondents on the NSDUH sample were now all being grouped into the other category, the same technique was used to produce the 32 cell population estimates.

Some of the differences in the 2007 and 2008 population estimates can be attributed to reasons (1) and (3), and the rest are most likely attributed to the fact that the 2008-2012 Claritas projections are based on updated population information. Because of these differences in the 2007 population projections based on 2002-2007 Claritas data and the 2008 population counts based on 2008-2012 Claritas data, it was decided that "new" 2006 and 2007 population projections would be obtained by "projecting back" the 2008-2012 Claritas data. These new population projections were obtained so that they could be used in the 2006-2008 SAE reports.

In summary, based on the information above, the following steps were taken for the current 2008-2010 substate SAE analysis:

1. Using the 2008-2012 Claritas data, 2008, 2009, and 2010 population counts were obtained (the 2009 and 2010 counts were obtained by using linear interpolation between the 2008 and 2012 counts) and used to create the predictors that were merged onto the 2008, 2009, and 2010 sample and universe files (the universe file is a census block-group level file containing SAE predictor variables and population counts).

2. All block group, tract, and county-level continuous predictors were converted into 10-category, semicontinuous variables by using the corresponding 2007-2008 decile values created by pooling the 2007 and 2008 NSDUH data. The same 2007-2008 decile values will be used for future SAE analyses until new Claritas data containing the 2013 population counts and projections are obtained. Using the same decile values year after year makes it possible to keep track of any temporal changes occurring in the predictor variables, which

may help in detecting any changes in State prevalence rates across years in an efficient manner. The 10-category predictor variables subsequently were used to form linear, quadratic, and cubic orthogonal polynomials eventually used in the SAE modeling process.

3. For all predictors other than the unemployment rate, the same 2007-2008 decile values were used in the 2008-2010 substate SAE process. Because of the recent large jumps in the unemployment rate, the decile values for the unemployment rate needed to be re-created using the 2009 and 2010 NSDUH data. Using the older set of decile values resulted in the distribution of the unemployment deciles to be very skewed. Hence, a decision was made to update the unemployment rate deciles based on 2009 and 2010 data. The predictor based on the unemployment deciles was used in the SAE model for the 35 or older age group for producing the small area estimates for the measure on needing but not receiving treatment for illicit drug use. Using this updated data is not expected to cause any inconsistencies in the estimation of trends for this measure. The updated population estimates for the 32 cells (age group × race/ethnicity × gender population estimates) and the new deciles were used to create the updated universe files for all 3 years (2008, 2009, and 2010). The 2006, 2007, and 2008 sample and universe files based on the 2008-2012 Claritas data were used in simultaneous modeling to produce the correlations required to estimate change between the 2006-2008 and 2008-2010 substate prevalence rates. The 2006-2008 substate small area estimates were created using 2006-2008 population projections that were obtained from the new 2008-2012 Claritas data.

B.7. Adjustment of Weights

The person-level NSDUH weights are poststratified (adjusted) to match census population estimates at the State level. These population estimates were based on the 2000 decennial census and updated by Claritas to projections for the years 2008-2010. Because the objective here was to produce small area estimates for substate regions, it was decided to ratio adjust the person-level sampling weights to population projections (available from Claritas as shown in Table C1 in Section C) at the substate × age group × gender level. The advantage to doing this ratio adjustment is to ensure that the adjusted sampling weights better reflect the demography of the substate regions. The downside to this adjustment is that the design-based estimates based on the unadjusted sampling weights may be slightly different (at the national level) from the design-based estimates obtained from the adjusted weights. However, because the aim was to be able to produce reliable substate region-level small area estimates, this ratio adjustment to the weights seemed more appropriate. Note that this ratio adjustment was done at the substate region (383 regions) × age group (12 to 17, 18 to 25, 26 to 34, and 35 or older) × gender (male and female) level collectively over 3 years (2008, 2009, and 2010) of data.

B.8. Calculation of Average Annual Rate (Incidence) of First Use of Marijuana, and Underage Drinking

Incidence rates typically are calculated as the number of new initiates of a substance during a period of time (such as in the past year) divided by an estimate of the number of person-years of exposure (in thousands). The incidence definition used here employs a simpler form of the at-risk population based on the model-based methodology. This model-based average annual incidence rate for first use of marijuana is defined as follows:

$$Average\ annual\ rate = 100 * \{[X_1 \div (0.5 * X_1 + X_2)] \div 2\},$$

where X_1 is the number of marijuana initiates in the past 24 months and X_2 is the number of persons who never used marijuana. Both X_1 and X_2 are based on binary measures that correspond to questions with a "yes" or "no" response option. For details on calculating the average annual rate of first use of marijuana from NSDUH data, see Appendix A, Section A.8, of the 2009-2010 State estimates report (Hughes et al., 2012).

To obtain small area estimates for persons aged 12 to 20 for past month alcohol use and binge alcohol use, a separate set of models was fit for these two outcomes for the 12 to 17 age group and the 18 to 20 age group (similar to what was done for producing substate estimates using the 2006-2008 NSDUH data). For details on underage drinking, see Section A.9, Appendix A, of the 2009-2010 State estimates report (Hughes et al., 2012).

B.9. Illicit Drug and Alcohol Dependence or Abuse / Needing But Not Receiving Treatment

The NSDUH computer-assisted interviewing (CAI) instrumentation includes questions that are designed to measure illicit drug and alcohol dependence and abuse. For these substances,[5] dependence and abuse questions were based on the criteria in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) (American Psychiatric Association [APA], 1994).

Specifically, for marijuana, hallucinogens, inhalants, and tranquilizers, a respondent was defined as having dependence if he or she met three or more of the following six dependence criteria:

1. Spent a great deal of time over a period of a month getting, using, or getting over the effects of the substance.

2. Used the substance more often than intended or was unable to keep set limits on the substance use.

3. Needed to use the substance more than before to get desired effects or noticed that the same amount of substance use had less effect than before.

4. Inability to cut down or stop using the substance every time tried or wanted to.

5. Continued to use the substance even though it was causing problems with emotions, nerves, mental health, or physical problems.

6. The substance use reduced or eliminated involvement or participation in important activities.

[5] Substances include alcohol, marijuana, cocaine, heroin, hallucinogens, inhalants, pain relievers, tranquilizers, stimulants, and sedatives.

For alcohol, cocaine, heroin, pain relievers, sedatives, and stimulants, a seventh withdrawal criterion was added. A respondent was defined as having dependence if he or she met three or more of seven dependence criteria. The seventh withdrawal criterion is defined by a respondent reporting having experienced a certain number of withdrawal symptoms that vary by substance (e.g., having trouble sleeping, cramps, hands tremble).

For each illicit drug and alcohol, a respondent was defined as having abused that substance if he or she met one or more of the following four abuse criteria and was determined not to be dependent on the respective substance in the past year:

1. Serious problems at home, work, or school caused by the substance, such as neglecting your children, missing work or school, doing a poor job at work or school, or losing a job or dropping out of school.

2. Used the substance regularly and then did something that might have put you in physical danger.

3. Use of the substance caused you to do things that repeatedly got you in trouble with the law.

4. Had problems with family or friends that were probably caused by using the substance and continued to use the substance even though you thought the substance use caused these problems.

For additional details on how respondents were classified as having dependence or abuse of illicit drugs and alcohol, see Section B.4.2 in Appendix B of the 2010 NSDUH national findings report (CBHSQ, 2011, pp. 118-120).

Additionally, the NSDUH CAI instrument included a series of questions that are designed to measure treatment need for an alcohol or illicit drug use problem and to determine persons needing but not receiving treatment.

Respondents were classified as needing treatment for an alcohol use problem in the past year if they met at least one of three criteria during the past year: (1) dependence on alcohol; (2) abuse of alcohol; or (3) received treatment for alcohol use at a specialty facility (i.e., drug and alcohol rehabilitation facility [inpatient or outpatient], hospital [inpatient only], or mental health center). A respondent was classified as needing but not receiving treatment for an alcohol problem if he or she met the criteria for alcohol dependence or abuse in the past year, but did not receive treatment at a specialty facility for an alcohol problem in the past year.

Respondents were classified as needing treatment for an illicit drug use problem in the past year if they met at least one of three criteria during the past year: (1) dependence on illicit drugs; (2) abuse of illicit drugs; or (3) received treatment for illicit drug use at a specialty facility (i.e., drug and alcohol rehabilitation facility [inpatient or outpatient], hospital [inpatient only], or mental health center). A respondent was classified as needing but not receiving treatment for an illicit drug problem if he or she met the criteria for illicit drug dependence or abuse in the past year, but did not receive treatment at a specialty facility for an illicit drug problem in the past year.

B.10. Mental Health Measures

This section provides a summary of measurement issues associated with the four mental health outcome variables for which 2008-2010 substate small area estimates were produced—serious mental illness, any mental illness, serious thoughts of suicide, and major depressive episode. Additional details can be found in Sections B.4.6 and B.4.7 of Appendix B in the 2008 NSDUH national findings report for serious mental illness and major depressive episode, respectively (OAS, 2009), and in Sections B.4.2 to B.4.4 of Appendix B in the 2010 NSDUH mental health findings report for all four outcome variables (CBHSQ, 2012).

B.10.1 Serious Mental Illness

In the 2000-2001 and 2002-2003 NSDUH State reports, the Kessler-6 (K6) distress scale was used to measure serious mental illness (Kessler et al., 2003). However, SAMHSA discontinued producing State-level serious mental illness estimates beginning with the release of the 2003-2004 State report because of concerns about the validity of using only the K6 distress scale without an impairment scale; see Section B.4.4 of Appendix B in the 2004 NSDUH national findings report (OAS, 2005b). The use of the K6 distress scale continued in the 2003-2004, 2004-2005, 2005-2006, and 2006-2007 State reports and in the 2002-2004 and 2004-2006 substate reports, not as a measure of serious mental illness, but as a measure of serious psychological distress because it was determined that the K6 scale only measured serious psychological distress and just contributed to measuring serious mental illness (see details below).

In December 2006, a technical advisory group meeting of expert consultants was convened by SAMHSA's Center for Mental Health Services to solicit recommendations for mental health surveillance data collection strategies among the U.S. population. The panel recommended that NSDUH should be used to produce estimates of serious mental illness among adults using NSDUH's mental health measures and a gold-standard clinical psychiatric interview. In response, SAMHSA's CBHSQ initiated a Mental Health Surveillance Study (MHSS) under its NSDUH contract with RTI International to develop and implement methods to estimate serious mental illness. Using recommendations from this panel, substate estimates of serious mental illness using 2008, 2009, and 2010 NSDUH data were based on this revised methodology and, thus, are not comparable with estimates for serious mental illness or serious psychological distress shown in NSDUH State reports prior to 2009.

To develop methods for preparing the estimates of serious mental illness and any mental illness presented here and in other NSDUH reports, the MHSS was initiated as part of the 2008 NSDUH design and analysis. Because of constraints on the interview time in NSDUH and the need for trained mental health clinicians, it was not possible to administer a full structured diagnostic clinical interview to assess mental illness on approximately 45,000 adult respondents; therefore, the approach adopted by SAMHSA was to utilize short scales separately measuring psychological distress (K6) and functional impairment that could be used in a statistical model to accurately predict whether a respondent had a mental illness. Two impairment scales—the World Health Organization Disability Assessment Schedule (WHODAS) and the Sheehan Disability Scale (SDS)—were included in the 2008 survey for evaluation. The collection of clinical psychiatric interview data was achieved using a subsample of approximately 1,500 adult

NSDUH participants in 2008. These participants were recruited for a follow-up clinical interview consisting of a gold-standard diagnostic assessment for mental disorders and functional impairment. In order to determine the optimal scale to measure functional impairment, a split-sample design was incorporated into the full 2008 NSDUH data collection in which half of the adult respondents received the WHODAS and half received the SDS. Statistical models using the data from the subsample of respondents collected as part of the MHSS then were developed for each half sample in which the short scales (the K6 in combination with the WHODAS or the K6 in combination with the SDS) were used as predictors in models of mental illness assessed via the clinical interviews. The model parameter estimates then were used to predict serious mental illness in the full 2008 NSDUH sample.

Kessler-6 Distress Scale

The K6 in NSDUH consists of two sets of six questions that asked adult respondents how frequently they experienced symptoms of psychological distress during two different time periods: (1) during the past 30 days, and (2) if applicable, the one month in the past year when they were at their worst emotionally. Respondents were asked about the second time period only if they indicated that there was a month in the past 12 months when they felt more depressed, anxious, or emotionally stressed than they felt during the past 30 days.

The six questions comprising the K6 scale for the past month are as follows:

NERVE30 During the past 30 days, how often did you feel nervous?

1 All of the time
2 Most of the time
3 Some of the time
4 A little of the time
5 None of the time
Don't know/Refused

Response categories are the same for the remaining questions shown below.

HOPE30 During the past 30 days, how often did you feel hopeless?

FIDG30 During the past 30 days, how often did you feel restless or fidgety?

NOCHR30 During the past 30 days, how often did you feel so sad or depressed that nothing could cheer you up?

EFFORT30 During the past 30 days, how often did you feel that everything was an effort?

DOWN30 During the past 30 days, how often did you feel down on yourself, no good or worthless?

To create a score, the six items (NERVE30, HOPE30, FIDG30, NOCHR30, EFFORT30, and DOWN30) on the K6 scale were recoded from 0 to 4 so that "all of the time" was coded 4, "most of the time" 3, "some of the time" 2, "a little of the time" 1, and "none of the time" 0, with

"don't know" and "refused" also coded as 0. Summing across the transformed responses in these six items resulted in a score with a range from 0 to 24.

If respondents were asked about a month in the past 12 months when they felt more depressed, anxious, or emotionally stressed than they felt during the past 30 days, they were asked comparable K6 items for that particular month in the past 12 months. The scoring procedures for these K6 items for the past 12 months were the same as those described above. The higher of the two K6 total scores for the past 30 days or past 12 months was used both for MHSS analysis purposes and in the adult respondents' final data.

An alternative K6 total score also was created in which K6 scores less than 8 were recoded as 0 and scores from 8 to 24 were recoded as 1 to 17. The rationale for creating the alternative past year K6 score was that serious mental illness prevalence was typically extremely low for respondents with past year K6 scores less than 8, and the prevalence rates started increasing only when scores were 8 or greater.

MHSS Clinical Interviews

As described previously, a subsample of approximately 1,500 adult NSDUH participants in 2008 completed follow-up clinical interviews to provide data for the statistical modeling of the NSDUH interview data of psychological distress and functional impairment on mental health status. The MHSS sample respondents were administered clinical interviews within 4 weeks of the NSDUH main interview to assess the presence of mental disorders and functional impairment. Specifically, each participant was assessed by a trained clinical interviewer (master's or doctoral-level clinician, counselor, or social worker) via paper-and-pencil interviewing (PAPI) over the telephone. The clinical interview used was an adapted version of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP) (First, Spitzer, Gibbon, & Williams, 2002). Past year disorders that were assessed through the SCID included mood disorders (e.g., major depressive episode, manic episode), anxiety disorders (e.g., panic disorder, generalized anxiety disorder, posttraumatic stress disorder), eating disorders (e.g., anorexia nervosa), intermittent explosive disorder, and adjustment disorder. In addition, the presence of psychotic symptoms was assessed. Substance use disorders also were assessed, although these disorders were not included in the estimates of mental illness.

Functional impairment ratings were assigned by clinical interviewers using the Global Assessment of Functioning (GAF) scale (Endicott, Spitzer, Fleiss, & Cohen, 1976). Mental illness, measured using the SCID and differentiated by the level of functional impairment, was defined in the MHSS as follows:

- Respondents were defined as having *any mental illness* if they were determined to have any of the mental disorders assessed in the SCID, regardless of the level of functional impairment.

- Respondents were defined as having *serious mental illness* if they had any of the mental disorders assessed in the SCID, and these disorders resulted in substantial impairment in carrying out major life activities, based on GAF scores of 50 or below.

The SCID and the GAF in combination were considered to be the gold standard for measuring mental illness.

Statistical modeling involved developing separate weighted logistic regression prediction models for the K6 and for each of the two impairment scales. With serious mental illness status based on having a SCID diagnosis plus a GAF less than or equal to 50, the response variable *Y* was defined so that

$Y = 1$ when a serious mental illness diagnosis is positive; otherwise, $Y = 0$.

If **X** is a vector of explanatory variables, then the response probability $\pi = \Pr(Y = 1 | \mathbf{X})$ can be estimated using weighted logistic regression models for the WHODAS and SDS half samples. The final 2008 WHODAS and SDS calibration models, respectively, were determined as follows:

$$\text{logit}(\hat{\pi}_w) \equiv \log[\hat{\pi}_w/(1-\hat{\pi}_w)] = -4.7500 + 0.2098 X_k + 0.3839 X_w \quad (1)$$

$$\text{logit}(\hat{\pi}_s) = -4.4924 + 0.2960 X_k + 0.2242 X_s, \quad (2)$$

where $\hat{\pi}$ refers to an estimate of the serious mental illness response probability π for the WHODAS and SDS models (indicated by the "w" subscript for the WHODAS and the "s" subscript for the SDS). The X_k, X_w, and X_s terms refer to the alternative K6, WHODAS, and SDS scores, respectively:[6]

X_k = *Alternative Past Year K6 Score*: Past year K6 score less than 8 recoded as 0; past year K6 score 8 to 24 recoded as 1 to 17.

X_w = *Alternative WHODAS Score*: WHODAS item scores less than 2 recoded as 0; WHODAS item scores 2 to 3 recoded as 1, then summed for a score ranging from 0 to 8.

X_s = *Alternative SDS Score*: SDS item scores less than 7 recoded as 0; SDS item scores 7 to 10 recoded as 1, then summed for a score ranging from 0 to 4.

Rearranging terms of the two models provided a direct calculation of the *predicted probability* of serious mental illness:

$$\hat{\pi}_w = \frac{1}{1 + \exp[-(-4.7500 + 0.2098 X_k + 0.3839 X_w)]},$$

$$\hat{\pi}_s = \frac{1}{1 + \exp[-(-4.4924 + 0.2960 X_k + 0.2242 X_s)]}.$$

[6] For more information on the WHODAS and SDS scores, see Section B.4.3 of Appendix B in the 2009 mental health findings report (CBHSQ, 2010).

Next, a cut point probability π_0 was determined, so that if $\hat{\pi} \geq \pi_0$ for a particular respondent, then he or she was *predicted* to be serious mental illness positive; otherwise, he or she was predicted to be serious mental illness negative. Receiver operating characteristic (ROC) analyses were used to determine the cut point that resulted in the weighted number of false-positive and false-negative counts being (approximately) equal, thus ensuring unbiased estimates. The optimal cut points were determined to be 0.26972 and 0.26657 for the WHODAS and SDS models, respectively. See Aldworth et al. (2009) for further details.

Model fit statistics and various sensitivity analyses indicated that in combination with the K6, the WHODAS was a better predictor of serious mental illness than the SDS. Consequently, the decision was made to continue with the WHODAS as the measure of impairment for all adults in future NSDUHs. Nevertheless, for the final models, serious mental illness estimates based on the SDS in the 2008 full dataset were very similar to those based on the WHODAS, indicating that the estimates from the two half samples could be combined to form single estimates.

The 2008 prediction model parameters and cut points estimated using the 2008 WHODAS subsample were used to estimate serious mental illness in the 2009 and 2010 NSDUH samples.

B.10.2 Any Mental Illness

Various methods to estimate any mental illness were investigated in the 2008 MHSS. These methods were subject to the constraint that they would have no effect on the serious mental illness estimates produced by the models discussed above. The methods investigated included logistic models based on any mental illness as the response variable, serious mental illness as the response variable, and multilogistic models based on a multilevel mental illness variable from which both serious mental illness and any mental illness could be derived. Analyses suggested that models based on serious mental illness as the response variable provided almost identical results to those of the other models, so this method was chosen to estimate any mental illness.

As noted previously, serious mental illness estimates for 2008 were based on both the WHODAS and SDS half samples because estimates of serious mental illness were comparable between half samples. Because estimates of any mental illness based on the SDS half sample were not comparable with those based on the WHODAS half sample, the decision was made to base estimates of any mental illness for 2008 only on the WHODAS half sample.

Estimates of any mental illness were obtained from the serious mental illness predicted probabilities calculated using the WHODAS model described above. Respondents with a predicted probability of serious mental illness greater than the cut point of 0.02400 were classified as having any mental illness. The same models were implemented for 2009 and 2010.

B.10.3 Serious Thoughts of Suicide

Responding to a need for national data on the prevalence of suicidal thoughts and behavior, a set of questions was added beginning with the 2008 NSDUH questionnaire (and

those sets of questions were continued to be asked in 2009 and 2010). These questions asked all adult respondents aged 18 or older if at any time during the past 12 months they had serious thoughts of suicide (suicidal ideation). Substate-level estimates of suicidal ideation were produced using 2008, 2009, and 2010 data.

B.10.4 Major Depressive Episode (Depression)

According to the DSM-IV, a person is defined as having had major depressive episode in his or her lifetime if he or she has had at least five or more of the following nine symptoms nearly every day in the same 2-week period, where at least one of the symptoms is a depressed mood or loss of interest or pleasure in daily activities (APA, 1994): (1) depressed mood most of the day; (2) markedly diminished interest or pleasure in all or almost all activities most of the day; (3) significant weight loss when not sick or dieting, or weight gain when not pregnant or growing, or decrease or increase in appetite; (4) insomnia or hypersomnia; (5) psychomotor agitation or retardation; (6) fatigue or loss of energy; (7) feelings of worthlessness; (8) diminished ability to think or concentrate or indecisiveness; and (9) recurrent thoughts of death or suicidal ideation. Respondents who have had a major depressive episode in their lifetime are asked if, during the past 12 months, they had a period of depression lasting 2 weeks or longer while also having some of the other symptoms mentioned. Those reporting that they have are defined as having had major depressive episode in the past year and then are asked questions from the SDS to measure the level of functional impairment in major life activities reported to be caused by the major depressive episode in the past 12 months (Leon, Olfson, Portera, Farber, & Sheehan, 1997).

Beginning in 2004, modules related to major depressive episode, derived from DSM-IV (APA, 1994) criteria for major depression, were included in the questionnaire. These questions permit prevalence estimates of major depressive episode to be calculated. Separate modules were administered to adults aged 18 or older and youths aged 12 to 17. The adult questions were adapted from the depression section of the National Comorbidity Survey Replication (NCS-R), and the questions for youths were adapted from the depression section of the National Comorbidity Survey Adolescent (NCS-A) (see http://www.hcp.med.harvard.edu/ncs/). To make the modules developmentally appropriate for youths, there are minor wording differences in a few questions between the adult and youth modules. Revisions to the questions in both modules were made primarily to reduce its length and to modify the NCS questions, which are interviewer-administered, to the audio computer-assisted self-interviewing (ACASI) format used in NSDUH. In addition, some revisions, based on cognitive testing, were made to improve comprehension.

Since 2004, the NSDUH questions that determine major depressive episode have remained unchanged. In the 2008 questionnaire, however, changes were made in other mental health items that precede the major depressive episode questions for adults (K6, suicide, and impairment). Questions also were retained in 2009 and 2010 for the WHODAS impairment scale, and the questions for the SDS impairment scale were deleted; see Sections B.4.2 and B.4.3 in Appendix B of the 2010 NSDUH mental health findings report (CBHSQ, 2012) for further details about these questionnaire changes. These questionnaire changes in 2008 appear to have affected the reporting on major depressive episode questions among adults.

Because the WHODAS was selected to be used in the 2009 and subsequent surveys, model-based adjustments were applied to major depressive episode estimates from the SDS half sample in 2008 to remove the context effect differential between the two half samples. Additionally, model-based adjustments were made to the 2005, 2006, and 2007 adult major depressive episode estimates to make them comparable with the 2008 through 2010 major depressive episode estimates (for more information on these adjustments, see Aldworth, Kott, Yu, Mosquin, & Barnett-Walker, 2012). Thus, the 2008-2010 substate estimates of major depressive episode were produced using the adjusted 2008 major depressive episode variable along with the unadjusted 2009 and 2010 major depressive episode variable. Additionally, the 2006-2008 substate small area estimates of major depressive episode were re-created using the adjusted major depressive episode variable.

In addition, changes to the youth mental health service utilization module questions in 2009 that preceded the questions about adolescent depression could have affected adolescents' responses to the adolescent depression questions and estimates of adolescent major depressive episode. However, these changes in 2009 did not appear to affect the estimates of adolescent major depressive episode. Therefore, data on trends in past year major depressive episode from 2004 to 2010 are available for adolescents aged 12 to 17.

Table B1. Outcomes, by Survey Year, for Which Substate Small Area Estimates Are Available

Measure	2002-2004	2004-2006	2006-2008	2008-2010
Illicit Drug Use in Past Month	Yes	Yes	Yes	Yes
Marijuana Use in Past Year	Yes	Yes	Yes	Yes
Marijuana Use in Past Month	Yes	Yes	Yes	Yes
Perceptions of Great Risk of Smoking Marijuana Once a Month	Yes	Yes	Yes	Yes
First Use of Marijuana	Yes	Yes	Yes	Yes
Illicit Drug Use Other Than Marijuana in Past Month	Yes	Yes	Yes	Yes
Cocaine Use in Past Year	Yes	Yes	Yes	Yes
Nonmedical Use of Pain Relievers in Past Year	Yes	Yes	Yes	Yes
Alcohol Use in Past Month	Yes	Yes	Yes	Yes
Underage Past Month Use of Alcohol	Yes	Yes	Yes	Yes
Binge Alcohol Use in Past Month	Yes	Yes	Yes	Yes
Underage Past Month Binge Alcohol Use	Yes	Yes	Yes	Yes
Perceptions of Great Risk of Having Five or More Drinks of an Alcoholic Beverage Once or Twice a Week	Yes	Yes	Yes	Yes
Tobacco Product Use in Past Month	Yes	Yes	Yes	Yes
Cigarette Use in Past Month	Yes	Yes	Yes	Yes
Perceptions of Great Risk of Smoking One or More Packs of Cigarettes Per Day	Yes	Yes	Yes	Yes
Alcohol Dependence or Abuse in Past Year	Yes	Yes	Yes	Yes
Alcohol Dependence in Past Year	Yes	Yes	Yes	Yes
Illicit Drug Dependence or Abuse in Past Year	Yes	Yes	Yes	Yes
Illicit Drug Dependence in Past Year	Yes	Yes	Yes	Yes
Dependence or Abuse of Illicit Drugs or Alcohol in Past Year	Yes	Yes	Yes	Yes
Needing But Not Receiving Treatment for Illicit Drug Use in Past Year	Yes	Yes	Yes	Yes
Needing But Not Receiving Treatment for Alcohol Use in Past Year	Yes	Yes	Yes	Yes
Serious Psychological Distress in Past Year[1]	Yes	Yes	No	No
Had at Least One Major Depressive Episode in Past Year[2]	No	Yes	Yes	Yes
Serious Mental Illness in Past Year	No	No	No	Yes
Any Mental Illness in Past Year	No	No	No	Yes
Had Serious Thoughts of Suicide in Past Year	No	No	No	Yes

Yes = available, No = not available.

[1] Because of questionnaire changes, estimates for serious psychological distress (SPD) in the years 2002-2004 are not comparable with the 2004-2006 SPD estimates. For more details, see Section B.7 of the report on *Substate Estimates from the 2004-2006 National Surveys on Drug Use and Health* (Office of Applied Studies [OAS], 2008). Additional questionnaire changes were made in 2008 that affected past year SPD trends. However, revised past year SPD measures were created for 2005 through 2007 that are comparable with the 2008 through 2010 past year SPD measure. Substate small area estimates for 2006-2008 and 2008-2010 were not created for this measure.

[2] Questions used to determine a major depressive episode (MDE) were added in 2004. Estimates for adults aged 18 or older are not available in the 2006-2008 substate report. However, MDE substate estimates for youths aged 12 to 17 were produced for 2006-2008 and were included in a set of age group tables separate from the main report. Estimates for 18 or older will be produced for 2006-2008 and will be shown in 2008-2010 NSDUH Substate Comparison Tables. The 2004-2006 MDE estimate is not comparable with the 2006-2008 and 2008-2010 MDE estimates that will be shown in the 2008-2010 NSDUH Substate Comparison Tables. For more details, see Section B.10.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2002-2010.

Section C: Sample Sizes, Response Rates, and Population Estimates

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 NSDUHs

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Total United States	591,812	488,023	432,102	88.48%	255,493	203,739	252,093,001	74.79%	66.17%
Northeast	126,705	105,171	87,167	82.09%	50,395	39,070	46,380,374	72.47%	59.49%
Midwest	160,684	135,152	121,455	90.11%	72,349	57,748	55,263,136	75.24%	67.80%
South	184,270	148,476	134,048	90.95%	76,656	62,434	92,099,064	76.66%	69.72%
West	120,153	99,224	89,432	88.14%	56,093	44,487	58,350,427	73.31%	64.61%
Alabama	8,656	6,899	6,367	92.34%	3,468	2,751	3,881,067	74.13%	68.44%
Region 1	2,269	1,898	1,746	92.03%	982	772	1,083,792	74.29%	68.36%
Region 2	2,958	2,342	2,145	91.68%	1,142	886	1,246,030	69.23%	63.47%
Region 3	1,469	1,139	1,062	93.30%	579	476	689,036	77.89%	72.67%
Region 4	1,960	1,520	1,414	92.98%	765	617	862,209	78.55%	73.03%
Alaska	7,157	5,250	4,811	91.63%	3,314	2,678	550,880	77.85%	71.33%
Anchorage	2,792	2,365	2,171	91.84%	1,483	1,211	231,658	77.77%	71.43%
Northern	1,581	1,114	1,021	91.38%	755	602	117,322	78.47%	71.71%
South Central	1,898	1,141	1,026	90.06%	701	557	144,244	76.60%	68.99%
Southeast	886	630	593	94.18%	375	308	57,656	79.31%	74.70%
Arizona	8,277	6,180	5,459	86.83%	3,390	2,749	5,333,984	76.32%	66.27%
Maricopa	4,860	3,859	3,365	85.25%	2,157	1,744	3,217,104	74.95%	63.90%
Pima	1,180	987	885	89.83%	474	384	826,110	81.22%	72.96%
Rural North	1,310	745	669	90.01%	457	371	617,189	78.81%	70.94%
Rural South	927	589	540	91.13%	302	250	673,580	77.06%	70.23%
Arkansas	7,868	6,342	5,913	93.19%	3,378	2,746	2,357,158	76.56%	71.35%
Catchment Area 1	1,142	929	831	89.50%	525	426	366,185	76.00%	68.02%
Catchment Area 2	879	724	679	93.64%	310	254	291,964	77.43%	72.50%
Catchment Area 3	1,295	975	928	95.13%	540	413	320,661	71.58%	68.10%
Catchment Area 4	652	548	500	91.01%	341	267	208,918	70.13%	63.83%
Catchment Area 5	1,383	1,105	1,047	94.74%	596	505	346,907	79.30%	75.13%
Catchment Area 6	647	515	495	95.94%	250	215	181,044	85.32%	81.86%
Catchment Area 7	528	420	409	97.32%	240	196	195,006	73.15%	71.19%
Catchment Area 8	1,342	1,126	1,024	91.06%	576	470	446,472	79.77%	72.64%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
California	27,344	23,927	20,252	84.64%	14,509	11,205	30,138,172	71.16%	60.23%
Region 1R	725	605	520	86.34%	305	248	816,993	77.77%	67.15%
Region 2R	898	763	648	84.89%	476	374	832,296	75.60%	64.18%
Region 3R (Sacramento)	977	855	722	84.78%	443	343	1,144,189	69.10%	58.59%
Region 4R	1,032	894	763	85.59%	467	349	1,058,929	67.48%	57.76%
Region 5R (San Francisco)	893	808	584	72.63%	270	195	661,449	65.65%	47.68%
Region 6 (Santa Clara)	1,243	1,143	977	85.22%	619	438	1,390,996	66.73%	56.86%
Region 7R (Contra Costa)	734	650	543	83.72%	326	249	853,197	72.16%	60.41%
Region 8R (Alameda)	1,133	1,018	834	82.31%	575	403	1,191,649	59.54%	49.01%
Region 9R (San Mateo)	571	522	445	85.43%	288	211	571,487	68.59%	58.59%
Region 10	866	747	650	87.20%	470	353	995,090	70.10%	61.13%
Region 11 (Los Angeles)	6,972	6,258	5,270	84.31%	3,911	2,979	8,126,588	69.80%	58.85%
LA SPA 1 and 5	841	715	556	77.60%	323	239	846,525	68.54%	53.18%
LA SPA 2	1,590	1,441	1,178	81.69%	763	590	1,735,407	70.22%	57.36%
LA SPA 3	1,206	1,113	978	88.26%	743	532	1,467,884	63.62%	56.15%
LA SPA 4	840	726	585	81.07%	419	336	983,681	76.00%	61.61%
LA SPA 6	686	606	537	88.30%	508	398	786,028	72.95%	64.42%
LA SPA 7	801	738	644	87.43%	581	439	1,043,744	65.05%	56.88%
LA SPA 8	1,008	919	792	86.19%	574	445	1,263,319	76.25%	65.72%
Region 12R	550	474	404	85.39%	316	258	692,984	71.81%	61.32%
Regions 13 and 19R	1,737	1,271	1,137	89.38%	899	733	1,855,281	74.80%	66.86%
Region 13 (Riverside)	1,441	1,012	884	87.45%	651	510	1,721,650	72.01%	62.97%
Region 19R (Imperial)	296	259	253	97.60%	248	223	133,631	86.43%	84.35%
Region 14 (Orange)	2,015	1,876	1,571	83.79%	1,233	963	2,443,343	70.13%	58.76%
Region 15R (Fresno)	682	610	499	79.03%	419	352	719,014	80.31%	63.47%
Region 16R (San Diego)	2,478	2,147	1,808	84.13%	1,218	909	2,448,679	71.37%	60.04%
Region 17R	1,131	999	809	80.24%	641	535	1,116,646	81.23%	65.17%
Region 18R (San Bernardino)	1,339	1,171	1,071	91.58%	926	741	1,650,606	70.72%	64.77%
Region 20R	665	552	493	89.42%	392	318	758,885	77.78%	69.56%
Region 21R	703	564	504	89.70%	315	254	809,870	80.03%	71.79%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Colorado	8,219	6,722	6,149	91.72%	3,507	2,837	4,102,784	77.66%	71.23%
Region 1	880	747	681	91.05%	391	327	542,307	79.64%	72.51%
Regions 2 and 7	4,136	3,605	3,239	89.97%	1,865	1,492	2,276,050	76.56%	68.88%
Region 3	1,412	1,189	1,112	93.97%	674	558	595,606	82.75%	77.76%
Region 4	557	425	399	93.80%	204	176	231,074	78.47%	73.61%
Regions 5 and 6	1,234	756	718	95.00%	373	284	457,747	72.06%	68.46%
Connecticut	7,549	6,645	5,775	86.71%	3,460	2,779	2,952,037	75.56%	65.52%
Eastern	785	689	616	89.17%	349	276	359,822	75.47%	67.29%
North Central	2,223	2,033	1,761	86.58%	1,070	863	833,207	73.67%	63.78%
Northwestern	1,441	1,236	1,016	81.76%	612	512	516,198	75.18%	61.46%
South Central	1,841	1,582	1,433	90.47%	816	656	696,180	78.18%	70.73%
Southwest	1,259	1,105	949	85.66%	613	472	546,629	75.67%	64.82%
Delaware	7,763	6,376	5,577	87.54%	3,394	2,752	730,344	76.53%	66.99%
Kent	1,307	1,064	933	87.77%	592	491	129,068	79.11%	69.44%
New Castle (excluding Wilmington City)	3,587	3,114	2,666	85.72%	1,708	1,365	377,301	76.07%	65.20%
Sussex	1,946	1,446	1,316	90.94%	693	552	160,441	73.22%	66.59%
Wilmington City	923	752	662	88.14%	401	344	63,535	83.14%	73.28%
District of Columbia	13,505	11,010	8,974	80.84%	3,230	2,721	511,275	81.26%	65.69%
Ward 1	1,772	1,417	1,215	85.71%	395	332	64,979	84.83%	72.71%
Ward 2	1,777	1,449	1,132	76.97%	357	295	74,341	80.21%	61.74%
Ward 3	1,985	1,639	1,305	77.53%	443	367	68,990	81.60%	63.27%
Ward 4	1,510	1,312	1,098	83.61%	413	331	66,276	72.06%	60.25%
Ward 5	1,189	966	758	78.92%	317	275	62,263	82.41%	65.04%
Ward 6	2,116	1,645	1,328	80.02%	412	336	60,350	80.45%	64.38%
Ward 7	1,836	1,546	1,275	82.40%	499	436	59,012	84.85%	69.91%
Ward 8	1,320	1,036	863	83.25%	394	349	55,064	86.72%	72.19%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Florida	35,652	27,168	24,635	90.56%	13,255	10,893	15,480,164	76.87%	69.62%
Region A - Northwest	2,910	2,219	2,036	91.92%	1,126	906	1,121,473	75.02%	68.96%
Circuit 1	1,432	1,121	1,013	90.67%	559	461	568,424	79.80%	72.35%
Circuit 2	800	576	530	92.12%	315	245	313,187	71.18%	65.57%
Circuit 14	678	522	493	94.35%	252	200	239,863	69.85%	65.91%
Region B - Northeast	4,743	3,803	3,500	91.34%	1,765	1,410	2,110,410	74.29%	67.85%
Circuits 3 and 8	1,139	916	871	95.13%	433	351	462,058	74.44%	70.81%
Circuit 4	2,128	1,725	1,556	89.27%	868	687	912,907	73.85%	65.93%
Circuit 7	1,476	1,162	1,073	92.26%	464	372	735,444	74.73%	68.95%
Region C - Central	8,480	6,571	6,024	91.73%	3,384	2,793	3,887,055	76.19%	69.89%
Circuit 5	1,985	1,598	1,472	92.35%	703	551	883,400	74.31%	68.62%
Circuit 9	2,164	1,756	1,648	93.83%	1,105	938	1,100,423	78.96%	74.08%
Circuit 10	1,652	1,175	1,070	90.92%	566	484	583,666	76.14%	69.23%
Circuit 18	1,651	1,301	1,183	91.04%	655	525	816,409	74.09%	67.45%
Circuit 19	1,028	741	651	88.09%	355	295	503,157	77.52%	68.29%
Region D - Southeast	6,201	4,367	3,860	88.41%	2,098	1,750	2,544,841	77.85%	68.82%
Circuit 15 (Palm Beach)	2,663	1,775	1,509	85.29%	767	584	1,089,052	69.42%	59.20%
Circuit 17 (Broward)	3,538	2,592	2,351	90.39%	1,331	1,166	1,455,788	82.79%	74.84%
Region E - Sun Coast	9,128	6,873	6,213	90.29%	3,062	2,484	3,754,990	76.28%	68.87%
Circuit 6	2,794	2,087	1,891	90.78%	885	701	1,171,601	75.98%	68.97%
Circuit 12	1,392	1,030	908	88.06%	394	324	631,253	75.48%	66.47%
Circuit 13 (Hillsborough)	2,444	2,100	1,928	92.05%	1,143	944	969,022	77.43%	71.27%
Circuit 20	2,498	1,656	1,486	88.92%	640	515	983,114	75.64%	67.26%
Region F - Southern (Circuits 11 and 16)	4,190	3,335	3,002	89.84%	1,820	1,550	2,061,396	82.35%	73.98%
Georgia	7,290	5,868	5,356	91.20%	3,302	2,694	7,847,010	75.91%	69.23%
Region 1	1,863	1,440	1,291	89.55%	816	653	2,002,117	73.92%	66.20%
Region 2	967	776	710	91.62%	396	326	1,019,758	77.93%	71.40%
Region 3	2,056	1,731	1,559	89.81%	1,010	853	2,415,319	80.61%	72.40%
Region 4	510	420	398	94.87%	200	155	493,136	74.70%	70.86%
Region 5	840	632	594	94.04%	353	299	835,046	78.67%	73.98%
Region 6	1,054	869	804	92.41%	527	408	1,081,634	66.96%	61.88%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Hawaii	9,117	7,534	6,290	82.36%	3,894	2,831	1,069,970	66.31%	54.62%
Hawaii Island	1,334	989	834	84.16%	513	390	146,741	70.92%	59.69%
Honolulu	6,176	5,326	4,369	81.26%	2,781	1,977	753,234	63.93%	51.95%
Kauai and Maui	1,607	1,219	1,087	85.56%	600	464	169,995	73.28%	62.70%
Kauai	517	421	396	94.10%	196	159	52,513	73.36%	69.04%
Maui	1,090	798	691	81.32%	404	305	117,482	73.24%	59.56%
Idaho	7,269	5,754	5,445	94.64%	3,379	2,770	1,240,669	77.84%	73.67%
Region 1	1,126	780	735	94.25%	413	326	181,323	72.04%	67.90%
Region 2	449	326	313	96.19%	177	153	86,052	90.17%	86.73%
Region 3	1,007	914	869	94.92%	573	480	202,263	79.54%	75.49%
Region 4	2,244	1,777	1,675	94.29%	980	820	349,384	77.64%	73.21%
Region 5	878	651	602	92.27%	361	294	143,028	78.64%	72.56%
Region 6	757	638	601	94.33%	373	300	127,216	79.45%	74.94%
Region 7	808	668	650	97.53%	502	397	151,402	75.34%	73.48%
Illinois	31,264	27,115	21,839	80.49%	14,593	11,007	10,606,775	70.39%	56.66%
Region I (Cook)	12,491	10,968	7,816	71.21%	5,502	3,915	4,228,949	65.16%	46.40%
Region II	8,817	7,775	6,492	83.40%	4,533	3,496	3,425,673	72.72%	60.65%
Region III	4,272	3,476	3,122	89.82%	1,939	1,533	1,193,555	76.81%	68.99%
Region IV	2,353	2,032	1,821	89.49%	1,029	802	755,520	72.79%	65.14%
Region V	3,331	2,864	2,588	90.29%	1,590	1,261	1,003,078	74.41%	67.19%
Indiana	7,776	6,454	6,006	92.93%	3,408	2,734	5,263,445	76.93%	71.49%
Central	1,972	1,648	1,512	91.59%	828	627	1,350,747	74.53%	68.26%
East	645	494	472	95.54%	277	243	448,124	77.92%	74.44%
North Central	1,054	875	818	93.31%	472	360	765,290	73.58%	68.66%
Northeast	782	629	580	92.36%	328	264	525,384	75.80%	70.01%
Northwest	834	699	633	90.15%	386	328	618,589	82.78%	74.63%
Southeast	870	755	718	94.93%	392	330	568,692	78.57%	74.58%
Southwest	607	530	498	93.76%	258	198	415,153	77.18%	72.36%
West	1,012	824	775	94.04%	467	384	571,466	78.74%	74.05%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Iowa	7,611	6,544	6,122	93.57%	3,364	2,794	2,520,427	80.52%	75.34%
Central	1,277	1,166	1,091	93.52%	597	486	446,866	74.67%	69.83%
North Central	1,097	933	861	92.38%	427	340	279,161	74.90%	69.20%
Northeast	1,700	1,449	1,349	93.11%	761	645	610,504	82.77%	77.06%
Northwest	1,219	982	933	94.90%	548	461	398,566	83.69%	79.42%
Southeast	1,641	1,432	1,341	93.74%	771	645	532,185	82.96%	77.76%
Southwest	677	582	547	94.03%	260	217	253,146	83.65%	78.66%
Kansas	6,867	5,905	5,476	92.76%	3,333	2,678	2,281,891	75.90%	70.41%
Kansas City Metro	2,502	2,279	2,087	91.59%	1,311	1,038	771,541	74.20%	67.96%
Northeast	1,104	877	820	93.55%	504	414	428,861	83.45%	78.07%
South Central	721	587	553	94.32%	296	237	292,088	69.32%	65.38%
Southeast	461	387	359	93.07%	215	166	158,246	73.53%	68.44%
West	929	774	712	92.05%	423	335	249,472	73.43%	67.59%
Wichita (Sedgwick)	1,150	1,001	945	94.29%	584	488	381,684	79.64%	75.08%
Kentucky	7,638	6,256	5,859	93.67%	3,324	2,696	3,579,401	75.66%	70.87%
Adanta, Cumberland River, and Lifeskills	1,412	1,071	1,012	94.50%	569	459	610,807	77.18%	72.93%
Bluegrass, Comprehend, and North Key	2,174	1,815	1,674	92.30%	984	795	1,039,966	74.59%	68.85%
Communicare and River Valley	675	569	528	92.85%	324	260	393,876	71.30%	66.20%
Four Rivers and Pennyroyal	892	693	658	95.06%	355	314	338,341	88.24%	83.89%
Kentucky River, Mountain, and Pathways	951	736	706	95.93%	364	302	419,022	74.73%	71.70%
Seven Counties	1,534	1,372	1,281	93.28%	728	566	777,389	72.89%	67.99%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Louisiana	7,634	6,037	5,665	93.87%	3,337	2,710	3,632,758	78.54%	73.73%
Regions 1 and 3	1,396	919	846	91.94%	590	472	631,645	76.88%	70.69%
Regions 2 and 9	1,785	1,523	1,458	95.72%	970	826	960,603	82.91%	79.36%
Regions 4, 5, and 6	2,071	1,627	1,539	94.76%	788	622	943,149	76.85%	72.82%
Regions 7 and 8	1,594	1,289	1,206	93.52%	673	553	718,733	80.46%	75.25%
Region 10 (Jefferson)	788	679	616	90.78%	316	237	378,628	69.90%	63.46%
Maine	9,748	7,117	6,543	91.82%	3,334	2,803	1,134,608	80.13%	73.58%
Aroostook/Downeast	1,279	894	853	94.98%	457	414	137,389	83.82%	79.60%
Central	1,220	893	818	91.73%	441	368	148,494	78.48%	71.99%
Cumberland	1,985	1,577	1,399	88.70%	707	584	235,871	78.43%	69.57%
Midcoast	1,266	821	768	93.70%	309	277	130,898	84.15%	78.86%
Penquis	1,089	791	726	91.67%	408	349	140,685	84.36%	77.34%
Western	1,634	1,197	1,108	91.94%	565	471	167,004	82.96%	76.28%
York	1,275	944	871	92.25%	447	340	174,267	70.54%	65.08%
Maryland	7,172	6,183	5,006	80.82%	3,185	2,563	4,701,377	76.78%	62.05%
Anne Arundel	732	671	523	77.10%	299	252	421,933	77.50%	59.75%
Baltimore City	840	654	495	75.39%	309	266	520,595	79.71%	60.09%
Baltimore County	886	786	615	78.31%	381	305	665,697	77.75%	60.89%
Montgomery	1,099	1,028	818	79.25%	548	417	762,906	73.92%	58.59%
North Central	543	502	428	85.38%	305	254	373,353	81.08%	69.22%
Northeast	580	518	446	85.42%	267	220	409,291	81.59%	69.69%
Prince George's	980	817	641	78.31%	437	337	693,889	72.60%	56.85%
South	955	702	594	84.82%	327	272	453,959	77.84%	66.02%
West	557	505	446	88.58%	312	240	399,754	74.28%	65.79%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Massachusetts	8,955	7,688	6,658	86.70%	3,500	2,796	5,556,250	76.22%	66.08%
Boston	1,026	851	719	84.64%	361	302	647,793	80.08%	67.78%
Central	1,034	910	761	83.35%	422	336	729,748	72.73%	60.62%
Metrowest	2,139	1,908	1,616	84.93%	878	702	1,272,100	77.54%	65.85%
Northeast	1,681	1,510	1,318	87.11%	682	538	1,080,907	76.40%	66.55%
Southeast	1,890	1,468	1,323	90.37%	628	482	1,099,740	72.89%	65.88%
Western	1,185	1,041	921	88.41%	529	436	725,962	79.22%	70.04%
Michigan	31,434	25,194	22,267	88.35%	13,678	11,004	8,326,133	75.90%	67.06%
Detroit City	2,526	1,805	1,601	88.91%	1,067	883	663,193	78.91%	70.16%
Genesee	1,193	970	842	87.07%	536	445	359,424	78.04%	67.94%
Kalamazoo	2,262	1,709	1,572	91.94%	961	748	558,898	73.68%	67.74%
Kent	1,651	1,452	1,253	86.41%	810	640	486,251	73.82%	63.79%
Lakeshore	2,187	1,814	1,640	90.25%	998	782	587,186	74.70%	67.42%
Macomb	2,439	2,200	1,856	84.14%	1,097	855	701,444	73.95%	62.22%
Mid South	2,895	2,339	2,054	87.34%	1,231	1,042	769,199	81.09%	70.83%
Northern	3,071	1,860	1,703	91.59%	922	769	732,014	80.35%	73.60%
Oakland	3,582	3,185	2,779	87.13%	1,694	1,320	1,003,970	73.55%	64.08%
Pathways and Western	1,175	884	807	91.47%	458	396	264,361	80.58%	73.71%
Riverhaven	1,178	973	888	91.13%	511	431	294,438	77.36%	70.50%
Saginaw	871	734	657	89.19%	429	350	168,530	74.59%	66.53%
Southeast	3,634	3,153	2,748	87.49%	1,760	1,369	1,023,356	71.04%	62.15%
St. Clair	1,025	897	803	88.90%	516	419	261,419	78.72%	69.98%
Washtenaw	1,745	1,219	1,064	87.43%	688	555	452,451	79.09%	69.15%
Minnesota	7,104	5,989	5,608	93.66%	3,354	2,752	4,384,564	78.28%	73.32%
Regions 1 and 2	1,077	804	740	92.17%	370	274	440,485	65.52%	60.39%
Regions 3 and 4	1,313	1,047	1,000	95.55%	618	515	768,639	82.70%	79.01%
Regions 5 and 6	1,476	1,212	1,167	96.18%	691	585	836,739	83.46%	80.27%
Region 7A (Hennepin)	1,284	1,158	1,060	91.66%	632	527	944,494	78.47%	71.93%
Region 7B (Ramsey)	725	631	574	90.82%	387	316	407,755	74.99%	68.10%
Region 7C	1,229	1,137	1,067	93.86%	656	535	986,453	78.35%	73.54%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Mississippi	6,678	5,272	4,953	94.03%	3,251	2,667	2,380,781	77.40%	72.78%
Region 1	1,524	1,239	1,146	92.54%	827	644	533,101	70.54%	65.28%
Region 2	807	530	510	96.20%	290	234	317,444	79.86%	76.82%
Region 3	956	744	701	94.26%	482	395	334,845	79.75%	75.17%
Region 4	1,204	1,046	967	92.48%	644	550	434,654	81.06%	74.96%
Region 5	462	369	359	97.19%	222	187	152,050	78.49%	76.29%
Region 6	605	480	464	96.66%	295	255	241,131	82.35%	79.60%
Region 7	1,120	864	806	93.72%	491	402	367,557	78.06%	73.16%
Missouri	7,784	6,433	6,009	93.42%	3,385	2,724	4,929,201	75.90%	70.91%
Central	989	754	725	96.13%	386	318	652,325	76.56%	73.60%
Eastern	2,594	2,167	2,035	93.92%	1,140	920	1,757,850	76.47%	71.82%
Eastern (St. Louis City and County)	1,906	1,587	1,482	93.46%	782	629	1,121,478	77.01%	71.97%
Eastern (excluding St. Louis)	688	580	553	95.23%	358	291	636,372	75.12%	71.54%
Northwest	2,013	1,682	1,552	92.31%	930	759	1,183,313	77.48%	71.52%
Northwest (Jackson)	1,078	886	808	91.37%	482	398	546,287	81.59%	74.56%
Northwest (excluding Jackson)	935	796	744	93.31%	448	361	637,026	73.21%	68.32%
Southeast	984	841	797	94.75%	421	329	583,337	72.10%	68.31%
Southwest	1,204	989	900	91.11%	508	398	752,376	74.73%	68.08%
Montana	8,095	6,743	6,365	94.35%	3,395	2,747	818,561	76.64%	72.31%
Region 1	624	500	482	96.32%	251	216	63,353	82.45%	79.42%
Region 2	1,164	998	960	96.13%	507	418	115,576	76.72%	73.75%
Region 3	1,709	1,444	1,330	92.11%	701	576	168,669	79.10%	72.86%
Region 4	2,114	1,707	1,612	94.22%	927	754	214,266	75.37%	71.01%
Region 5	2,484	2,094	1,981	94.66%	1,009	783	256,697	74.55%	70.57%
Nebraska	6,926	5,851	5,518	94.30%	3,350	2,705	1,462,435	76.21%	71.87%
Regions 1 and 2	900	650	620	95.47%	337	290	153,765	82.47%	78.74%
Region 1	399	310	293	94.47%	166	140	70,737	83.47%	78.86%
Region 2	501	340	327	96.32%	171	150	83,028	81.09%	78.10%
Region 3	964	846	803	94.75%	481	393	185,906	77.96%	73.87%
Region 4	731	574	545	94.93%	297	232	169,721	75.48%	71.65%
Region 5	1,684	1,429	1,333	93.42%	871	724	360,459	80.44%	75.15%
Region 6	2,647	2,352	2,217	94.20%	1,364	1,066	592,584	71.90%	67.73%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Nevada	8,057	6,382	5,997	94.44%	3,456	2,775	2,138,278	72.71%	68.66%
Clark	5,414	4,250	3,978	94.28%	2,404	1,942	1,524,755	72.05%	67.92%
Rural	1,073	832	791	95.18%	360	291	279,616	78.13%	74.36%
Washoe	1,570	1,300	1,228	94.68%	692	542	333,907	72.19%	68.35%
New Hampshire	8,603	6,819	5,984	87.83%	3,463	2,766	1,130,191	76.11%	66.85%
Central	2,652	2,060	1,852	89.76%	1,079	873	322,203	77.72%	69.77%
Central 1	1,273	1,002	906	90.21%	520	401	156,735	73.98%	66.73%
Central 2	1,379	1,058	946	89.35%	559	472	165,468	81.10%	72.47%
Northern	1,418	851	761	89.55%	366	301	145,205	77.23%	69.16%
Southern	4,533	3,908	3,371	86.41%	2,018	1,592	662,783	75.06%	64.85%
Southern 1 (Rockingham)	1,675	1,370	1,207	88.39%	701	544	253,793	75.00%	66.29%
Southern 2	2,858	2,538	2,164	85.33%	1,317	1,048	408,990	75.08%	64.07%
New Jersey	7,456	6,387	5,651	88.58%	3,576	2,803	7,245,571	74.68%	66.15%
Central	1,751	1,363	1,190	87.81%	721	558	1,703,097	74.33%	65.27%
Metropolitan	1,698	1,511	1,351	89.49%	911	743	1,708,009	78.58%	70.33%
Northern	2,342	2,104	1,840	87.51%	1,166	923	2,276,564	75.77%	66.31%
Southern	1,665	1,409	1,270	89.95%	778	579	1,557,902	69.17%	62.22%
New Mexico	7,749	6,056	5,710	94.27%	3,305	2,706	1,637,309	77.91%	73.45%
Region 1	1,658	1,352	1,289	95.51%	868	701	340,441	74.40%	71.06%
Region 2	1,323	943	875	92.67%	408	339	247,265	82.90%	76.83%
Region 3 (Bernalillo)	2,242	1,953	1,826	93.50%	1,040	837	523,402	77.38%	72.35%
Region 4	947	733	687	93.64%	382	313	200,222	81.19%	76.03%
Region 5	1,579	1,075	1,033	95.98%	607	516	325,979	78.73%	75.57%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
New York	37,947	31,837	24,434	76.62%	15,010	10,903	16,385,102	68.10%	52.18%
Region A	15,866	13,540	9,127	67.22%	5,867	4,050	6,873,429	63.63%	42.77%
Region 1	2,319	2,050	1,568	76.23%	1,073	808	1,112,439	72.35%	55.16%
Region 2	5,483	4,606	3,328	72.29%	2,221	1,529	2,480,170	63.44%	45.86%
Region 3	3,832	3,104	1,775	56.53%	950	694	1,409,808	68.46%	38.70%
Region 4	4,232	3,780	2,456	65.15%	1,623	1,019	1,871,011	56.70%	36.94%
Region B	8,784	7,774	6,060	77.85%	4,014	2,810	4,232,149	66.23%	51.56%
Region 5	4,460	4,031	3,156	78.18%	2,079	1,451	2,358,897	66.63%	52.09%
Region 6	2,435	2,187	1,681	76.89%	1,086	747	1,130,035	63.84%	49.09%
Region 7	1,889	1,556	1,223	78.35%	849	612	743,217	68.60%	53.75%
Region C	9,699	8,028	7,011	87.30%	3,913	3,045	3,919,524	74.12%	64.71%
Region 8	2,282	1,819	1,576	86.51%	858	641	861,251	69.60%	60.21%
Region 9	2,098	1,658	1,413	85.36%	769	618	814,919	74.44%	63.54%
Region 10	938	797	713	89.49%	394	336	380,859	80.57%	72.11%
Region 11	1,952	1,716	1,520	88.79%	913	687	890,030	76.63%	68.03%
Region 12	2,429	2,038	1,789	87.47%	979	763	972,465	73.49%	64.28%
Region D	3,598	2,495	2,236	89.20%	1,216	998	1,360,000	80.26%	71.59%
Region 13	1,299	696	632	90.43%	357	268	423,082	72.25%	65.33%
Region 14	1,330	997	886	88.53%	489	407	465,439	83.10%	73.57%
Region 15	969	802	718	88.91%	370	323	471,480	84.37%	75.02%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
North Carolina	7,624	6,432	5,911	92.06%	3,299	2,723	7,595,961	78.07%	71.87%
CenterPoint/Guilford	760	640	587	91.79%	343	271	824,256	76.07%	69.82%
CenterPoint	310	268	245	91.46%	130	100	437,015	71.26%	65.17%
Guilford	450	372	342	92.06%	213	171	387,241	79.32%	73.02%
Durham	1,514	1,350	1,255	92.82%	749	608	1,267,570	73.39%	68.13%
East Carolina	513	383	372	97.11%	193	151	485,123	79.92%	77.61%
Eastpointe	563	453	434	95.76%	227	196	646,693	78.80%	75.46%
ECCS	420	359	325	90.96%	176	143	475,675	79.92%	72.70%
Mecklenburg	861	728	653	89.32%	392	314	712,396	75.30%	67.25%
Pathways	864	742	697	93.84%	396	342	746,034	82.52%	77.43%
PBH	877	720	663	93.11%	349	288	1,122,782	78.35%	72.94%
Sandhills	429	349	314	90.32%	160	130	451,080	75.65%	68.33%
Smoky Mountain	324	284	252	89.17%	152	142	438,863	93.19%	83.10%
Western Highlands	499	424	359	84.94%	162	138	425,488	83.04%	70.53%
North Dakota	8,790	7,287	6,868	94.28%	3,479	2,815	537,026	77.27%	72.85%
Badlands and West Central	2,249	1,873	1,792	95.85%	843	687	146,443	76.34%	73.17%
Lake Region and South Central	1,296	1,025	978	95.29%	449	357	80,376	77.16%	73.53%
North Central and Northwest	1,470	1,188	1,128	95.17%	544	428	89,456	72.54%	69.04%
Northeast	1,087	887	823	92.75%	463	383	75,001	76.75%	71.19%
Southeast	2,688	2,314	2,147	92.74%	1,180	960	145,750	80.64%	74.79%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Ohio	30,441	25,930	24,033	92.63%	13,666	11,008	9,562,910	74.55%	69.06%
Boards 2, 46, 55, and 68	1,597	1,383	1,335	96.31%	706	595	428,709	80.56%	77.59%
Boards 3, 52, and 85	815	726	680	93.75%	424	346	319,177	70.55%	66.14%
Boards 4 and 78	779	663	626	94.24%	325	256	266,461	72.36%	68.19%
Boards 5 and 60	1,055	882	842	95.56%	592	502	279,467	75.09%	71.75%
Boards 7, 15, 41, 79, and 84	1,259	1,066	986	92.39%	570	466	389,291	74.36%	68.70%
Boards 8, 13, and 83	1,061	935	845	90.42%	491	385	413,875	72.91%	65.93%
Board 9 (Butler)	927	791	719	90.52%	387	292	301,261	71.98%	65.15%
Board 12	1,060	938	870	92.70%	550	452	282,864	74.54%	69.10%
Boards 18 and 47	4,546	3,831	3,505	91.53%	1,862	1,524	1,326,792	75.76%	69.34%
Boards 20, 32, 54, and 69	824	724	714	98.71%	419	350	290,861	80.38%	79.34%
Boards 21, 39, 51, 70, and 80	1,116	988	895	90.61%	496	403	457,588	77.94%	70.62%
Boards 22, 74, and 87	1,221	1,031	962	93.15%	511	372	325,308	66.33%	61.78%
Boards 23 and 45	887	776	730	94.10%	423	346	305,100	76.55%	72.03%
Board 25 (Franklin)	3,102	2,626	2,380	90.50%	1,435	1,138	895,510	73.37%	66.40%
Boards 27, 71, and 73	1,298	1,066	1,001	93.96%	540	417	406,100	72.67%	68.28%
Boards 28, 43, and 67	1,440	1,281	1,212	94.59%	710	586	412,824	79.57%	75.27%
Board 31 (Hamilton)	2,031	1,658	1,401	84.51%	752	583	666,883	73.08%	61.76%
Board 48 (Lucas)	1,029	871	833	95.67%	536	422	363,495	68.05%	65.11%
Boards 50 and 76	1,602	1,374	1,311	95.34%	671	560	532,665	75.81%	72.27%
Board 57 (Montgomery)	1,320	1,060	1,002	94.56%	597	491	443,454	74.15%	70.12%
Board 77 (Summit)	1,472	1,260	1,184	93.85%	669	522	455,223	73.62%	69.09%
Oklahoma	7,466	6,039	5,469	90.67%	3,414	2,728	2,969,398	75.56%	68.51%
Central	830	702	633	90.19%	443	354	358,460	78.04%	70.38%
East Central	665	569	527	92.79%	329	272	348,800	77.18%	71.61%
Northeast	1,100	825	752	91.17%	442	345	391,855	72.86%	66.43%
Northwest and Southwest	1,200	905	812	89.82%	482	366	417,975	68.69%	61.70%
Oklahoma County	1,362	1,099	990	90.15%	634	506	565,537	77.67%	70.02%
Southeast	1,036	875	817	93.59%	514	420	416,367	71.38%	66.81%
Tulsa County	1,273	1,064	938	88.35%	570	465	470,405	81.99%	72.44%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Oregon	8,161	7,025	6,500	92.64%	3,546	2,865	3,210,349	75.54%	69.98%
Region 1 (Multnomah)	1,489	1,326	1,195	90.42%	621	475	600,209	71.25%	64.42%
Region 2	1,863	1,654	1,508	91.28%	801	606	757,648	69.70%	63.63%
Region 3	2,572	2,154	2,019	93.69%	1,222	1,056	1,004,226	81.01%	75.90%
Region 4	1,157	999	915	91.70%	438	343	470,461	75.09%	68.86%
Region 5 (Central)	408	337	331	98.24%	166	148	179,635	83.08%	81.62%
Region 6 (Eastern)	672	555	532	95.90%	298	237	198,169	77.78%	74.59%
Pennsylvania	29,931	25,681	20,392	79.40%	11,459	8,830	10,546,396	72.96%	57.93%
Region 1 (Allegheny)	3,422	2,981	2,509	84.11%	1,382	1,047	1,016,566	70.08%	58.94%
Regions 3, 8, 9, and 51	1,757	1,467	1,249	85.70%	586	452	600,039	74.99%	64.27%
Regions 4, 11, 37, and 49	2,210	1,776	1,522	85.95%	814	624	779,498	72.38%	62.21%
Regions 5, 18, 23, 24, and 46	1,752	1,516	580	37.29%	320	257	617,919	75.60%	28.19%
Regions 6, 12, 16, 31, 35, 45, and 47	1,669	1,342	1,174	87.59%	665	549	582,897	80.35%	70.37%
Regions 7, 13, 20, and 33	4,998	4,536	3,673	81.03%	2,271	1,736	2,066,328	74.54%	60.40%
Regions 10, 15, 27, 32, 43,and 44	1,218	1,017	958	94.18%	514	433	444,868	79.69%	75.05%
Regions 17 and 21	946	811	744	91.62%	419	333	308,708	74.50%	68.26%
Regions 19, 26, 28, and 42	3,295	2,976	1,871	62.92%	1,095	776	1,190,062	67.65%	42.57%
Regions 22, 38, 40, 41, and 48	2,133	1,844	1,626	88.14%	873	654	719,874	68.81%	60.65%
Regions 29 and 34	1,447	1,261	1,114	88.26%	525	377	548,936	65.75%	58.03%
Regions 30 and 50	1,460	1,178	1,064	90.31%	560	460	506,900	77.67%	70.14%
Region 36 (Philadelphia)	3,624	2,976	2,308	77.32%	1,435	1,132	1,163,803	72.77%	56.27%
Rhode Island	8,006	6,634	5,893	88.84%	3,352	2,709	890,921	76.23%	67.72%
Bristol and Newport	945	799	709	88.73%	388	297	113,593	71.18%	63.15%
Kent	1,100	977	868	88.67%	458	357	143,475	74.47%	66.03%
Providence	4,842	4,068	3,601	88.52%	2,109	1,725	524,982	77.74%	68.81%
Washington	1,119	790	715	90.73%	397	330	108,871	76.37%	69.29%
South Carolina	8,519	6,681	6,049	90.27%	3,404	2,819	3,722,158	78.07%	70.47%
Region 1	2,162	1,826	1,651	90.73%	904	730	977,963	75.80%	68.77%
Region 2	2,523	2,022	1,837	90.25%	1,072	918	1,111,180	82.96%	74.87%
Region 3	1,636	1,137	1,044	91.59%	592	472	660,477	71.26%	65.27%
Region 4	2,198	1,696	1,517	88.93%	836	699	972,538	79.20%	70.43%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
South Dakota	7,113	5,985	5,708	95.42%	3,346	2,812	666,440	79.97%	76.31%
Region 1	1,169	936	901	96.25%	551	488	104,109	84.72%	81.54%
Region 2	1,817	1,599	1,526	95.50%	926	757	174,441	75.25%	71.87%
Region 3	1,203	1,031	990	96.14%	628	543	105,752	85.10%	81.82%
Region 4	577	484	460	95.17%	228	190	62,315	77.32%	73.59%
Region 5	772	647	630	97.50%	329	275	64,675	81.30%	79.27%
Region 6	473	370	356	96.24%	160	131	49,982	78.04%	75.11%
Region 7	1,102	918	845	91.95%	524	428	105,166	78.15%	71.85%
Tennessee	8,029	6,592	6,088	92.21%	3,470	2,787	5,229,574	74.06%	68.29%
Region 1	700	600	566	94.30%	299	255	431,391	82.75%	78.03%
Region 2	1,494	1,247	1,162	93.23%	635	508	994,343	72.42%	67.52%
Region 3	1,488	1,217	1,132	92.87%	599	471	824,718	73.37%	68.14%
Region 4 (Davidson)	1,004	782	688	87.93%	398	322	490,582	76.43%	67.20%
Region 5	1,512	1,260	1,134	89.73%	731	570	1,199,721	72.23%	64.81%
Region 6	870	743	722	97.19%	390	325	533,377	70.55%	68.56%
Region 7 (Shelby)	961	743	684	91.55%	418	336	755,442	74.98%	68.64%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Texas	25,659	21,150	19,503	92.23%	13,186	10,742	19,532,104	77.03%	71.04%
Region 1	1,137	937	895	95.49%	589	461	651,357	74.75%	71.38%
Region 2	648	458	442	96.24%	260	236	443,878	89.70%	86.33%
Region 3	6,599	5,631	5,348	95.04%	3,611	2,988	5,315,556	77.94%	74.08%
Region 3a	4,098	3,494	3,319	95.10%	2,269	1,838	3,383,390	75.18%	71.49%
Region 3bc	2,501	2,137	2,029	94.95%	1,342	1,150	1,932,166	83.06%	78.86%
Region 4	1,378	1,111	973	87.05%	579	478	911,120	77.29%	67.28%
Region 5	986	705	679	96.42%	448	389	623,690	82.12%	79.18%
Region 6	5,703	4,805	4,135	86.03%	2,976	2,312	4,719,423	73.87%	63.55%
Region 6a	5,072	4,263	3,668	85.99%	2,649	2,057	4,203,911	73.42%	63.13%
Region 6bc	631	542	467	86.34%	327	255	515,512	77.59%	66.99%
Region 7	3,383	2,751	2,602	94.60%	1,616	1,343	2,265,243	78.08%	73.87%
Region 7a	2,102	1,780	1,689	94.76%	1,049	853	1,411,776	76.52%	72.50%
Region 7bcd	1,281	971	913	94.24%	567	490	853,467	82.10%	77.38%
Region 8	2,554	2,026	1,844	91.08%	1,143	940	1,994,684	79.04%	71.98%
Region 9	706	610	592	96.96%	398	308	432,141	69.59%	67.48%
Region 10	681	619	603	97.42%	463	355	606,041	66.65%	64.93%
Region 11	1,884	1,497	1,390	92.96%	1,103	932	1,568,971	81.64%	75.90%
Region 11abd	1,355	1,058	979	92.60%	722	600	1,016,938	80.83%	74.85%
Region 11c (Hidalgo)	529	439	411	93.86%	381	332	552,033	83.19%	78.08%
Utah	4,776	4,221	3,998	94.73%	3,361	2,798	2,151,413	79.49%	75.30%
Bear River, Northeastern, Summit, Tooele, and Wasatch	557	484	456	94.45%	372	315	255,324	79.16%	74.77%
Central, Four Corners, San Juan, and Southwest	605	499	471	94.24%	390	308	269,437	71.06%	66.97%
Davis County	529	487	462	94.94%	382	331	234,167	85.14%	80.83%
Salt Lake County	1,906	1,673	1,583	94.63%	1,258	1,064	816,732	82.72%	78.28%
Utah County	853	788	751	95.23%	705	570	391,203	76.97%	73.30%
Weber, Morgan	326	290	275	94.86%	254	210	184,551	75.90%	72.00%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Vermont	8,510	6,363	5,837	91.71%	3,241	2,681	539,298	78.94%	72.39%
Champlain Valley	2,929	2,481	2,302	92.72%	1,466	1,207	210,276	79.35%	73.57%
Rural Northeast	2,187	1,588	1,375	86.57%	702	561	129,408	73.95%	64.02%
Rural Southeast	1,918	1,281	1,190	92.76%	569	485	112,946	81.58%	75.67%
Rural Southwest	1,476	1,013	970	96.03%	504	428	86,668	81.86%	78.61%
Virginia	7,700	6,597	5,839	88.47%	3,373	2,732	6,403,390	76.49%	67.67%
Region 1	1,452	1,223	1,082	88.57%	652	529	1,014,701	79.65%	70.55%
Region 2	1,689	1,523	1,353	88.80%	829	655	1,699,869	72.42%	64.31%
Region 3	1,319	1,090	985	90.29%	572	482	1,115,898	77.66%	70.12%
Region 4	1,399	1,252	1,080	86.11%	594	464	1,094,859	75.18%	64.73%
Region 5	1,841	1,509	1,339	88.75%	726	602	1,478,062	78.31%	69.50%
Washington	7,753	6,783	6,229	91.82%	3,549	2,753	5,513,047	73.52%	67.50%
Region 1	1,585	1,338	1,290	96.40%	710	564	1,192,621	77.19%	74.41%
East 1 (previously Region 1)	999	832	800	96.10%	452	358	687,824	77.03%	74.03%
East 2 (previously Region 2)	586	506	490	96.90%	258	206	504,797	77.46%	75.06%
Region 2	3,695	3,231	2,906	89.96%	1,610	1,220	2,507,907	71.36%	64.19%
North 1 (previously Region 3)	1,388	1,155	1,054	91.31%	576	439	925,860	71.43%	65.22%
North 2 (previously Region 4)	2,307	2,076	1,852	89.21%	1,034	781	1,582,047	71.32%	63.63%
Region 3	2,473	2,214	2,033	91.72%	1,229	969	1,812,518	74.42%	68.26%
West 1 (previously Region 5)	1,112	1,001	924	92.16%	608	474	870,026	76.14%	70.17%
West 2 (previously Region 6)	1,361	1,213	1,109	91.38%	621	495	942,492	73.00%	66.71%
West Virginia	9,417	7,574	6,884	90.87%	3,386	2,710	1,545,143	76.12%	69.17%
Region I	844	692	586	84.49%	274	204	125,406	63.81%	53.92%
Region II	1,146	909	842	92.68%	444	373	220,044	82.67%	76.61%
Region III	883	743	651	87.69%	323	270	144,273	78.81%	69.10%
Region IV	1,837	1,458	1,318	90.39%	711	561	324,156	77.02%	69.62%
Region V	2,812	2,335	2,163	92.59%	1,067	844	443,016	75.51%	69.91%
Region VI	1,895	1,437	1,324	92.11%	567	458	288,247	76.12%	70.11%

See notes at end of table.

(continued)

Table C1. Sample Sizes, Weighted Screening and Interview Response Rates, and Population Estimates, by Substate Region, for Persons Aged 12 or Older: 2008, 2009, and 2010 (continued)

State/Substate Region	Total Selected DUs	Total Eligible DUs	Total Completed Screeners	Weighted DU Screening Response Rate (Percentage)	Total Selected	Total Responded	Population Estimate	Weighted Interview Response Rate (Percentage)	Weighted Overall Response Rate (Percentage)
Wisconsin	7,574	6,465	6,001	92.77%	3,393	2,715	4,721,889	76.78%	71.23%
Milwaukee	1,316	1,177	1,079	91.46%	640	503	745,910	70.38%	64.37%
Northeastern	1,766	1,531	1,403	91.73%	797	639	1,028,299	78.18%	71.72%
Northern	766	551	521	94.31%	252	206	422,164	76.56%	72.21%
Southeastern	1,227	1,075	982	91.18%	638	476	962,612	71.25%	64.96%
Southern	1,368	1,166	1,090	93.54%	551	457	912,909	81.89%	76.60%
Western	1,131	965	926	96.00%	515	434	649,995	83.70%	80.35%
Wyoming	8,179	6,647	6,227	93.74%	3,488	2,773	445,011	74.68%	70.00%
Judicial District 1 (Laramie)	1,401	1,174	1,080	92.09%	572	439	74,342	73.86%	68.02%
Judicial District 2	696	507	473	93.05%	304	269	39,005	82.77%	77.02%
Judicial District 3	1,153	922	878	95.33%	589	474	64,503	75.59%	72.06%
Judicial District 4	522	464	439	94.65%	197	152	31,161	76.95%	72.84%
Judicial District 5	1,101	830	772	93.09%	349	292	44,092	78.76%	73.32%
Judicial District 6	858	727	696	95.95%	446	333	45,431	68.12%	65.36%
Judicial District 7 (Natrona)	1,066	914	852	93.42%	471	356	60,693	72.41%	67.64%
Judicial District 8	438	373	346	92.63%	188	163	30,834	79.57%	73.70%
Judicial District 9	944	736	691	93.74%	372	295	54,950	72.51%	67.97%

DU = dwelling unit; ECCS = Eastern Coastal Care System; PBH = Piedmont Behavioral Health; SPA = service planning area.

NOTE: For substate region definitions, see the "2008-2010 National Survey on Drug Use and Health Substate Region Definitions" at http://www.samhsa.gov/data/NSDUH/substate2k10/toc.aspx.

NOTE: To compute the pooled 2008-2010 weighted response rates, the three samples were combined, and the individual-year weights were used for the pooled sample. Thus, the response rates presented here are weighted across 3 years of data rather than being a simple average of the 2008, 2009, and 2010 individual response rates.

NOTE: The total responded column represents the combined sample size from the 2008, 2009, and 2010 NSDUHs.

NOTE: The population estimate is the simple average of the 2008, 2009, and 2010 population counts for persons aged 12 or older. Because of rounding, the sum of the substate region population counts within a State may not exactly match the State population count listed in the table.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008, 2009, and 2010 (Revised March 2012).

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Section E: List of Contributors

This National Survey on Drug Use and Health (NSDUH) report was prepared by the Center for Behavioral Health Statistics and Quality (CBHSQ), Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services (HHS), and by RTI International (a trade name of Research Triangle Institute), Research Triangle Park, North Carolina. Work by RTI was performed under Contract No. HHSS283200800004C.

At RTI, Neeraja S. Sathe and Kathryn Spagnola were responsible for the writing of the report, and Ralph E. Folsom and Akhil K. Vaish were responsible for the overall methodology and estimation for the model-based Bayes estimates and confidence intervals. At SAMHSA, Arthur Hughes reviewed the report and provided substantive revisions.

The following staff were responsible for generating the estimates and providing other support and analysis: Akhil K. Vaish, Neeraja S. Sathe, Kathryn Spagnola, and Brenda K. Porter. Ms. Spagnola provided oversight for production of the report. Richard S. Straw edited it; Debbie Bond, Valerie Garner, and Roxanne Snaauw formatted its text and tables; and Teresa F. Bass, Kimberly Cone, Danny Occoquan, Marissa R. Straw, Pamela Tuck, and Cheryl Velez prepared its print and Web versions. Justine L. Allpress, E. Andrew Jessup, and Shari B. Lambert prepared and processed the maps.