Results from the 2012 National Survey on Drug Use and Health: Mental Health Findings

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration
Center for Behavioral Health Statistics and Quality

Acknowledgments

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Highlights

- In 2012, an estimated 43.7 million adults aged 18 or older in the United States had any mental illness (AMI) in the past year. This represents 18.6 percent of all adults in this country. The percentage of adults with AMI in 2012 was similar to the estimate in 2011, but it was higher than the 2008 estimate (17.7 percent).

- Among adults aged 18 or older in 2012, 9.6 million (4.1 percent) had serious mental illness (SMI) in the past year. The percentage of adults with past year SMI in 2012 was similar to that in 2008 (3.7 percent).

- The percentage of adults in 2012 with AMI in the past year was highest for adults aged 26 to 49 (21.2 percent), followed by those aged 18 to 25 (19.6 percent), then by those aged 50 or older (15.8 percent). Similarly, the percentage of adults with past year SMI in 2012 was highest among adults aged 26 to 49 (5.2 percent), followed by those aged 18 to 25 (4.1 percent), then by those aged 50 or older (3.0 percent).

- Women aged 18 or older were more likely than men aged 18 or older to have past year AMI (22.0 vs. 14.9 percent) and SMI (4.9 vs. 3.2 percent) in 2012.

- Among the 43.7 million adults aged 18 or older in 2012 with AMI in the past year, 19.2 percent (8.4 million adults) met criteria for a substance use disorder (i.e., illicit drug or alcohol dependence or abuse). Among the 9.6 million adults with SMI in the past year, 27.3 percent also had past year substance dependence or abuse. In comparison, 6.4 percent of adults who did not have mental illness in the past year met criteria for a substance use disorder.

- In 2012, an estimated 9.0 million adults (3.9 percent) aged 18 or older had serious thoughts of suicide in the past year. The estimated number and percentage remained stable between 2008 (8.3 million persons and 3.7 percent) and 2012.

- Among adults aged 18 or older in 2012, 2.7 million (1.1 percent) made suicide plans in the past year, and 1.3 million (0.6 percent) attempted suicide in the past year.

- Adults aged 18 or older with a past year substance use disorder were more likely than those without dependence or abuse to have serious thoughts of suicide in the past year (12.6 vs. 3.0 percent). Adults with a substance use disorder also were more likely to make suicide plans compared with adults without dependence or abuse (3.9 vs. 0.9 percent) and were more likely to attempt suicide compared with adults without dependence or abuse (2.3 vs. 0.4 percent).

- In 2012, 34.1 million adults (14.5 percent of the population aged 18 or older) received mental health services (i.e., treatment or counseling) during the past 12 months. The number and the percentage were higher than those in 2011 (31.6 million persons and 13.6 percent).

- Between 2002 and 2012, the percentage of adults using outpatient mental health services in the past year declined from 7.4 to 6.6 percent, and the percentage using prescription medication for a mental health problem increased from 10.5 to 12.4 percent.

- Among the 43.7 million adults aged 18 or older with AMI in 2012, 17.9 million (41.0 percent) received mental health services in the past year. Among the 9.6 million adults with SMI in 2012, 6.0 million (62.9 percent) received mental health services in the past year.

- Among the 8.4 million adults aged 18 or older in 2012 who had AMI in the past year and a past year substance use disorder, 46.3 percent received substance use treatment at a specialty facility or mental health care in the past year, including 7.9 percent who received both mental health care and specialty substance use treatment, 34.0 percent who received mental health care only, and 4.3 percent who received specialty substance use treatment only.

- Among the 2.6 million adults aged 18 or older in 2012 with both SMI and a substance use disorder in the past year, 64.7 percent received substance use treatment at a specialty facility or mental health care in that time period, including 15.8 percent who received both mental health care and specialty substance use treatment, 44.0 percent who received mental health care only, and 4.6 percent who received specialty substance use treatment only.

- In 2012, there were 2.2 million youths aged 12 to 17 (9.1 percent) who had major depressive episode (MDE) during the past year.

- Among youths in 2012, females were more likely than males to have past year MDE (13.7 vs. 4.7 percent).

- Among youths aged 12 to 17 in 2012 who had past year MDE, 34.0 percent used illicit drugs in the past year compared with 16.3 percent among youths who did not have past year MDE.

- In 2012, youths aged 12 to 17 with MDE in the past year were more likely than those without MDE to have a substance use disorder in the past year (16.0 vs. 5.1 percent).

- In 2012, 3.1 million youths aged 12 to 17 (12.7 percent) received treatment or counseling for problems with emotions or behavior in a specialty mental health setting (inpatient or outpatient care) in the past 12 months. The 2012 percentage was similar to those in 2002 through 2011 (ranging from 12.0 to 13.5 percent).

- The most common reason for youths receiving specialty mental health services in 2012 was feeling depressed (50.7 percent).

1. Introduction

This report presents results pertaining to mental health from the 2012 National Survey on Drug Use and Health (NSDUH), an annual survey of the civilian, noninstitutionalized population of the United States aged 12 years old or older. This report presents national estimates of the prevalence of past year mental disorders and past year mental health service utilization for youths aged 12 to 17 and adults aged 18 or older. Among adults, estimates presented include rates and numbers of persons with any mental illness (AMI), serious mental illness (SMI), suicidal thoughts and behavior, major depressive episode (MDE), treatment for depression (among adults with MDE), and mental health service utilization. Estimates presented in this report for youths include MDE, treatment for depression (among youths with MDE), and mental health service utilization. Measures related to the co-occurrence of mental disorders with substance use or with substance use disorders also are presented for both adults and youths. The report focuses mainly on trends between 2011 and 2012 and differences across population subgroups in 2012.

Summary of NSDUH

NSDUH is the primary source of statistical information on the use of illegal drugs, alcohol, and tobacco by the civilian, noninstitutionalized population of the United States aged 12 years or older. The survey also includes several modules of questions that focus on mental health issues. Conducted by the Federal Government since 1971, the survey collects data through face-to-face interviews with a representative sample of the population at the respondent's place of residence. The survey is sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), U.S. Department of Health and Human Services, and is planned and managed by SAMHSA's Center for Behavioral Health Statistics and Quality (CBHSQ). Data collection and analysis are conducted under contract with RTI International.[1] This section briefly describes the survey methodology; a more complete description is provided in Appendix A.

NSDUH collects information from residents of households and noninstitutional group quarters (e.g., shelters, rooming houses, dormitories) and from civilians living on military bases. The survey excludes homeless persons who do not use shelters, military personnel on active duty, and residents of institutional group quarters, such as jails and hospitals. Appendix C describes data sources that provide estimates of mental health indicators for populations outside of the NSDUH target population.

From 1971 through 1998, the survey employed paper-and-pencil data collection. Since 1999, the NSDUH interview has been carried out using computer-assisted interviewing (CAI). Most of the questions are administered with audio computer-assisted self-interviewing (ACASI). ACASI is designed to provide the respondent with a highly private and confidential mode for responding to questions in order to increase the level of honest reporting of illicit drug use and about other sensitive topics, including mental health issues. Less sensitive items are administered by interviewers using computer-assisted personal interviewing (CAPI).

[1] RTI International is a trade name of Research Triangle Institute.

Consistent with previous years, the 2012 NSDUH employed a State-based design with an independent, multistage area probability sample within each State and the District of Columbia. The eight States with the largest population (which together account for about half of the total U.S. population aged 12 or older) are designated as large sample States (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas) and have a sample size of about 3,600 each. For the remaining 42 States and the District of Columbia, the sample size is about 900 per State. In all States and the District of Columbia, the design oversampled youths and young adults; each State's sample was approximately equally distributed among three age groups: 12 to 17 years, 18 to 25 years, and 26 years or older.

Nationally, screening was completed at 153,873 addresses, and 68,309 completed interviews were obtained. The survey was conducted from January through December 2012. Weighted response rates for household screening and for interviewing were 86.1 and 73.0 percent, respectively. See Appendix B for more information on NSDUH response rates.

Limitations on Trend Measurement

Several important changes were made to the adult mental health section in the 2008 NSDUH questionnaire. These changes provide valuable new data on mental health, but they also affect the comparability of some of the measures that have been collected in NSDUH since 2004. A brief summary of the changes and their impact is provided below.

From 2004 to 2007, NSDUH collected data for adults aged 18 or older on lifetime and past year MDE. The survey also included the Kessler-6 (K6) distress scale that was used to generate estimates of serious psychological distress (SPD) in the past 12 months. However, the K6 scale does not directly measure the presence of a diagnosable mental, behavioral, or emotional disorder, nor does it capture information on functional impairment (i.e., difficulties that substantially interfere with or limit role functioning in one or more major life activities). Both of these measures are needed to determine whether a respondent can be categorized as having SMI or other categories of mental illness defined by levels of functional impairment (i.e., low/mild mental illness or moderate mental illness).

To address SAMHSA's need for estimates of SMI and AMI, as well as data on suicidal ideation and behavior, CBHSQ modified the NSDUH adult mental health items in 2008 to obtain these data. Items were added that assessed functional impairment due to mental health problems (abbreviated World Health Organization Disability Assessment Schedule [WHODAS]; Novak, 2007) and that assessed suicidal thoughts and behavior among adults. In 2008, CBHSQ also expanded the K6 questions to ask about the past 30 days (the time frame for which the K6 was originally designed). In addition, as part of the Mental Health Surveillance Study (MHSS), a clinical follow-up study was initiated in which a randomly selected subsample of adults (about 1,500 in 2008, 2011, and 2012, and 500 in 2009 and 2010) who had completed the NSDUH interview was administered a standard clinical interview by mental health clinicians via paper and pencil over the telephone to determine their mental illness status; the clinical interview was used as a "gold standard" for measuring mental illness among adults. Using both the clinical interview and the NSDUH CAI data for the respondents who completed the clinical interview, statistical models were developed that then were applied to data from all adult respondents who had completed the NSDUH CAI interviews (regardless of whether they had clinical interview

data) to produce estimates of mental illness among the adult civilian, noninstitutionalized population. Subsequently, using the entire clinical interview sample of approximately 5,000 interviews that were collected in 2008 to 2012, CBHSQ developed a more accurate statistical model for adults. This revised model incorporated the NSDUH respondent's age, past year suicidal thoughts, past year MDE, and the variables that were specified in the 2008 model (i.e., the K6 and WHODAS). Results for SMI and AMI from this revised model were closer to the direct estimates of SMI and AMI from the clinical interviews in the MHSS than the previous model's results were, especially for young adults aged 18 to 25. See Section B.4.3 in Appendix B of this report for a more complete discussion of the revised 2012 model and estimates.

Updated estimates of AMI and SMI for 2008 to 2011 were produced using this revised model and are presented in this report and in a comprehensive set of tables of national mental health estimates.[2] These revised 2008 to 2011 NSDUH estimates of AMI and SMI are not comparable with 2008 to 2011 estimates of AMI and SMI shown in many NSDUH reports that were published prior to this report. Other mental health estimates for adults, such as MDE or suicidal thoughts and behaviors, were not affected.

Although the same information on MDE has been collected since 2004, the 2008 questionnaire changes for other mental health measures caused discontinuities in trends for MDE among adults; see Sections B.4.2 and B.4.4 in Appendix B for more information. A statistical adjustment to ensure comparability between past year and lifetime MDE estimates from 2005 onward was applied to estimates of lifetime and past year MDE that were affected by the 2008 questionnaire changes. This allowed trends in MDE among adults for 2005 onward to be included in reports since 2010. Because of these adjustments, estimates of past year and lifetime MDE for 2005 to 2008 in this report may differ from estimates published in NSDUH reports prior to 2010. Questionnaire changes in 2008 did not affect comparability of estimates based on adult mental health service utilization questions; therefore, estimates of mental health service utilization presented in this report reflect trends from 2002 to 2012.

The 2008 questionnaire changes did not affect youth MDE or the youth mental health service utilization items. In 2009, changes were made in the youth mental health utilization module; however, analyses determined that the changes did not affect estimates of MDE among youths in 2009 (see Section B.4.2 in Appendix B). The discussion of estimates for these measures in this report includes comparisons with prior years' data for youths.

The calculation of NSDUH person-level weights includes a calibration step that results in weights that are consistent with population control totals obtained from the U.S. Census Bureau (see Section A.3.3 in Appendix A). These control totals are based on the most recently available decennial census; the Census Bureau updates these control totals annually to account for population changes after the census. For the analysis weights in the 2002 through 2010 NSDUHs, the control totals were derived from the 2000 census data; for the 2011 and 2012 NSDUH weights, the control totals were based on data from the 2010 census. This shift to the 2010 census data could affect comparisons between mental health estimates for 2011 and onward and those from prior years. An analysis conducted for the 2011 report of the impact of this

[2] This comprehensive set of tables is referred to as "mental health detailed tables" and is available at http://www.samhsa.gov/data/. The comprehensive set of tables for the 2008 NSDUH is referred to as "detailed tables" and also is available at this location.

change in NSDUH weights showed that estimates of the number of substance users for some demographic groups were substantially affected, but that the percentages of substance users within these groups (i.e., rates) were unaffected. Mental health estimates were affected relatively less, and the effects were restricted to certain estimates and demographic subgroups (CBHSQ, 2012d). A portion of this analysis was repeated using revised SMI and AMI estimates for 2010 and 2011, and the results were similar to the 2011 analysis. Section B.4.5 in Appendix B summarizes the results of investigations of the change to using 2010 census control totals for NSDUH. This change in control totals does not affect comparisons of estimates between 2011 and 2012. However, some trends between 2012 and years prior to 2011 may need to be interpreted with caution because of the differences in how the control totals for each of these years were developed.

Format of Report and Data Presentation

Estimates presented in this report—including those mentioned previously for AMI and SMI—are based on data from the 2012 mental health detailed tables. In addition, the tables are accompanied by a glossary that covers key definitions used in this report and the mental health detailed tables.[3] This report has separate chapters that discuss the national findings of mental disorders and service utilization for adults aged 18 or older, suicidal thoughts and behaviors among adults, mental disorders and service utilization for youths aged 12 to 17, and mental disorders that co-occurred with substance use or with substance use disorders for both adults and youths. Technical appendices in this report describe the survey (Appendix A), provide technical details on the statistical methods and measurement (Appendix B), discuss other sources of related data (Appendix C), and list the references cited in the report (Appendix D). A list of contributors to the production of this report also is provided (Appendix E).

Text, figures, and mental health detailed tables present prevalence measures for the population in terms of both the number of persons and the percentage of the population. Figures on mental disorders show prevalence estimates for the 12-month period prior to the survey (also referred to as the past year). Figures in which estimates are presented by year have footnotes indicating whether the 2012 estimates are significantly different from 2011 or earlier estimates.

During regular data collection and processing checks for the 2011 NSDUH, data errors were identified. These errors affected the data for Pennsylvania (2006 to 2010) and Maryland (2008 and 2009). Data and estimates for 2011 and subsequent years were not affected, including those for 2012. The errors had minimal impact on the national estimates. The only estimates appreciably affected in this report and the mental health detailed tables were estimates for the Northeast region. Cases with erroneous data were removed from data files, and the remaining cases were reweighted to provide representative estimates. Therefore, some estimates for 2010 and other prior years in the 2012 mental health findings report and the 2012 mental health detailed tables will differ from corresponding estimates found in some previous reports and tables. Further information is available in Section B.3.4 in Appendix B of this report.

Statistical tests have been conducted for all statements appearing in the text of the report that compare estimates between years or subgroups of the population. Unless explicitly stated

[3] The glossary is available with the mental health detailed tables for the 2012 NSDUH at http://www.samhsa.gov/data/.

that a difference is not statistically significant, all statements that describe differences are significant at the .05 level. Statistically significant differences are described using terms such as "higher," "lower," "increased," and "decreased." Statements that use terms such as "similar," "no difference," "same," or "remained steady" to describe the relationship between estimates denote that a difference is not statistically significant. When a set of estimates for survey years or population subgroups is presented without a statement of comparison, statistically significant differences among these estimates are not implied and testing may not have been conducted.

All estimates presented in the report have met the criteria for statistical reliability (see Section B.2.2 in Appendix B). Estimates that do not meet these criteria are suppressed and do not appear in tables, figures, or text. Suppressed estimates are not included in statistical tests of comparisons. For example, a statement that "whites had the highest prevalence" means that the rate among whites was higher than the rate among all nonsuppressed racial/ethnic subgroups, but not necessarily higher than the rate among a subgroup for which the estimate was suppressed.

Data are presented for racial/ethnic groups based on guidelines for collecting and reporting race and ethnicity data (Office of Management and Budget, 1997). Because respondents could choose more than one racial group, a "two or more races" category is included for persons who reported more than one category (i.e., white, black or African American, American Indian or Alaska Native, Native Hawaiian, Other Pacific Islander, Asian, Other). Respondents choosing both Native Hawaiian and Other Pacific Islander but no other categories are classified as being in the "Native Hawaiian or Other Pacific Islander" category instead of the "two or more races" category. Except for the "Hispanic or Latino" group, the racial/ethnic groups include only non-Hispanics. The category "Hispanic or Latino" includes Hispanics of any race.

Other NSDUH Reports and Data

Data on substance use was released in a separate report in September 2013: *Results from the 2012 National Survey on Drug Use and Health: Summary of National Findings* (CBHSQ, 2013). The 2011-2012 NSDUH State-level estimates for substance use and mental health are scheduled to be released in late 2013. Other reports using the 2012 NSDUH data and focusing on specific topics of interest will be made available on SAMHSA's Web site. The mental health detailed tables described previously are also available through the Internet at http://samhsa.gov/data/. The tables are organized into sections on mental health topics among adults and youths. Most tables are provided in several parts, showing population estimates (e.g., numbers of persons with mental disorders), prevalence estimates (e.g., percentages of persons with mental disorders), and standard errors of all nonsuppressed estimates. Additional methodological information on NSDUH, including the questionnaire, is available electronically at the same Web address.

Descriptive reports and in-depth analytic reports focusing on specific issues or populations and methodological information on NSDUH, including the questionnaire, are available at http://samhsa.gov/data/. In addition, CBHSQ makes public use data files available through the Substance Abuse and Mental Health Data Archive (SAMHDA) at http://www.datafiles.samhsa.gov. Currently, files are available from the 1979 to 2011 surveys. The 2012 NSDUH public use file will be available by the end of 2013. CBHSQ also makes confidential restricted-use data available in two ways. Restricted-use data, including State codes

and other detailed variables, can be included in tables as part of the online Restricted-use Data Analysis System (R-DAS) where the data are not directly available, but estimates by State and other restricted variables that are specified by the user are public use. CBHSQ also makes restricted-use microdata files available through a data portal on the SAMHDA Web site. More details on both of these programs are available at http://www.datafiles.samhsa.gov.

2. Mental Illness and Mental Health Service Utilization among Adults

This chapter presents findings from the National Survey on Drug Use and Health (NSDUH) on past year mental illness in the United States, including the percentage of adults aged 18 or older with any mental illness (AMI), serious mental illness (SMI), and major depressive episode (MDE). In addition, this chapter includes estimates of the percentages of adults who received treatment for mental health problems in the past year overall and among those with AMI, SMI, and MDE. The chapter also presents data on the percentage of adults who had a perceived unmet need for mental health services in the past year.

As discussed in Chapter 1, an improved methodology for generating estimates of AMI and SMI was applied to all AMI and SMI estimates for 2008 through 2012. Therefore, estimates of AMI and SMI for 2008 to 2011 in this report are different from corresponding estimates in prior reports. This improved methodology is used to generate estimates of mental illness for each year from 2008 to 2012, which allows statements to be made in this chapter about trends in the prevalence of AMI or SMI among adults. In addition, estimates of MDE and overall mental health treatment are not affected by this change, but estimates of treatment among those with AMI or SMI are affected. For a more detailed explanation, see Section B.4.3 in Appendix B.

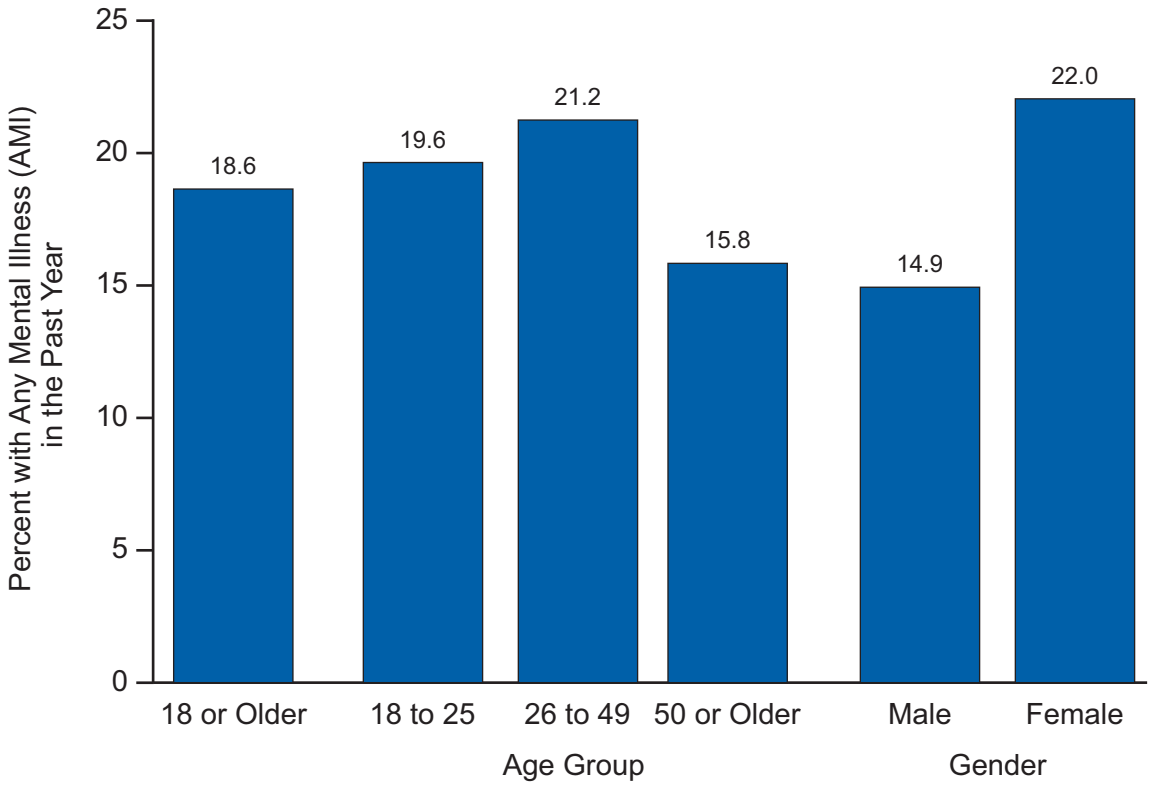
Any Mental Illness

AMI among adults aged 18 or older is defined as currently or at any time in the past 12 months having had a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association [APA], 1994).

In order to generate estimates of mental illness in the United States, the Substance Abuse and Mental Health Services Administration (SAMHSA) designed and implemented the Mental Health Surveillance Study (MHSS). Each year since 2008, a subsample of adults has been selected from the main study to participate in a follow-up telephone interview that obtains a detailed mental health assessment administered by a trained mental health clinician. The MHSS interview uses the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP) (First, Spitzer, Gibbon, & Williams, 2002). As noted previously, an improved prediction model was developed for the 2012 NSDUH using the clinical interview data that were collected from 2008 to 2012 to produce estimates of AMI for the entire NSDUH adult sample in these years.

- In 2012, an estimated 43.7 million adults aged 18 or older in the United States had AMI in the past year. This represents 18.6 percent of all adults in this country (Figure 2.1). The percentage of adults with AMI in 2012 was similar to the estimate in 2011, but it was higher than the 2008 estimate (17.7 percent).

Figure 2.1 Any Mental Illness in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2012



- The percentage of adults in 2012 with AMI in the past year was highest for adults aged 26 to 49 (21.2 percent), followed by those aged 18 to 25 (19.6 percent), then by those aged 50 or older (15.8 percent) (Figure 2.1). The rate for AMI among 18 to 25 year olds increased from 2011 to 2012 (18.5 vs. 19.6 percent).

- Adult women in 2012 were more likely than adult men to have AMI in the past year (22.0 vs. 14.9 percent) (Figure 2.1). Among all adult age groups (i.e., 18 to 25, 26 to 49, 50 or older), females also were more likely than their male counterparts to have AMI in the past year.

- In 2012, the percentage of persons aged 18 or older with past year AMI varied by race/ethnicity. The percentage was 13.9 percent among Asians, 16.3 percent among Hispanics, 18.6 percent among blacks, 19.3 percent among whites, 20.7 percent among persons reporting two or more races, and 28.3 percent among American Indians or Alaska Natives. The estimate of past year AMI among Native Hawaiians or Other Pacific Islanders aged 18 or older could not be reported because of low precision (see Section B.2.2 in Appendix B).

- In 2012, the percentage of adults with past year AMI was higher among unemployed adults (25.5 percent) than among those who were employed either part time (19.8 percent) or full time (15.2 percent). Adults who were employed part time also were more likely than those who were employed full time to have AMI in the past year.

- The percentage of adults in 2012 with AMI in the past year was highest among those with a family income that was below the Federal poverty level (26.8 percent), followed by those with a family income at 100 to 199 percent of the Federal poverty level (21.8 percent), then by adults with a family income at 200 percent or more of the Federal poverty level (15.6 percent).

- In 2012, the percentage of adults who had AMI in the past year was higher among those who were covered by Medicaid or the Children's Health Insurance Program (CHIP)[4] (30.5 percent) than among those with no health insurance (22.3 percent), those with private health insurance (15.4 percent), and those with other forms of health insurance (19.5 percent). Having other forms of health insurance is defined as having Medicare, CHAMPUS, TRICARE, CHAMPVA, the VA, military health care, or any other type of health insurance.

- The percentage of adults in 2012 with AMI in the past year was higher among those who had not completed high school (21.9 percent) than among adults with some college but no degree (19.7 percent), a high school degree but no further education (18.7 percent), or a college degree (15.9 percent).

- The percentage of adults in 2012 with past year AMI was 33.6 percent among those on probation in the past year, which was higher than that among adults who were not on probation in the past year (18.3 percent). Similarly, among adults on parole or supervised release in the past year, the percentage having AMI was 33.4 percent, which was higher than the percentage having AMI among adults who were not on parole or supervised release in the past year (18.5 percent).

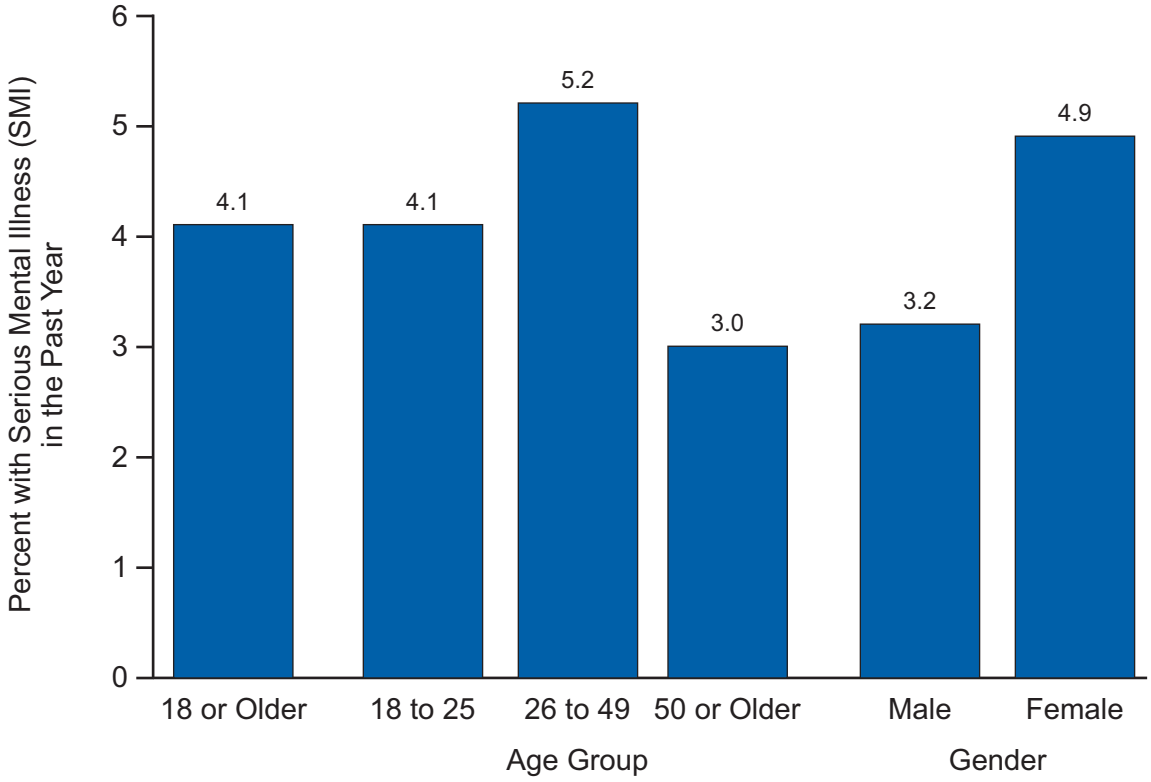
Serious Mental Illness

Public Law No. 102-321, the Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act of 1992, established a block grant for States within the United States to fund community mental health services for adults with SMI. The law required States to include prevalence estimates in their annual applications for block grant funds. This legislation also required SAMHSA to develop an operational definition of SMI. SAMHSA defined SMI as persons aged 18 or older who currently or at any time in the past year have had a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within DSM-IV (APA, 1994) that has resulted in serious functional impairment, which substantially interferes with or limits one or more major life activities.

[4] The estimate of AMI for adults who were covered either by Medicaid or CHIP refers to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

- In 2012, there were an estimated 9.6 million adults aged 18 or older in the United States with SMI in the past year. This represented 4.1 percent of all adults in this country in 2012 (Figure 2.2). The percentage of adults with past year SMI in 2012 was similar to that in 2008 (3.7 percent).

Figure 2.2 Serious Mental Illness in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2012



- The percentage of adults with past year SMI in 2012 was highest among adults aged 26 to 49 (5.2 percent), followed by those aged 18 to 25 (4.1 percent), then by those aged 50 or older (3.0 percent) (Figure 2.2).

- Women aged 18 or older in 2012 were more likely than men to have SMI in the past year (4.9 vs. 3.2 percent) (Figure 2.2).

- In 2012, the percentage of persons aged 18 or older with past year SMI varied by race/ethnicity. Percentages were 1.8 percent among Native Hawaiians or Other Pacific Islanders, 2.0 percent among Asians, 3.4 percent among blacks, 4.2 percent among whites, 4.2 percent among adults reporting two or more races, 4.4 percent among Hispanics, and 8.5 percent among American Indians or Alaska Natives.

- The percentage of adults with past year SMI in 2012 was higher among unemployed adults (7.8 percent) than among those who were employed either part time (3.9 percent) or full time (2.7 percent). Adults who were employed part time also were more likely than those who were employed full time to have SMI in the past year.

- In 2012, the percentage of adults with SMI in the past year was highest among those with a family income that was below the Federal poverty level (7.2 percent), followed by adults with a family income at 100 to 199 percent of the Federal poverty level (5.2 percent), then by adults with a family income at 200 percent or more of the Federal poverty level (3.0 percent).

- The percentage of adults in 2012 with SMI in the past year was higher among those who were covered by Medicaid or CHIP[5] (8.5 percent) than that among adults with no health insurance (6.1 percent), adults with private health insurance (2.7 percent), and those with other forms of health insurance (4.4 percent).

- The percentage of adults with a college degree who had SMI in the past year (3.1 percent) was lower than the percentages for adults with less than a high school education (4.8 percent), adults with a high school degree but no further education (4.4 percent), and adults who completed some college but did not receive a degree (4.4 percent).

- In 2012, the percentage of adults having past year SMI was higher among adults on probation in the past year (10.8 percent) than that among adults who were not on probation in the past year (3.9 percent). Similarly, among adults on parole or supervised release in the past year, 12.1 percent had past year SMI, which was higher than the percentage among adults who were not on parole or supervised release (4.0 percent).

Major Depressive Episode

A NSDUH module designed to obtain measures of lifetime and past year prevalence of MDE and treatment for depression has been administered to adults aged 18 or older since 2004. Some questions in the adult depression module differ slightly from questions in the adolescent depression module. Therefore, the MDE data for adults aged 18 or older should not be compared or combined with MDE data for youths aged 12 to 17.

MDE, as defined in NSDUH, is based on the definition of MDE in the DSM-IV (APA, 1994) and is measured for the lifetime and past year periods. Lifetime MDE is defined as having at least five or more of nine symptoms of depression in the same 2-week period in a person's lifetime, in which at least one of the symptoms was a depressed mood or loss of interest or pleasure in daily activities. Respondents who had MDE in their lifetime were defined as having past year MDE if they had a period of depression lasting 2 weeks or longer in the past 12 months while also having some of the other symptoms of MDE. It should be noted that, unlike the DSM-IV criteria for MDE, no exclusions were made in NSDUH for depressive symptoms caused by medical illness, bereavement, or substance use disorders. Treatment for MDE in adults is defined as seeing or talking to a health professional or other professional or using prescription

[5] The estimate of SMI for adults who were covered either by Medicaid or CHIP refers to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

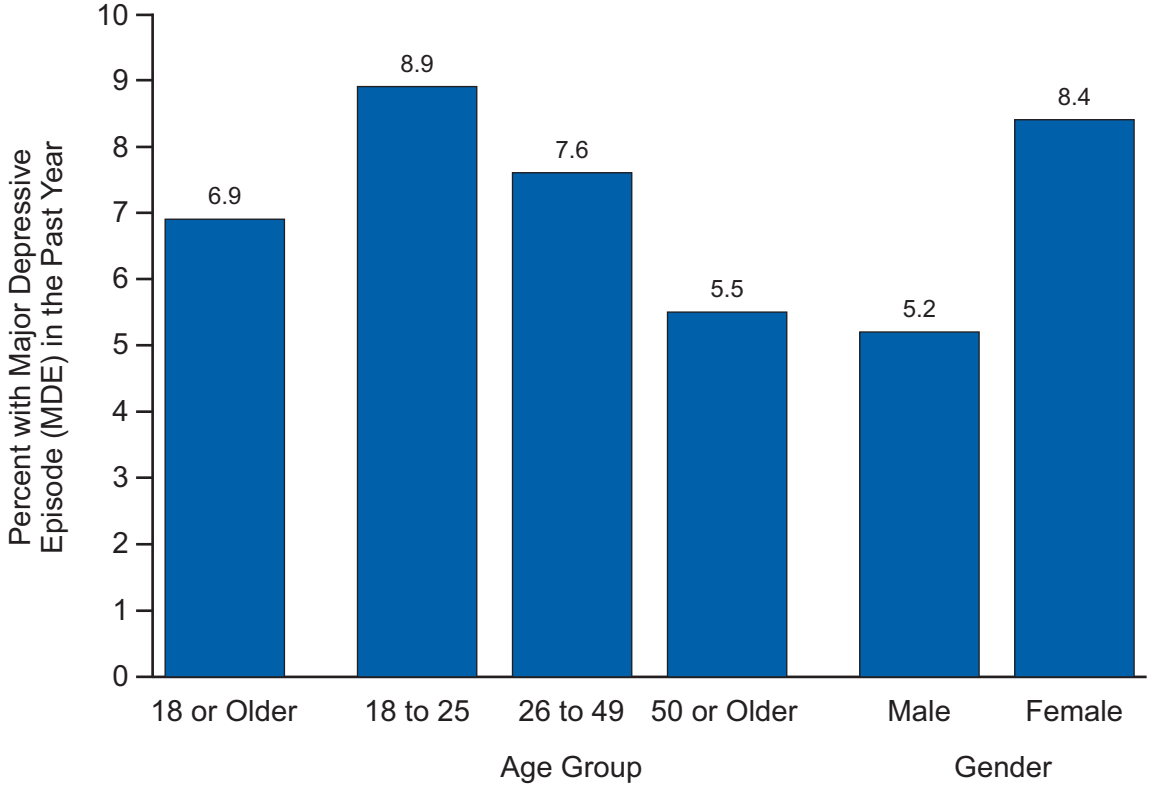
medication for depression in the past year. The specific questions used to measure MDE and a discussion of measurement issues are included in Section B.4.4 in Appendix B of this report.

Adding new adult mental health questions in 2008 (i.e., the past 30-day Kessler-6 or K6 scale, the functional impairment scale[s], and the suicidal thoughts and behavior items) may have affected how respondents reported their symptoms in the adult MDE module; for further discussion, see Sections B.4.2 and B.4.4 in Appendix B of this report and Sections B.4.4 and B.4.7 in Appendix B of the 2008 NSDUH national findings report (Office of Applied Studies, 2009). These changes in 2008 caused discontinuities in trends for MDE among adults. However, an adjustment was applied to estimates of MDE that were affected by these questionnaire changes to allow trends in MDE among adults for 2005 to 2012 to be included in this report.

- In 2012, 6.9 percent of adults aged 18 or older (16.0 million people) had at least one MDE in the past year (Figure 2.3). The percentage of adults who had a past year MDE remained stable between 2005 (6.6 percent) and 2012 (6.9 percent).

- Among adults aged 18 or older, the percentage having past year MDE in 2012 was lowest for those aged 50 or older (5.5 percent), followed by those aged 26 to 49 (7.6 percent), then by those aged 18 to 25 (8.9 percent) (Figure 2.3).

Figure 2.3 Major Depressive Episode in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2012



- In 2012, the percentage of adults with past year MDE was higher among women than among men (8.4 vs. 5.2 percent) (Figure 2.3). Among women, the percentage having MDE was lowest among women aged 50 or older (6.5 percent), followed by women aged 26 to 49 (9.4 percent), then by those aged 18 to 25 (11.6 percent).

- Past year MDE among adults varied by race/ethnicity in 2012. The percentage of adults with past year MDE was 3.2 percent among Asians, 6.3 percent among blacks, 7.0 percent among Hispanics, 7.1 percent among whites, 7.7 percent among adults reporting two or more races, and 10.0 percent among American Indians or Alaska Natives. The percentage among Native Hawaiians or Other Pacific Islanders could not be reported because of low precision (see Section B.2.2 in Appendix B).

- Among adults in 2012, the percentage having past year MDE was higher among unemployed persons (11.4 percent) and persons who were employed part time (7.9 percent) than among those who were employed full time (5.0 percent).

- Among the 16.0 million adults aged 18 or older who had MDE in the past year, 10.9 million (68.0 percent) received treatment (i.e., saw or talked to a medical doctor or other professional or used prescription medication) for depression in the same time period (Figure 2.4).

- Adults aged 50 years or older in 2012 with past year MDE were most likely to receive treatment for depression in the past year (76.8 percent), followed by those aged 26 to 49 with past year MDE (68.8 percent), then by those aged 18 to 25 with past year MDE (49.8 percent) (Figure 2.4).

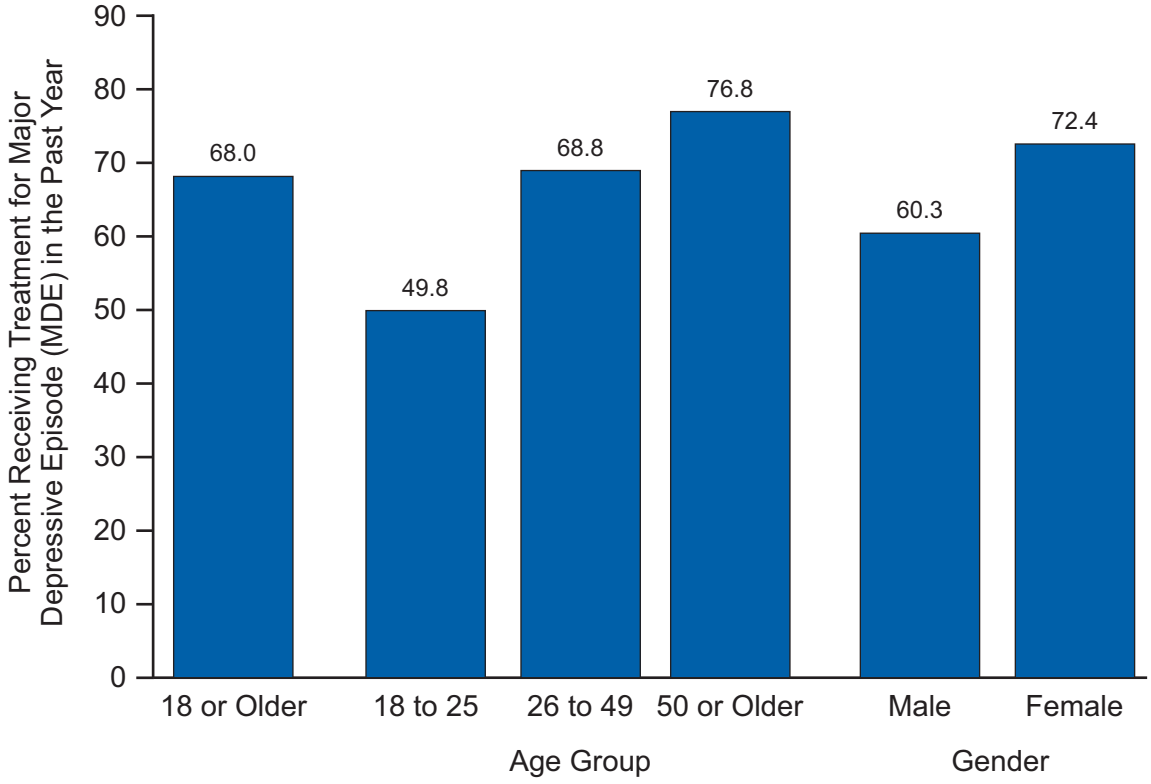
- In 2012, women aged 18 or older who had MDE in the past year were more likely than their male counterparts to have received treatment for depression in the past year (72.4 vs. 60.3 percent) (Figure 2.4).

- Among adults aged 18 or older in 2012 with past year MDE, about half of those with no health insurance coverage (50.2 percent) received treatment for depression in the past year. This percentage was lower than those for adults with past year MDE who had private insurance (68.6 percent), those who were covered by Medicaid or CHIP[6] (77.9 percent), or those with other forms of health insurance (79.4 percent).

- Among adults aged 18 or older in 2012 with past year MDE, there were similar rates for receiving treatment in the past year by poverty level (69.6 percent for those with a family income that was below the Federal poverty level, 64.2 percent for those with a family income at 100 to 199 percent of the Federal poverty level, and 69.2 percent for those with a family income at 200 percent or more of the Federal poverty level).

[6] The estimate of MDE for adults who were covered either by Medicaid or CHIP refers to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

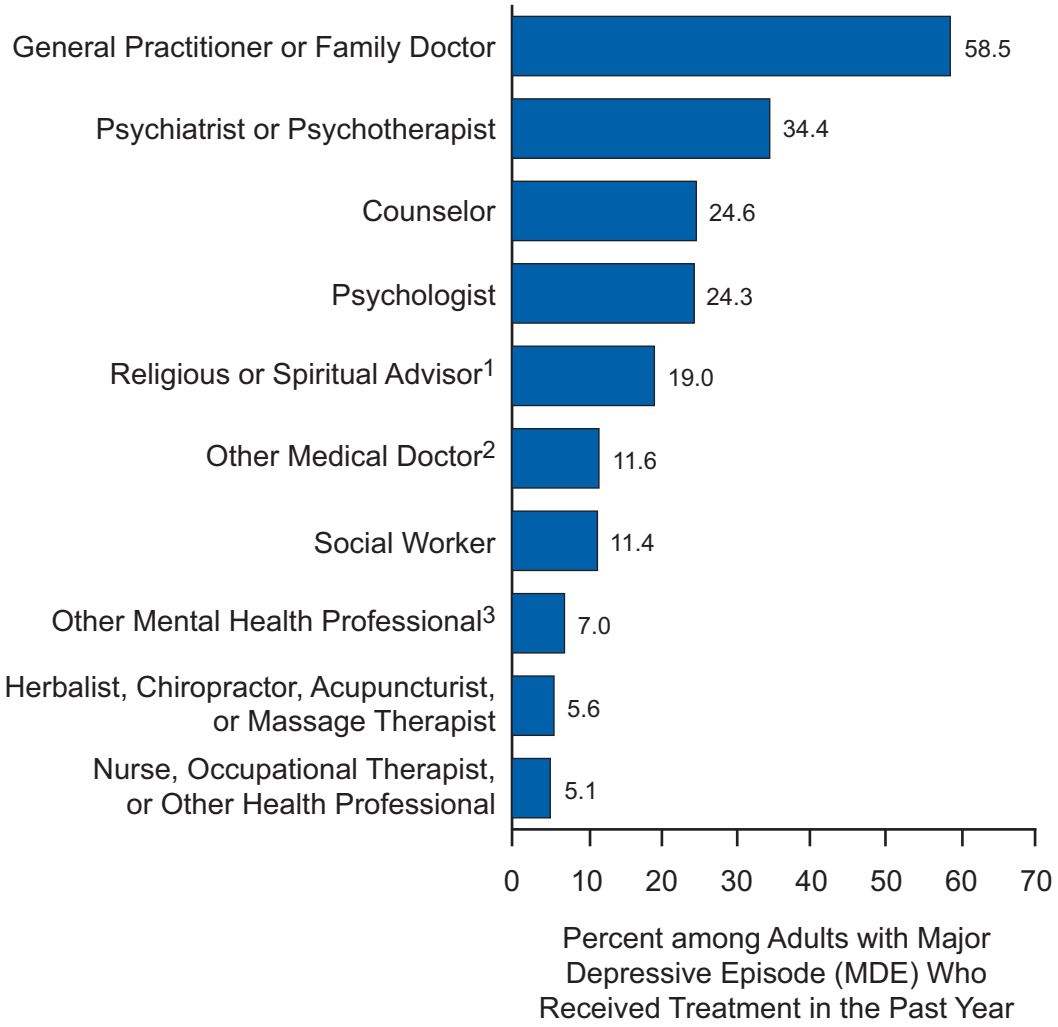
Figure 2.4 Receipt of Treatment for Major Depressive Episode in the Past Year among Adults Aged 18 or Older Who Had a Major Depressive Episode in the Past Year, by Age and Gender: 2012



- Adults aged 18 or older in 2012 with past year MDE who saw or talked to a health professional or other professional about depression in the past year were seen most commonly by general practitioners or family doctors (58.5 percent), followed by psychiatrists or psychotherapists (34.4 percent), then by counselors (24.6 percent) or psychologists (24.3 percent) (Figure 2.5).

- In 2012, 45.0 percent of adults with past year MDE received treatment for depression through a combination of seeing or talking to a health professional or other professional and using prescription medication. In contrast, 14.1 percent saw or talked to a health professional or other professional only, and 6.6 percent used prescription medication only.

Figure 2.5 Type of Professional Seen among Adults Aged 18 or Older with a Major Depressive Episode Who Received Treatment in the Past Year: 2012



[1] Religious or Spiritual Advisor includes ministers, priests, or rabbis.

[2] Other Medical Doctor includes cardiologists, gynecologists, urologists, and other medical doctors who are not general practitioners or family doctors.

[3] Other Mental Health Professional includes mental health nurses and other therapists where type is not specified.

Mental Health Service Utilization among Adults

This section presents data on the receipt of mental health services among adults aged 18 or older, the perceived unmet need for mental health services among adults, and reasons for not receiving mental health services among adults with an unmet need. Adults are asked whether they received treatment or counseling for any problem with emotions, "nerves," or mental health in the past year in any inpatient or outpatient setting or used prescription medication in the past year for a mental or emotional condition, not including treatment for use of alcohol or illicit drugs. The treatment questions in this module do not ask specifically about treatment for a particular disorder. Consequently, references to treatment or counseling for any problem with emotions, nerves, or mental health are described broadly as "mental health service use" or receiving/needing "mental health care."

Questions in NSDUH on mental health service utilization are asked of all adults and are not limited to those with a mental health disorder. Questions for adults about treatment for MDE also are asked in a section of the interview that is separate from these other questions about mental health service utilization. Thus, respondents could indicate receipt of treatment for depression in the adult MDE section without having indicated in the mental health service utilization section that they received services for any problems with emotions, nerves, or mental health.

Estimates of the receipt of mental health services are presented by level of mental illness for adults. These include AMI and three levels of mental illness among those with AMI: low (mild) mental illness, moderate mental illness, and SMI. Definitions for AMI and SMI among persons aged 18 or older were described previously. Low (mild) mental illness was defined as mental illness with mild impairment in carrying out major life activities; moderate mental illness was defined as mental illness with moderate impairment in carrying out major life activities (see Section B.4.3 in Appendix B for additional details on the procedures for constructing these measures).[7] As noted previously, estimates of the receipt of mental health services among adults with AMI, SMI, or other levels of mental illness for 2008 to 2011 are based on an improved methodology to generate estimates of mental illness and therefore are different from corresponding estimates in prior reports. The improved methodology is used to generate estimates of mental illness for each year from 2008 to 2012, which allows statements to be made about trends in mental health service utilization among adults by level of mental illness.

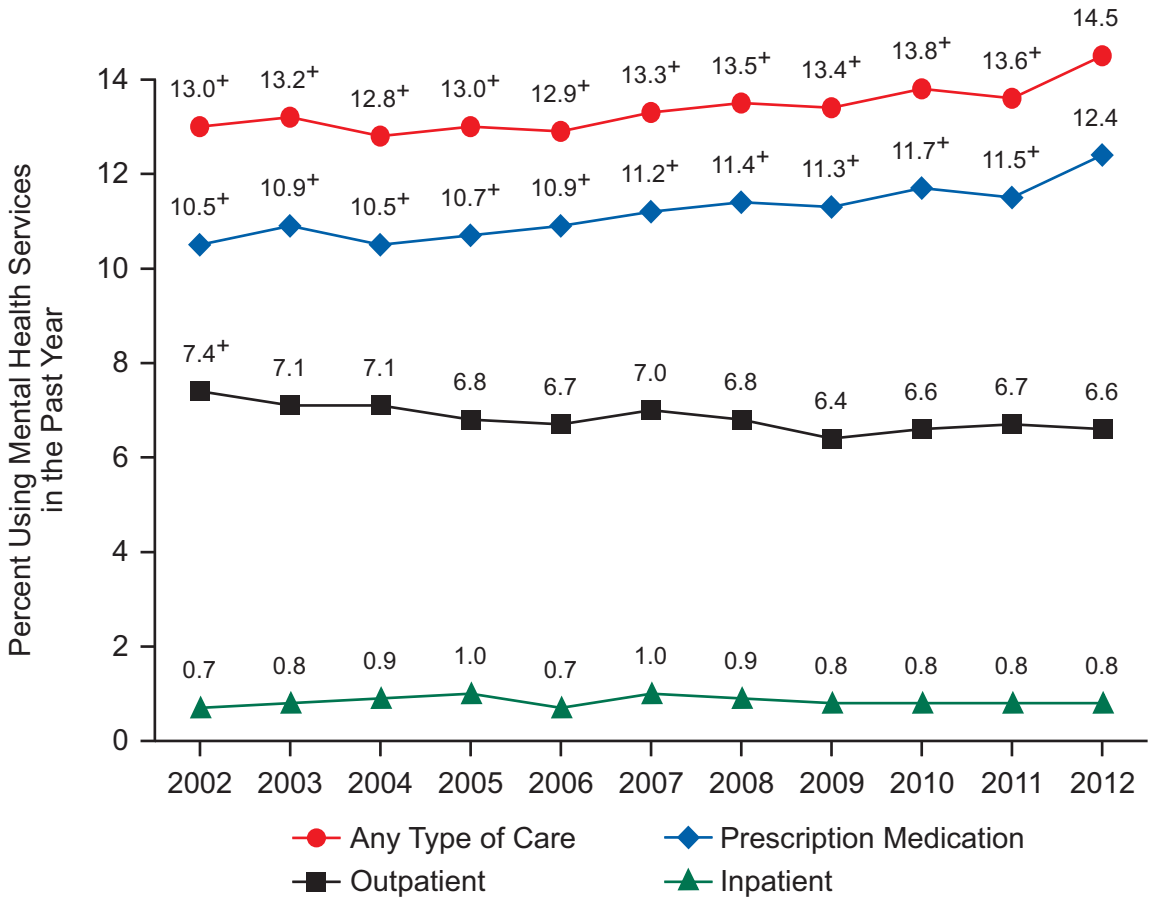
Also described in this section are estimates of the perceived unmet need for mental health services and reasons for not receiving mental health services among adults aged 18 or older with an unmet need. Unmet need is established using a question that asks whether a respondent perceived a need for, but did not receive, mental health treatment or counseling at any time in the 12 months prior to the NSDUH interview. This measure also includes persons who received some type of mental health service in the past 12 months but reported a perceived need for additional services they did not receive.

[7] Also see the entry for mental illness in the glossary included as part of the 2012 mental health detailed tables (for access information, see Chapter 1).

It is important to note that because the survey covers the U.S. civilian, noninstitutionalized population, persons residing in long-term psychiatric or other institutions continuously throughout the year were not included in the NSDUH sampling frame (see Section A.1 in Appendix A and Section B.1 in Appendix B). However, persons who were hospitalized or institutionalized for a period of time during the survey period, but who resided in households for most of the survey period were included in the sample.

- In 2012, 34.1 million persons aged 18 or older (14.5 percent of the population aged 18 or older) received mental health treatment or counseling during the past 12 months (Figure 2.6). The number and the percentage were higher than those in 2011 (31.6 million persons and 13.6 percent).

Figure 2.6 Past Year Mental Health Service Use among Adults Aged 18 or Older, by Type of Care: 2002-2012



+Difference between this estimate and the 2012 estimate is statistically significant at the .05 level.

- The use of mental health services in the past year varied by age for adults. The percentages who used mental health services were higher among adults aged 26 to 49 (15.2 percent) and those aged 50 or older (14.8 percent) than among those aged 18 to 25 (12.0 percent).

- Among adults aged 18 or older in 2012, women were more likely than men to use mental health services in the past year (18.6 vs. 10.2 percent).

- Among racial/ethnic groups, the rates of past year mental health service use among adults aged 18 or older in 2012 were 4.4 percent for Asians, 5.3 percent for Native Hawaiians or Other Pacific Islanders, 7.1 percent for Hispanics, 10.2 percent for blacks, 14.2 percent for persons reporting two or more races, 15.4 percent for American Indians or Alaska Natives, and 17.8 percent for whites.

- In 2012, the percentage of adults using mental health services in the past year was higher among adults aged 18 or older who were covered by Medicaid or CHIP[8] (21.4 percent) compared with percentages of adults with private health insurance (14.2 percent), adults without health insurance coverage (10.4 percent), and adults with other forms of health insurance coverage (16.4 percent).

- In 2012, the type of mental health service most commonly used by adults in the past year was prescription medication (12.4 percent or 29.0 million adults), followed by outpatient services (6.6 percent or 15.5 million adults), then by inpatient services (0.8 percent or 1.9 million adults) (Figure 2.6). Percentages of adults who used outpatient services or inpatient services in 2012 were similar to those in 2011 (6.7 and 0.8 percent, respectively). However, there was an increase between 2011 and 2012 in the percentage of adults who received prescription medication (11.5 vs. 12.4 percent). Note that respondents could report using more than one type of mental health care.

- Between 2002 and 2012, the percentage of adults using outpatient services in the past year declined from 7.4 to 6.6 percent, and the percentage using prescription medication increased from 10.5 to 12.4 percent (Figure 2.6).

- In 2012, adult women aged 18 or older were more likely than adult men to use outpatient mental health services (8.6 vs. 4.5 percent) or prescription medication (15.9 vs. 8.6 percent) for mental health problems in the past year.

- Among adults aged 18 or older in 2012 who reported using mental health services in the past year, 66.7 percent used one type of care (inpatient, outpatient, or prescription medication), 30.7 percent used two types of care, and 2.6 percent used all three types of care.

- Among adults aged 18 or older in 2012 who used outpatient mental health services in the past year, several types of locations were reported where services were received. These included an office of a private therapist, psychologist, psychiatrist, social worker, or counselor that was not part of a clinic (55.1 percent); an outpatient mental health clinic or center (23.5 percent); a doctor's office that was not part of a clinic (20.1 percent); or an outpatient medical clinic (6.6 percent).

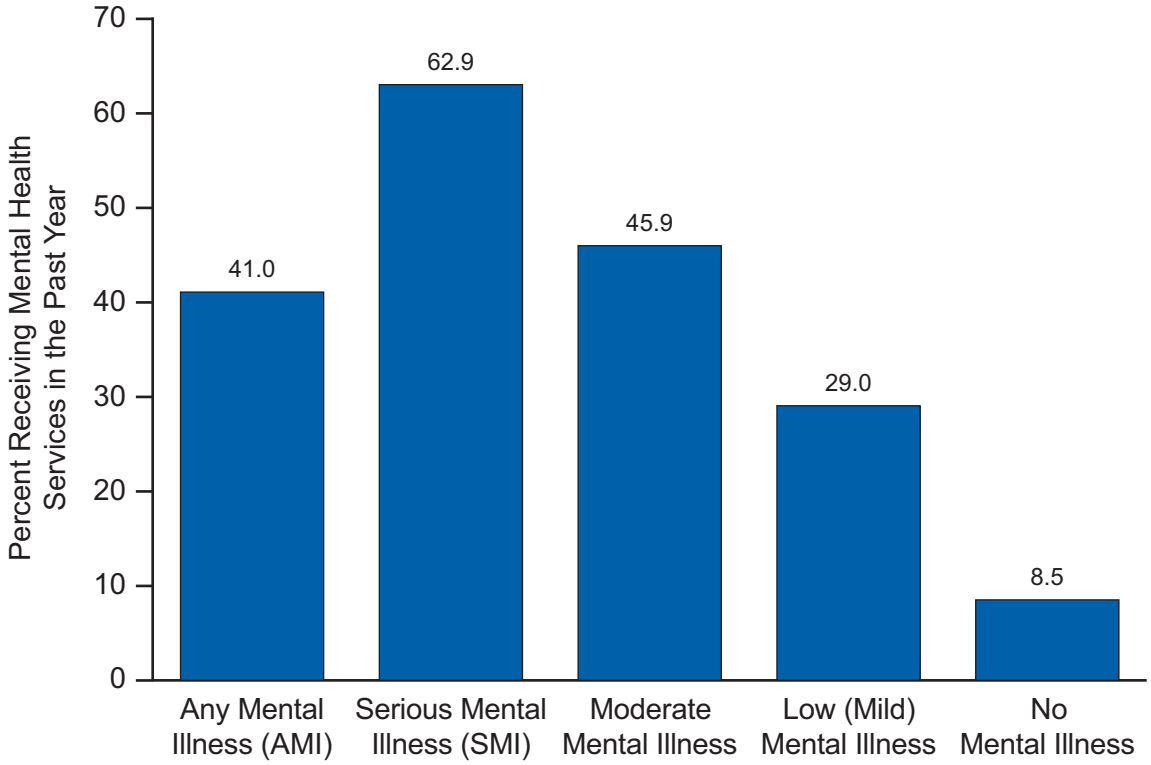
- In 2012, the most likely sources of payment for outpatient mental health services among adults aged 18 or older who used outpatient mental health services in the past year were

[8] The estimate of mental health service use for adults who were covered either by Medicaid or CHIP refers to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

private health insurance (40.7 percent) and self-payment or payment by a family member living in the household (37.2 percent), followed by Medicare (13.5 percent), then by Medicaid (10.1 percent) or an employer (6.3 percent).

- Among the 43.7 million adults aged 18 or older with AMI in 2012, 17.9 million (41.0 percent) received mental health services in the past year (Figure 2.7). Also, among the 9.6 million adults aged 18 or older with SMI in 2012, 6.0 million (62.9 percent) received mental health services in the past year. Mental health services were received by 45.9 and 29.0 percent of adults with moderate mental illness and low (mild) mental illness, respectively.

Figure 2.7 Receipt of Mental Health Services among Adults Aged 18 or Older, by Level of Mental Illness: 2012



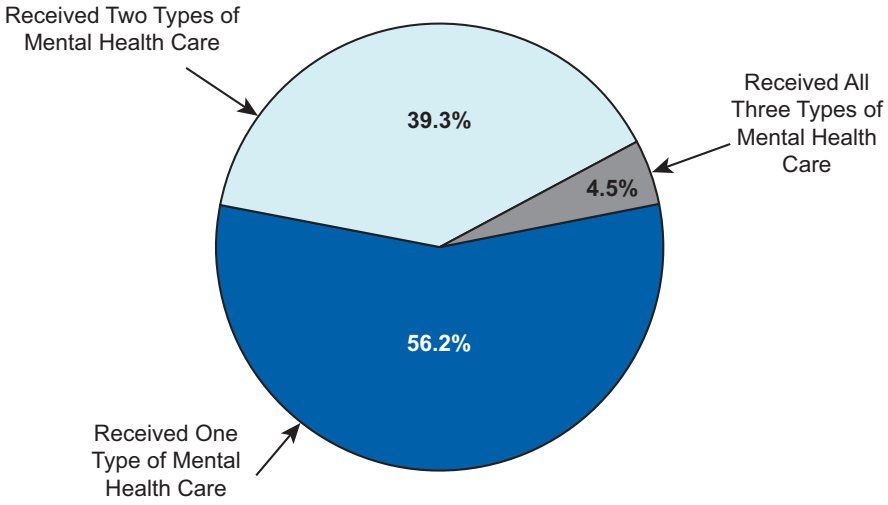
- Rates of mental health service use were similar in 2011 and 2012 among adults with SMI (64.9 and 62.9 percent, respectively) and among adults with AMI (40.8 and 41.0 percent, respectively).

- Among adults with SMI in 2012, the rate of mental health service use was lower among adults aged 18 to 25 (53.1 percent) than that among adults aged 26 to 49 (63.5 percent) and those aged 50 or older (66.3 percent).

- In 2012, among all adults aged 18 or older with past year AMI, 35.3 percent used prescription medication, 22.4 percent used outpatient services, and 3.0 percent used inpatient services for a mental health problem in the past year. The percentages of adults with past year SMI who used prescription medication, outpatient services, and inpatient services were 57.8, 39.0, and 6.2 percent, respectively. Respondents could report that they used more than one type of service.

- Among the 17.9 million adults aged 18 or older in 2012 with past year AMI who reported receiving mental health services in the past year, 56.2 percent received one type of care (inpatient, outpatient, or prescription medication), 39.3 percent received two types of care, and 4.5 percent received all three types of care (Figure 2.8).

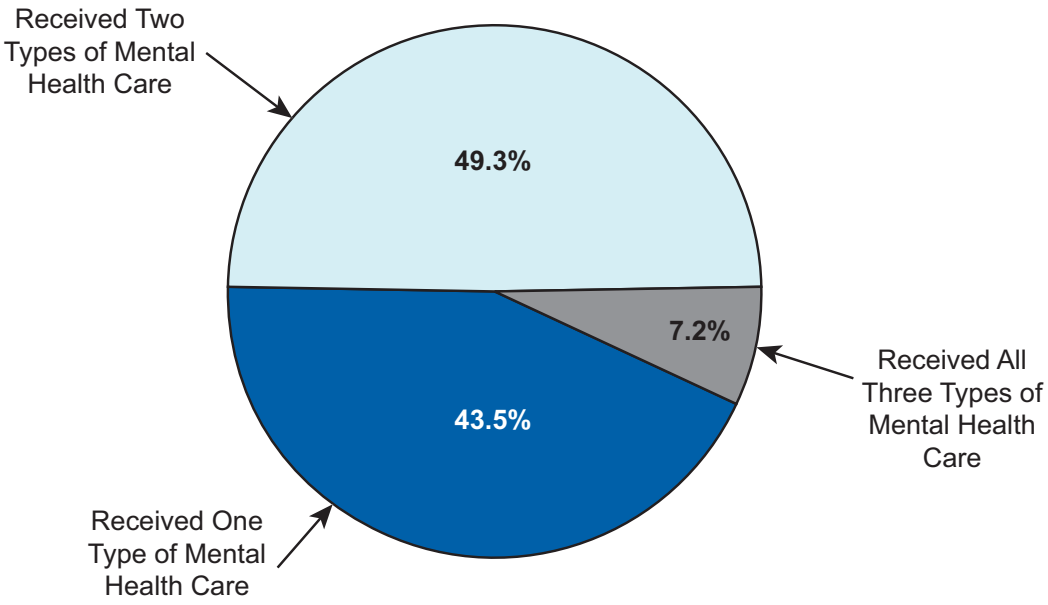
Figure 2.8 Number of Types of Mental Health Services Received among Adults Aged 18 or Older with Past Year Any Mental Illness Who Received Mental Health Services in the Past Year: 2012



Note: The three types of mental health care are receiving inpatient care, outpatient care, or prescription medication.

- Among the 6.0 million adults aged 18 or older in 2012 with past year SMI who reported receiving mental health services in the past year, 43.5 percent received one type of care (inpatient, outpatient, or prescription medication), 49.3 percent received two types of care, and 7.2 percent received all three types of care (Figure 2.9).

Figure 2.9 Number of Types of Mental Health Services Received among Adults Aged 18 or Older with Past Year Serious Mental Illness Who Received Mental Health Services in the Past Year: 2012



Note: The three types of mental health care are receiving inpatient care, outpatient care, or prescription medication.

- Among adults aged 18 or older in 2012 who reported receiving mental health services in the past year, the percentages receiving one type of mental health service (inpatient, outpatient, or prescription medication) were 43.5 percent among adults with past year SMI, 57.2 percent among adults with past year moderate mental illness, and 67.3 percent among adults with past year low (mild) mental illness.

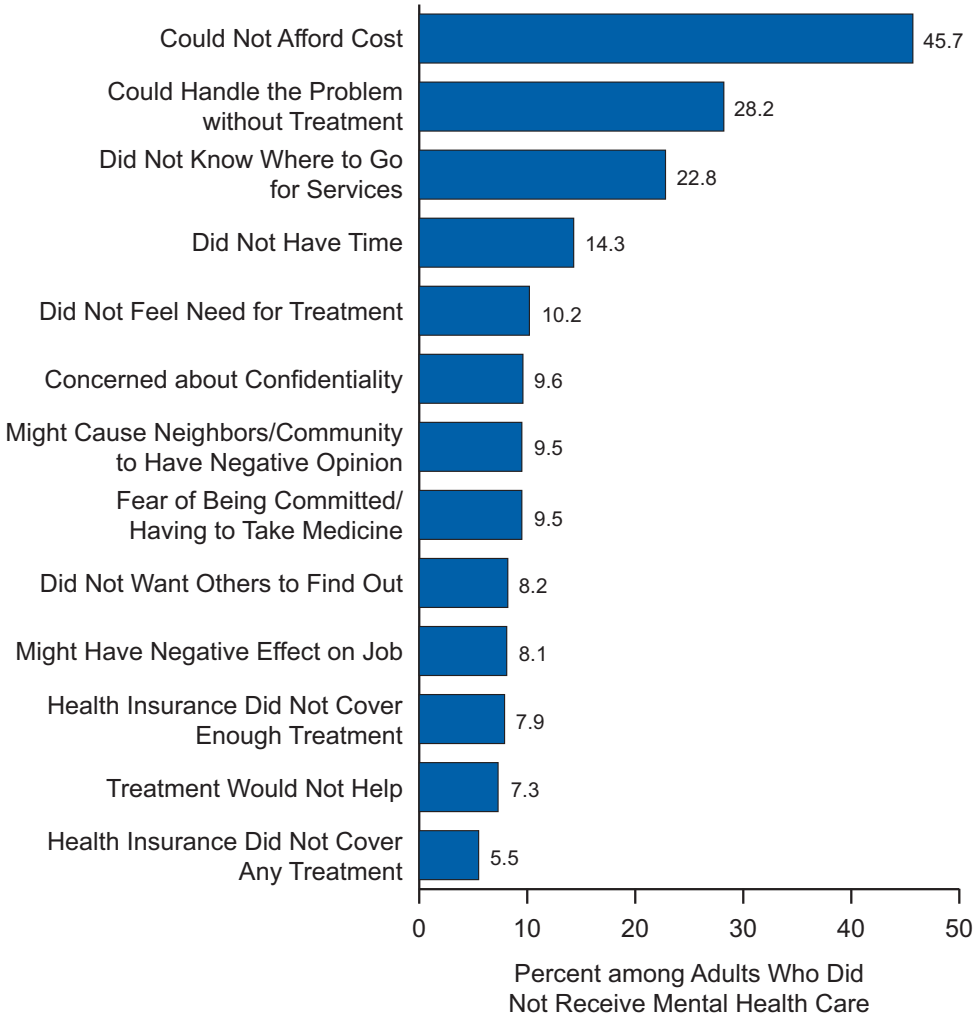
- Among adults aged 18 or older, receipt of prescription medication for mental health problems varied by level of mental illness in the past year. In 2012, 57.8 percent of adults with SMI, 38.3 percent of adults with moderate mental illness, and 24.0 percent of adults with low (mild) mental illness received prescription medication for their mental health problems in the past year.

- In 2012, there were 11.5 million adults aged 18 or older (4.9 percent of all adults) who reported an unmet need for mental health care in the past year. These included 5.4 million adults who did not receive any mental health services in the past year. Among adults who did receive some type of mental health service in the past year, 17.8 percent (6.1 million)

reported an unmet need for mental health care. (Unmet need among adults who received mental health services may reflect a delay in care or a perception of insufficient care.)

- Among the 5.4 million adults aged 18 or older in 2012 who reported an unmet need for mental health care and did not receive mental health services in the past year, several reasons were reported for not receiving mental health care. These included an inability to afford the cost of care (45.7 percent), believing at the time that the problem could be handled without treatment (28.2 percent), not knowing where to go for services (22.8 percent), and not having the time to go for care (14.3 percent) (Figure 2.10).

Figure 2.10 Reasons for Not Receiving Mental Health Services in the Past Year among Adults Aged 18 or Older with an Unmet Need for Mental Health Care Who Did Not Receive Mental Health Services: 2012



3. Suicidal Thoughts and Behavior

This chapter presents findings from the 2012 National Survey on Drug Use and Health (NSDUH) on the prevalence of suicidal thoughts and behavior among civilian, noninstitutionalized adults aged 18 or older in the United States. The data in this chapter are based on a set of questions that have been included in the NSDUH questionnaire since 2008. These questions ask all adult respondents if at any time during the past 12 months they had serious thoughts of suicide, and among those who had serious thoughts of suicide, whether they planned or attempted suicide in the past year. If an attempt was made, additional items ask whether the respondent received medical attention or was hospitalized as a result of a suicide attempt.

Some estimates discussed in this chapter are based on suicide survivors and may therefore be underestimates. However, the annual number of reported deaths by suicide is small relative to the annual number of persons reporting suicide thoughts, plans, and attempts in the United States. In 2010, for example, suicide was listed as the cause of death in fewer than 40,000 deaths among persons of all ages in the United States (Murphy, Xu, & Kochanek, 2013). In comparison, more than 1 million adults in 2010 reported making a suicide attempt in the past 12 months (Center for Behavioral Health Statistics and Quality, 2012b).

Having serious thoughts of suicide increases the risk of a person making an actual suicide attempt. A history of prior suicide attempts is one of the strongest predictors for death by suicide (Kessler, Berglund, Borges, Nock, & Wang, 2005; Suominen et al., 2004; U.S. Department of Health and Human Services, 2012). Thus, suicidal thoughts and behaviors are important public health concerns in the United States.

Suicidal Thoughts and Behavior among Adults

- In 2012, an estimated 9.0 million adults (3.9 percent) aged 18 or older had serious thoughts of suicide in the past year (Figure 3.1). The estimated number and percentage remained stable between 2008 (8.3 million persons and 3.7 percent) and 2012.

- In 2012, the percentage of adults having serious thoughts of suicide was highest among persons aged 18 to 25 (7.2 percent), followed by persons aged 26 to 49 (4.2 percent), then by persons aged 50 or older (2.4 percent) (Figure 3.1).

- In 2012, male and female adults had similar rates of having serious thoughts of suicide in the past year (3.6 and 4.1 percent, respectively).

- Among adults aged 18 or older in 2012, 2.7 million persons (1.1 percent) made suicide plans in the past year (Figure 3.2). The percentage of adults who made suicide plans in the past year was higher among persons aged 18 to 25 (2.4 percent) than among persons aged 26 to 49 (1.3 percent) and those aged 50 or older (0.6 percent). Moreover, among adults aged 18 to 25, the percentage of adults who made suicide plans in 2012 was higher than that in 2011 (1.9 percent).

Figure 3.1 Suicidal Thoughts in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2012

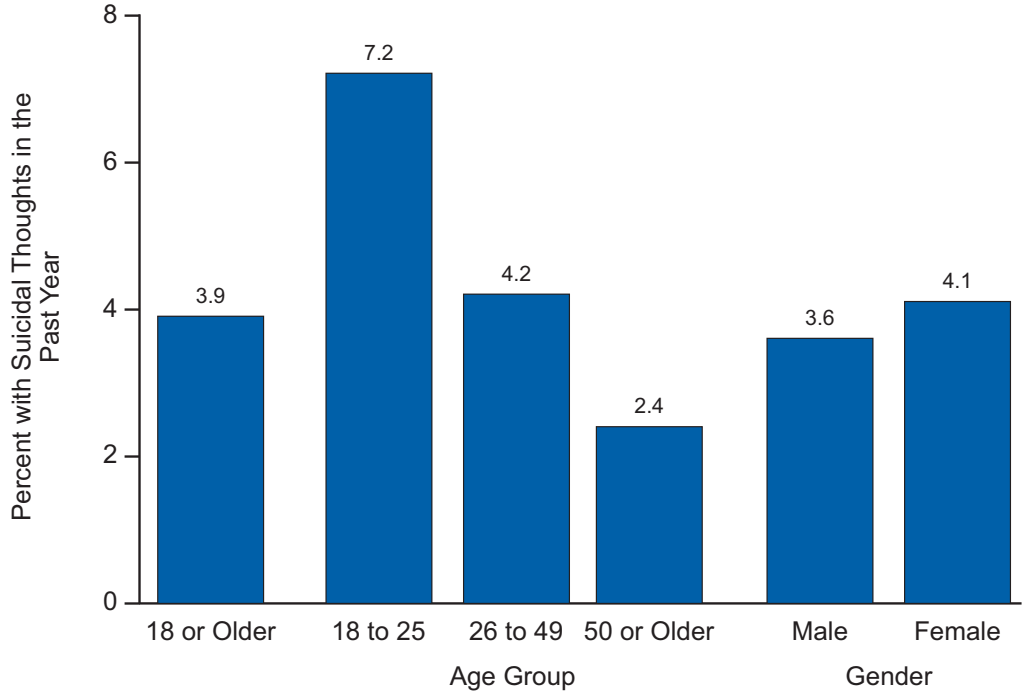
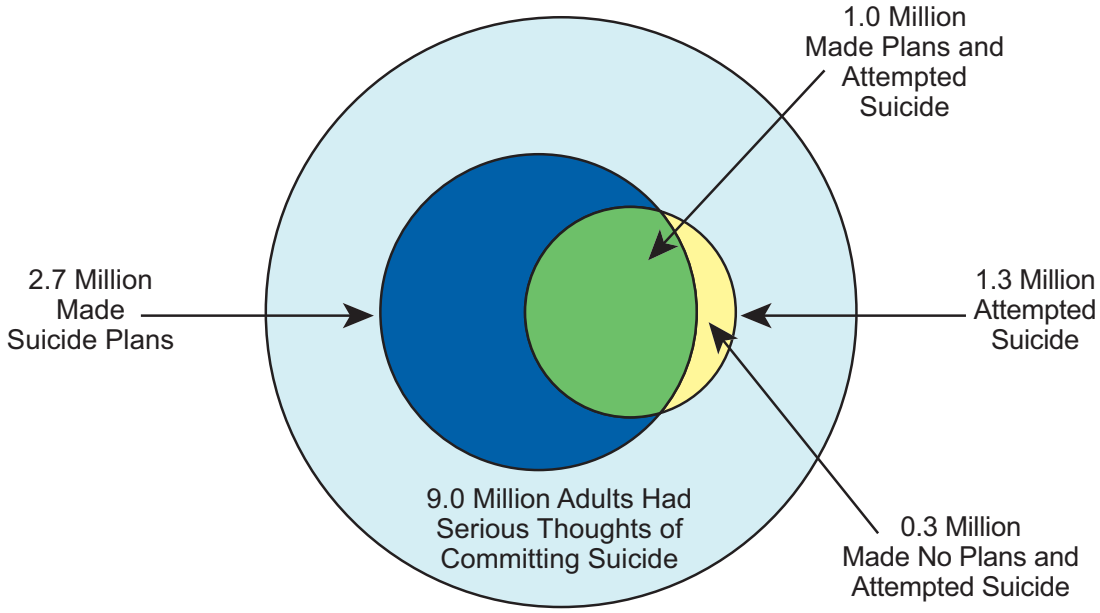


Figure 3.2 Suicidal Thoughts and Behavior in the Past Year among Adults Aged 18 or Older: 2012



- In 2012, 1.3 million adults (0.6 percent) aged 18 or older attempted suicide in the past year (Figure 3.2). Among these persons who attempted suicide, 1.0 million also reported making suicide plans, and 0.3 million did not make suicide plans.

- In 2012, the percentages of adults aged 18 or older having serious thoughts of suicide in the past year were 1.5 percent among Native Hawaiians or Other Pacific Islanders, 3.3 percent among Asians, 3.5 percent among Hispanics, 3.6 percent among blacks, 4.0 percent among whites, 5.5 percent among persons reporting two or more races, and 5.9 percent among American Indians or Alaska Natives.

- Among adults aged 18 or older in 2012, those who completed college were less likely to have serious thoughts of suicide (2.9 percent) than their counterparts who had not completed high school (4.5 percent), were high school graduates but had no further education (4.0 percent), or had completed some college but had not received a degree (4.4 percent).

- In 2012, adults who were unemployed in the past year were more likely than those who were employed full time or part time to have serious thoughts of suicide (7.2 vs. 3.2 and 4.0 percent, respectively), make suicide plans (2.6 vs. 0.8 and 1.2 percent, respectively), or attempt suicide (1.2 vs. 0.4 and 0.6 percent, respectively).

- Adults with Medicaid or those who were covered by the Children's Health Insurance Program (CHIP)[9] in 2012 were more likely than those with private health insurance to have serious thoughts of suicide (6.5 vs. 2.9 percent), make suicide plans (2.2 vs. 0.7 percent), or attempt suicide (1.2 vs. 0.3 percent) in the past year.

- In 2012, adults with annual family incomes at 200 percent or more of the Federal poverty level were less likely to have serious thoughts of suicide in the past year (3.0 percent) than their counterparts with family incomes below the Federal poverty level (5.8 percent) and their counterparts with family incomes between 100 and 199 percent of the Federal poverty level (5.0 percent).

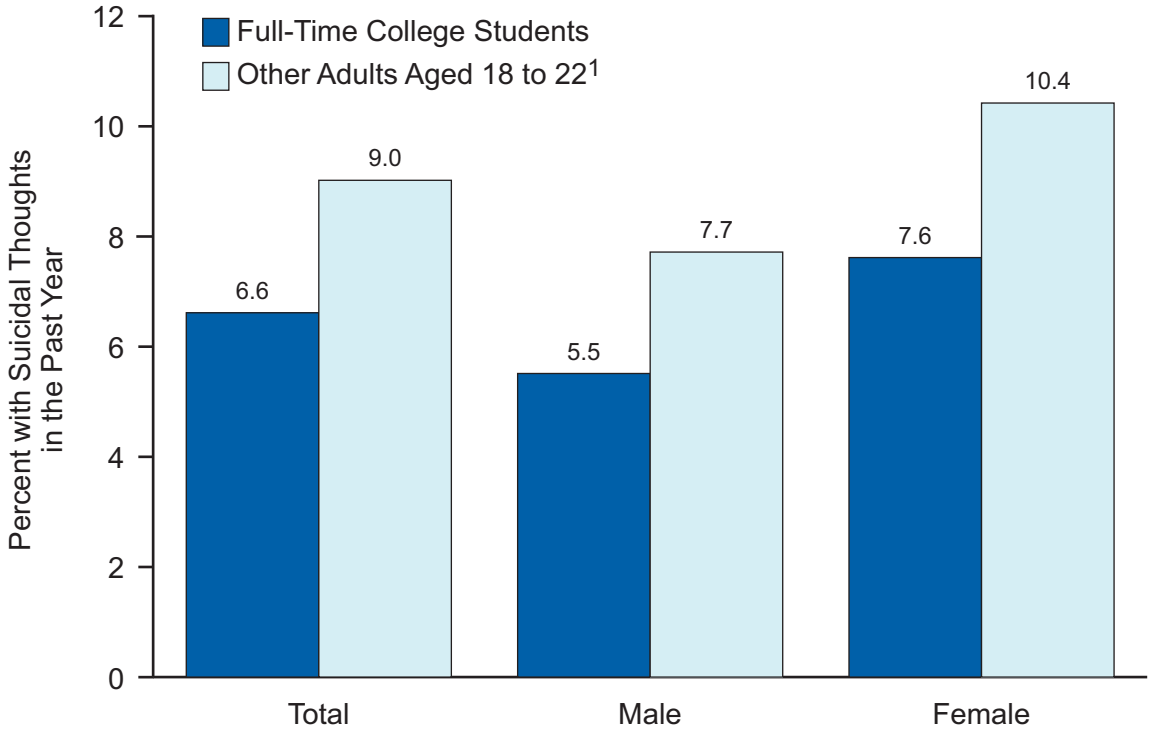
College Students

- In 2012, full-time college students aged 18 to 22 were less likely than other adults aged 18 to 22 to have serious thoughts of suicide (6.6 vs. 9.0 percent) (Figure 3.3), make suicide plans (2.2 vs. 3.1 percent), attempt suicide (1.1 vs. 2.2 percent), or receive medical attention as a result of a suicide attempt in the past year (0.5 vs. 1.0 percent).

- Male full-time college students aged 18 to 22 were less likely than other male adults aged 18 to 22 to have serious thoughts of suicide (5.5 vs. 7.7 percent) (Figure 3.3) and to make suicide plans (1.5 vs. 2.6 percent). However, similar percentages of males who were full-time college students and those were not in college full time attempted suicide (0.9 and 1.6 percent, respectively) or received medical attention as a result of a suicide attempt in the past year (0.5 and 0.7 percent, respectively).

[9] Estimates for adults who were covered either by Medicaid or CHIP refer to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

Figure 3.3 Suicidal Thoughts in the Past Year among Full-Time College Students Aged 18 to 22 and Other Adults Aged 18 to 22, by Gender: 2012



[1] Other adults include respondents aged 18 to 22 not enrolled in school, enrolled in college part time, enrolled in other grades either full or part time, or enrolled with no other information available.

- Female full-time college students aged 18 to 22 were less likely than other female adults aged 18 to 22 to have serious thoughts of suicide (7.6 vs. 10.4 percent) (Figure 3.3), attempt suicide (1.3 vs. 2.8 percent), or receive medical attention as a result of a suicide attempt in the past year (0.5 vs. 1.3 percent). However, similar percentages of females who were full-time college students and those who were not in college full time made suicide plans in the past year (2.7 and 3.7 percent, respectively).

Criminal Justice Populations

- In 2012, the rate of serious thoughts of suicide in the past year among adults aged 18 or older who were on parole or a supervised release from jail in the past 12 months (9.7 percent) was higher than that among their counterparts who were not on parole or a supervised release from jail during this period (3.8 percent).

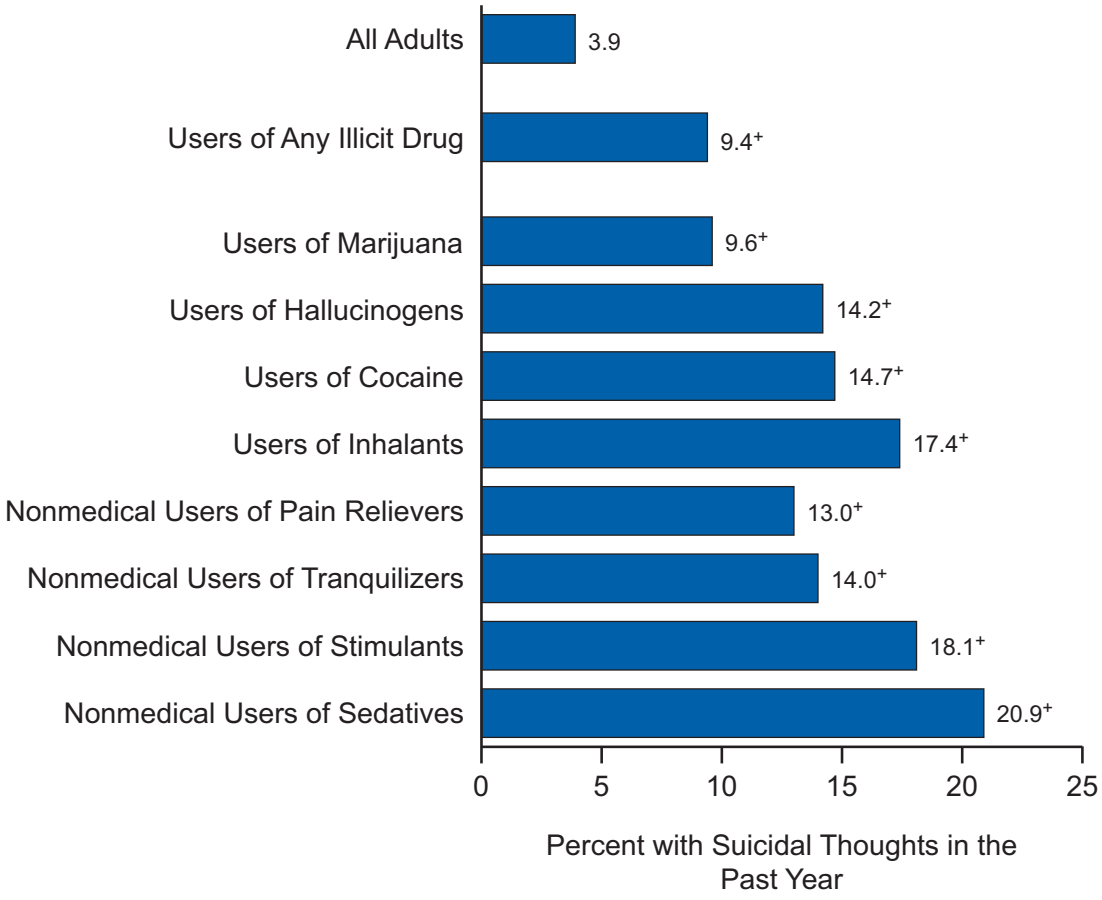
- Probation status was associated with serious thoughts of suicide. In 2012, the rate of serious thoughts of suicide in the past year among adults aged 18 or older who were on probation during the past 12 months (9.6 percent) was higher than that among their counterparts who were not on probation during this period (3.7 percent).

Suicidal Thoughts and Behavior among Adults Who Used Substances

Illicit Drug Use

- In 2012, adults aged 18 or older who used illicit drugs in the past year had higher rates of serious thoughts, plans, and attempts of suicide compared with all adults in the general population (i.e., including users and nonusers of illicit drugs in the past year). Among adults who used illicit drugs in the past year, 9.4 percent had serious thoughts of suicide (Figure 3.4), 3.2 percent made a suicide plan, and 1.6 percent attempted suicide in the past year. Corresponding rates among all adults aged 18 or older were 3.9, 1.1, and 0.6 percent, respectively.

Figure 3.4 Suicidal Thoughts in the Past Year among Adults Aged 18 or Older, by Past Year Use of Selected Illicit Drugs: 2012



+ Difference between this estimate and the estimate for all adults aged 18 or older is statistically significant at the .05 level.

Note: Illicit Drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically.

- Percentages of adults in 2012 who had serious thoughts of suicide in the past year were 9.6 percent among past year users of marijuana, 14.2 percent among past year users of hallucinogens, 14.7 percent among past year users of cocaine, and 17.4 percent among past year users of inhalants (Figure 3.4).

- In 2012, 12.8 percent of adults who were nonmedical users of psychotherapeutic drugs in the past year had serious thoughts of suicide in that period. Rates of serious thoughts of suicide in the past year among adults who were nonmedical users of specific categories of prescription drugs in the past year were 13.0 percent for pain relievers, 14.0 percent for tranquilizers, 18.1 percent for stimulants, and 20.9 percent for sedatives (Figure 3.4).

- Percentages of adults in 2012 who made suicide plans in the past year were 3.3 percent among past year users of marijuana, 5.0 percent among past year users of cocaine, 5.8 percent among past year users of hallucinogens, and 7.2 percent among past year users of inhalants.

- In 2012, 4.9 percent of adults who were nonmedical users of psychotherapeutic drugs in the past year made suicide plans in that period. Percentages of adults who made suicide plans in the past year among past year nonmedical users of specific categories of prescription drugs were 5.0 percent for pain relievers, 5.6 percent for tranquilizers, 5.9 percent for sedatives, and 8.7 percent for stimulants.

- Percentages of adults in 2012 who made suicide attempts in the past year were 1.7 percent among past year users of marijuana, 2.8 percent among past year users of heroin, 3.1 percent among past year users of cocaine, 3.7 percent among past year users of hallucinogens, and 4.3 percent among past year users of inhalants.

- In 2012, 2.2 percent of adults who were nonmedical users of psychotherapeutic drugs in the past year attempted suicide in that period. Percentages of adults who attempted suicide in the past year among past year nonmedical users of specific categories of prescription drugs were 2.1 percent for pain relievers, 2.4 percent for tranquilizers, 4.0 percent for stimulants, and 5.7 percent for sedatives.

Cigarette and Alcohol Use

- In 2012, among adults aged 18 or older who smoked cigarettes in the past year, 6.4 percent had serious thoughts of suicide, 2.1 percent made suicide plans, and 1.1 percent attempted suicide in the past year.

- Among adults aged 18 or older in 2012 who were binge alcohol users in the past month, 5.4 percent had serious thoughts of suicide, 1.5 percent made suicide plans, and 1.0 percent attempted suicide in the past year. Binge alcohol use is defined as having five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days.

- Among adults who were heavy alcohol users in the past month, 6.6 percent had serious thoughts of suicide, 1.9 percent made suicide plans, and 1.0 percent attempted suicide in the past year. Heavy alcohol use is defined as having five or more drinks on the same occasion on each of 5 or more days in the past 30 days.

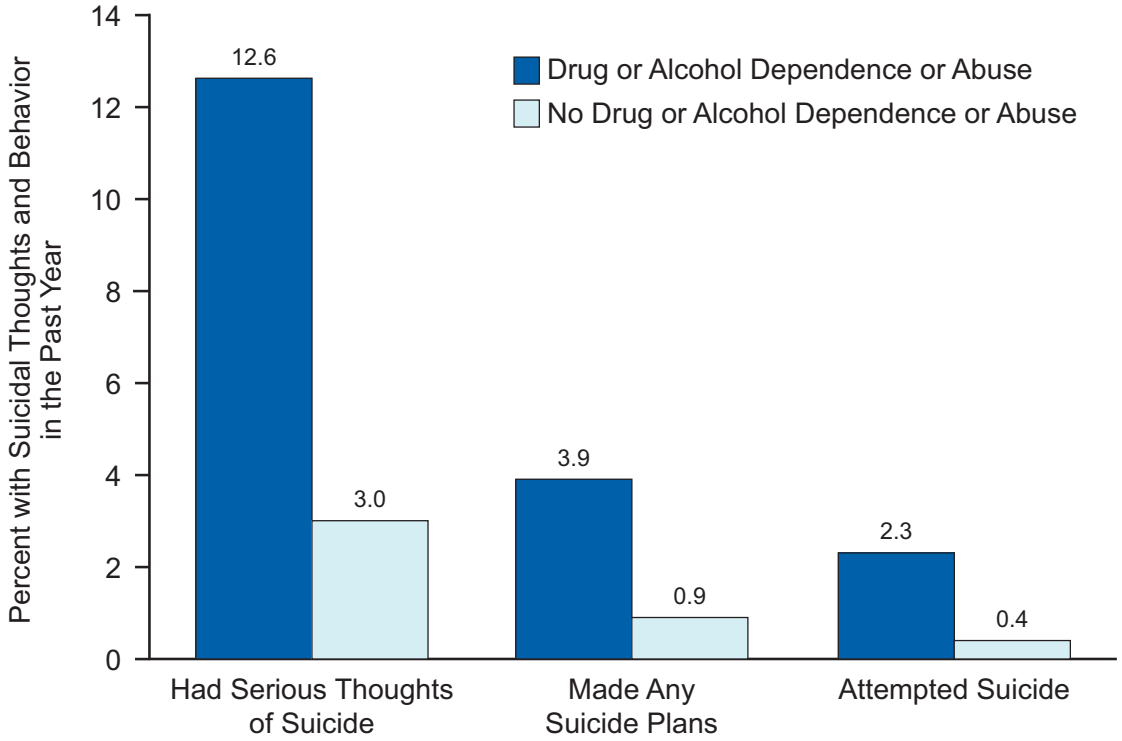
Suicidal Thoughts and Behavior among Adults with Substance Dependence or Abuse and Adults with Major Depressive Episode

- In 2012, among adults aged 18 or older who had substance dependence or abuse in the past year, 2.6 million (12.6 percent) had serious thoughts of suicide, 0.8 million (3.9 percent) made suicide plans, and 0.5 million (2.3 percent) attempted suicide in the past year.

- Among adults with past year alcohol dependence or abuse, 2.0 million (12.0 percent) had serious thoughts of suicide. Among adults with past year illicit drug dependence or abuse, 1.2 million (19.3 percent) had serious thoughts of suicide.

- Adults aged 18 or older who had past year substance dependence or abuse were more likely than those without substance dependence or abuse to have serious thoughts about suicide (12.6 vs. 3.0 percent), make suicide plans (3.9 vs. 0.9 percent), or attempt suicide (2.3 vs. 0.4 percent) in the past year (Figure 3.5).

Figure 3.5 Suicidal Thoughts and Behavior in the Past Year among Adults Aged 18 or Older, by Substance Dependence or Abuse: 2012



- Among the 16.0 million adults with a past year major depressive episode (MDE), 4.3 million (26.9 percent) had serious thoughts of suicide. MDE is based on the criteria in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 1994) and is described in Section B.4.4 in Appendix B.

4. Major Depressive Episode and Mental Health Service Utilization among Youths

This chapter presents findings from the National Survey on Drug Use and Health (NSDUH) on past year major depressive episode (MDE), MDE accompanied by severe impairment in one or more role domains, and the percentage receiving treatment for depression among youths aged 12 to 17 in the United States. This chapter also presents findings on mental health service utilization by youths for any emotional and behavioral problems (excluding those caused by alcohol or illicit drug use).

Major Depressive Episode (MDE), MDE with Severe Impairment, and Treatment

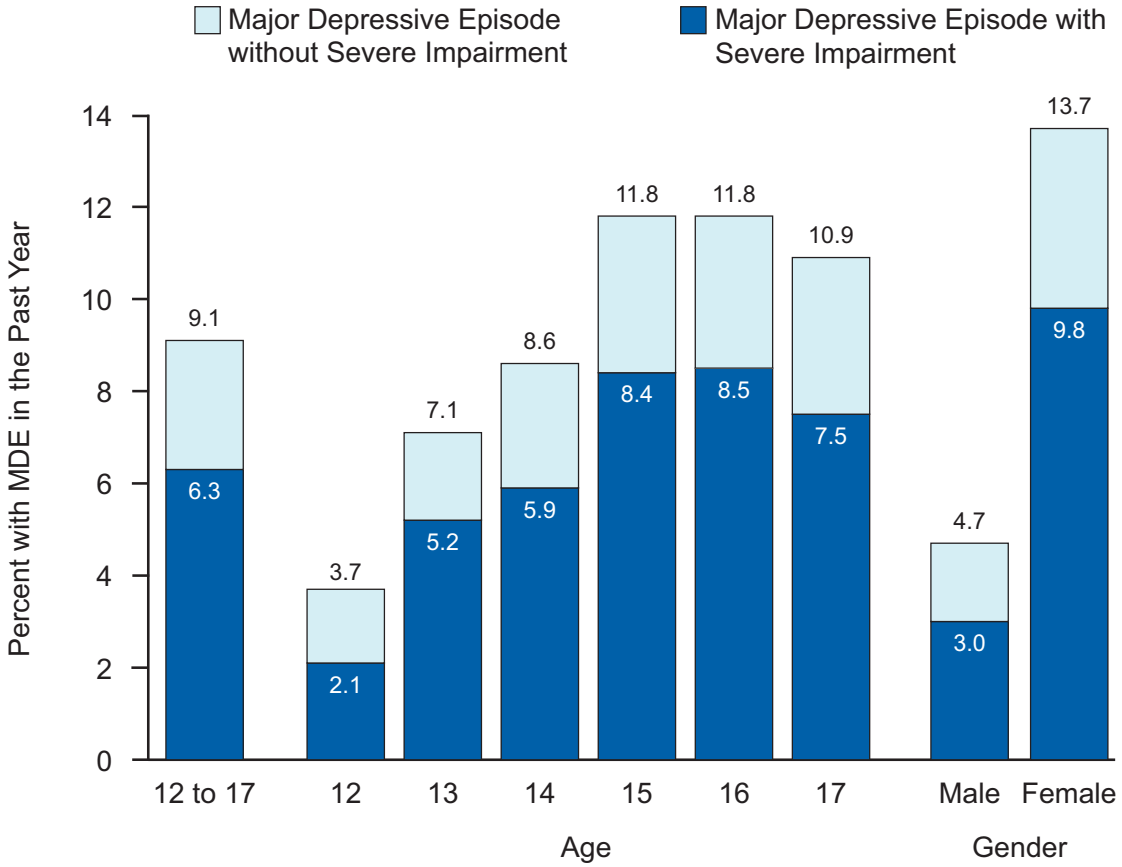
A module of questions designed to obtain measures of lifetime and past year prevalence of MDE, severe impairment caused by MDE in the past year, and treatment for MDE in the past year has been administered to youths aged 12 to 17 since 2004. As described in the next paragraph, some questions in the adolescent depression module differ slightly from questions in the adult depression module to make them more appropriate for youths. Therefore, these data should not be compared or combined with MDE data for adults aged 18 or older.

MDE is defined as a period of at least 2 weeks when a person experienced a depressed mood or loss of interest or pleasure in daily activities and had at least four of seven additional symptoms reflecting the criteria as described in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association [APA], 1994). Unlike the DSM-IV criteria for MDE, however, no exclusions were made in NSDUH for depressive symptoms caused by medical illness, bereavement, or substance use disorders. Severe impairment is defined by the level of role interference reported to be caused by MDE. The role domains (i.e., chores at home, school or work, close relationships with family, or social life) for youths aged 12 to 17 are slightly modified from those for adults to be made age appropriate. Treatment for MDE among youths is defined as seeing or talking to a medical doctor or other professional or using prescription medication for depression in the past year. The specific questions used to measure MDE and a discussion of measurement issues are included in Section B.4.4 of Appendix B.

- In 2012, 9.1 percent of the population aged 12 to 17 (2.2 million youths) had MDE during the past year (Figure 4.1). This was higher than the percentages in 2006 to 2011 (ranging from 7.9 to 8.3 percent) and was similar to the percentages in 2004 (9.0 percent) and 2005 (8.8 percent).

- In 2012, 6.3 percent of the population aged 12 to 17 (1.5 million youths) had past year MDE with severe impairment in one or more role domains (Figure 4.1). This was higher than the percentages in 2010 and 2011 (5.7 percent in each year) and in 2006 and 2007 (5.5 percent in each year), but it was similar to the percentages in 2008 (6.0 percent) and 2009 (5.8 percent).

Figure 4.1 Major Depressive Episode in the Past Year among Youths Aged 12 to 17, by Severe Impairment, Age, and Gender: 2012



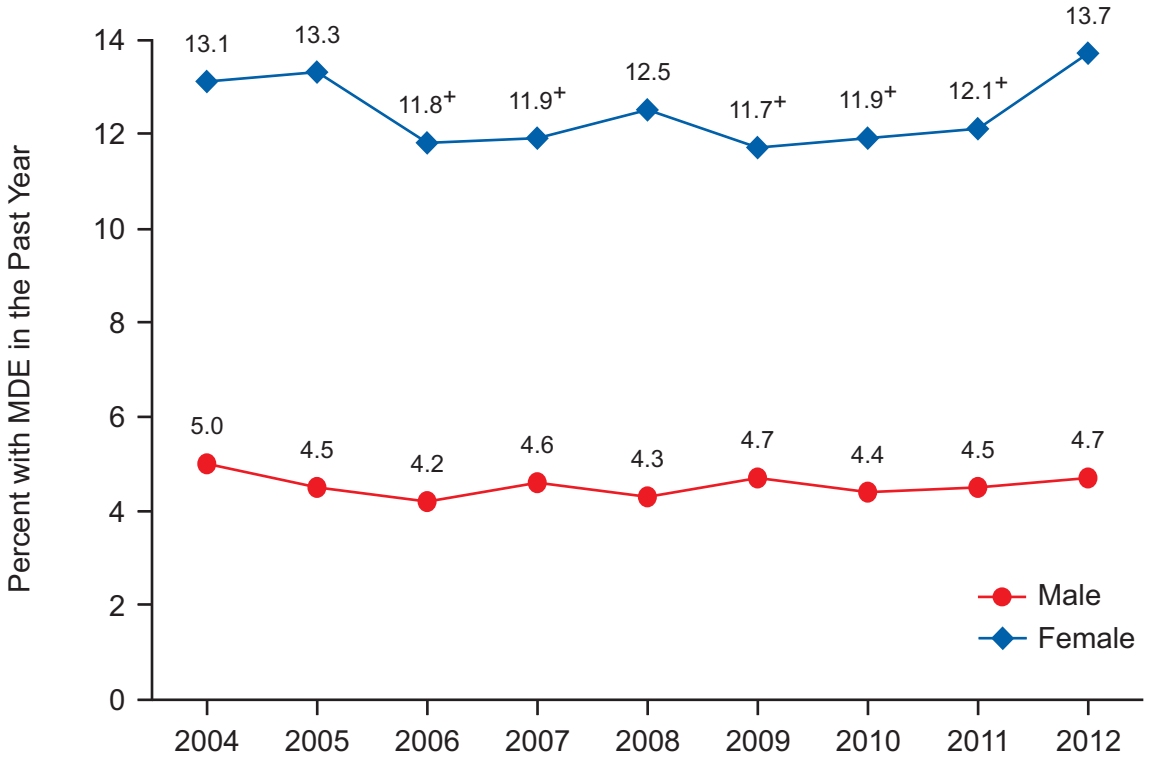
Note: Respondents with an unknown level of impairment were included in the estimates for Major Depressive Episode without Severe Impairment.

- In 2012, past year MDE and past year MDE with severe impairment among youths generally increased with age. Among 12 year olds, 3.7 percent had past year MDE, and 2.1 percent had past year MDE with severe impairment. Corresponding 2012 rates for past year MDE and past year MDE with severe impairment among 16 year olds were 11.8 and 8.5 percent, respectively, and 10.9 and 7.5 percent, respectively, among 17 year olds (Figure 4.1).

- Among youths aged 12 to 17 in 2012, females were more likely than males to have past year MDE (13.7 vs. 4.7 percent) and past year MDE with severe impairment (9.8 vs. 3.0 percent) (Figure 4.1).

- The rate of past year MDE among female youths in 2012 (13.7 percent) was higher than in 2009 to 2011 and in 2006 and 2007 (ranging from 11.7 to 12.1 percent), but it was similar to the percentages in 2004, 2005, and 2008 (Figure 4.2). The rate of past year MDE with severe impairment among female youths in 2012 (9.8 percent) was higher than in 2009 to 2011 and 2006 and 2007 (ranging from 8.2 to 8.6 percent), but it was similar to the percentage in 2008 (9.2 percent).

Figure 4.2 Major Depressive Episode in the Past Year among Youths Aged 12 to 17, by Gender: 2004-2012



+ Difference between this estimate and the 2012 estimate is statistically significant at the .05 level.

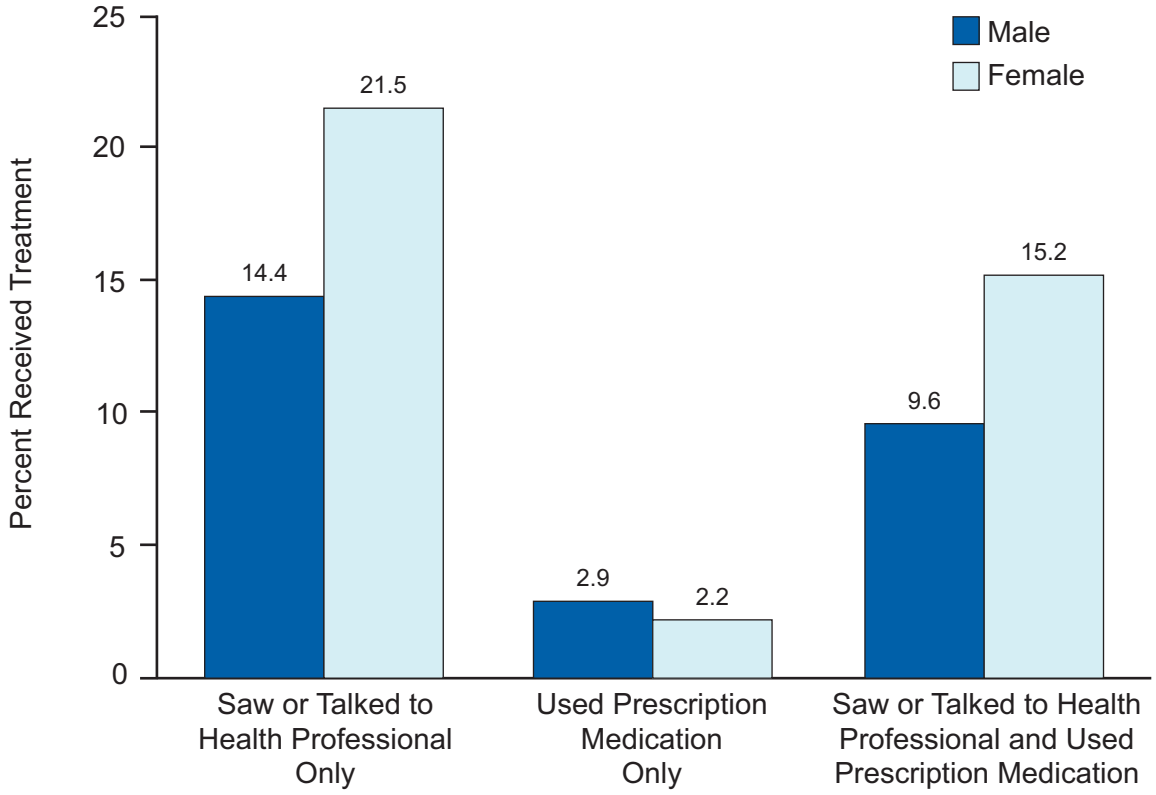
- The rate of past year MDE among male youths in 2012 (4.7 percent) was similar to the percentages in 2004 to 2011 (ranging from 4.2 to 5.0 percent) (Figure 4.2). The rate of past year MDE with severe impairment among male youths in 2012 (3.0 percent) was similar to the percentages in 2006 to 2011 (ranging from 2.6 to 3.2 percent).

- In 2012, 37.0 percent of youths aged 12 to 17 with past year MDE and 41.0 percent with past year MDE with severe impairment received treatment for depression (i.e., saw or talked to a medical doctor or other professional or used prescription medication). These percentages were similar to those in 2011 (38.4 and 43.5 percent, respectively).

- Among youths in 2012 with past year MDE, 19.6 percent saw or talked to a health professional only, 2.4 percent used prescription medication only, and 13.7 percent received treatment from both sources for depression in the past year. These percentages were similar to those in 2011 (19.9, 2.6, and 13.6 percent, respectively).

- Among female youths in 2012 with past year MDE, 21.5 percent saw or talked to a health professional only, 2.2 percent used prescription medication only, and 15.2 percent received treatment from both sources for depression in the past year (Figure 4.3). These percentages for female youths were similar to those in 2011 (20.7, 2.0, and 14.5 percent, respectively).

Figure 4.3 Type of Treatment Received for Major Depressive Episode in the Past Year among Youths Aged 12 to 17, by Gender: 2012



Note: Health Professionals include general practitioner or family doctor; other medical doctor (e.g., cardiologist, gynecologist, urologist); psychologist; psychiatrist or psychotherapist; social worker; counselor; other mental health professional (e.g., mental health nurse or other therapist where type is not specified); and nurse, occupational therapist, or other health professional.

- Among male youths in 2012 with past year MDE, 14.4 percent saw or talked to a health professional only, 2.9 percent used prescription medication only, and 9.6 percent received treatment from both sources for depression in the past year (Figure 4.3). These percentages for male youths were similar to those in 2011 (17.8, 4.2, and 11.1 percent, respectively).

Mental Health Service Utilization

In 2000, NSDUH initiated mental health service utilization modules for respondents aged 12 to 17 and those aged 18 or older. These modules ask about services for emotional and behavioral problems that were not caused by substance use. The mental health service utilization questions for youths aged 12 to 17 are different from those asked of adults aged 18 or older. The youth module was revised in 2009 to include updates to the sources of youth mental health services in an education setting (i.e., school system) and a new question on mental health service utilization in a juvenile justice setting.

The youth mental health service utilization module asks respondents aged 12 to 17 whether they received any treatment or counseling within the 12 months prior to the interview for problems with emotions or behavior in several settings: (a) the *specialty mental health setting* (inpatient or outpatient care); (b) the *education setting* (talked with a school social worker, psychologist, or counselor about an emotional or behavioral problem; participated in a program for students with emotional or behavioral problems while in a regular school; or attended a school for students with emotional or behavioral problems); (c) the *general medical setting* (pediatrician or family physician care for emotional or behavioral problems); or (d) the *juvenile justice setting* (received services for an emotional or behavioral problem in a detention center, prison, or jail). Youths also are asked about the number of nights spent in overnight facilities, the number of visits they had to outpatient mental health or general medical providers for mental health treatment or counseling, and the reason(s) for the most recent stay or visit.

- In 2012, 3.1 million youths aged 12 to 17 (12.7 percent) received treatment or counseling for problems with emotions or behaviors in a specialty mental health setting (inpatient or outpatient care) in the past 12 months. The 2012 percentage was similar to those in 2002 through 2011 (ranging from 12.0 to 13.5 percent).

- In 2012, 3.2 million youths (12.9 percent) received mental health services in an education setting, which was higher than the 2011 estimate (2.9 million youths or 11.9 percent).

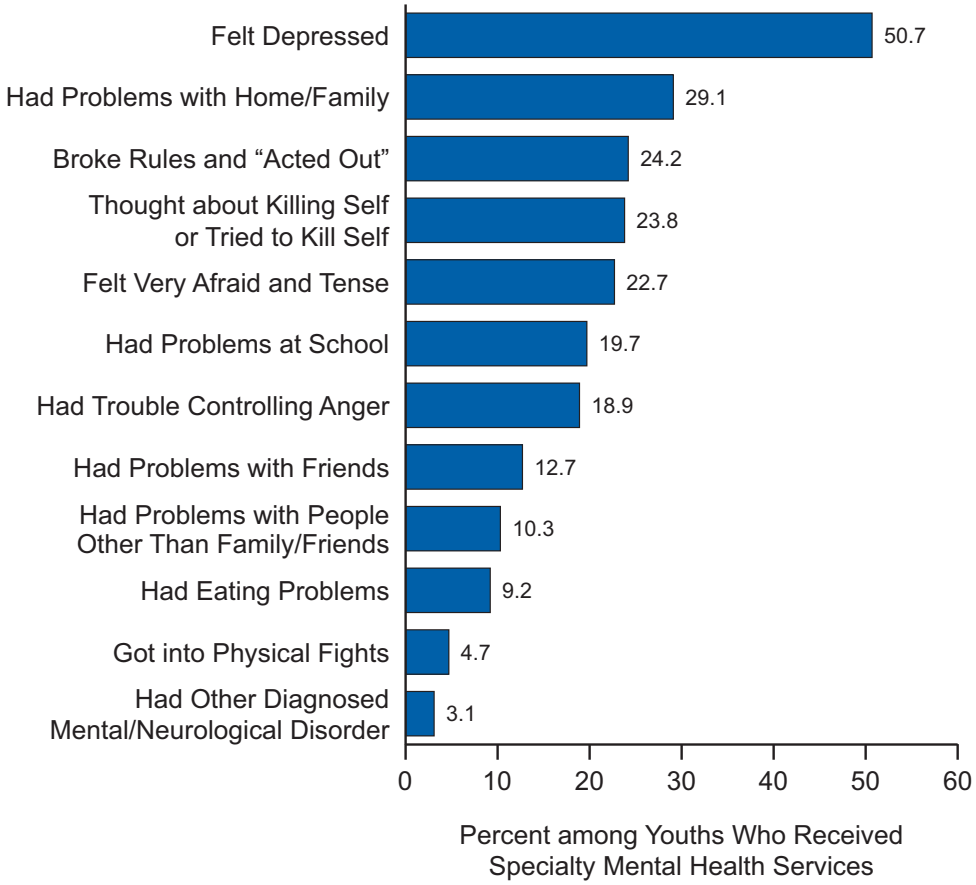
- In 2012, 629,000 youths (2.5 percent) received mental health services in a general medical setting. Additionally in 2012, 1.4 million youths (5.5 percent) received mental health services in both a specialty setting and a nonspecialty setting (i.e., either an education or a general medical setting). These numbers and percentages were similar to those in 2011.

- In 2012, 83,000 youths (0.3 percent) received mental health services in a juvenile justice setting in the past 12 months. Estimates were greater for male than for female youths, with 57,000 males (0.4 percent) and 26,000 females (0.2 percent) having received mental health services in a juvenile justice setting. The number and percentage of female youths receiving mental health services in a juvenile justice setting decreased between 2011 (54,000 or 0.4 percent) and 2012 (26,000 or 0.2 percent).

- Of the 3.1 million youths aged 12 to 17 in 2012 who received specialty mental health services, the most likely reason for receiving services was feeling depressed (50.7 percent), followed by having problems with home or family (29.1 percent), then by breaking rules and "acting out" (24.2 percent), thinking about or attempting suicide (23.8 percent), feeling very afraid and tense (22.7 percent), which was followed by having problems at school (19.7 percent) and having trouble controlling anger (18.9 percent) (Figure 4.4).

- Youths in 2012 who received inpatient specialty mental health services in the past year were more likely than those who received outpatient specialty mental health services to report that they received services because they thought about or attempted suicide (47.3 vs. 22.0 percent).

Figure 4.4 Reasons for Receiving Specialty Mental Health Services among Youths Aged 12 to 17 Who Received Mental Health Services in the Past Year: 2012

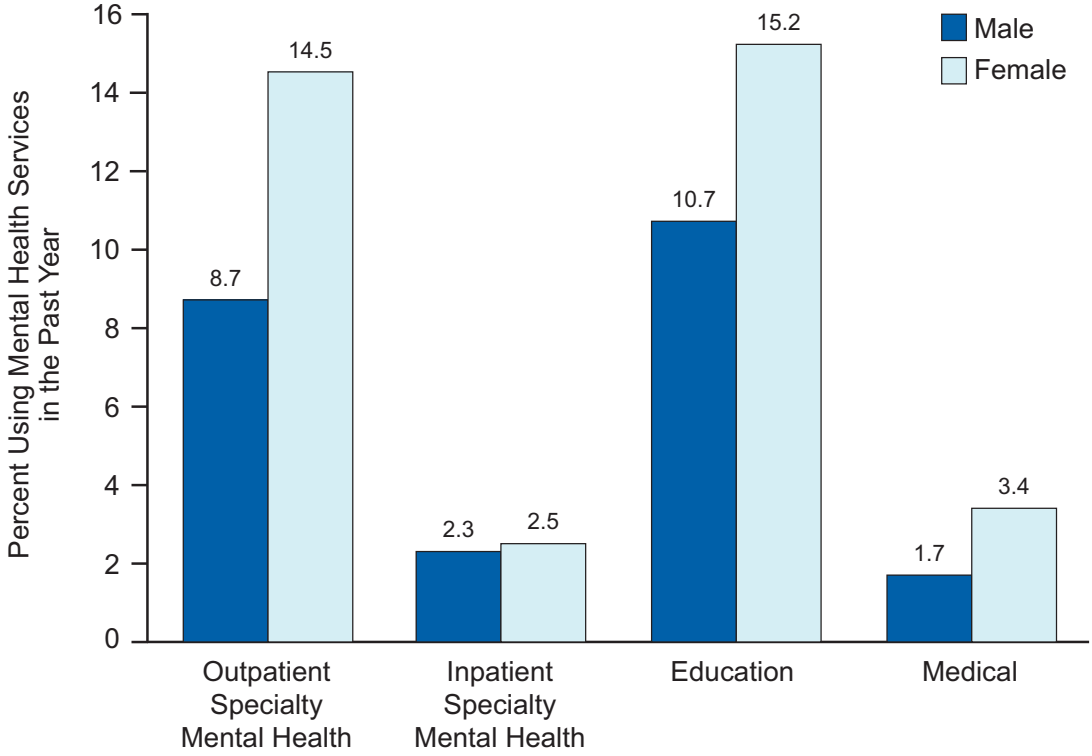


- Of the 3.2 million youths aged 12 to 17 in 2012 who received mental health services in the education setting, the most likely reason for receiving services was feeling depressed (37.9 percent), followed by having problems at school (24.4 percent), then having problems with friends (20.3 percent), breaking rules and "acting out" (19.9 percent), having problems with home or family (18.1 percent), and feeling very afraid and tense (16.7 percent).

- Of the 629,000 youths aged 12 to 17 in 2012 who received mental health services in a general medical setting, the most likely reason for receiving services was feeling depressed (51.2 percent), followed by feeling very afraid and tense (19.6 percent), having thoughts of or attempting suicide (19.2 percent), having eating problems (18.9 percent, which was an increase from 12.4 percent in 2011), breaking rules and "acting out" (13.7 percent), some other reason (12.1 percent), having problems at school (11.2 percent), having problems with home or family (9.5 percent), having problems controlling anger (8.6 percent), and having problems with friends (6.3 percent).

- Female youths aged 12 to 17 were more likely than male youths in 2012 to use outpatient specialty mental health services (14.5 vs. 8.7 percent), education services (15.2 vs. 10.7 percent), and general medical-based services (3.4 vs. 1.7 percent) (Figure 4.5). Similar percentages of female and male youths received inpatient specialty mental health services (2.5 and 2.3 percent, respectively). Between 2011 and 2012, the percentage of male youths receiving outpatient specialty mental health services decreased from 9.7 to 8.7 percent, and the percentage of female youths receiving services in an education setting increased from 13.0 to 15.2 percent.

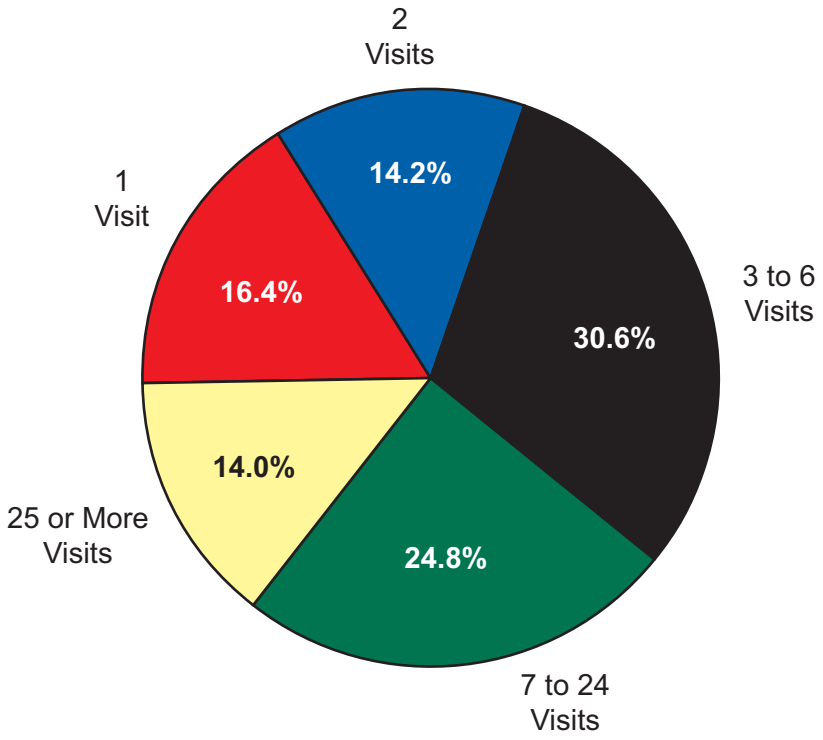
Figure 4.5 Past Year Mental Health Service Use among Youths Aged 12 to 17, by Gender: 2012



- Of the 2.8 million youths aged 12 to 17 in 2012 who received outpatient specialty mental health services in the past 12 months, 16.4 percent reported having 1 visit, 14.2 percent reported having 2 visits, 30.6 percent reported having 3 to 6 visits, 24.8 percent reported having 7 to 24 visits, and 14.0 percent reported having 25 or more visits (Figure 4.6).

- Of the 588,000 youths aged 12 to 17 in 2012 who received inpatient or residential specialty mental health services in the past 12 months, 37.5 percent reported staying overnight 1 night, 13.6 percent reported staying overnight 2 nights, 17.0 percent reported staying overnight 3 to 6 nights, 21.9 percent reported staying overnight 7 to 24 nights, and 10.0 percent reported staying overnight 25 or more nights.

Figure 4.6 Number of Outpatient Visits in the Past Year among Youths Aged 12 to 17 Who Received Outpatient Specialty Mental Health Services: 2012



2.8 Million Youths Who Received Outpatient Specialty Mental Health Services

5. Co-Occurrence of Mental Illness and Substance Use

This chapter presents findings from the 2012 National Survey on Drug Use and Health (NSDUH) on the co-occurrence of mental illness and mental health problems with substance use and substance use disorders (illicit drug or alcohol dependence or abuse) in the United States. Findings presented for adults aged 18 or older include the co-occurrence of substance use and substance use disorders with past year mental illness and major depressive episode (MDE). Also, the utilization of substance use and mental health services among adults with co-occurring mental illness and substance use is discussed. Findings for youths aged 12 to 17 are presented on the co-occurrence of MDE with substance use and substance use disorders.

Mental illness, as discussed in Chapter 2, is defined as the presence of a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994). Levels of any mental illness (AMI) considered in this report include serious mental illness (SMI), moderate mental illness, and low (mild) mental illness, which are differentiated by their level of functional impairment. Functional impairment is the interference with or limitation of one or more major life activities. Definitions for these mental health measures and other measures used in this chapter are included in a glossary as part of the 2012 mental health detailed tables.[10] Procedures in NSDUH for estimating these levels of mental illness in the past year among adults are described in Section B.4.3 in Appendix B.

Substance Use among Adults with Mental Illness

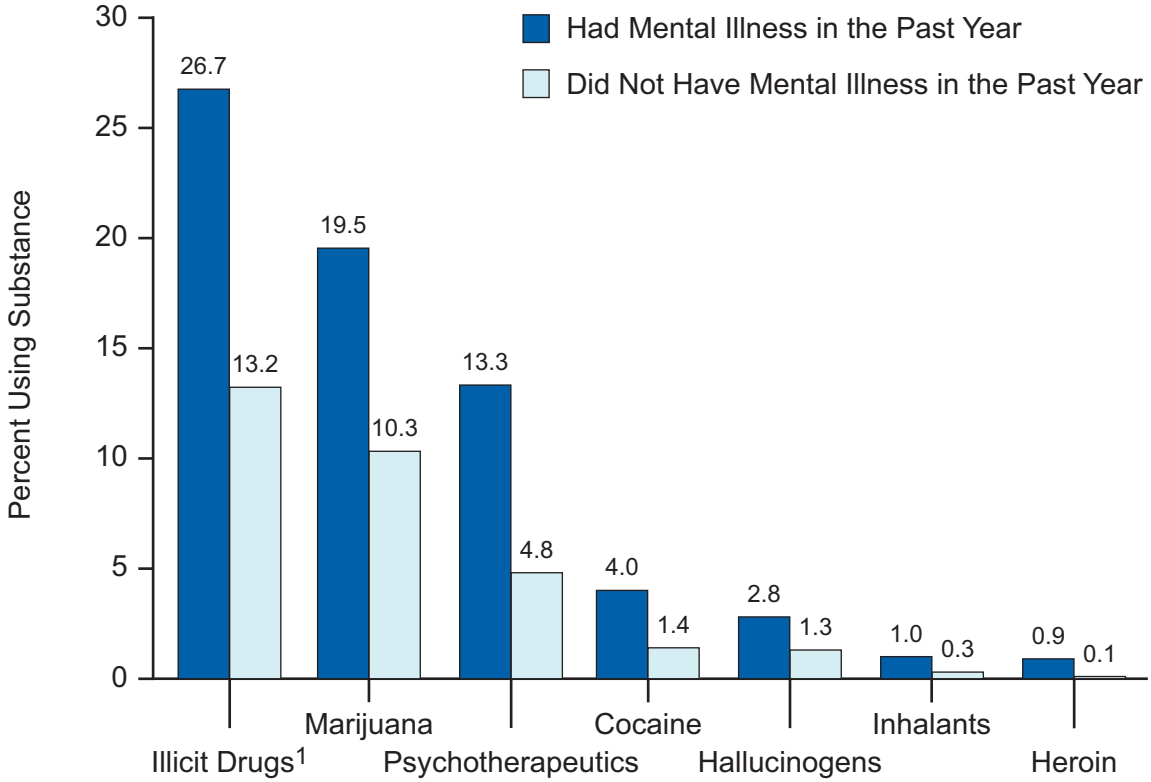
- In 2012, the use of illicit drugs in the past year was more likely among adults aged 18 or older with past year AMI (26.7 percent) than it was among adults who did not have mental illness in the past year (13.2 percent) (Figure 5.1). This pattern was similar for most specific types of illicit drug use, including the use of marijuana, cocaine, hallucinogens, inhalants, or heroin and the nonmedical use of prescription-type psychotherapeutics.

- The use of cigarettes in the past month was more likely among adults aged 18 or older with AMI compared with adults who did not have mental illness (34.4 vs. 21.4 percent).

- Among adults aged 18 or older with AMI in the past year, 27.6 percent were binge alcohol users in the past month, which was higher than the percentage among adults who did not have mental illness in the past year (23.9 percent). Binge alcohol use is defined as drinking five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days.

[10] See Chapter 1 for more information on this report's mental health glossary and the mental health detailed tables.

Figure 5.1 Past Year Substance Use among Adults Aged 18 or Older, by Any Mental Illness: 2012



[1] Illicit Drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically.

- Adults aged 18 or older with AMI in the past year were more likely than adults who did not have mental illness to be heavy alcohol users in the past month (9.2 vs. 6.6 percent). Heavy alcohol use is defined as drinking five or more drinks on the same occasion on 5 or more days in the past 30 days.

- Illicit drug use in the past year was associated with the level of mental illness. The rate of illicit drug use in the past year among adults aged 18 or older was highest among adults with past year SMI (32.1 percent), followed by adults with moderate mental illness (27.6 percent), then by those with low (mild) mental illness (23.8 percent), then by those who did not have past year mental illness (13.2 percent).

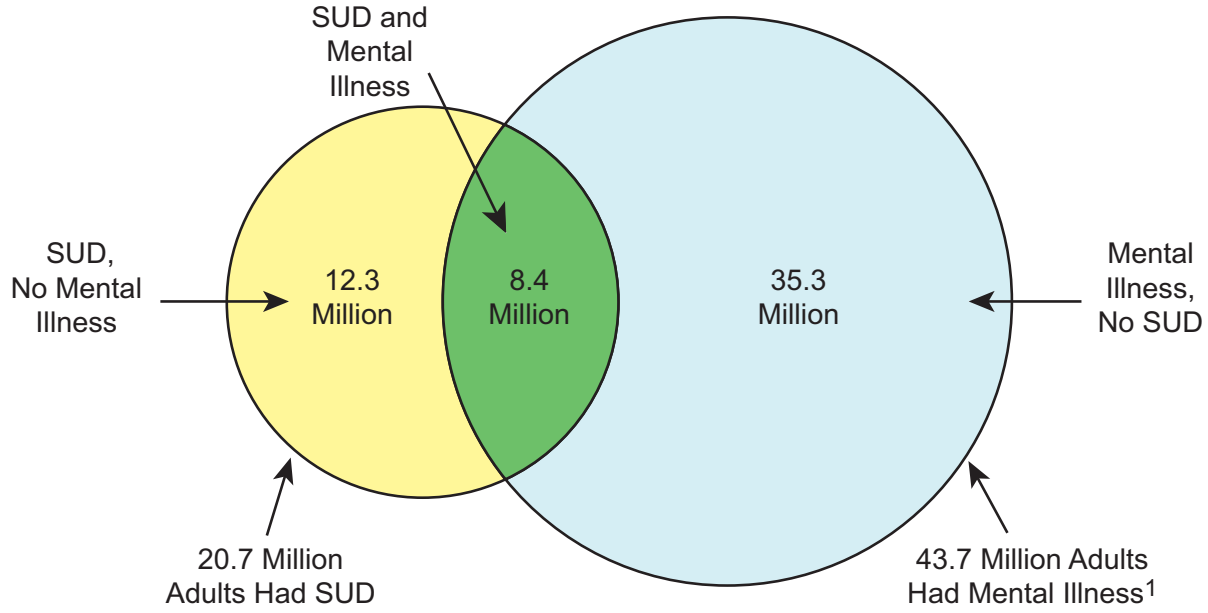
- Adults aged 18 or older with SMI were more likely than those who did not have mental illness in the past year to be past month cigarette users (39.9 vs. 21.4 percent).

- Adults aged 18 or older in 2012 with SMI in the past year were more likely than those without mental illness to be past month binge alcohol users (29.5 vs. 23.9 percent) or heavy alcohol users (10.7 vs. 6.6 percent).

Mental Illness and Substance Use Disorder among Adults

- Among the 20.7 million adults with a past year substance use disorder, 40.7 percent (8.4 million adults) had co-occurring mental illness in 2012 (Figure 5.2). In comparison, among adults without a substance use disorder, 16.5 percent had mental illness.

Figure 5.2 Past Year Substance Dependence or Abuse and Mental Illness among Adults Aged 18 or Older: 2012



SUD = substance use disorder.

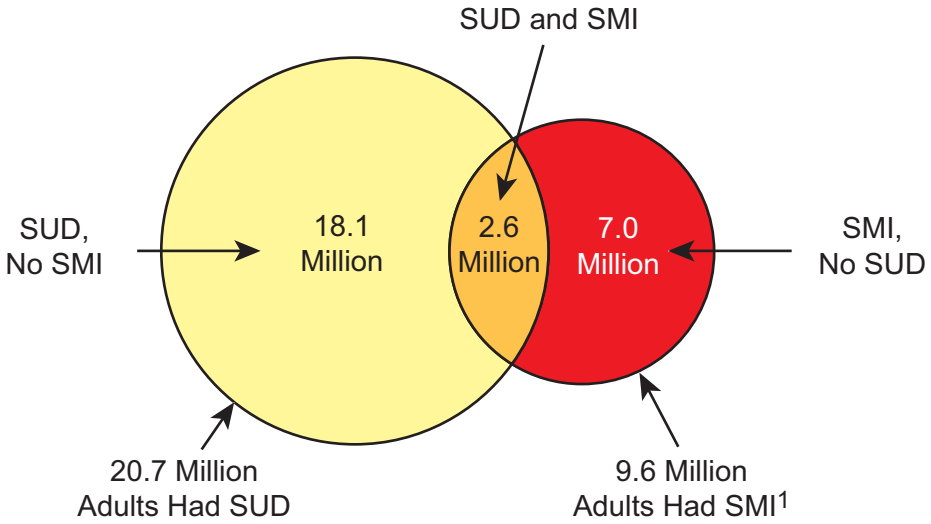
[1] Statistics on mental illness are provided in Chapter 2 of this report.

- Among the 43.7 million adults aged 18 or older in 2012 with AMI in the past year, 19.2 percent (8.4 million adults) met criteria for substance dependence or abuse (Figure 5.2). In comparison, 6.4 percent of adults who did not have mental illness in the past year (12.3 million adults) met criteria for a substance use disorder.

- Among adults aged 18 or older in 2012 with AMI in the past year, the percentage who met criteria for substance dependence or abuse was highest among those aged 18 to 25 (34.5 percent), followed by those aged 26 to 49 (22.6 percent), then by those aged 50 or older (8.6 percent). Similarly, the prevalence of substance dependence or abuse in the past year among adults with SMI was highest among those aged 18 to 25 (39.9 percent), followed by those aged 26 to 49 (29.4 percent), then by those aged 50 or older (18.0 percent).

- Among the 20.7 million adults aged 18 or older in 2012 with a past year substance use disorder, 12.6 percent (2.6 million adults) also had SMI (Figure 5.3).

Figure 5.3 Past Year Substance Dependence or Abuse and Serious Mental Illness among Adults Aged 18 or Older: 2012



SMI = serious mental illness; SUD = substance use disorder.

[1] Statistics on mental illness are provided in Chapter 2 of this report.

- Substance dependence or abuse in the past year was associated with the level of mental illness. In 2012, 27.3 percent of adults aged 18 or older with SMI in the past year also had past year substance dependence or abuse, followed by 18.9 percent of adults with moderate mental illness, then by 15.9 percent of adults with low (mild) mental illness, then by 6.4 percent of adults who did not have mental illness (Figure 5.4).

- In 2012, 11.6 percent of adults aged 18 or older with SMI in the past year also met criteria for illicit drug dependence or abuse in the past year, as did 6.9 percent of adults with moderate mental illness, 5.4 percent of adults with low (mild) mental illness, and 1.7 percent of adults who did not have mental illness (Figure 5.5).

- In 2012, 21.6 percent of adults aged 18 or older with SMI in the past year also had past year alcohol dependence or abuse, followed by 15.5 percent of adults with moderate mental illness, then by 12.8 percent of adults with low (mild) mental illness, then by 5.3 percent of adults who did not have mental illness (Figure 5.6).

Figure 5.4 Past Year Substance Dependence or Abuse among Adults Aged 18 or Older, by Level of Mental Illness: 2012

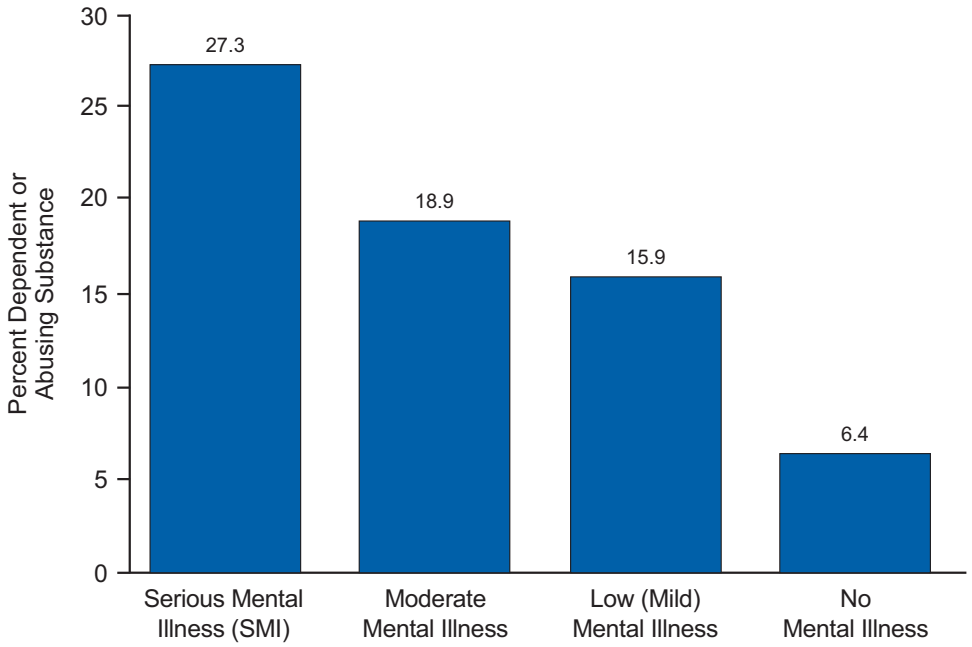


Figure 5.5 Past Year Illicit Drug Dependence or Abuse among Adults Aged 18 or Older, by Level of Mental Illness: 2012

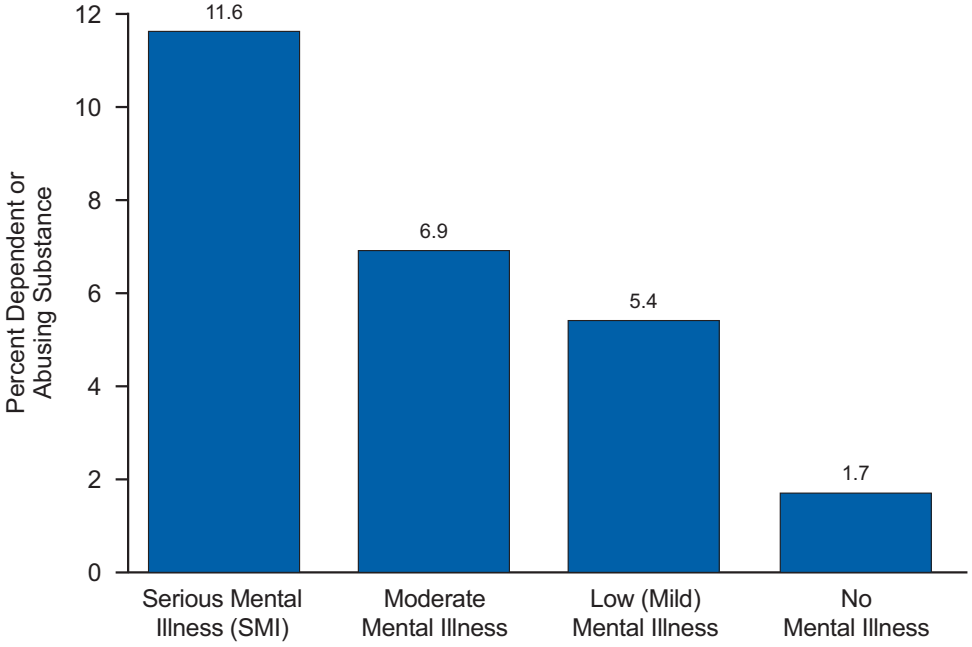
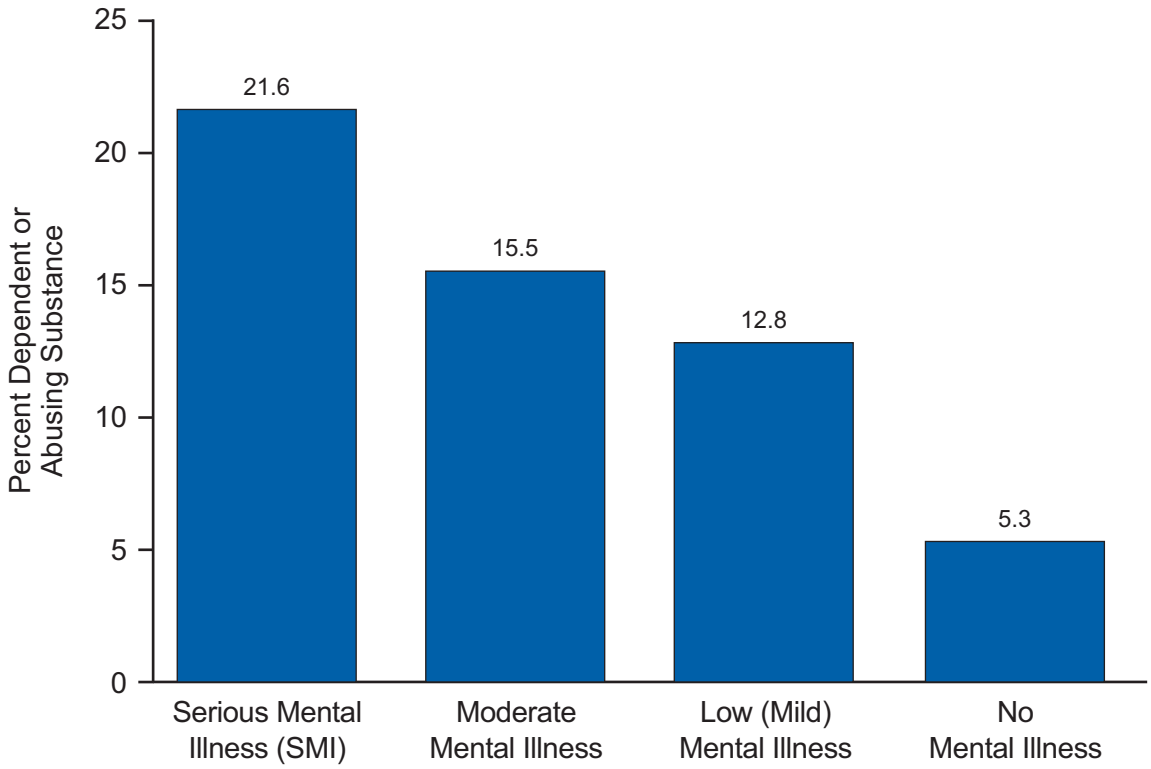


Figure 5.6 Past Year Alcohol Dependence or Abuse among Adults Aged 18 or Older, by Level of Mental Illness: 2012

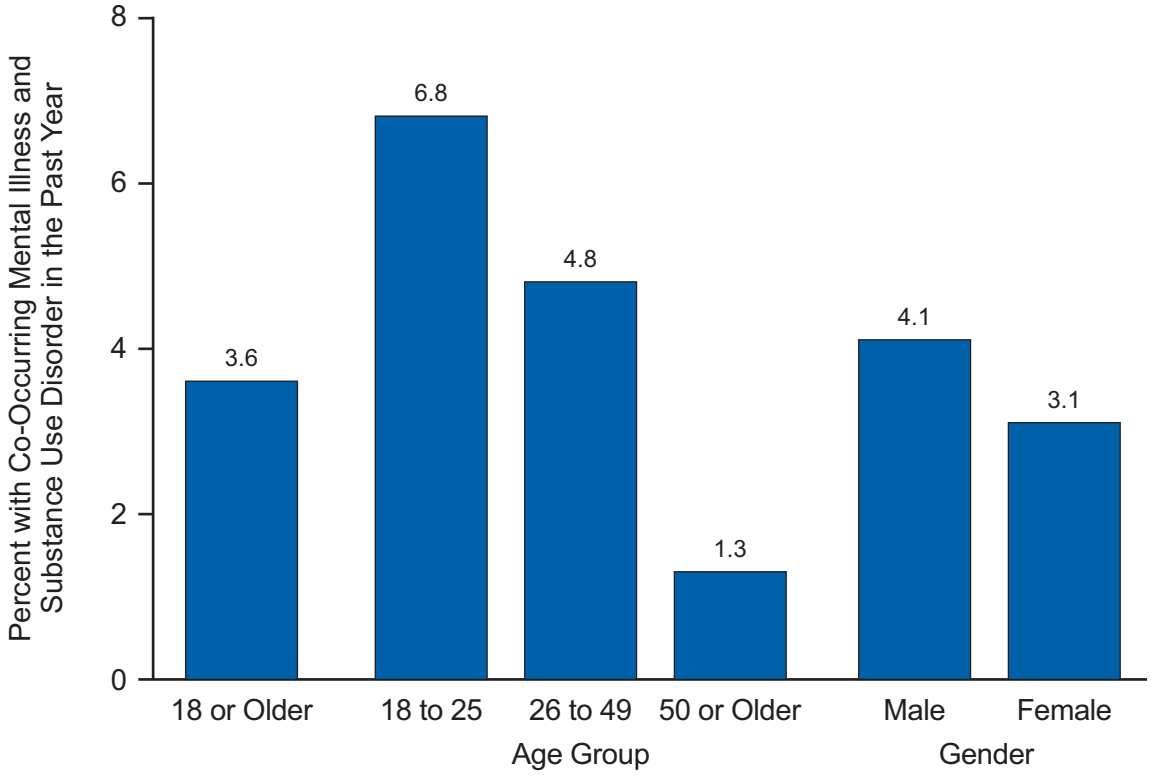


Co-Occurring Mental Illness and Substance Use Disorder among Adults, by Demographic and Socioeconomic Characteristics

The prior section described the prevalence of mental illness among the subgroup of adults with a past year substance use disorder as well as the prevalence of substance use disorders among the subgroup of adults with mental illness. This section presents findings on the prevalence of the co-occurrence of substance use disorders with mental illness among all adults as a whole and among demographic and socioeconomic subgroups of adults in the United States.

- In 2012, 3.6 percent of all adults aged 18 or older (8.4 million adults) had co-occurring mental illness and substance use disorder (Figure 5.7).
- The percentage of adults with co-occurring mental illness and substance use disorder in 2012 was highest among adults aged 18 to 25 (6.8 percent), followed by those aged 26 to 49 (4.8 percent), then by those aged 50 or older (1.3 percent) (Figure 5.7).
- In 2012, the percentage of adult males with past year co-occurring mental illness and substance use disorder was higher than that among adult females (4.1 vs. 3.1 percent) (Figure 5.7).

Figure 5.7 Co-Occurring Mental Illness and Substance Use Disorder in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2012

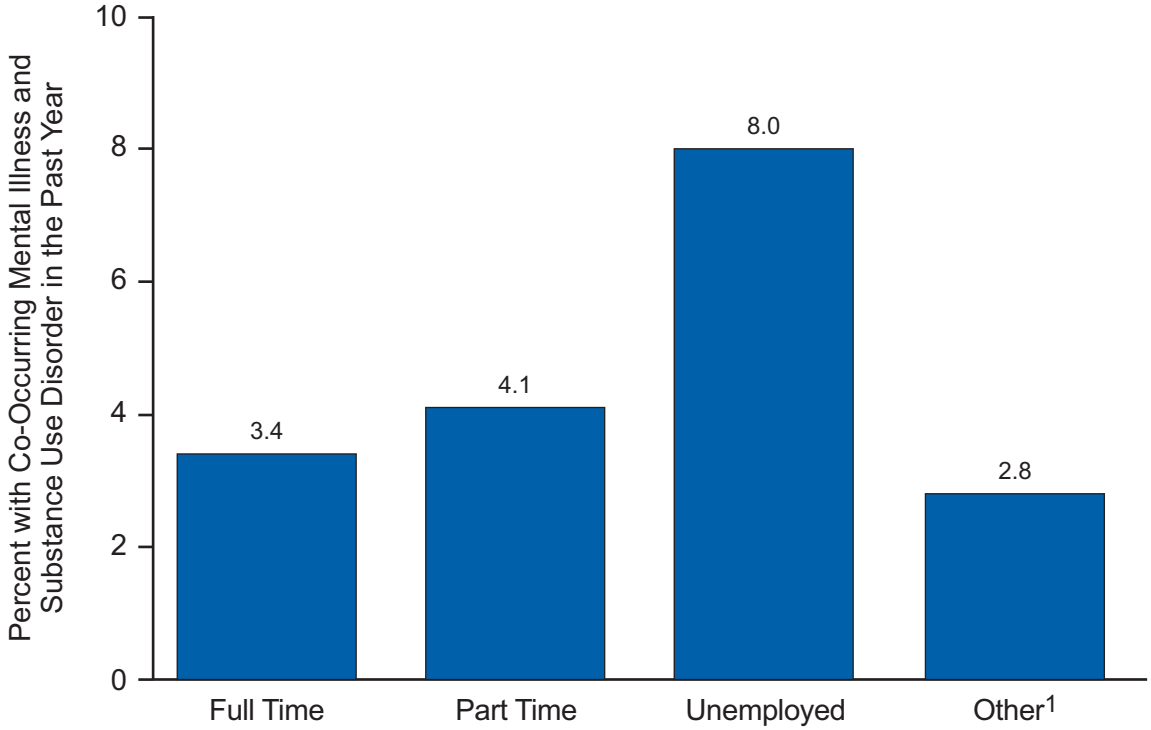


- In 2012, the percentage of adults aged 18 or older with past year mental illness and substance use disorder was 1.1 percent among Asians, 3.3 percent among blacks, 3.4 percent among Hispanics, 3.8 percent among whites, 4.3 percent among persons reporting two or more races, and 14.0 percent among American Indians or Alaska Natives.

- Among adults aged 18 or older in 2012, those who graduated from college were less likely to have past year mental illness and substance use disorder (2.7 percent) than their counterparts who had not completed high school (4.1 percent), those who had graduated from high school but had no further education (3.7 percent), and those who had some college education but no degree (4.1 percent).

- The percentage of adults aged 18 or older with co-occurring mental illness and substance use disorder in 2012 was higher among adults who were unemployed (8.0 percent) than among adults who were employed full time (3.4 percent) or part time (4.1 percent) (Figure 5.8).

Figure 5.8 Co-Occurring Mental Illness and Substance Use Disorder in the Past Year among Adults Aged 18 or Older, by Employment Status: 2012



[1] The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

- Among adults aged 18 or older in 2012 whose family income was below the Federal poverty level, 5.6 percent (2.1 million adults) had past year mental illness and substance use disorder. In contrast, 4.2 percent of adults whose family income was between 100 and 199 percent of the Federal poverty level and 2.9 percent of adults whose family income was at or above 200 percent of the Federal poverty level had past year mental illness and substance use disorder.

- In 2012, the percentage of adults with co-occurring mental illness and substance use disorder was highest among persons without health insurance (6.1 percent) and among persons who were covered by Medicaid or the Children's Health Insurance Program (CHIP)[11] (5.3 percent), followed by persons with private health insurance (2.8 percent), then by persons with other forms of health insurance (2.2 percent).

[11] The estimate for adults with co-occurring mental illness and substance use disorder who were covered either by Medicaid or CHIP refers to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

- In 2012, 1.1 percent of all adults aged 18 or older (2.6 million adults) had co-occurring SMI and substance use disorder.

- In 2012, the percentage of adults with both SMI and substance use disorder was similar among adults aged 18 to 25 (1.6 percent) and adults aged 26 to 49 (1.5 percent), but it was lower for adults aged 50 or older (0.5 percent).

- The percentages of adults in 2012 with co-occurring SMI and substance use disorder in the past year were similar for males and females (1.2 and 1.0 percent, respectively).

- The percentage of adults with past year SMI and substance use disorder was 0.3 percent among Asians, 0.3 percent among Native Hawaiians or Other Pacific Islanders, 0.9 percent among blacks, 1.2 percent among Hispanics, 1.2 percent among whites, 1.2 percent among persons reporting two or more races, and 4.8 percent among American Indians or Alaska Natives.

- Among adults aged 18 or older in 2012, the percentages with past year SMI and substance use disorder were 0.8 percent for adults who had graduated from college, 1.1 percent for those who had some college education but no degree, 1.3 percent for those who had graduated from high school but had no further education, and 1.3 percent for those who had not completed high school.

- In 2012, the percentage of adults with SMI and substance use disorder in the past year was higher among adults who were unemployed (3.0 percent) than among adults who were employed full time (0.8 percent) and among adults who were employed part time (1.0 percent).

- The percentage of adults in 2012 with SMI and substance use disorder in the past year was higher among adults whose family income was below the Federal poverty level (2.1 percent or 795,000 adults) than it was among adults whose family income was between 100 and 199 percent of the Federal poverty level or those whose family income was at or above 200 percent of the Federal poverty level (1.4 and 0.8 percent, respectively).

- In 2012, 2.1 percent of adults without health insurance and 2.1 percent of adults who were covered by Medicaid or CHIP[12] had co-occurring SMI and substance use disorder in the past year. Percentages of adults with co-occurring SMI and substance use disorder were lower among adults with other forms of health insurance (0.8 percent) and among adults with private health insurance (0.7 percent).

[12] The estimate for adults with co-occurring SMI and substance use disorder who were covered either by Medicaid or CHIP refers to adults aged 18 or older who were covered by Medicaid or those aged 18 or 19 who were covered by CHIP.

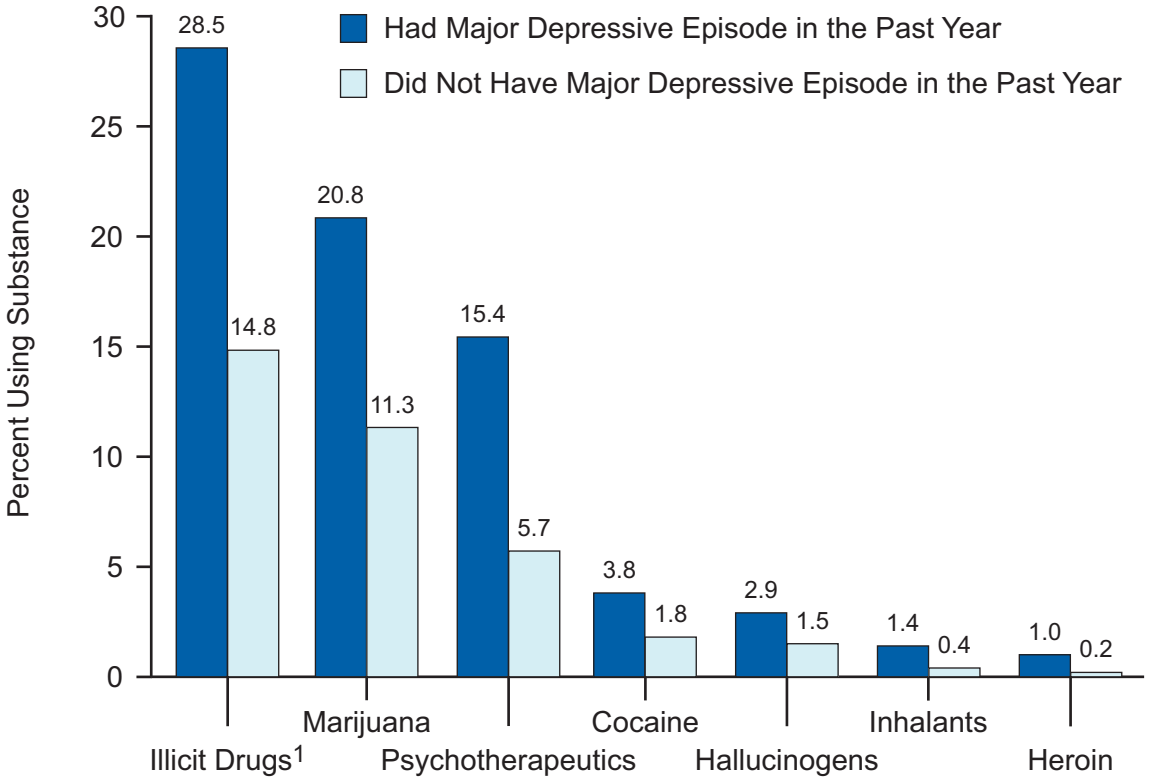
Major Depressive Episode and Substance Use among Adults

- In 2012, adults aged 18 or older who had past year MDE were more likely than those without past year MDE to have used illicit drugs in the past year (28.5 vs. 14.8 percent) (Figure 5.9). A similar pattern was observed for specific types of past year illicit drug use, such as the use of marijuana, cocaine, hallucinogens, inhalants, or heroin and the nonmedical use of prescription-type psychotherapeutics.

- In 2012, the percentage of adults aged 18 or older who were heavy alcohol users in the past month was higher among adults who had MDE in the past year (10.0 percent) than among those without MDE in the past year (6.9 percent).

- The percentage of adults in 2012 who were daily cigarette users in the past month was higher among those with past year MDE than among adults without past year MDE (22.7 vs. 14.1 percent).

Figure 5.9 Past Year Substance Use among Adults Aged 18 or Older, by Major Depressive Episode in the Past Year: 2012

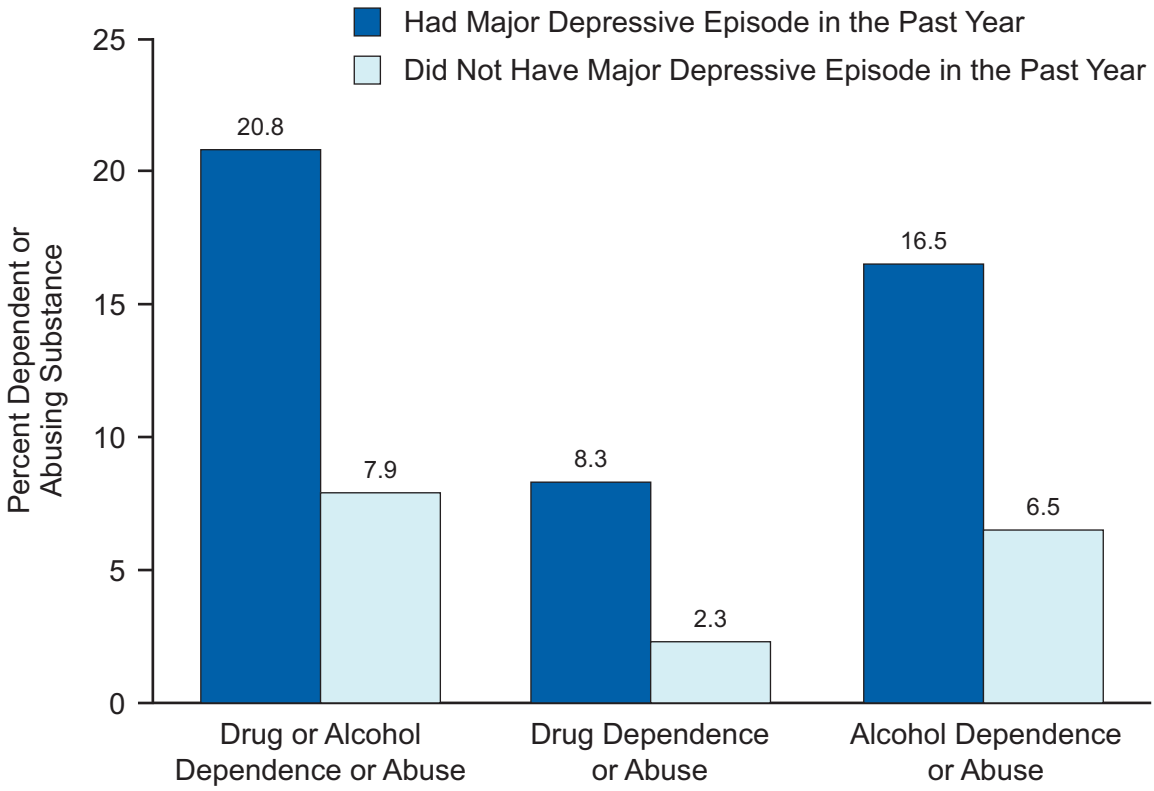


[1] Illicit Drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically.

Major Depressive Episode and Substance Use Disorder among Adults

- In 2012, 1.4 percent (3.3 million) of all adults aged 18 or older in the United States had both substance dependence or abuse and MDE in the past year.
- In 2012, 3.3 million adults aged 18 or older (16.3 percent) with past year substance dependence or abuse also had MDE in the same time period.
- Adults aged 18 or older in 2012 who had MDE in the past year were more likely to have substance dependence or abuse than adults who did not have past year MDE (20.8 vs. 7.9 percent) (Figure 5.10).
- In 2012, the percentage of adults who met criteria for illicit drug dependence or abuse was greater among adults aged 18 or older who had MDE in the past year than for adults without MDE in the past year (8.3 vs. 2.3 percent) (Figure 5.10). Also, the percentage of adults who met criteria for alcohol dependence or abuse in the past year was greater among adults with MDE in the past year than for adults without MDE in the past year (16.5 vs. 6.5 percent).

Figure 5.10 Past Year Substance Dependence or Abuse among Adults Aged 18 or Older, by Major Depressive Episode in the Past Year: 2012

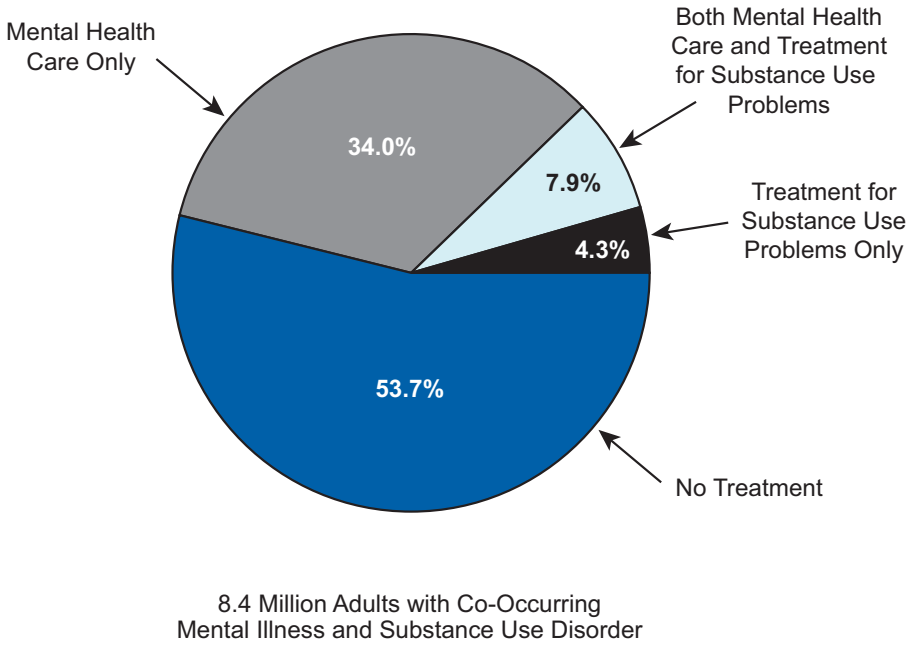


- In 2012, adults aged 18 or older with past year MDE were more likely than adults without past year MDE to meet criteria for illicit drug dependence (6.7 vs. 1.6 percent), alcohol dependence (11.4 vs. 3.0 percent), or dependence for both illicit drugs and alcohol (2.5 vs. 0.4 percent).

Mental Health Service Utilization among Adults with Co-Occurring Mental Illness and Substance Use Disorders

- Among the 8.4 million adults aged 18 or older in 2012 who had AMI in the past year and a past year substance use disorder, 46.3 percent received substance use treatment at a specialty facility or mental health care in the past year, including 7.9 percent who received both mental health care and specialty substance use treatment, 34.0 percent who received mental health care only, and 4.3 percent who received specialty substance use treatment only (Figure 5.11). A specialty substance use treatment facility is defined as a drug or alcohol rehabilitation facility (inpatient or outpatient), a hospital (inpatient services only), or a mental health center.

Figure 5.11 Past Year Mental Health Care and Treatment for Substance Use Problems among Adults Aged 18 or Older with Both Mental Illness and a Substance Use Disorder: 2012



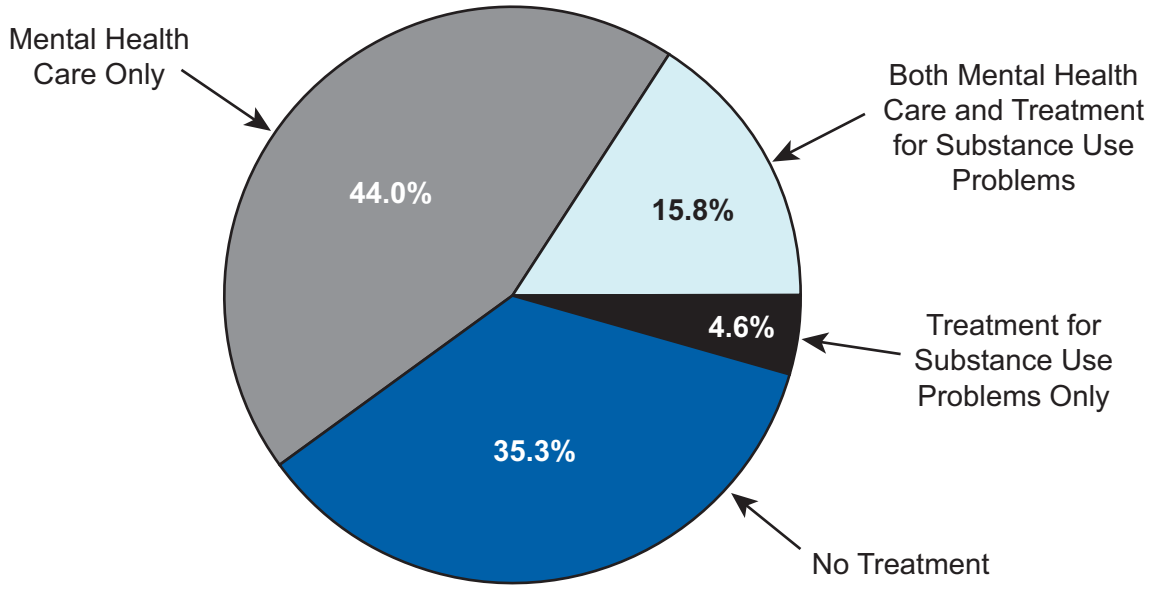
Note: Mental health care is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Treatment for substance use problems refers to treatment at a hospital (inpatient only), rehabilitation facility (inpatient or outpatient), or mental health center in order to reduce or stop drug or alcohol use, or for medical problems associated with drug or alcohol use.

Note: The percentages do not add to 100 percent due to rounding.

- Among the 2.6 million adults aged 18 or older in 2012 with both SMI and substance dependence or abuse in the past year, 64.7 percent received substance use treatment at a specialty facility or mental health care in that time period (Figure 5.12). Included in the 64.7 percent are 15.8 percent who received both mental health care and specialty substance use treatment, 44.0 percent who received mental health care only, and 4.6 percent who received specialty substance use treatment only.

- Among adults who had a past year substance use disorder, those who also had past year SMI were more likely to have received mental health care or specialty substance use treatment (64.7 percent), followed by those who had moderate mental illness (47.2 percent), then by those with low (mild) mental illness (32.2 percent), then by those who had no mental illness in the past year (15.8 percent).

Figure 5.12 Past Year Mental Health Care and Treatment for Substance Use Problems among Adults Aged 18 or Older with Both Serious Mental Illness and a Substance Use Disorder: 2012



Note: Mental health care is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Treatment for substance use problems refers to treatment at a hospital (inpatient only), rehabilitation facility (inpatient or outpatient), or mental health center in order to reduce or stop drug or alcohol use, or for medical problems associated with drug or alcohol use.

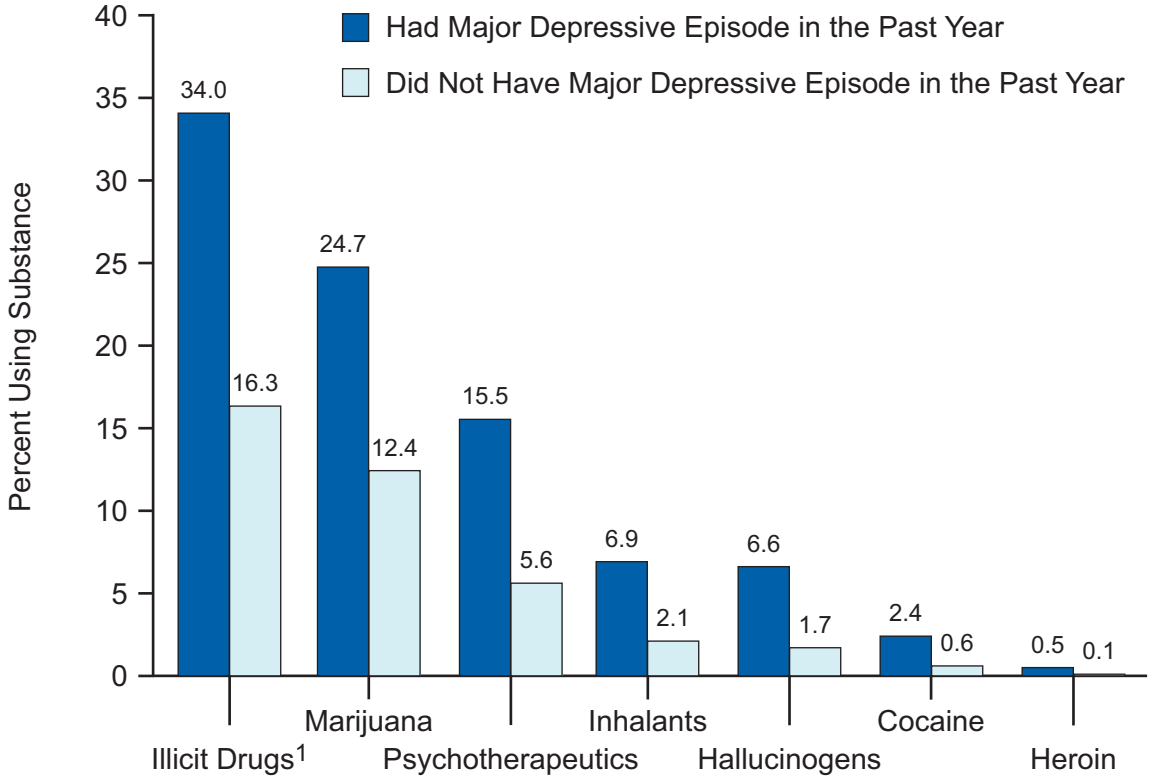
Note: The percentages do not add to 100 percent due to rounding. Also, percentages who received only one or both types of service sum to less than the percentage who received either type of service due to incomplete data.

Major Depressive Episode and Substance Use among Youths

- In 2012, youths aged 12 to 17 who had past year MDE were more likely than those without past year MDE to have used illicit drugs in the past year (34.0 vs. 16.3 percent) (Figure 5.13). This pattern was similar for most specific types of illicit drug use, including the use of marijuana, inhalants, hallucinogens, cocaine, and the nonmedical use of prescription-type psychotherapeutics.

- In 2012, youths aged 12 to 17 who had MDE in the past year were more likely to be daily cigarette users in the past month compared with those who did not have MDE in the past year (2.7 vs. 1.3 percent). Similarly, youths who had past year MDE were more likely to be heavy alcohol users in the past month compared with those who did not have past year MDE (2.3 vs. 1.2 percent).

Figure 5.13 Past Year Substance Use among Youths Aged 12 to 17, by Major Depressive Episode in the Past Year: 2012

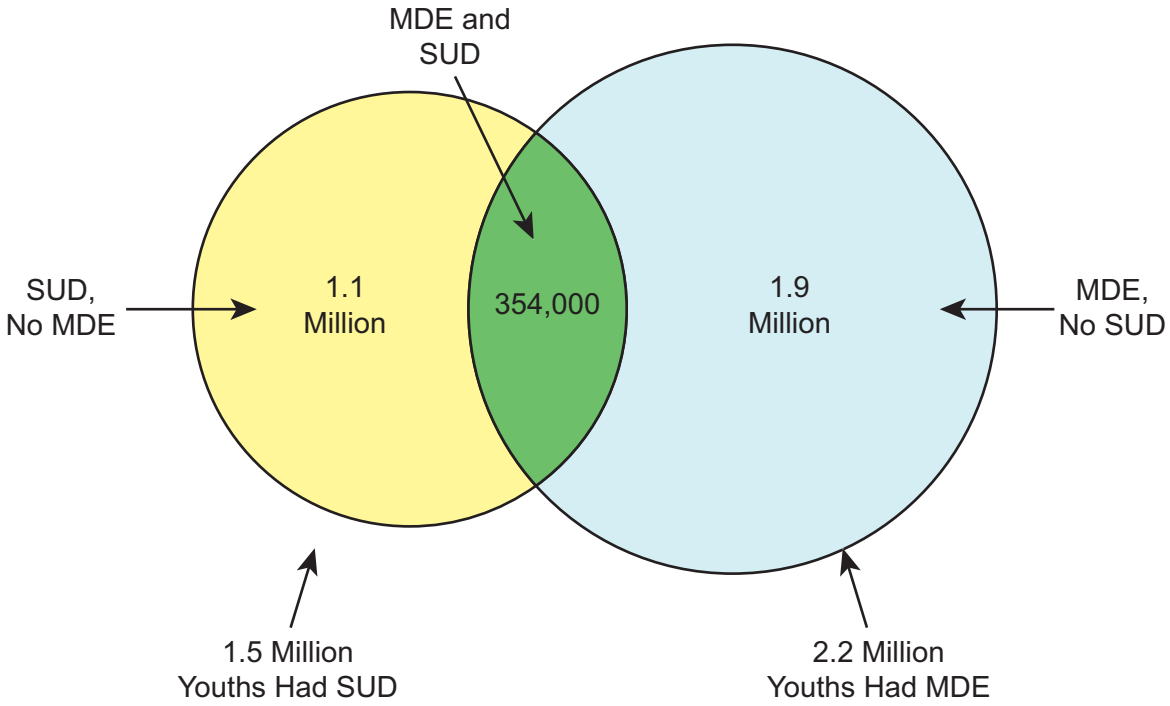


[1] Illicit Drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically.

Major Depressive Episode and Substance Use Disorder among Youths

- In 2012, 1.4 percent (354,000 youths) of youths aged 12 to 17 in the United States had both substance dependence or abuse and MDE in the past year.
- Among the 1.5 million youths in 2012 with a past year substance use disorder, 23.3 percent (354,000 youths) had MDE in the past year (Figure 5.14).

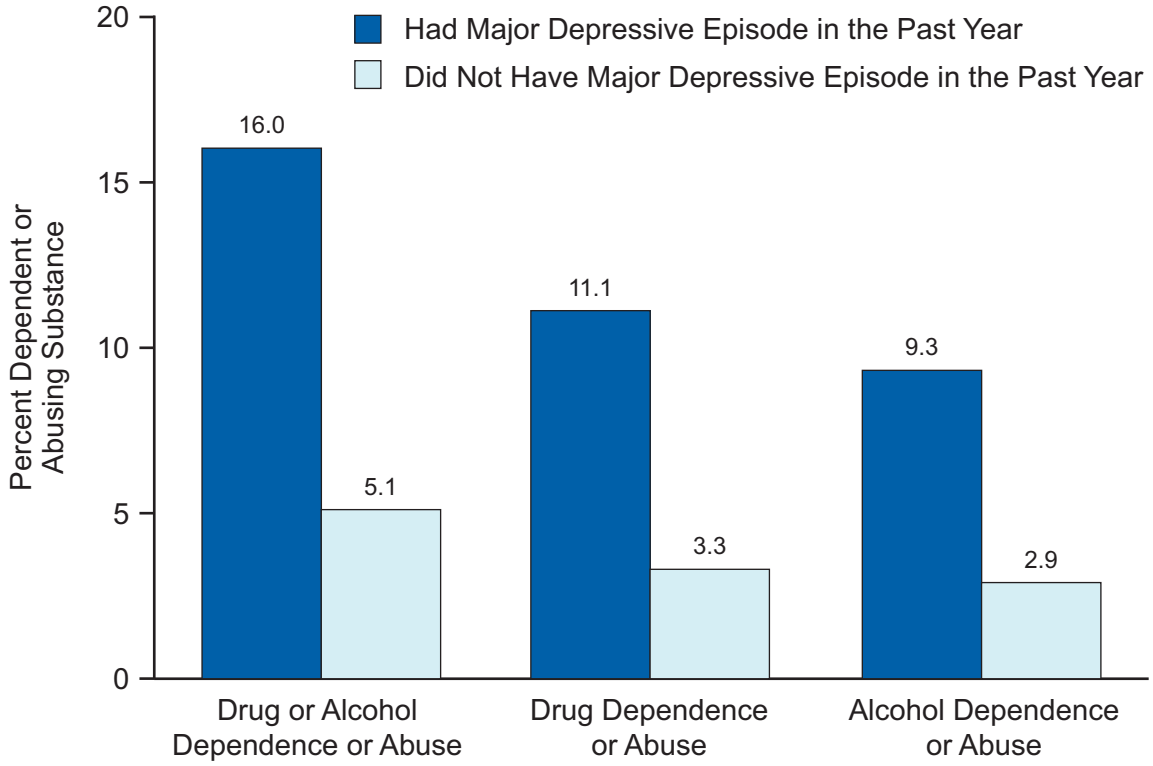
Figure 5.14 Past Year Substance Dependence or Abuse and Major Depressive Episode in the Past Year among Youths Aged 12 to 17: 2012



MDE = major depressive episode; SUD = substance use disorder.

- Among the 2.2 million youths aged 12 to 17 in 2012 with MDE in the past year, 16.0 percent (354,000 youths) met criteria for substance dependence or abuse (Figure 5.14).
- In 2012, youths aged 12 to 17 with MDE in the past year were more likely than those without MDE to have a substance use disorder in the past year (16.0 vs. 5.1 percent) (Figure 5.15).

Figure 5.15 Past Year Substance Dependence or Abuse among Youths Aged 12 to 17, by Major Depressive Episode in the Past Year: 2012



Appendix A: Description of the Survey

A.1 Sample Design

The sample design for the 2012 National Survey on Drug Use and Health (NSDUH)[13] was an extension of a coordinated 5-year design providing estimates for all 50 States plus the District of Columbia initially for the years 2005 through 2009, then continuing through 2012. The respondent universe for NSDUH is the civilian, noninstitutionalized population aged 12 years old or older residing within the United States. The survey covers residents of households (persons living in houses/townhouses, apartments, condominiums; civilians living in housing on military bases, etc.) and persons in noninstitutional group quarters (e.g., shelters, rooming/boarding houses, college dormitories, migratory workers' camps, halfway houses). Excluded from the survey are persons with no fixed household address (e.g., homeless and/or transient persons not in shelters), active-duty military personnel, and residents of institutional group quarters, such as correctional facilities, nursing homes, mental institutions, and long-term hospitals.

The coordinated design for 2005 through 2009 included a 50 percent overlap in second-stage units (area segments) within each successive 2-year period from 2005 through 2009. The 2010, 2011, and 2012 NSDUHs continued the 50 percent overlap by retaining half of the second-stage units from the previous survey. Because the coordinated design enabled estimates to be developed by State in all 50 States plus the District of Columbia, States may be viewed as the first level of stratification and as a variable for reporting estimates.

For the 50-State design, 8 States were designated as large sample States (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas) with target sample sizes of 3,600. In 2012, the actual sample sizes in these States ranged from 3,544 to 3,687. For the remaining 42 States and the District of Columbia, the target sample size was 900. Sample sizes in these States ranged from 829 to 976 in 2012. This approach ensured there was sufficient sample in every State to support State estimation by either direct methods or small area estimation (SAE)[14] while at the same time maintaining efficiency for national estimates.

States were first stratified into a total of 900 State sampling regions (SSRs) (48 regions in each large sample State and 12 regions in each small sample State). These regions were contiguous geographic areas designed to yield approximately the same number of interviews.[15] Unlike the 1999 through 2001 NHSDAs and the 2002 through 2004 NSDUHs in which the first-stage sampling units were clusters of census blocks called area segments, the first stage of

[13] Prior to 2002, the survey was known as the National Household Survey on Drug Abuse (NHSDA).

[14] SAE is a hierarchical Bayes modeling technique used to make State-level estimates for 25 measures related to substance use and mental health. For more details, see the *State Estimates of Substance Use and Mental Disorders from the 2009-2010 National Surveys on Drug Use and Health* (Hughes, Muhuri, Sathe, & Spagnola, 2012).

[15] Sampling areas were defined using 2000 census geography. Counts of dwelling units (DUs) and population totals were obtained from the 2000 decennial census data supplemented with revised population counts from Nielsen Claritas.

selection for the 2005 through 2012 NSDUHs was census tracts.[16] This stage was included to contain sample segments within a single census tract to the extent possible.[17]

Within each SSR, 48 census tracts were selected with probability proportional to population size. Within sampled census tracts, adjacent census blocks were combined to form the second-stage sampling units or area segments. One area segment was selected within each sampled census tract with probability proportional to population size. Although only 24 segments were needed to support the coordinated 2005 through 2009 5-year sample, an additional 24 segments were selected to support any supplemental studies that the Substance Abuse and Mental Health Services Administration (SAMHSA) may have chosen to field. These 24 segments constituted the reserve sample and were available for use in 2010, 2011, and 2012. Eight reserve sample segments per SSR were fielded during the 2012 survey year. Four of these segments were retained from the 2011 survey, and four were selected for use in the 2012 survey.

These sampled segments were allocated equally into four separate samples, one for each 3-month period (calendar quarter) during the year. That is, a sample of addresses was selected from two segments in each calendar quarter so that the survey was relatively continuous in the field. In each of the area segments, a listing of all addresses was made from which a national sample of 214,274 addresses was selected. Of the selected addresses, 178,586 were determined to be eligible sample units. In these sample units (which can be either households or units within group quarters), sample persons were randomly selected using an automated screening procedure programmed in a handheld computer carried by the interviewers. The number of sample units completing the screening was 153,873. Youths aged 12 to 17 years and young adults aged 18 to 25 years were oversampled at this stage, with 12 to 17 year olds sampled at an actual rate of 87.3 percent and 18 to 25 year olds at a rate of 69.8 percent on average, when they were present in the sampled households or group quarters. Similarly, persons in age groups 26 or older were sampled at rates of 44.6 percent or less, with persons in the eldest age group (50 years or older) sampled at a rate of 8.6 percent on average. The overall population sampling rates were 0.09 percent for 12 to 17 year olds, 0.07 percent for 18 to 25 year olds, 0.02 percent for 26 to 34 year olds, 0.01 percent for 35 to 49 year olds, and 0.01 percent for those 50 or older. Nationwide, 87,656 persons were selected. Consistent with previous surveys in this series, the final respondent sample of 68,309 persons was representative of the U.S. general population (since 1991, the civilian, noninstitutionalized population) aged 12 or older. In addition, State samples were representative of their respective State populations. More detailed information on the disposition of the national screening and interview sample can be found in Appendix B. More information about the sample design can be found in the 2012 NSDUH sample design report by Morton, Martin, Shook-Sa, Chromy, and Hirsch (2013).

A.2 Data Collection Methodology

The data collection method used in NSDUH involves in-person interviews with sample persons, incorporating procedures to increase respondents' cooperation and willingness to report

[16] Census tracts are relatively permanent statistical subdivisions of counties and parishes and provide a stable set of geographic units across decennial census periods.

[17] Some census tracts had to be aggregated in order to meet the minimum DU requirement of 150 DUs in urban areas and 100 DUs in rural areas.

honestly about sensitive topics, such as illicit drug use behavior and mental health issues. Confidentiality is stressed in all written and oral communications with potential respondents. Respondents' names are not collected with the data, and computer-assisted interviewing (CAI) methods are used to provide a private and confidential setting to complete the interview.

Introductory letters are sent to sampled addresses, followed by an interviewer visit. When contacting a dwelling unit (DU), the field interviewer (FI) asks to speak with an adult resident (aged 18 or older) of the household who can serve as the screening respondent. Using a handheld computer, the FI completes a 5-minute procedure with the screening respondent that involves listing all household members along with their basic demographic data. The computer uses the demographic data in a preprogrammed selection algorithm to select zero to two sample persons, depending on the composition of the household. This selection process is designed to provide the necessary sample sizes for the specified population age groupings. In areas where a third or more of the households contain Spanish-speaking residents, the initial introductory letters written in English are mailed with a Spanish version on the back. All interviewers carry copies of this letter in Spanish. If the interviewer is not certified bilingual, he or she will use preprinted Spanish cards to attempt to find someone in the household who speaks English and who can serve as the screening respondent or who can translate for the screening respondent. If no one is available, the interviewer will schedule a time when a Spanish-speaking interviewer can come to the address. In households where a language other than Spanish is encountered, another language card is used to attempt to find someone who speaks English to complete the screening.

The NSDUH interview can be completed in English or Spanish, and both versions have the same content. If the sample person prefers to complete the interview in Spanish, a certified bilingual interviewer is sent to the address to conduct the interview. Because the interview is not translated into any other language, if a sample person does not speak English or Spanish, the interview is not conducted.

Immediately after completion of the screener, interviewers attempt to conduct the NSDUH interview with each sample person in the household. The interviewer requests the selected respondent to identify a private area in the home to conduct the interview away from other household members. The interview averages about an hour and includes a combination of CAPI (computer-assisted personal interviewing, in which the interviewer reads the questions) and ACASI (audio computer-assisted self-interviewing).

The NSDUH interview consists of core and noncore (i.e., supplemental) sections. A core set of questions critical for basic trend measurement of prevalence estimates remains in the survey every year and comprises the first part of the interview. Noncore questions, or modules, that can be revised, dropped, or added from year to year make up the remainder of the interview. The core consists of initial demographic items (which are interviewer-administered) and self-administered questions pertaining to the use of tobacco, alcohol, marijuana, cocaine, crack cocaine, heroin, hallucinogens, inhalants, pain relievers, tranquilizers, stimulants, and sedatives.

Questions about mental illness and the utilization of mental health services are included in noncore self-administered sections of the interview. Although many of the questions are asked both of youths aged 12 to 17 and adults, some are asked only of adults and others are asked only of youths. In separate age-specific modules, adults and youths each are asked questions about

major depressive episode (MDE) and mental health service utilization. Mental health service utilization questions for both youths and adults cover receipt of mental health treatment in inpatient settings in the past 12 months, the number of nights that respondents received inpatient treatment, receipt of mental health treatment in outpatient settings in the past 12 months, and the number of visits to outpatient mental health treatment providers in that period. Questions that are asked only of adults include symptoms of psychological distress in the past 30 days and past 12 months, impairment with daily activities because of psychological distress, use of prescribed medication to treat a mental or emotional condition in the past 12 months, and unmet need for mental health treatment in that period. All adults also are asked questions about suicidal thoughts and behavior; youths do not receive these same questions on suicidal thoughts and behavior. Both youths and adults are asked about suicidal thoughts and behavior as a symptom of MDE. However, this symptom is assessed only if respondents reported having a period in their life lasting 2 weeks or longer in which they had feelings associated with being depressed (i.e., feeling sad, empty, or depressed; feeling discouraged or hopeless; or losing interest with most things). Questions that are asked of youths but not adults include reasons for receiving mental health treatment from specific sources, receipt of school-based mental health treatment services, and receipt of mental health treatment in juvenile detention, prison, or jail in the past year. Definitions for many of these terms are included in the glossary of the mental health detailed tables.[18]

Additional topics in noncore self-administered sections include (but are not limited to) injection drug use, perceived risks of substance use, substance dependence or abuse, arrests, treatment for substance use problems, pregnancy, and other health care issues. Noncore demographic questions (which are interviewer-administered and follow the ACASI questions) address such topics as immigration, current school enrollment, employment and workplace issues, health insurance coverage, and income. In practice, some of the noncore portions of the interview have remained in the survey, relatively unchanged, from year to year (e.g., current health insurance coverage, employment).

The interview begins in CAPI mode with the FI reading the questions from the computer screen and entering the respondent's replies into the computer. The interview then transitions to the ACASI mode for the sensitive questions. In this mode, the respondent can read the questions silently on the computer screen and/or listen to the questions read through headphones and enter his or her responses directly into the computer. At the conclusion of the ACASI section, the interview returns to the CAPI mode with the FI completing the questionnaire. Each respondent who completes a full interview is given a $30 cash payment as a token of appreciation for his or her time.

No personal identifying information about the respondent is captured in the CAI record. FIs transmit the completed interview data to RTI in Research Triangle Park, North Carolina. Screening and interview data are encrypted while they reside on laptops and mobile computers. Data are transmitted back to RTI on a regular basis using either a direct dial-up connection or the Internet. All data are encrypted while in transit across dial-up or Internet connections. In addition, the screening and interview data are transmitted back to RTI in separate data streams and are kept physically separate (on different devices) before transmission occurs.

[18] This comprehensive set of mental health detailed tables is available at http://www.samhsa.gov/data/.

After the data are transmitted to RTI, certain cases are selected for verification. The respondents are contacted by RTI to verify the quality of an FI's work based on information that respondents provide at the end of screening (if no one is selected for an interview at the DU or the entire DU is ineligible for the study) or at the end of the interview. For the screening interview, the adult DU member who served as the screening respondent provides his or her first name and telephone number to the FI, who enters the information into a handheld computer and transmits the data to RTI. For completed interviews, respondents write their home telephone number and mailing address on a quality control form and seal the form in a preaddressed envelope that FIs mail back to RTI. All contact information is kept completely separate from the answers provided during the screening or interview.

Samples of respondents who completed screenings or interviews are randomly selected for verification. These cases are called by telephone interviewers who ask scripted questions designed to determine the accuracy and quality of the data collected. Any cases discovered to have a problem or discrepancy are flagged and routed to a small specialized team of telephone interviewers who recontact respondents for further investigation of the issue(s). Depending on the amount of an FI's work that cannot be verified through telephone verification, including bad telephone numbers (e.g., incorrect number, disconnected, not in service), a field verification may be conducted. Field verifications involve another FI returning to the sampled DU to verify the accuracy and quality of the data in person. If the verification procedures identify situations in which an FI has falsified data, the FI is terminated. All cases completed that quarter by the falsifying FI are reworked by the FI conducting the field verification. Any cases completed by the falsifying FI in earlier quarters of the same year are also verified. All cases from earlier quarters identified as falsified or unresolvable are removed and not reworked. Examples of unresolvable cases include those for which verifiers were never able to make contact with a resident of the DU, residents who refused to verify their data, previous residents who had moved, or residents who reported accurate roster data for the DU but did not recall speaking to an FI.

A subsample of adult respondents from the 2012 NSDUH also was administered a clinical follow-up interview as part of the Mental Health Surveillance Study (MHSS) that has been conducted in conjunction with the main survey since 2008. The MHSS sample respondents were administered a clinical interview 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 over the telephone. An estimated 84 percent of selected persons agreed to participate in the MHSS, and 80 percent of those persons completed the clinical interview. The content and function of the clinical interview data are discussed further in Section B.4.3 in Appendix B.

A.3 Data Processing

Data that FIs transmit to RTI are processed to create a raw data file in which no logical editing of the data has been done. The raw data file consists of one record for each transmitted interview. Cases are eligible to be treated as final respondents only if they provided data on lifetime use of cigarettes and at least 9 out of 13 of the other substances in the core section of the questionnaire. Even though editing and consistency checks are done by the CAI program during the interview, additional, more complex edits and consistency checks are completed at RTI.

Additionally, statistical imputation is used to replace missing or ambiguous values after editing for some key variables. Analysis weights are created so that estimates will be representative of the target population. Details of the editing, imputation, and weighting procedures for 2012 will appear in the *2012 NSDUH Methodological Resource Book*, which is in process. Until that volume becomes available, refer to the *2011 NSDUH Methodological Resource Book* (RTI International, 2013).

A.3.1 Data Coding and Editing

With the exception of industry and occupation data, coding of written answers that respondents or interviewers typed was performed at RTI for the 2012 NSDUH. These written answers include mentions of drugs that respondents had used or other responses that did not fit a previous response option (subsequently referred to as "OTHER, Specify" data). For example, the "OTHER, Specify" data for mental health issues in 2012 included (but were not limited to) such topics as outpatient settings in which adults aged 18 or older received mental health treatment in the past 12 months and reasons for the most recent visit or stay in outpatient or inpatient mental health treatment settings in the past 12 months for adolescents aged 12 to 17.

Written responses in "OTHER, Specify" data were assigned numeric codes through computer-assisted survey procedures and the use of a secure Web site that allowed for coding and review of the data. The computer-assisted procedures entailed a database check for a given "OTHER, Specify" variable that contained typed entries and the associated numeric codes. If an exact match was found between the typed response and an entry in the system, the computer-assisted procedures assigned the appropriate numeric code. Typed responses that did not match an existing entry were coded through the Web-based coding system.

As noted above, the CAI program included checks that alerted respondents or interviewers when an entered answer was inconsistent with a previous answer in a given module. In this way, the inconsistency could be resolved while the interview was in progress. However, not every inconsistency was resolved during the interview, and the CAI program did not include checks for every possible inconsistency that might have occurred in the data.

Therefore, the first step in processing the raw NSDUH data was logical editing of the data. Logical editing involved using data from within a respondent's record to (a) reduce the amount of item nonresponse (i.e., missing data) in interview records, including identification of items that were legitimately skipped; (b) make related data elements consistent with each other; and (c) identify ambiguities or inconsistencies to be resolved through statistical imputation procedures (see Section A.3.2). An important aspect of editing the mental health variables was documentation of situations in which it was known unambiguously that respondents legitimately skipped out of the corresponding questions. These included situations in which respondents were not asked questions based on their age and those that were based on routing logic within a given set of mental health questions. For example, if adult respondents reported that they did not stay overnight or longer in a hospital or other facility to receive mental health counseling in the past 12 months, the CAI logic skipped them out of all remaining adult mental health treatment questions about inpatient mental health services. In the editing procedures, the skipped variables were assigned codes to indicate that these additional inpatient adult mental health treatment variables did not apply.

If respondents were skipped out of drug use questions because they reported that they never used a given drug, the corresponding drug variables used in this report also were edited to assign codes indicating lifetime nonuse. In addition, respondents could report that they were lifetime users of a drug but not provide specific information on when they last used it. In this situation, a temporary "indefinite" value for the most recent period of use was assigned to the edited recency-of-use variable (e.g., "Used at some point in the lifetime LOGICALLY ASSIGNED"), and a final, specific value was statistically imputed. The editing procedures for key drug use variables also involved identifying inconsistencies between related variables so that these inconsistencies could be resolved through statistical imputation. For example, if a respondent reported last using a drug more than 12 months ago and also reported first using it at his or her current age, both of those responses could not be true. In this example, the inconsistent period of most recent use was replaced with an "indefinite" value, and the inconsistent age at first use was replaced with a missing data code. These indefinite or missing values were subsequently imputed through statistical procedures to yield consistent data for the related measures, as discussed in the next section. Procedures for editing the drug use variables also are discussed in Appendix A of the national findings report for the 2012 NSDUH (Center for Behavioral Health Statistics and Quality, 2013).

In the adult NSDUH data for 2012, all respondents with skipped or missing item scores for psychological distress (based on the Kessler-6 [K6] distress scale) or functional impairment because of psychological distress (based on the abridged World Health Organization Disability Assessment Schedule [WHODAS]) had their scores assigned as zeros.[19] This included cases where all item scores were missing and those where the skip pattern allowed all WHODAS questions to be skipped when the sum of all K6 item scores was zero. Specifically, of the 45,836 final adult respondents in the 2012 NSDUH, approximately 500 (1.1 percent) had at least one of the six past month K6 item scores missing.[20] Of those, nearly 100 (18.4 percent) had all six item scores missing. There were approximately 8,400 respondents (18.3 percent) who were skipped out of the WHODAS questions because the sum of all K6 item scores was zero, and approximately 400 respondents (0.9 percent) had at least one of the eight WHODAS item scores missing. Of those, nearly 100 (20.1 percent) had all eight item scores missing. As a result of assigning zeros to the K6 and WHODAS scores in these situations, there are no missing values in the 2012 survey for measures of adult serious mental illness (SMI) and other mental illness measures that were created from a model using K6 and WHODAS scores. Further details on the creation of these mental illness measures can be found in Section B.4.3 in Appendix B.

A.3.2 Statistical Imputation

For substance use, demographic, and other key variables that still had missing or ambiguous values after editing, statistical imputation was used to replace these values with appropriate response codes. However, the mental health variables related to mental health service utilization, suicidal ideation, and MDE used in this report were not imputed. Also, the variables were not imputed for substance use disorders (i.e., illicit drug or alcohol dependence and abuse)

[19] The content of the K6 and WHODAS in the 2012 NSDUH and procedures for scoring these scales are described further in Section B.4.3 in Appendix B.

[20] The number of final adult respondents differs from the number of interviews for adults presented in Appendix B because data in Appendix B are based on initial demographic information obtained from screener data.

for findings presented in Chapter 5 of this report. Consequently, these variables continued to have some amount of missing data after they were edited.

The remainder of this section discusses procedures for substance use and other variables that underwent statistical imputation to replace missing or ambiguous values. For example, a response is ambiguous if the editing procedures assigned a respondent's most recent use of a drug to "Used at some point in the lifetime," with no definite period within the lifetime. In this case, the imputation procedure assigns a value for when the respondent last used the drug (e.g., in the past 30 days, more than 30 days ago but within the past 12 months, more than 12 months ago). Similarly, if a response is completely missing, the imputation procedures replace missing values with nonmissing ones.

For most variables, missing or ambiguous values are imputed in NSDUH using a methodology called predictive mean neighborhoods (PMN), which was developed specifically for the 1999 survey and has been used in all subsequent survey years. PMN allows for the following: (1) the ability to use covariates to determine donors is greater than that offered in the hot-deck imputation procedure, (2) the relative importance of covariates can be determined by standard modeling techniques, (3) the correlations across response variables can be accounted for by making the imputation multivariate, and (4) sampling weights can be easily incorporated in the models. The PMN method has some similarity with the predictive mean matching method of Rubin (1986) except that, for the donor records, Rubin used the observed variable value (not the predictive mean) to compute the distance function. Also, the well-known method of nearest neighbor imputation is similar to PMN, except that the distance function is in terms of the original predictor variables and often requires somewhat arbitrary scaling of discrete variables. PMN is a combination of a model-assisted imputation methodology and a random nearest neighbor hot-deck procedure. The hot-deck procedure within the PMN method ensures that missing values are imputed to be consistent with nonmissing values for other variables. Whenever feasible, the imputation of variables using PMN is multivariate, in which imputation is accomplished on several response variables at once. Variables imputed using PMN are the core demographic variables, core drug use variables (recency of use, frequency of use, and age at first use), income, health insurance, and noncore demographic variables for work status, immigrant status, and the household roster. Table A.1 at the end of this appendix summarizes the distribution of weighted statistical imputation rates of these variables by interview section.

In the modeling stage of PMN, the model chosen depends on the nature of the response variable. In the 2012 NSDUH, the models included binomial logistic regression, multinomial logistic regression, Poisson regression, and ordinary linear regression, where the models incorporated the sampling design weights.

In general, hot-deck imputation replaces an item nonresponse (missing or ambiguous value) with a recorded response that is donated from a "similar" respondent who has nonmissing data. For random nearest neighbor hot-deck imputation, the missing or ambiguous value is replaced by a responding value from a donor randomly selected from a set of potential donors. Potential donors are those defined to be "close" to the unit with the missing or ambiguous value according to a predefined function called a distance metric. In the hot-deck procedure of PMN, the set of candidate donors (the "neighborhood") consists of respondents with complete data who have a predicted mean close to that of the item nonrespondent. The predicted means are

computed both for respondents with and without missing data, which differs from Rubin's method where predicted means are not computed for the donor respondent (Rubin, 1986). In particular, the neighborhood consists of either the set of the closest 30 respondents or the set of respondents with a predicted mean (or means) within 5 percent of the predicted mean(s) of the item nonrespondent, whichever set is smaller. If no respondents are available who have a predicted mean (or means) within 5 percent of the item nonrespondent, the respondent with the predicted mean(s) closest to that of the item nonrespondent is selected as the donor.

In the univariate case (where only one variable is imputed using PMN), the neighborhood of potential donors is determined by calculating the relative distance between the predicted mean for an item nonrespondent and the predicted mean for each potential donor, then choosing those means defined by the distance metric. The pool of donors is restricted further to satisfy logical constraints whenever necessary (e.g., age at first crack use must not be less than age at first cocaine use).

Whenever possible, missing or ambiguous values for more than one response variable are considered together. In this (multivariate) case, the distance metric is a Mahalanobis distance, which takes into account the correlation between variables (Manly, 1986), rather than a Euclidean distance. The Euclidean distance is the square root of the sum of squared differences between each element of the predictive mean vector for the respondent and the predictive mean vector for the nonrespondent. The Mahalanobis distance standardizes the Euclidean distance by the variance-covariance matrix, which is appropriate for random variables that are correlated or have heterogeneous variances. Whether the imputation is univariate or multivariate, only missing or ambiguous values are replaced, and donors are restricted to be logically consistent with the response variables that are not missing. Furthermore, donors are restricted to satisfy "likeness constraints" whenever possible. That is, donors are required to have the same values for variables highly correlated with the response. For example, donors for the age at first use variable are required to be of the same age as recipients, if at all possible. If no donors are available who meet these conditions, these likeness constraints can be loosened. Further details on the PMN methodology are provided by Singh, Grau, and Folsom (2002).

Although statistical imputation could not proceed separately within each State due to insufficient pools of donors, information about each respondent's State of residence was incorporated in the modeling and hot-deck steps. For most drugs, respondents were separated into three "State usage" categories as follows: respondents from States with high usage of a given drug were placed in one category, respondents from States with medium usage into another, and the remainder into a third category. This categorical "State rank" variable was used as one set of covariates in the imputation models. In addition, eligible donors for each item nonrespondent were restricted to be of the same State usage category (i.e., the same "State rank") as the nonrespondent.

In the 2012 NSDUH, the majority of variables that underwent statistical imputation required less than 5 percent of their records to be logically assigned or statistically imputed. Variables for measures that are highly sensitive or that may not be known to younger respondents (e.g., family income) often have higher rates of item nonresponse. In addition, certain variables that are subject to a greater number of skip patterns and consistency checks

(e.g., frequency of use in the past 12 months and past 30 days) often require greater amounts of imputation.

A.3.3 Development of Analysis Weights

The general approach to developing and calibrating analysis weights involved developing design-based weights as the product of the inverse of the selection probabilities at each selection stage. Since 2005, NSDUH has used a four-stage sample selection scheme in which an extra selection stage of census tracts was added before the selection of a segment. Thus, the design-based weights, d_k, incorporate an extra layer of sampling selection to reflect the sample design change. Adjustment factors, $a_k(\lambda)$, then were applied to the design-based weights to adjust for nonresponse, to poststratify to known population control totals, and to control for extreme weights when necessary. In view of the importance of State-level estimates with the 50-State design, it was necessary to control for a much larger number of known population totals. Several other modifications to the general weight adjustment strategy that had been used in past surveys also were implemented for the first time beginning with the 1999 CAI sample.

Weight adjustments were based on a generalization of Deville and Särndal's (1992) logit model. This generalized exponential model (GEM) (Folsom & Singh, 2000) incorporates unit-specific bounds $(\ell_k, u_k), k \in s,$ for the adjustment factor $a_k(\lambda)$ as follows:

$$a_k(\lambda) = \frac{\ell_k(u_k - c_k) + u_k(c_k - \ell_k)\exp(A_k x_k'\lambda)}{(u_k - c_k) + (c_k - \ell_k)\exp(A_k x_k'\lambda)},$$

where c_k are prespecified centering constants, such that $\ell_k < c_k < u_k$ and $A_k = (u_k - \ell_k)/(u_k - c_k)(c_k - \ell_k)$. The variables ℓ_k, c_k, and u_k are user-specified bounds, and λ is the column vector of p model parameters corresponding to the p covariates x. The λ parameters are estimated by solving

$$\sum\nolimits_s x_k d_k a_k(\lambda) - \tilde{T}_x = 0,$$

where $\tilde{T}_x$ denotes control totals that could be either nonrandom, as is generally the case with poststratification, or random, as is generally the case for nonresponse adjustment.

The final weights $w_k = d_k a_k(\lambda)$ minimize the distance function $\Delta(w, d)$ defined as

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

This general approach was used at several stages of the weight adjustment process, including (1) adjustment of household weights for nonresponse at the screener level, (2) poststratification of household weights to meet population controls for various household-level demographics by State, (3) adjustment of household weights for extremes,

(4) poststratification of selected person weights, (5) adjustment of responding person weights for nonresponse at the questionnaire level, (6) poststratification of responding person weights, and (7) adjustment of responding person weights for extremes.

Every effort was made to include as many relevant State-specific covariates (typically defined by demographic domains within States) as possible in the multivariate models used to calibrate the weights (nonresponse adjustment and poststratification steps). Because further subdivision of State samples by demographic covariates often produced small cell sample sizes, it was not possible to retain all State-specific covariates (even after meaningful collapsing of covariate categories) and still estimate the necessary model parameters with reasonable precision. Therefore, a hierarchical structure was used in grouping States with covariates defined at the national level, at the census division level within the Nation, at the State group within the census division, and, whenever possible, at the State level. In every case, the controls for the total population within a State and the five age groups (12 to 17, 18 to 25, 26 to 34, 35 to 49, 50 or older) within a State were maintained except that, in the last step of poststratification of person weights, six age groups (12 to 17, 18 to 25, 26 to 34, 35 to 49, 50 to 64, 65 or older) were used. Census control totals by age, race, gender, and Hispanic origin were required for the civilian, noninstitutionalized population of each State. Beginning with the 2002 NSDUH, the Population Estimates Branch of the U.S. Census Bureau has produced the necessary population estimates for the same year as each NSDUH survey in response to a special request.

Census control totals for the 2012 NSDUH weights were based on population estimates from the 2010 decennial census as for the 2011 NSDUH, whereas the control totals for the 2010 NSDUH weights were still based on the 2000 census. Section B.4.5 in Appendix B discusses the results of an investigation using data from 2010 and 2011 that assessed the effects of using control totals based on the 2010 census instead of the 2000 census for making mental health estimates for 2010.

Consistent with the surveys from 1999 onward, control of extreme weights through separate bounds for adjustment factors was incorporated into the GEM calibration processes for both nonresponse and poststratification. This is unlike the traditional method of winsorization in which extreme weights are truncated at prespecified levels and the trimmed portions of weights are distributed to the nontruncated cases. In GEM, it is possible to set bounds around the prespecified levels for extreme weights, then the calibration process provides an objective way of deciding the extent of adjustment (or truncation) within the specified bounds. A step was included to poststratify the household-level weights to obtain census-consistent estimates based on the household rosters from all screened households. An additional step poststratified the selected person sample to conform to the adjusted roster estimates. This additional step takes advantage of the inherent two-phase nature of the NSDUH design. The respondent poststratification step poststratified the respondent person sample to external census data (defined within the State whenever possible, as discussed above).

In developing the person-level analysis weights for the 2011 NSDUH, the lower bounds in GEM were inadvertently allowed to be less than 1 in the DU nonresponse and the person nonresponse adjustment steps for the East North Central division. Normally, the lower bounds for nonresponse adjustments in GEM are required to be at least 1. To assess the potential impact on estimates because of this deviation from the normal practice of bound setting, estimates were

compared using the weights that included this error and newly calculated weights that did not include this error. The impact of this correction on substance use and mental health estimates was minimal. Therefore, this report and the 2012 detailed tables include the same 2011 estimates that were based on the original person-level analysis weights from the 2011 NSDUH. Additional quality control checks were added in GEM to reduce the reoccurrence of this event.

Table A.1 Weighted Statistical Imputation Rates (Percentages) for the 2012 NSDUH, by Interview Section

Interview Section	Number of Variables	Mean	Minimum	25th Percentile	75th Percentile	Maximum
Core Demographics	12	2.16	0.01	0.24	3.55	3.73
Core Drug Use[1]	98	1.95	0.01	0.12	2.68	10.71
Income and Health Insurance	20	1.56	0.21	0.37	1.40	9.96
Other Noncore Demographics[2]	12	0.13	0.01	0.07	0.20	0.34

[1] Core drug use variables do not include initiation variables beyond age at first use because these additional questions are asked only if respondents first used within 1 year of their current age.

[2] Other noncore demographic variables include work status, immigrant status, and household roster variables.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2012.

Appendix B: Statistical Methods and Measurement

B.1 Target Population

The estimates of the prevalence of mental disorders and substance use from the National Survey on Drug Use and Health (NSDUH) are designed to describe the target population of the survey—the civilian, noninstitutionalized population aged 12 or older living in the United States. This population includes almost 98 percent of the total U.S. population aged 12 or older. However, it excludes some small subpopulations that may have very different estimates of mental disorders and substance use and therefore may have specific mental health issues or needs. For example, the survey excludes active military personnel, who may be exposed to combat situations or stressors associated with extended overseas deployment. In addition, military personnel have been shown to have significantly lower rates of illicit drug use but higher rates of heavy alcohol use compared with their counterparts in the civilian population. The survey also excludes persons living in institutional group quarters, such as prisons and residential mental health or substance abuse treatment centers. Persons in some of these institutional settings may have higher rates of mental health or substance use disorders compared with the general population. Another subpopulation excluded from NSDUH consists of homeless persons not living in a shelter on the survey date; they are another population shown to have higher than average rates of mental disorders and illicit drug use. Readers are reminded to consider the exclusion of these subpopulations when interpreting results. Appendix C describes other surveys that provide mental health data for these populations.

B.2 Sampling Error and Statistical Significance

This report includes national mental health estimates that were drawn from a set of tables referred to as "mental health detailed tables" that are available at http://www.samhsa.gov/data/. The national estimates, along with the associated standard errors (SEs, which are the square roots of the variances), were computed for all mental health detailed tables using a multiprocedure package, SUDAAN® Software for Statistical Analysis of Correlated Data. This software accounts for the complex survey design in NSDUH in estimating the SEs (RTI International, 2008). The final, nonresponse-adjusted, and poststratified analysis weights were used in SUDAAN to compute unbiased design-based estimates.

The sampling error of an estimate is the error caused by the selection of a sample instead of conducting a census of the population. The sampling error may be reduced by selecting a large sample and/or by using efficient sample design and estimation strategies, such as stratification, optimal allocation, and ratio estimation. The use of probability sampling methods in NSDUH allows estimation of sampling error from the survey data. SEs have been calculated using SUDAAN for all estimates presented in this report using a Taylor series linearization approach that takes into account the effects of NSDUH's complex design features. The SEs are used to identify unreliable estimates and to test for the statistical significance of differences between estimates.

B.2.1 Variance Estimation for Totals

The variances and SEs of estimates of means and proportions can be calculated reasonably well in SUDAAN using a Taylor series linearization approach. Estimates of means or proportions, $\hat{p}_d$, such as drug use prevalence estimates for a domain d, can be expressed as a ratio estimate:

$$\hat{p}_d = \frac{\hat{Y}_d}{\hat{N}_d},$$

where $\hat{Y}_d$ is a linear statistic estimating the number of substance users in the domain d and $\hat{N}_d$ is a linear statistic estimating the total number of persons in domain d (including both users and nonusers). The SUDAAN software package is used to calculate direct estimates of $\hat{Y}_d$ and $\hat{N}_d$ (and, therefore, $\hat{p}_d$) and also can be used to estimate their respective SEs. A Taylor series approximation method implemented in SUDAAN provides the estimate for the SE of $\hat{p}_d$.

When the domain size, $\hat{N}_d$, is free of sampling error, an appropriate estimate of the SE for the total number of substance users is

$$\text{SE}(\hat{Y}_d) = \hat{N}_d \text{SE}(\hat{p}_d).$$

This approach is theoretically correct when the domain size estimates, $\hat{N}_d$, are among those forced to match their respective U.S. Census Bureau population estimates through the weight calibration process. In these cases, $\hat{N}_d$ is not subject to a sampling error induced by the NSDUH design. Section A.3.3 in Appendix A contains further information about the weight calibration process. In addition, more detailed information about the weighting procedures for 2012 will appear in the *2012 NSDUH Methodological Resource Book*, which is in process. Until that volume becomes available, refer to the *2011 NSDUH Methodological Resource Book* (RTI International, 2013).

For estimated domain totals, $\hat{Y}_d$, where $\hat{N}_d$ is not fixed (i.e., where domain size estimates are not forced to match the U.S. Census Bureau population estimates), this formulation still may provide a good approximation if it can be assumed that the sampling variation in $\hat{N}_d$ is negligible relative to the sampling variation in $\hat{p}_d$. This is a reasonable assumption for many cases in this study.

For some subsets of domain estimates, the above approach can yield an underestimate of the SE of the total when $\hat{N}_d$ was subject to considerable variation. Because of this underestimation, alternatives for estimating SEs of totals were implemented. Since the 2005 NSDUH report, a "mixed" method approach has been implemented for all detailed tables to improve the accuracy of SEs and to better reflect the effects of poststratification on the variance

of total estimates. This approach assigns the methods of SE calculation to domains (i.e., subgroups for which the estimates were calculated) within tables so that all estimates among a select set of domains with fixed $\hat{N}_d$ were calculated using the formula above, and all other estimates were calculated directly in SUDAAN, regardless of what the other estimates are within the same table. The set of domains considered controlled (i.e., those with a fixed $\hat{N}_d$) was restricted to main effects and two-way interactions in order to maintain continuity between years. Domains consisting of three-way interactions may be controlled in a single year but not necessarily in preceding or subsequent years. The use of such SEs did not affect the SE estimates for the corresponding proportions presented in the same sets of tables because all SEs for means and proportions are calculated directly in SUDAAN. As a result of the use of this mixed-method approach, the SEs for the total estimates within many detailed tables were calculated differently from those in NSDUH reports prior to the 2005 report.

Table B.1 at the end of this appendix contains only a partial list of domains with a fixed $\hat{N}_d$ that were used in the weight calibration process. However, the list does include all of the domains that were used in computing SEs for estimates produced in this report and in the 2012 mental health detailed tables. This table includes both the main effects and two-way interactions and may be used to identify the method of SE calculation employed for estimates of totals in the mental health detailed tables from which data are presented in this report. For example, Tables 1.2 and 1.7 in the mental health detailed tables present estimates of any mental illness (AMI) and serious mental illness (SMI), respectively, among persons aged 18 or older within the domains of gender, Hispanic origin and race, and current employment. Estimates among the total population (age main effect), males and females (age by gender interaction), and Hispanics and non-Hispanics (age by Hispanic origin interaction) were treated as controlled in these tables, and the formula above was used to calculate the SEs. The SEs for all other estimates, including white and black or African American (age by Hispanic origin by race interaction) were calculated directly from SUDAAN. Estimates presented in this report for racial groups are for non-Hispanics. Thus, the domain for whites by age group in the weight calibration process in Table B.1 is a two-way interaction. However, published estimates for whites by age group in this report and in the 2012 mental health detailed tables actually represent a three-way interaction: white by Hispanic origin (i.e., not Hispanic) by age group.

B.2.2 Suppression Criteria for Unreliable Estimates

As has been done in past NSDUH reports, direct estimates from NSDUH that are designated as unreliable are not shown in this report and are noted by asterisks (*) in figures containing these estimates. The criteria used to define unreliability of direct estimates from NSDUH are based on the prevalence (for proportion estimates), relative standard error (RSE) (defined as the ratio of the SE over the estimate), nominal (actual) sample size, and effective sample size for each estimate. These suppression criteria for various NSDUH estimates are summarized in Table B.2 at the end of this appendix.

Proportion estimates $(\hat{p})$, or rates, within the range $[0 < \hat{p} < 1]$, and the corresponding estimated numbers of users were suppressed if

$$\text{RSE}[-\ln(\hat{p})] > .175 \text{ when } \hat{p} \leq .5$$

or

$$\text{RSE}[-\ln(1-\hat{p})] > .175 \text{ when } \hat{p} > .5 .$$

Using a first-order Taylor series approximation to estimate $\text{RSE}[-\ln(\hat{p})]$ and $\text{RSE}[-\ln(1-\hat{p})]$, the following equation was derived and used for computational purposes when applying a suppression rule dependent on effective sample size:

$$\frac{\text{SE}(\hat{p})/\hat{p}}{-\ln(\hat{p})} > .175 \text{ when } \hat{p} \leq .5$$

or

$$\frac{\text{SE}(\hat{p})/(1-\hat{p})}{-\ln(1-\hat{p})} > .175 \text{ when } \hat{p} > .5 .$$

The separate formulas for $\hat{p} \leq .5$ and $\hat{p} > .5$ produce a symmetric suppression rule; that is, if $\hat{p}$ is suppressed, $1-\hat{p}$ will be suppressed as well (see Figure B.1 following Table B.2). When $.05 < \hat{p} < .95$, the symmetric properties of the rule produce a local minimum effective sample size of 50 at $\hat{p} = .2$ and at $\hat{p} = .8$. Using the minimum for the suppression rule would mean that estimates of $\hat{p}$ between .05 and .95 would be suppressed if their corresponding effective sample sizes were less than 50. Within this same interval, a local maximum effective sample size of 68 is found at $\hat{p} = .5$. To simplify requirements and maintain a conservative suppression rule, estimates of $\hat{p}$ between .05 and .95 were suppressed if they had an effective sample size below 68.

In addition, a minimum nominal sample size suppression criterion (n = 100) that protects against unreliable estimates caused by small design effects and small nominal sample sizes was employed; Table B.2 shows a formula for calculating design effects. Prevalence estimates also were suppressed if they were close to 0 or 100 percent (i.e., if $\hat{p} < .00005$ or if $\hat{p} \geq .99995$).

Beginning with the 1991 survey, the suppression rule for proportions based on $\text{RSE}[-\ln(\hat{p})]$ described previously replaced a rule in which data were suppressed whenever $\text{RSE}(\hat{p}) > .5$. This rule was changed because the rule prior to 1991 imposed a very stringent application for suppressing estimates when $\hat{p}$ is small but imposed a very lax application for large $\hat{p}$. The new rule ensured a more uniformly stringent application across the whole range of $\hat{p}$ (i.e., from 0 to 1). The previous rule also was asymmetric in the sense that suppression only occurred in terms of $\hat{p}$. That is, there was no complementary rule for $(1-\hat{p})$, which the current NSDUH suppression criteria for proportions take into account.

Estimates of totals were suppressed if the corresponding prevalence rates were suppressed. Estimates of means that are not bounded between 0 and 1 (e.g., mean of age at first

use) were suppressed if the RSEs of the estimates were larger than .5 or if the nominal sample size was smaller than 10 respondents. This rule was based on an empirical examination of the estimates of mean age of first use and their SEs for various empirical sample sizes. Although arbitrary, a sample size of 10 appeared to provide sufficient precision and still allow reporting by year of first use for many substances.

B.2.3 Statistical Significance of Differences

This section describes the methods used to compare prevalence estimates in this report. Customarily, the observed difference between estimates is evaluated in terms of its statistical significance. Statistical significance is based on the *p* value of the test statistic and refers to the probability that a difference as large as that observed would occur because of random variability in the estimates if there were no difference in the prevalence estimates for the population groups being compared. The significance of observed differences in this report is reported at the .05 level. When comparing prevalence estimates, the null hypothesis (no difference between prevalence estimates) was tested against the alternative hypothesis (there is a difference in prevalence estimates) using the standard difference in proportions test expressed as

$$Z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\text{var}(\hat{p}_1) + \text{var}(\hat{p}_2) - 2\,\text{cov}(\hat{p}_1, \hat{p}_2)}},$$

where $\hat{p}_1$ = first prevalence estimate, $\hat{p}_2$ = second prevalence estimate, $\text{var}(\hat{p}_1)$ = variance of first prevalence estimate, $\text{var}(\hat{p}_2)$ = variance of second prevalence estimate, and $\text{cov}(\hat{p}_1, \hat{p}_2)$ = covariance between $\hat{p}_1$ and $\hat{p}_2$. In cases where significance tests between years were performed, the prevalence estimate from the earlier year becomes the first prevalence estimate, and the prevalence estimate from the later year becomes the second prevalence estimate (e.g., 2011 is the first estimate and 2012 the second).

Under the null hypothesis, *Z* is asymptotically distributed as a standard normal random variable. Therefore, calculated values of *Z* can be referred to the unit normal distribution to determine the corresponding probability level (i.e., *p* value). Because the covariance term between the two estimates is not necessarily zero, SUDAAN was used to compute estimates of *Z* along with the associated *p* values using the analysis weights and accounting for the sample design as described in Appendix A. A similar procedure and formula for *Z* were used for estimated totals. Whenever it was necessary to calculate the SE outside of SUDAAN (i.e., when domains were forced by the weighting process to match their respective U.S. Census Bureau population estimates), the corresponding test statistics also were computed outside of SUDAAN.

When comparing population subgroups across three or more levels of a categorical variable, log-linear chi-square tests of independence of the subgroups and the prevalence variables were conducted using SUDAAN in order to first control the error level for multiple comparisons. If Shah's Wald *F* test (transformed from the standard Wald chi-square) indicated overall significant differences, the significance of each particular pairwise comparison of interest was tested using SUDAAN analytic procedures to properly account for the sample design (RTI International, 2008). Using the published estimates and SEs to perform independent *t* tests for the difference of proportions usually will provide the same results as tests performed in

SUDAAN. However, where the significance level is borderline, results may differ for two reasons: (1) the covariance term is included in SUDAAN tests, whereas it is not included in independent *t* tests; and (2) the reduced number of significant digits shown in the published estimates may cause rounding errors in the independent *t* tests.

B.3 Other Information on Data Accuracy

The accuracy of survey estimates can be affected by nonresponse, coding errors, computer processing errors, errors in the sampling frame, reporting errors, and other errors not due to sampling. They are sometimes referred to as "nonsampling errors." These types of errors and their impact are reduced through data editing, statistical adjustments for nonresponse, close monitoring and periodic retraining of interviewers, and improvement in various quality control procedures.

Although these types of errors often can be much larger than sampling errors, measurement of most of these errors is difficult. However, some indication of the effects of some types of these errors can be obtained through proxy measures, such as response rates, and from other research studies.

B.3.1 Screening and Interview Response Rate Patterns

In 2012, respondents continued to receive a $30 incentive for the main study in an effort to maximize response rates. The weighted screening response rate (SRR) is defined as the weighted number of successfully screened households[21] divided by the weighted number of eligible households (as defined in Table B.3), or

$$SRR = \frac{\sum w_{hh} complete_{hh}}{\sum w_{hh} eligible_{hh}},$$

where w_{hh} is the inverse of the unconditional probability of selection for the household and excludes all adjustments for nonresponse and poststratification defined in Section A.3.3 of Appendix A. Of the 178,586 eligible households sampled for the 2012 NSDUH, 153,873 were screened successfully, for a weighted screening response rate of 86.1 percent (Table B.3). At the person level, the weighted interview response rate (IRR) is defined as the weighted number of respondents divided by the weighted number of selected persons (see Table B.4), or

$$IRR = \frac{\sum w_i complete_i}{\sum w_i selected_i},$$

where w_i is the inverse of the probability of selection for the person and includes household-level nonresponse and poststratification adjustments (adjustments 1, 2, and 3 in Section A.3.3 of Appendix A). To be considered a completed interview, a respondent must provide enough data to

[21] A successfully screened household is one in which all screening questionnaire items were answered by an adult resident of the household and either zero, one, or two household members were selected for the NSDUH interview.

pass the usable case rule.[22] In the 153,873 screened households, a total of 87,656 sample persons were selected, and completed interviews were obtained from 68,309 of these sample persons, for a weighted IRR of 73.0 percent (Table B.4). A total of 14,275 (19.6 percent) sample persons were classified as refusals or parental refusals, 2,592 (3.0 percent) were not available or never at home, and 2,480 (4.4 percent) did not participate for various other reasons, such as physical or mental incompetence or language barrier (see Table B.4, which also shows the distribution of the selected sample by interview code and age group). Among demographic subgroups, the weighted IRR was higher among 12 to 17 year olds (82.8 percent), females (74.7 percent), blacks (79.1 percent), persons in the Midwest (74.3 percent), and residents of small metropolitan areas (75.2 percent) than among other related groups (Table B.5).

The overall weighted response rate, defined as the product of the weighted screening response rate and weighted interview response rate or

$$ORR = SRR \times IRR,$$

was 62.9 percent in 2012. Nonresponse bias can be expressed as the product of the nonresponse rate $(1-R)$ and the difference between the characteristic of interest between respondents and nonrespondents in the population $(P_r - P_{nr})$. By maximizing NSDUH response rates, it is hoped that the bias due to the difference between the estimates from respondents and nonrespondents is minimized. Drug use surveys are particularly vulnerable to nonresponse because of the difficult nature of accessing heavy drug users. However, in a study that matched 1990 census data to 1990 NHSDA nonrespondents,[23] it was found that populations with low response rates did not always have high drug use rates. For example, although some populations were found to have low response rates and high drug use rates (e.g., residents of large metropolitan areas and males), other populations had low response rates and low drug use rates (e.g., older adults and high-income populations). Therefore, many of the potential sources of bias tend to cancel each other in estimates of overall prevalence (Gfroerer, Lessler, & Parsley, 1997).

B.3.2 Inconsistent Responses and Item Nonresponse

Among survey participants, item response rates were generally very high for most mental health and drug use items. For example, 0.1 percent of the adult respondents in 2012 had missing data (i.e., responses other than "yes" or "no") for whether they received mental health treatment in the past 12 months as an inpatient, and 0.3 percent had missing data for whether they received outpatient mental health treatment in this period. Also, about 0.4 percent of adults had missing data for questions about suicidal thoughts and behavior. About 0.6 to 0.9 percent of adults had missing data for questions about specific lifetime symptoms of depression; the highest percentage of missing data (0.9 percent) occurred in the question about the specific number of pounds that respondents lost without trying to lose weight (question AD26f in the adult depression module). In addition, about 0.6 to 0.8 percent of adults had missing data for these lifetime depression symptom questions because they had missing data (e.g., answers of "don't know" or "refused") for preceding questions that needed to be answered affirmatively in order

[22] The usable case rule requires that a respondent answer "yes" or "no" to the question on lifetime use of cigarettes and "yes" or "no" to at least nine additional lifetime use questions.

[23] Prior to 2002, NSDUH was known as the National Household Survey on Drug Abuse (NHSDA).

for them to be asked the questions about depression symptoms. Information on item nonresponse for questions used to measure psychological distress and functional impairment among adults is presented in Section A.3.1 in Appendix A of this report.

For respondents aged 12 to 17 in the 2012 NSDUH, 1.6 to 2.1 percent had missing data for questions about specific lifetime symptoms of depression; as for adults, the highest percentage of missing data (2.1 percent) occurred in the question about the specific number of pounds that youths lost without trying (question YD26f in the adolescent depression module). About 1.5 to 1.9 percent of youths had missing data for these lifetime depression symptom questions because they had missing data for preceding questions that youths needed to answer affirmatively in order to be asked the questions about depression symptoms.

In addition, the logic in the 2012 NSDUH computer-assisted interviewing (CAI) instrumentation skipped respondents out of the mental health and other questions that would not apply based on their answers to previous questions. This skip logic reduced the potential for inconsistent data by limiting respondents' opportunity to provide answers that were inconsistent with previous answers. For example, if adult respondents did not report that they stayed overnight in a hospital or other facility to receive mental health treatment in the past 12 months, they were not asked questions about the type of inpatient facility where they received mental health treatment, the number of nights they spent in inpatient facilities, or the payment sources for their inpatient treatment in that period. Thus, respondents could not report that they did not receive inpatient mental health treatment in the past 12 months and then answer one or more of these additional questions as though they had.

Respondents also could give inconclusive or inconsistent information about whether they ever used a given drug (i.e., "yes" or "no") and, if they had used a drug, when they last used it; the latter information is needed to identify those lifetime users of a drug who used it in the past year or past month. Further, the logic in the CAI instrument did not eliminate all occurrences of inconsistent data. For example, respondents could give inconsistent responses to items such as when they first used a drug compared with their most recent use of a drug. These missing or inconsistent responses first are resolved where possible through a logical editing process. Additionally, missing or inconsistent responses are imputed using statistical methodology. These imputation procedures in NSDUH are based on responses to multiple questions, so that the maximum amount of information is used in determining whether a respondent is classified as a user or nonuser, and if the respondent is classified as a user, whether the respondent is classified as having used in the past year or the past month. For example, ambiguous data on the most recent use of cocaine are statistically imputed based on a respondent's data for use (or most recent use) of tobacco products, alcohol, inhalants, marijuana, hallucinogens, and nonmedical use of prescription psychotherapeutic drugs. Nevertheless, editing and imputation of missing responses are potential sources of measurement error.

As was the case with the drug use variables, the CAI skip logic also did not eliminate all opportunities for inconsistent reports in the mental health questions. Consequently, the logical editing procedures for the mental health data could slightly increase the amount of missing data when inconsistent answers were given. For example, if adult or adolescent respondents who met the criteria for a lifetime major depressive episode (MDE) (see Section B.4.4) reported an age at

onset for depression symptoms[24] that was greater than their current age, the inconsistent age-at-onset variable was set to a missing value. However, the number of respondents in 2012 with this inconsistency was small (i.e., fewer than 10 respondents aged 12 or older).

For more information on editing and statistical imputation, see Sections A.3.1 and A.3.2 of Appendix A. Details of the editing and imputation procedures for 2012 also will appear in the *2012 NSDUH Methodological Resource Book*, which is in process. Until that volume becomes available, refer to the *2011 NSDUH Methodological Resource Book* (RTI International, 2013).

B.3.3 Data Reliability

A reliability study was conducted as part of the 2006 NSDUH to assess the reliability of responses to the NSDUH questionnaire. An interview/reinterview method was employed in which 3,136 individuals were interviewed on two occasions during 2006 generally 5 to 15 days apart; the initial interviews in the reliability study were a subset of the main study interviews. The reliability of the responses was assessed by comparing the responses of the first interview with the responses from the reinterview. Responses from the first interview and reinterview that were analyzed for response consistency were raw data that had been only minimally edited for ease of analysis and had not been imputed (see Sections A.3.1 and A.3.2 of Appendix A).

This section summarizes results for the reliability of selected variables related to substance use, mental health, and demographic characteristics. Reliability is expressed by estimates of Cohen's kappa (κ), which ranges from -1.00 to 1.00 (Cohen, 1960). Cohen's kappa can be interpreted according to benchmarks proposed by Landis and Koch (1977, p. 165): (a) *poor* agreement for kappas less than 0.00, (b) *slight* agreement for kappas of 0.00 to 0.20, (c) *fair* agreement for kappas of 0.21 to 0.40, (d) *moderate* agreement for kappas of 0.41 to 0.60, (e) *substantial* agreement for kappas of 0.61 to 0.80, and (f) *almost perfect* agreement for kappas of 0.81 to 1.00.

The kappa values for the lifetime and past year substance use variables (marijuana use, alcohol use, and cigarette use) among persons aged 12 or older all showed almost perfect response consistency, ranging from 0.82 for past year marijuana use to 0.93 for lifetime marijuana use and past year cigarette use. The value obtained for the substance dependence or abuse measure in the past year showed substantial agreement (0.67), while the substance abuse treatment variable showed almost perfect consistency in both the lifetime (0.89) and past year (0.87).

Among adults, the values for past year outpatient mental health treatment and prescription medication mental health treatment showed almost perfect consistency (0.85 each). Reliability statistics for the adult MDE measures were moderate to substantial (lifetime: 0.67; past year: 0.52).

[24] Adults were asked to report the age when they first had a period of 2 weeks or longer when they were sad or discouraged or lost interest in most things for most of the day nearly every day and also reported that they had some symptoms of depression. Adolescents were asked to report the age when they first had a period of 2 weeks or longer when they were sad, discouraged, or really bored and also reported that they had some symptoms of depression.

A dichotomous measure of whether adults had scores of less than 13 or scores of 13 or higher based on six items (the Kessler-6 or K6 scale; see Section B.4.3 in this appendix for more information on the K6 scale) was used to estimate symptoms of psychological distress during the one month in the past 12 months when respondents were at their worst emotionally.[25] This measure showed substantial agreement (0.64) between the first interview and the reinterview. The kappa for the K6 score, which ranged from 0 to 24, was weak (0.21) when exact agreement was required between the scores from the first interview and the reinterview. When the K6 scores were allowed to differ by no more than three points between the two interviews, however, the kappa increased to 0.63.

The demographic variables showed almost perfect agreement, ranging from 0.95 for current enrollment in school to 1.00 for gender. For further information on the reliability of a wide range of measures contained in NSDUH, see the complete methodology report (Chromy et al., 2010).

B.3.4 Revised Estimates for 2006 to 2010

During regular data collection and processing checks for the 2011 NSDUH, data errors were identified. These errors resulted from fraudulent cases submitted by field interviewers and affected the data for Pennsylvania (2006 to 2010) and Maryland (2008 and 2009). Although all fraudulent interview cases were removed from the data files, the affected screening cases were not removed because they were part of the assigned sample. Instead, these screening cases were assigned a final screening code of 39 ("Fraudulent Case") and treated as incomplete with unknown eligibility. The screening eligibility status for these cases then was imputed. Those cases that were imputed to be eligible were treated as unit nonrespondents for weighting purposes; however, these cases were not treated differently from other unit nonrespondents in the weighting process in 2006 to 2010 (see Section A.3.3 in Appendix A).

Table B.3 in Appendix B of the 2011 mental health findings report (Center for Behavioral Health Statistics and Quality [CBHSQ], 2012d) presents screening results for 2010, the last year that was affected by these errors. Cases that were imputed to be eligible are classified with a final code of 39 ("Fraudulent Case"; see Table B.3 in this report). The cases that were imputed to be ineligible did not contribute to the weights and are reported as "Other, Ineligible" in Table B.3. Because any cases with falsified data were treated either as ineligible or as unit nonrespondents at the screening level, they were excluded from the interview data (see Table B.4). However, some estimates for 2006 to 2010 in the 2012 mental health findings report and the 2012 mental health detailed tables, as well as other new reports, may differ from corresponding estimates found in some previous reports or tables.

These errors had minimal impact on the national estimates and no effect on direct estimates for the other 48 States and the District of Columbia. In reports where model-based small area estimation techniques are used, estimates for all States may be affected, even though the errors were concentrated in only two States. In reports that do not use model-based estimates,

[25] In NSDUHs prior to 2008, a score of 13 or higher on the K6 scale was used to define a measure of serious psychological distress among adults.

the only estimates appreciably affected are estimates for Pennsylvania, Maryland, the mid-Atlantic division, and the Northeast region.

The 2012 mental health findings report and mental health detailed tables do not include division-level, State-level, or model-based estimates. However, they do show region-level estimates, including estimates for the Northeast region. Single-year estimates based on 2006 to 2010 data may differ from previously published estimates. Tables and estimates based only on data since 2011 are unaffected by these data errors.

Caution is advised when comparing data from older reports with data from more recent reports that are based on corrected data files. As discussed above, comparisons of mental health estimates for Pennsylvania, Maryland, the mid-Atlantic division, and the Northeast region are of most concern, while comparisons of national data or data for other States and regions are essentially still valid. CBHSQ within the Substance Abuse and Mental Health Services Administration (SAMHSA) is producing a selected set of corrected versions of reports and tables. In particular, CBHSQ has released a set of modified detailed tables for 2006 to 2008 that include revised estimates for the Northeast region for certain mental health measures. However, CBHSQ does not recommend making comparisons between unrevised 2006 to 2010 mental health estimates and estimates based on data for 2011 and subsequent years for the Northeast region.

B.4 Measurement Issues

Several measurement issues associated with the 2012 NSDUH are discussed in this section. Specifically, these issues include the methods for measuring substance dependence and abuse and mental health issues.

B.4.1 Illicit Drug and Alcohol Dependence and Abuse

The 2012 NSDUH CAI instrumentation included questions that were designed to measure alcohol and illicit drug dependence and abuse. For these substances,[26] dependence and abuse questions were based on the criteria in the American Psychiatric Association (APA) *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV) (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.

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

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.

For alcohol, cocaine, heroin, pain relievers, sedatives, and stimulants, a seventh withdrawal criterion was added. 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). A respondent was defined as having dependence if he or she met three or more of seven dependence criteria for these substances.

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.

Criteria used to determine whether a respondent was asked about the dependence and abuse questions during the interview included the core substance use questions, the frequency of substance use questions (for alcohol and marijuana only), and the noncore substance use questions (for cocaine, heroin, and stimulants, including methamphetamine). Missing or incomplete responses in the core substance use and frequency of substance use questions were imputed. However, the imputation process did not take into account reported data in the noncore (i.e., substance dependence and abuse) CAI modules because of the complexity of doing this and to avoid disrupting trends for imputed variables as a result of any changes to the noncore questions. Very infrequently, this may result in responses to the dependence and abuse questions that are inconsistent with the imputed substance use or frequency of substance use.

For alcohol and marijuana, respondents were asked the dependence and abuse questions if they reported substance use on more than 5 days in the past year, or if they reported any substance use in the past year but did not report their frequency of past year use (i.e., they had missing frequency data). These missing frequency data were subsequently imputed after data

collection processing. Therefore, inconsistencies could have occurred where the imputed frequency of use response indicated less frequent use than required for respondents to be asked the dependence and abuse questions originally (i.e., the imputed frequency value was 5 or fewer days). For alcohol, for example, about 41,000 respondents were past year alcohol users in 2012. Of these, fewer than 100 respondents (about 0.2 percent) were missing their frequency data, but were still asked the alcohol dependence and abuse questions; however, their final imputed frequency of use indicated that they used alcohol on 5 or fewer days in the past year.

For cocaine, heroin, and stimulants, respondents were asked the dependence and abuse questions if they reported past year use in a core drug module or past year use in the noncore special drugs module. Thus, the CAI logic allowed some respondents to be asked the dependence and abuse questions for these drugs even if they did not report past year use in the corresponding core module. For cocaine, for example, about 1,500 respondents in 2012 were asked the questions about cocaine dependence and abuse because they reported past year use of cocaine or crack in the core section of the interview. Fewer than 10 additional respondents were asked these questions because they reported past year use of cocaine with a needle in the special drugs module despite not having previously reported past year use of cocaine or crack.

In 2005, two new questions were added to the noncore special drugs module about past year methamphetamine use: "Have you ever, even once, used methamphetamine?" and "Have you ever, even once, used a needle to inject methamphetamine?" In 2006, an additional follow-up question was added to the noncore special drugs module confirming prior responses about methamphetamine use: "Earlier, the computer recorded that you have never used methamphetamine. Which answer is correct?" The responses to these new questions were used in the skip logic for the stimulant dependence and abuse questions. Based on the decisions made during the methamphetamine analysis,[27] respondents who indicated past year methamphetamine use solely from these new special drug use questions (i.e., did not indicate methamphetamine use from the core drug module or other questions in the special drugs module) were categorized as NOT having past year stimulant dependence or abuse regardless of how they answered the dependence and abuse questions. Furthermore, if these same respondents were categorized as not having past year dependence or abuse of any other psychotherapeutic drug (e.g., pain relievers, tranquilizers, or sedatives), then they were categorized as NOT having past year dependence or abuse of psychotherapeutics. Also, if these respondents were not classified as having dependence or abuse for other substances (e.g., alcohol, marijuana, other illicit drugs), then they were categorized as not having dependence or abuse for illicit drugs, illicit drugs or alcohol, or illicit drugs and alcohol.

In 2008, questionnaire logic for determining hallucinogen, stimulant, and sedative dependence or abuse was modified. The revised skip logic used information collected in the noncore special drugs module in addition to that collected in questions from the core drug modules. Respondents were asked about hallucinogen dependence and abuse if they additionally reported in the special drugs module using ketamine, dimethyltryptamine (DMT), alpha-methyltryptamine (AMT), Foxy, or *Salvia divinorum*; stimulant dependence and abuse if they additionally reported nonmedical use of Adderall®; and sedative dependence and abuse if they

[27] See Section B.4.8 in the *Results from the 2008 National Survey on Drug Use and Health: National Findings* (Office of Applied Studies [OAS], 2009) for the methamphetamine analysis decisions.

additionally reported nonmedical use of Ambien®. Complying with the previous decision to exclude respondents whose methamphetamine use was based solely on responses to noncore questions from being classified as having stimulant dependence or abuse, respondents who indicated past year use or nonmedical use of hallucinogens, stimulants, or sedatives based solely on these special drug questions were categorized as NOT having past year dependence or abuse of the relevant substance regardless of how they answered the dependence and abuse questions.

Respondents might have provided ambiguous information about past year use of any individual substance, in which case these respondents were not asked the dependence and abuse questions for that substance. Subsequently, these respondents could have been imputed to be past year users of the respective substance. In this situation, the dependence and abuse data were unknown; thus, these respondents were classified as not having dependence or abuse of the respective substance. However, such a respondent never actually was asked the dependence and abuse questions.

B.4.2 Effects of Questionnaire Changes on Mental Health Measures

Changes were made to the mental health questions in the 2008 and 2009 NSDUH questionnaires. These changes are summarized as follows:

1. For adults aged 18 or older, a split-sample study was embedded within the 2008 NSDUH, such that a reduced set of questions from the World Health Organization Disability Assessment Schedule (WHODAS) or the Sheehan Disability Scale (SDS) were randomly assigned to respondents. The WHODAS questions were retained for use in the 2009 NSDUH and future surveys. The SDS items were no longer included after 2008.

2. For youths aged 12 to 17, a total of five questions that were in the youth mental health service utilization (YMHSU) module in 2008 were no longer included in 2009. These questions asked about the receipt of special education services and school counseling, as well as time spent in jail or foster care.

3. For youths, seven questions have been included since 2009 that asked about receipt of mental health services in the education and justice system sectors. These questions replaced the previous questions that were removed from the YMHSU module in 2009.

These types of changes to questions in a given module between survey years could affect how respondents answer questions in subsequent modules (i.e., context effects). A context effect may be said to take place when the response to a question is affected by information that is not part of the question itself. For example, the content of a preceding question may affect the interpretation of a subsequent question. Or a respondent may answer a subsequent question in a manner that is consistent with responses to a preceding question if the two questions are closely related to each other.

Effects of Changes to the Questions for Adults. The split-sample design in 2008 for adults (item 1 above) affected reporting of MDE, depending on whether adult respondents received the WHODAS or SDS. Therefore, CBHSQ decided to publish estimates of adult MDE in 2008 that were based on the half sample of adults who received the WHODAS because it was decided that the WHODAS would be retained in subsequent surveys. Investigation of the effects

of the split-sample design on estimates of adult MDE in 2008 is discussed in further detail in Sections B.4.4 and B.4.7 of the 2008 NSDUH's national findings report (OAS, 2009). However, subsequent adjustment procedures were developed for adult MDE from the SDS half sample to allow data from all adult respondents in 2008 to be used for estimating MDE among adults. These adjustment procedures are described further in Section B.4.4 in this appendix.

Administration of the WHODAS or SDS in 2008 did not appear to differentially affect responses to the questions for adults about suicide that also were added in 2008 (OAS, 2009). Therefore, further investigation was not done to examine the effects on estimates of suicidal ideation and behavior in 2009 due to the removal of the SDS items.

Effects of Changes to the Questions for Youths. The changes to the YMHSU module (items 2 and 3 above) in 2009 could have affected how adolescents answered the items at the beginning of the adolescent depression module (i.e., due to context effects). The adolescent depression module follows the YMHSU module for youths. In turn, changes in youths' answers to these introductory adolescent depression items could affect estimates of adolescent MDE.

The effects of these changes to the YMHSU module on subsequent reports in the adolescent depression module were investigated using data from the first 6 months of the 2009 NSDUH. As discussed in Section B.4.2 in Appendix B of the 2009 mental health findings report (CBHSQ, 2010), the changes to the YMHSU module in 2009 did not appear to affect estimates for the variables based on the lead adolescent depression questions or estimates of adolescent MDE between 2008 and 2009.

B.4.3 Estimation of Serious and Other Levels of Mental Illness

Background. The 1992 Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act that created SAMHSA also required the agency to develop a definition and methodology for estimating SMI among adults. States were required to utilize these measures in developing their plans for use of block grant funds distributed by SAMHSA. SAMHSA convened a technical advisory group that developed a definition of SMI, which was published in the *Federal Register* in 1993 (SAMHSA, 1993):

> Pursuant to Section 1912(c) of the Public Health Service Act, as amended by Public Law 102-321, "adults with serious mental illness" are defined as the following:
>
> - Persons aged 18 and over, who currently or at any time during the past year, have had diagnosable mental, behavioral, or emotional disorder of sufficient duration to meet diagnostic criteria specified within DSM-III-R [sic] that has resulted in functional impairment, which substantially interferes with or limits one or more major life activities.
>
> - These disorders include any mental disorders (including those of biological etiology) listed in DSM-III-R or their ICD-9-CM equivalent (and subsequent revisions), with the exception of DSM-III-R "V" codes, substance use disorders, and developmental disorders, which are excluded unless they co-occur with other diagnosable serious mental illness.

- All of these disorders have episodic, recurrent, or persistent features; however, they vary in terms of severity or disabling effects. Functional impairment is defined as difficulties that substantially interfere with or limit role functioning in one or more major life activities including basic daily living skills (e.g., eating, bathing, dressing); instrumental living skills (e.g., maintaining a household, managing money, getting around the community, taking prescribed medication); and functioning in social, family, and vocational/educational contexts.

- Adults who would have met functional impairment criteria during the referenced year without benefit of treatment or other support services are considered to have serious mental illness.

In NSDUH reports prior to 2004, the K6 psychological distress scale was used to measure SMI. In 2004, yearly estimation of SMI ceased temporarily because of concerns about the validity of using only the K6 distress scale to measure SMI without including a functional impairment scale (see Section B.4.4 of Appendix B in the 2004 NSDUH national findings report [OAS, 2005] for a discussion). In December 2006, a new technical advisory group was convened by SAMHSA's OAS (which later became CBHSQ) and the Center for Mental Health Services (CMHS) to solicit recommendations for mental health surveillance data collection strategies to address SAMHSA's legislative requirements. The panel recommended that NSDUH be used to produce estimates of SMI among adults by employing NSDUH's mental health measures and a "gold-standard" clinical psychiatric interview.

Although it was recognized that the ideal way to estimate SMI in NSDUH would be to administer a clinical diagnostic interview annually to all 45,000 adult respondents, this approach was not feasible because of constraints on the interview time and the need for trained mental health clinicians to conduct the interviews. Therefore, the approach recommended by the technical advisory group and adopted by SAMHSA for NSDUH was to utilize short scales in the NSDUH interview that separately measure psychological distress and functional impairment for use in a statistical model that predicts whether a respondent had mental illness. To accomplish this, SAMHSA's CBHSQ initiated a Mental Health Surveillance Study (MHSS) in 2007 as part of NSDUH to develop and implement methods to estimate SMI. The estimation methodology was implemented in the 2008 NSDUH. Models using the short scales for psychological distress and impairment to predict mental illness status were developed from a subsample of adult respondents who had completed the NSDUH interview and were administered a psychological diagnostic interview. For the clinical interview data, persons were defined as having SMI if they had a diagnosable mental, behavioral, or emotional disorder in the past 12 months, other than a developmental or substance use disorder, that met DSM-IV criteria (APA, 1994) and resulted in substantial functional impairment.

Summary of the 2008 MHSS. To create the statistical models, a randomly selected subsample of approximately 1,500 adults in 2008 who had completed the NSDUH interview was recruited for a follow-up clinical interview consisting of a diagnostic assessment for mental disorders.[28] Also, in order to determine the optimal scale for measuring functional impairment in

[28] The Structured Clinical Interview for the DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP) (First et al., 2002).

NSDUH, a split-sample design was incorporated into the full 2008 NSDUH data collection. Roughly half of the adult respondents were assigned to receive an abbreviated eight-item version of the WHODAS (Novak, Colpe, Barker, & Gfroerer, 2010), and the other half were assigned to receive the SDS (Leon, Olfson, Portera, Farber, & Sheehan, 1997).

Weighted logistic models were developed for each half sample using the data from the subsample of MHSS respondents. 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 SMI in the full 2008 NSDUH sample. For more detailed information on the 2008 MHSS design and analysis, see Colpe, Epstein, Barker, and Gfroerer (2009) and Aldworth et al. (2009).

Based on an analysis of the 2008 MHSS data, it was determined that the WHODAS was the better predictor of SMI and that this scale would be used in combination with the K6 scale to predict SMI. It also was decided that the WHODAS would continue to be administered as the sole impairment scale in the 2009 and subsequent NSDUHs (Aldworth et al., 2009). Therefore, the remainder of the discussion for the 2008 MHSS in this section focuses on the half sample that was assigned to the WHODAS. However, similar analyses were conducted in the 2008 MHSS for the half sample that was assigned to the SDS.[29]

For the **2008 SMI prediction model** (subsequently referred to as the "2008 model") that was fit on the 2008 clinical data for the half sample that was assigned to the WHODAS, the dependent variable was a diagnosis of SMI (1 = yes, 0 = no). The predictor variables were based on the K6 and WHODAS items collected in the main NSDUH interview. The model was used to produce a predicted probability of having SMI for each clinical interview respondent in this half sample. A cut point was established among the fitted probabilities of having SMI, such that if adults with probabilities at or above the cut point were predicted to have SMI and the rest were not, the weighted number of adults in the MHSS that were incorrectly predicted to have SMI (i.e., false positives) came as close as possible to equaling the weighted number of adults that were incorrectly predicted not to have SMI (i.e., false negatives).

Because the predictor variables in the model had been collected in the main interview, a probability of having SMI was computed for every 2008 NSDUH adult respondent in the WHODAS half sample using the appropriate model parameters. A dichotomous variable, indicating whether a person was predicted to have SMI, was produced (1 = predicted to have SMI; 0 = predicted not to have SMI) by employing the appropriate cut point from the 2008 model. The dichotomous SMI variable with values for all adult NSDUH respondents then was used to compute prevalence estimates of SMI for adults. SMI probabilities and SMI predicted values were computed for respondents in NSDUH samples from the 2008 WHODAS half sample and from 2009 to 2011 using the parameters estimated from the 2008 model.

The probabilities of having SMI from the 2008 MHSS regression model also were used to make predictions for AMI for all adult respondents in the main NSDUH interview for 2008

[29] Information about the SDS in the 2008 NSDUH as the second impairment scale for mental illness and the decision to use the WHODAS as the impairment scale in the 2009 NSDUH and beyond are discussed in Section B.4.3 of the 2009 mental health findings report (CBHSQ, 2010).

through 2011.[30] A second cut point was determined such that if adults with probabilities at or above the cut point were predicted to have AMI and the rest were not, the weighted totals of false positives and false negatives for AMI in the clinical sample would come as close as possible to being equal.

Decisions to Improve the Model. In 2010, SAMHSA began preliminary investigations to assess whether improvements to the model were warranted using all of the clinical data that had been collected since 2008. In 2011 and 2012, the clinical sample was augmented to include 1,500 respondents per year, leading to a combined sample of approximately 5,000 clinical interviews for 2008 to 2012.

SAMHSA determined that the 2008 model had some important shortcomings that had not been detected in the original model fitting because of the small number of respondents in the 2008 clinical subsample. Specifically, the 2008 model substantially overestimated SMI and AMI among young adults relative to the clinical interview data. In addition, improvements were needed in the weighting procedures for the MHSS sample data to account better for undercoverage and nonresponse (i.e., because NSDUH respondents who completed their surveys in Spanish were not eligible for the clinical follow-up[31] and because persons without mental illness appeared to be less likely to participate in the follow-up). Therefore, SAMHSA decided to modify the model for the 2012 estimates using the combined 2008-2012 clinical data (subsequently referred to as the "2012 model"). To reduce bias and improve prediction, additional mental health-related variables and an age variable were added in the 2012 model. To further reduce the potential for coverage and nonresponse error and increase precision, an alternative set of weights was applied to the clinical sample data during model development. To provide consistent data for comparison, mental illness estimates for 2008 to 2011 were also recomputed using the new 2012 model.

The next subsections describe the instruments and items used to measure the variables employed in the 2012 model. Specifically, the instrument used to measure mental illness in the clinical interviews is described, followed by descriptions of the scales and items in the main NSDUH interviews that were used as predictor variables in the model (e.g., the K6 and WHODAS total scores, age, and suicidal thoughts).[32] Next, procedures for the MHSS clinical interview sampling and weighting and for developing the 2012 model are described. The final subsection in Section B.4.3 discusses (conditional) SEs for the mental illness estimates based on the 2012 model.

Clinical Measurement of Mental Illness. Mental illness was measured in the MHSS clinical interviews using an adapted version of the SCID (First et al., 2002) and was differentiated by the level of functional impairment based on the Global Assessment of Functioning (GAF) scale (Endicott, Spitzer, Fleiss, & Cohen, 1976). Past year disorders that were assessed through the SCID included mood disorders (e.g., MDE, 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.

[30] See the "Clinical Measurement of Mental Illness" section for the definition of AMI.
[31] Clinical interviewers were trained to conduct these interviews only in English.
[32] MDE also was included in the 2012 model and is discussed in more detail in Section B.4.4.

In addition, the presence of psychotic symptoms was assessed. Substance use disorders also were assessed, although these disorders were not used to produce estimates of mental illness.

- Respondents were defined as having *any mental illness* (AMI) if they were determined to have any of the mental disorders assessed in the SCID (not including substance use disorders), regardless of the level of functional impairment.

- Respondents were defined as having *low (mild) mental illness* if they had any of the mental disorders assessed in the SCID (not including substance use disorders), but these disorders resulted in no more than mild impairment, based on GAF scores of greater than 59.

- Respondents were defined as having *moderate mental illness* if they had any of the mental disorders assessed in the SCID (not including substance use disorders), and these disorders resulted in moderate impairment, based on GAF scores of 51 to 59.

- Respondents were defined as having *serious mental illness* (SMI) if they had any of the mental disorders assessed in the SCID (not including substance use disorders), and these disorders resulted in substantial impairment in carrying out major life activities, based on GAF scores of 50 or below. The SMI diagnosis was used as the response variable in both the 2008 and 2012 prediction models.

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

K6. The K6 in the main NSDUH interview 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 as 4, "most of the time" as 3, "some of the time" as 2, "a little of the time" as 1, and "none of the time" as 0. Responses of "don't know" and "refused" also were 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 previously for the past 30 days. 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 was created in which K6 scores of 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 SMI prevalence typically was extremely low for respondents with past year K6 scores of less than 8, and the prevalence rates started increasing only when scores were 8 or greater. This alternative K6 score was used in both the 2008 and 2012 SMI prediction models.

WHODAS. An initial step of the MHSS was to modify the WHODAS for use in a general population survey, including making minor changes to question wording and reducing its length (Novak, 2007). That is, a subset of 8 items was found to capture the information represented in the full 16-item scale with no significant loss of information.

These eight WHODAS items that were included in the main NSDUH interview were assessed on a 0 to 3 scale, with responses of "no difficulty," "don't know," and "refused" coded as 0; "mild difficulty" coded as 1; "moderate difficulty" coded as 2; and "severe difficulty" coded as 3. Some items had an additional category for respondents who did not engage in a particular activity (e.g., they did not leave the house on their own). Respondents who reported that they did not engage in an activity were asked a follow-up question to determine if they did not do so because of emotions, nerves, or mental health. Those who answered "yes" to this follow-up question were subsequently assigned to the "severe difficulty" category; otherwise (i.e., for responses of "no," "don't know," or "refused"), they were assigned to the "no difficulty"

category. Summing across these codes for the eight responses resulted in a total score with a range from 0 to 24. More information about scoring of the WHODAS can be found in the 2011 NSDUH public use file codebook (CBHSQ, 2012a).

An **alternative WHODAS** total score was created in which individual WHODAS item scores of less than 2 were recoded as 0, and item scores of 2 to 3 were recoded as 1. The individual alternative item scores then were summed to yield a total alternative score ranging from 0 to 8. Creation of an alternative version of the WHODAS score was based on the assumption that a dichotomous measure dividing respondents into two groups (i.e., severely impaired vs. less severely impaired) might fit better than a linear continuous measure in models predicting SMI. This alternative WHODAS score was the variable used in both the 2008 and 2012 SMI prediction models.

Suicidal Thoughts, MDE, and Age. In addition to the K6 and WHODAS scales, the 2012 model included the following measures as predictors of SMI: (a) serious thoughts of suicide in the past year; (b) having a past year MDE; and (c) age. The first two variables were added to the model to decrease the error rate in the predictions (i.e., the sum of the false-negative and false-positive rates relative to the clinical interview results). A recoded age variable reduced the biases in estimates for particular age groups, especially 18 to 25 year olds.

Since 2008, all adult respondents in NSDUH have been asked the following question: "At any time in the past 12 months, that is from [DATEFILL] up to and including today, did you seriously think about killing yourself?"[33] Definitions for MDE in the lifetime and past year periods are discussed in Section B.4.4. For respondents aged 18 to 30, an adjusted age was created by subtracting 18 from the respondent's current age, resulting in values ranging from 0 to 12. For a respondent aged 18, for example, the adjusted age was 0 (i.e., 18 minus 18), and for a respondent aged 30, the adjusted age was 12 (i.e., 30 minus 18). For respondents aged 31 or older, the adjusted age was assigned a value of 12.

Sampling and Weighting. The target annual respondent sample sizes for the MHSS clinical interviews were 1,500 in 2008 (750 of which received the WHODAS and were used in developing the 2008 model), 500 in 2009 and 2010, and 1,500 in 2011 and 2012. Respondent sample sizes were roughly equal across quarters.

A stratified Bernoulli selection process was used in which each eligible NSDUH respondent was given an independent probability of selection based on his or her stratum. In 2008 and the first two quarters in 2009, K6 scores were used in the stratification in an attempt to minimize the variance of the estimate for SMI prevalence. In the last two quarters in 2009, a decision was made to allocate the sample to K6 scores based on AMI rather than SMI in order to reduce the probability that a respondent with an extremely large weight would be selected. Starting from 2010, to better control the distribution of respondents selected for the MHSS by functional impairment levels and age, both K6 and WHODAS scores were used in the stratification, as well as age. The younger age groups were undersampled for the MHSS clinical

[33] In the question about serious thoughts of suicide, [DATEFILL] refers to the date at the start of a respondent's 12-month reference period. The interview program sets the start of the 12-month reference period as the same month and day as the interview date but in the previous calendar year.

sample to reverse the impact of the oversampling of younger adults aged 18 to 25 in the main survey (see Section A.1 in Appendix A). This resulted in a more equally allocated clinical sample by age. More details about the sample design for the MHSS clinical study can be found in SAMHSA's 2012 NSDUH sample design report (Morton et al., 2013).

Special clinical sample analysis weights were created as the product of the following seven weight components: (1) NSDUH analysis weight; (2) coverage adjustment for Hispanics completing the main NSDUH interview in English to account for Hispanics who completed it in Spanish and thus were not eligible for the English-language clinical follow-up interview; (3) inverse of the selection probability for clinical follow-up; (4) refusal adjustment to account for NSDUH respondents who were selected for the MHSS but declined to be contacted for the clinical interview; (5) another nonresponse adjustment to account for MHSS nonresponse among NSDUH respondents who had originally agreed to be recontacted for the clinical interview but did not complete the interview; (6) poststratification adjustments from the main NSDUH interview by age, gender, race/ethnicity, alternative K6 score, alternative WHODAS score, having had serious thoughts of suicide in the past year, and having had an MDE; and (7) a scaling factor that scaled the weights in each year using different values.[34] The first six weight components were created separately for each year.

Separate sets of analysis weights were computed for (a) MHSS respondents from the 2008 half sample assigned to impairment questions derived from the WHODAS and (b) MHSS respondents from the half sample assigned to the alternative scale for measuring impairment based on the SDS. Only the MHSS respondents from the WHODAS half sample were used in determining and fitting the 2012 model.

The 2012 model was fit under the assumption that the relationship between SMI and the covariates of the model stayed the same from 2008 through 2012. Because the sample size, sampling allocation, and weight adjustments for the MHSS clinical samples differed across years, gains in statistical efficiency were realized by scaling the weights in each year using the following scaling factors: 12 percent for 2008, 4 percent for 2009, 14 percent for 2010, 35 percent for 2011, and 35 percent for 2012. The scaling factors were determined based on the relative sizes of the estimated variances for estimates of SMI, AMI, and past year MDE made directly from SCID diagnoses.[35]

The 2012 SMI Model. The 2012 SMI prediction model was fit with data from 4,912 WHODAS MHSS respondents from 2008 through 2012. The response variable Y equaled 1 when an SMI diagnosis was positive based on the clinical interview; otherwise, Y was 0. Letting $\mathbf{X}$ be a vector of characteristics attached to a NSDUH respondent and letting the probability that this respondent had SMI be $\pi = \Pr(Y = 1 \mid \mathbf{X})$, the 2012 SMI prediction model was

[34] Both the lifetime and past year measures of MDE in adults (see Section B.4.4) were used in poststratification.

[35] Past year MDE was defined based on responses to the SCID for the MHSS respondents and in the main survey for all adult respondents (see Section B.4.4). The two measures were created independently. The reference here is to the SCID measure from the MHSS.

$$\text{logit}(\hat{\pi}) = \log[\hat{\pi} / (1 - \hat{\pi})] = -5.972664 + 0.0873416X_k + 0.3385193X_w + 1.9552664X_s + 1.1267330\,X_m + 0.1059137X_a \quad (1)$$

or

$$\hat{\pi} = \frac{1}{1 + \exp[-(-5.972664 + 0.0873416X_k + 0.3385193X_w + 1.9552664X_s + 1.1267330\,X_m + 0.1059137X_a)}},$$

where $\hat{\pi}$ refers to the estimate of the SMI response probability π.

These covariates in equation (1) came from the main NSDUH interview data:

- X_k = *Alternative Past Year K6 Score*: Past year K6 score of less than 8 recoded as 0; past year K6 score of 8 to 24 recoded as 1 to 17.
- X_w = *Alternative WHODAS Score*: WHODAS item score of less than 2 recoded as 0; WHODAS item score of 2 to 3 recoded as 1, then summed for a score ranging from 0 to 8.
- X_s = *Serious Thoughts of Suicide in the Past Year*: Coded as 1 if "yes"; coded as 0 otherwise.
- X_m = *Past Year MDE*: Coded as 1 if the criteria for past year MDE were met (see Section B.4.4);[36] coded as 0 otherwise.
- X_a = *Adjusted Age*: Coded as age minus 18 if aged 18 to 30; coded as 12 otherwise.

As with the 2008 model, 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 SMI positive; otherwise, he or she was predicted to be SMI negative. The cut point (0.260573529) was chosen so that the weighted numbers of false positives and false negatives in the MHSS dataset were as close to equal as possible. The predicted SMI status for all adult NSDUH respondents was used to compute prevalence estimates of SMI.

A second cut point probability (0.0192519810) was determined so that any respondent with an SMI probability greater than or equal to the cut point was predicted to be positive for AMI, and the remainder were predicted to be negative for AMI. The second cut point was chosen so that the weighted numbers of AMI false positives and false negatives were as close to equal as possible.

Estimates of SMMI (serious or moderate mental illness; GAF score below 60) were analogously computed with the SMI method; the cut point was 0.077686285365. Estimates of low (mild) mental illness and moderate mental illness were derived by a process of subtraction. Respondents were classified as belonging to the moderate mental illness category if they belonged to the SMMI category, but they did not belong to the SMI category. Respondents were

[36] In this situation, the past year MDE measure is from the main NSDUH interview (i.e., not from the SCID).

classified as belonging to the low (mild) mental illness category if they belonged to the AMI category but not to the SMMI category.

Alternative 2012 Model for the SDS Half Sample. In 2008, approximately half of the respondents in the adult NSDUH sample were assigned to receive questions about impairment based on the WHODAS (referred to as the 2008A sample), and the other half were assigned to receive questions based on the SDS (referred to as the 2008B sample). As noted previously, the purpose of this split sample was to determine whether the SDS or WHODAS impairment scale was a better predictor of SMI. The WHODAS scale was identified as the better predictor.

For the clinical interview respondents who had been administered the SDS in the main survey, an alternative SMI model was fit using the complete MHSS dataset of clinical interviews from 2008 through 2012. SMI, AMI, and SMMI estimates were obtained using the same cut point methodology described previously but applied to the alternative model. Mental illness estimates based on the predicted values for the 2008B sample were compared with the ones based on the 2008A sample using the 2012 model described previously. The model-based estimates based on the 2008A and 2008B samples were similar, and the predicted values for the two half samples in 2008 were deemed to be comparable. For example, the AMI estimates for the 2008A and 2008B half samples were 17.69 and 17.78 percent, respectively. Therefore, the predicted values from the 2008B sample were combined with predicted values from the complete WHODAS sample for 2008A and for 2009 through 2012.

In fitting the alternative 2012 model for the SDS half sample, weights for the clinical interview respondents who had been assigned to the SDS were developed separately using the same steps as in other years. The 2008 sample of clinical interview respondents who had received WHODAS questions in NSDUH was treated as being equivalent to a sample in a different year. When data from clinical interview respondents were combined from the 2008A, 2008B, 2009, 2010, 2011, and 2012 samples, the 2008A and 2008B weights were each scaled by 6 percent (0.06). Weights for the other years were scaled as described previously.

The modified 2012 SMI prediction model for the SDS half sample was

$$\text{logit}(\hat{\pi}) = \log[\hat{\pi}/(1-\hat{\pi})] = -5.7736246 + 0.1772067X_k + 1.8392433X_s + 1.6428623X_m + 0.1231266X_a \qquad (2)$$

or

$$\hat{\pi} = \frac{1}{1+\exp[-(-5.7736246 + 0.1772067X_k + 1.8392433X_s + 1.6428623X_m + 0.1231266X_a)]}.$$

All of the covariates in equation (2) appeared in equation (1) as well.

The estimates of the parameters of the models displayed in equations (1) and (2) are given in Table B.6 shown at the end of this appendix.

Standard Errors for Mental Illness Estimates. For the report and the mental health detailed tables, SEs for mental illness estimates (SMI, AMI, SMMI, moderate mental illness, and

low [mild] mental illness) were computed using the NSDUH dichotomous variable values without taking into account any variance introduced through using a model based on the clinical subsample data. This ignores the added error resulting from fitting the 2012 SMI model, which can be very large (see Liao et al., in press). These *conditional* SEs (conditional on the model predictions being correct) are useful when making comparisons across years and across subpopulations within years because the errors due to model fitting are nearly the same across the estimates being compared and consequently roughly cancel each other out.

B.4.4 Major Depressive Episode (Depression)

Beginning in 2004, modules related to MDE derived from DSM-IV (APA, 1994) criteria for major depression were included in the questionnaire. These questions permit estimates to be calculated for the prevalence of MDE and treatment for MDE. 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 Replication Adolescent Supplement (NCS-A).[37] 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 their 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. Furthermore, even though titles similar to those used in the NCS were used for the NSDUH modules, the results of these items may not be directly comparable. This is mainly due to differing modes of administration in each survey (ACASI in NSDUH vs. computer-assisted personal interviewing [CAPI] in NCS), revisions to wording necessary to maintain the logical processes of the ACASI environment, and possible context effects resulting from deleting questions not explicitly pertinent to severe depression.

According to DSM-IV, a person is defined as having had MDE 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 MDE 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 had MDE in the past year are asked questions from the SDS to measure the level of functional impairment in major life activities reported to be caused by the MDE in the past 12 months (Leon et al., 1997).

[37] For details, see http://www.hcp.med.harvard.edu/ncs/.

NSDUH measures the nine attributes associated with MDE as defined in DSM-IV with the following questions. Note that the questions shown are taken from the adult depression module. A few of the questions in the youth module were modified slightly to use wording more appropriate for youths aged 12 to 17. It should be noted that no exclusions were made for MDE caused by medical illness, bereavement, or substance use disorders.

1. Depressed mood most of the day

The following questions refer to the worst or most recent period of time when the respondent experienced any or all of the following: sadness, discouragement, or lack of interest in most things.

During that [worst/most recent] period of time…

a. … did you feel sad, empty, or depressed **most of the day nearly every day**?
b. … did you feel discouraged about how things were going in your life **most of the day nearly every day**?

2. Markedly diminished interest or pleasure in all or almost all activities most of the day

a. … did you lose interest in almost all things like work and hobbies and things you like to do for fun?
b. … did you lose the ability to take pleasure in having good things happen to you, like winning something or being praised or complimented?

3. Weight

In answering the next questions, think about the [worst/most recent] period of time.

a. Did you have a much smaller appetite than usual nearly every day during that time?
b. Did you have a much **larger** appetite than usual nearly every day?
c. Did you gain weight without trying to during that [worst/most recent] period of time?
    a. … because you were growing?
    b. … because you were pregnant?
    c. How many pounds did you gain?

d. Did you lose weight without trying to?
    a. … because you were sick or on a diet?
    b. How many pounds did you lose?

4. Insomnia or hypersomnia

a. Did you have a lot more trouble than usual falling asleep, staying asleep, or waking too early nearly every night during that [worst/most recent] period of time?
b. During that [worst/most recent] period of time, did you sleep a lot more than usual nearly every night?

5. Psychomotor agitation or retardation

a. Did you talk or move more slowly than is normal for you nearly every day?
b. Were you so restless or jittery nearly every day that you paced up and down or couldn't sit still?

6. Fatigue or loss of energy

a. During that [worst/most recent] period of time, did you feel tired or low in energy nearly every day even when you had not been working very hard?

7. Feelings of worthlessness

a. Did you feel that you were not as good as other people nearly every day?
b. Did you feel totally worthless nearly every day?

8. Diminished ability to think or concentrate or indecisiveness

a. During that [worst/most recent] time period, did your thoughts come much more slowly than usual or seem confused nearly every day?
b. Did you have a lot more trouble concentrating than usual nearly every day?
c. Were you unable to make decisions about things you ordinarily have no trouble deciding about?

9. Recurrent thoughts of death or recurrent suicidal ideation

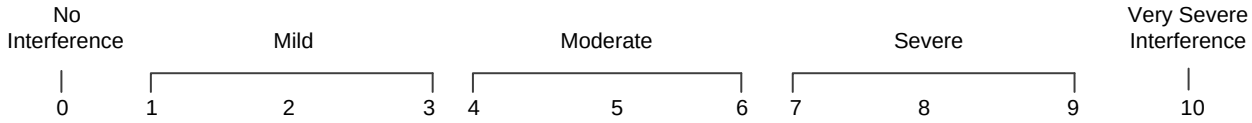
a. Did you often think about death, either your own, someone else's, or death in general?
b. During that period, did you ever think it would be better if you were dead?
c. Did you think about committing suicide?

NSDUH also collects data on impairment using the SDS, which is a measure of mental health-related impairment in four major life activities or role domains. These four domains are defined separately for adults aged 18 or older and youths aged 12 to 17 to reflect the different roles associated with the two age groups. Each module consists of four questions, and each item uses an 11-point scale ranging from 0 (no interference) to 10 (very severe interference). The impairment score is defined as the single highest severity level of role impairment across the four SDS role domains. Ratings greater than or equal to 7 on the scale were considered severe impairment. In addition to past year MDE, NSDUH shows estimates for past year MDE with severe impairment. Estimates for severe impairment are calculated separately for youths and adults because the four domains are slightly different for the two groups. The questions pertaining to the four domains are listed below for both groups.

Adult Depression Module: Functional Impairment

ASDSHOME Think about the time in the past 12 months when these problems with your mood were **most severe.**

Using the 0 to 10 scale shown below, where 0 means **no** interference and 10 means very **severe** interference, select the number that describes how much these problems interfered with **your ability to do** each of the following activities during that period. You can use any number between 0 and 10 to answer.



How much did your [depression symptoms] interfere with your **ability to do home management tasks**, like cleaning, shopping, and working around the house, apartment, or yard?

ASDSWORK During the time in the past 12 months when your [depression symptoms] were most severe, how much did this interfere with **your ability to work**?

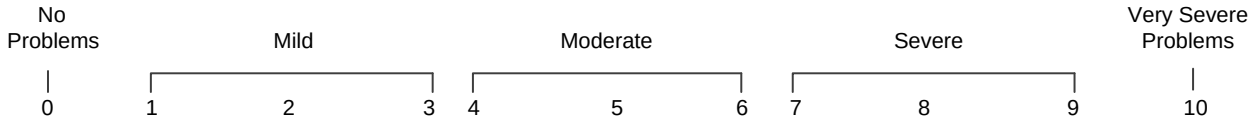
ASDSREL How much did your [depression symptoms] interfere with your **ability to form and maintain close relationships** with other people during that period of time?

ASDSSOC How much did [depression symptoms] interfere with your **ability to have a social life** during that period of time?

Youth Depression Module: Functional Impairment

YSDSHOME Think about the time in the past 12 months when these problems with your mood were the **worst.**

Using the 0 to 10 scale shown below, where 0 means **no** problems and 10 means very **severe** problems, select the number that describes how much your [depression symptoms] caused problems with **your ability to do** each of the following activities during that time. You can use any number between 0 and 10 to answer.



How much did your [depression symptoms] cause problems with your chores at home?

YSDSWORK During the time in the past 12 months when your [depression symptoms] were worst, how much did this cause problems with your **ability to do well at school or work**?

YSDSREL How much did your [depression symptoms] cause problems with your **ability to get along with your family** during that time?

YSDSSOC How much did your [depression symptoms] cause problems with your **ability to have a social life** during that time?

Adjustment of MDE Data for Context Effects. Since 2004, the NSDUH questions that determine MDE have remained unchanged for both adults and youths. In the 2008 questionnaire, however, changes were made in other mental health items that precede the MDE questions (K6, suicide, and impairment) for adults. Questions also were retained in 2009 for the WHODAS impairment scale, and the questions for the SDS impairment scale were deleted; see Sections B.4.2 and B.4.3 of this report for further details about these questionnaire changes. These questionnaire changes in 2008 appear to have affected the reporting on MDE questions among adults. Thus, adult MDE estimates for 2008 and 2009 cannot be directly compared with NSDUH adult MDE estimates based on data prior to 2008. See Sections B.4.4 and B.4.7 of the 2008 NSDUH's national findings report (OAS, 2009) for a further discussion. In addition, estimates of adult MDE in 2008 that were included in the 2009 mental health findings report (CBHSQ, 2010) were based only on half of the sample (see Section B.4.2 in this current appendix).

To address the break in comparability of the adult MDE data beginning in 2008 and to estimate adult MDE based on the full sample of adults from 2008, adjusted versions of lifetime and past year MDE variables for adults were created retroactively for 2005 to 2008. These variables were adjusted to make MDE estimates from the SDS half sample in 2008 and from all adult respondents for 2005 to 2007 that would be comparable with the MDE estimates based on data from the half sample who received the WHODAS in 2008 and from all adult respondents in later years. The adjusted data from 2005 to 2008 were used in conjunction with unadjusted data from later years to estimate trends in adult MDE over the entire period from 2005 to 2012.

Specifically, a weighted logistic regression was fit for the NSDUH data from 2005 to 2009 with past year MDE as the binary dependent variable. Independent variables in this model controlled for the questionnaire differences between NSDUHs from 2005 to 2007 and NSDUHs from 2008 and 2009, as well as for the context effects associated with the SDS half sample in 2008. This model was used to compute predicted probabilities of past year MDE for each respondent. The predicted probabilities, which can have any value between 0 and 1, then were dichotomized such that each respondent was specified as having or not having MDE in the past year. Adjusted lifetime MDE estimates were similarly constructed, with the additional condition that respondents reporting past year MDE were assumed to have lifetime MDE. Details about the adjustment of the adult MDE data for 2005 to 2008 can be found in a report describing these procedures (Aldworth, Kott, Yu, Mosquin, & Barnett-Walker, 2012).

In addition, changes to YMHSU 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 MDE. As discussed in Section B.4.2 in this report, however, these changes in 2009 did not appear to affect the estimates of adolescent MDE. Therefore, data on trends in past year MDE from 2004 to 2009 did not require adjustment for adolescents aged 12 to 17.

B.4.5 Impact of Decennial Census Effects on NSDUH Mental Health Estimates

As discussed in Section A.3.3 in Appendix A, the person-level weights in NSDUH were calibrated to population estimates (or control totals) obtained from the U.S. Census Bureau. For the weights in 2002 through 2010, annually updated control totals based on the 2000 census were used. Beginning with the 2011 weights, however, the control totals from the Census Bureau were based on the 2010 census. As a result, there was a possibility that the change from the 2000 to the 2010 census as the basis for updating NSDUH control totals could result in demographic and geographic shifts in the U.S. population that were not accounted for in population estimates that were made during the period between the censuses (i.e., in the annually updated 2000 census-based control totals provided by the Census Bureau for the years 2002 to 2010). This is because for the years between each decennial census, the Census Bureau produces annual national-level postcensal population estimates, based on the most recent census data, applying adjustments to account for births to U.S.-resident women, deaths of U.S. residents, and net international migration.[38] With this estimation method, the postcensal estimates made for the years immediately following a census are likely to be more accurate (e.g., 2002 postcensal estimates) than those for years that are farther from the last census (e.g., 2009 postcensal estimates).

SAMHSA conducted a study to compare estimates from the 2011 NSDUH with estimates for 2010 to examine whether the results and significance tests varied depending on whether analysis weights for 2010 were poststratified to population control totals based on the 2010 census ("2010 [New]") or based on the 2000 census ("2010 [Old]"), which represent the official NSDUH estimates for 2010. This evaluation was based on the premise that any difference between estimates based on these two weights could solely be attributed to the "census effect" because the underlying data were the same. When results of statistical testing differed (e.g., if the difference between 2010 [Old] vs. 2011 was significant but the difference between 2010 [New] vs. 2011 was not), caution would be advised in interpreting trends in substance use or mental health estimates from 2011 onward with estimates from prior years. Additional details about the methods and results for this study are included in Section B.4.5 in Appendix B of the mental health findings report for the 2011 NSDUH (CBHSQ, 2012d). For tables comparing mental health estimates from this evaluation, see http://www.samhsa.gov/data/NSDUH/NSDUHCensusEffects/Index.aspx.

However, these census effect investigations for the 2011 NSDUH used measures of AMI, SMI, and other levels of mental illness that were based on the model developed for the 2008 MHSS (see Section B.4.3). Conclusions about census effects on trends in estimates of adult mental illness could change based on revised estimates of mental illness among adults for 2008 to 2011 using the 2012 model. Therefore, a limited set of census effect comparisons was rerun for AMI, SMI, and other adult mental illness levels for 2010 [Old], 2010 [New], and 2011 using results from the 2012 model. Results of this additional investigation suggested that similar general conclusions would be reached about census effects on estimates of mental illness among adults (e.g., AMI, SMI) based on data from the 2012 model instead of the 2008 model.

[38] For details on how the Census Bureau creates the postcensal estimates, see http://www.census.gov/popest/methodology/2011-nat-st-co-meth.pdf.

Consequently, the remainder of this section discusses the findings based on mental illness data from the 2008 model.

In general, the use of 2010 census control totals for the 2010 estimates had only a moderate effect on mental health estimates for both estimated numbers and percentages, especially compared with the effect on substance use estimates; see Section B.4.3 in Appendix B of the 2011 NSDUH national findings report (CBHSQ, 2012c). Nevertheless, some caution is advised when comparing differences in mental health estimates since 2011 and in prior years. This is especially the case for particular subgroups (e.g., persons who are American Indians or Alaska Natives, Native Hawaiians or Other Pacific Islanders, and persons reporting two or more races) and for estimated numbers for particular mental health measures. When there was disagreement about statistical significance of differences in estimated percentages for 2011 versus 2010 (Old) and for 2011 versus 2010 (New), however, most estimates for 2010 (Old) and 2010 (New) were similar (i.e., differing by one tenth of a percentage point or less).

The general result regarding the direction of the differences (regardless of statistical significance) is that the 2010 (New) percentages for most estimates were lower than the 2010 (Old) estimates, except for the estimated numbers for youths aged 12 to 17. The implication is that the *2011* estimates (percentages) may have been higher if weights based on the *2000* census had been used. As a result, downward trends involving 2011 data may be slightly overstated, and upward trends may be slightly understated. Therefore, if affected 2011 data show an upward trend, then in most cases, confidence can be placed in that trend. If the 2011 data show a decreasing trend, then less confidence can be placed in it. Exceptions were for estimated numbers for youths and certain racial groups (e.g., American Indians or Alaska Natives, Native Hawaiians or Other Pacific Islanders, Asians, and persons reporting two or more races), where the opposite result was generally the case.

Thus, although the mental health estimates did not appear to be affected by the changes in the poststratification control total estimation process as much as the substance use estimates were affected, readers and NSDUH data users are advised to consider the potential effects of these changes in control totals. These changes are relevant to an interpretation of estimates and for inferences based on data analysis, especially for the estimated numbers of persons.

Table B.1 Demographic and Geographic Domains Forced to Match Their Respective U.S. Census Bureau Population Estimates through the Weight Calibration Process, 2012

Main Effects	Two-Way Interactions
Age Group 12-17 18-25 26-34 35-49 50-64 65 or Older All Combinations of Groups Listed Above[1]	**Age Group × Gender** (e.g., Males Aged 12 to 17)
Gender Male Female	**Age Group × Hispanic Origin** (e.g., Hispanics or Latinos Aged 18 to 25)
Hispanic Origin Hispanic or Latino Not Hispanic or Latino	**Age Group × Race** (e.g., Whites Aged 26 or Older)
Race[2] White Black or African American	**Age Group × Geographic Region** (e.g., Persons Aged 12 to 25 in the Northeast)
Geographic Region Northeast Midwest South West	**Age Group × Geographic Division** (e.g., Persons Aged 65 or Older in New England)
Geographic Division New England Middle Atlantic East North Central West North Central South Atlantic East South Central West South Central Mountain Pacific	**Gender × Hispanic Origin** (e.g., Not Hispanic or Latino Males) **Hispanic Origin × Race** (e.g., Not Hispanic or Latino Whites)

[1] Combinations of the age groups (including but not limited to 12 or older, 18 or older, 26 or older, 35 or older, and 50 or older) also were forced to match their respective U.S. Census Bureau population estimates through the weight calibration process.

[2] Unlike racial/ethnic groups discussed elsewhere in this report, race domains in this table include Hispanics in addition to persons who were not Hispanic.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2012.

Table B.2 Summary of 2012 NSDUH Suppression Rules

Estimate	Suppress if:
Prevalence Rate, $\hat{p}$, with Nominal Sample Size, *n*, and Design Effect, *deff* $\left(deff = \frac{n[SE(\hat{p})]^2}{\hat{p}(1-\hat{p})} \right)$	(1) The estimated prevalence rate, $\hat{p}$, is < .00005 or ≥ .99995, or (2) $\frac{SE(\hat{p})/\hat{p}}{-\ln(\hat{p})} > .175$ when $\hat{p} \le .5$, or $\frac{SE(\hat{p})/(1-\hat{p})}{-\ln(1-\hat{p})} > .175$ when $\hat{p} > .5$, or (3) *Effective n* < 68, where $Effective\ n = \frac{n}{deff} = \frac{\hat{p}(1-\hat{p})}{[SE(\hat{p})]^2}$, or (4) $n < 100$. Note: The rounding portion of this suppression rule for prevalence rates will produce some estimates that round at one decimal place to 0.0 or 100.0 percent but are not suppressed.
Estimated Number (Numerator of $\hat{p}$)	The estimated prevalence rate, $\hat{p}$, is suppressed. Note: In some instances when $\hat{p}$ is not suppressed, the estimated number may appear as a 0. This means that the estimate is greater than 0 but less than 500 (estimated numbers are shown in thousands).
Mean Age at First Use, $\bar{x}$, with Nominal Sample Size, *n*	(1) $RSE(\bar{x}) > .5$, or (2) $n < 10$.

deff = design effect; RSE = relative standard error; SE = standard error.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2012.

Figure B.1 Required Effective Sample in the 2012 NSDUH as a Function of the Proportion Estimated

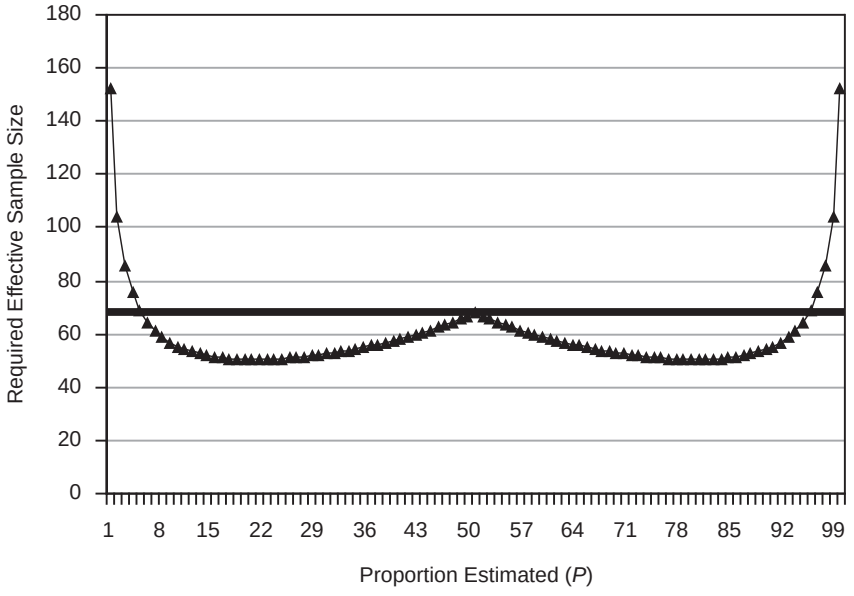


Table B.3 Weighted Percentages and Sample Sizes for 2011 and 2012 NSDUHs, by Final Screening Result Code

Final Screening Result Code	Sample Size 2011	Sample Size 2012	Weighted Percentage 2011	Weighted Percentage 2012
TOTAL SAMPLE	216,521	214,274	100.00	100.00
Ineligible Cases	37,228	35,688	16.86	16.57
Eligible Cases	179,293	178,586	83.14	83.43
INELIGIBLES	37,228	35,688	16.86	16.57
10 - Vacant	20,585	19,257	54.28	51.50
13 - Not a Primary Residence	8,612	8,520	24.71	27.46
18 - Not a Dwelling Unit	2,730	2,496	6.79	6.52
22 - All Military Personnel	370	352	0.96	0.97
Other, Ineligible[1]	4,931	5,063	13.26	13.55
ELIGIBLE CASES	179,293	178,586	83.14	83.43
Screening Complete	156,048	153,873	86.98	86.07
30 - No One Selected	94,342	92,991	51.82	50.99
31 - One Selected	34,246	33,455	19.37	19.12
32 - Two Selected	27,460	27,427	15.79	15.96
Screening Not Complete	23,245	24,713	13.02	13.93
11 - No One Home	3,124	3,029	1.71	1.62
12 - Respondent Unavailable	579	457	0.32	0.26
14 - Physically or Mentally Incompetent	513	597	0.27	0.32
15 - Language Barrier - Hispanic	66	48	0.04	0.03
16 - Language Barrier - Other	598	748	0.38	0.50
17 - Refusal	15,589	16,807	8.72	9.39
21 - Other, Access Denied[2]	2,080	2,359	1.24	1.37
24 - Other, Eligible	13	14	0.01	0.01
27 - Segment Not Accessible	0	0	0.00	0.00
33 - Screener Not Returned	87	90	0.04	0.05
39 - Fraudulent Case	595	563	0.30	0.37
44 - Electronic Screening Problem	1	1	0.00	0.00

[1] Examples of "Other, Ineligible" cases are those in which all residents lived in the dwelling unit for less than half of the calendar quarter and dwelling units that were listed in error.

[2] "Other, Access Denied" includes all dwelling units to which the field interviewer was denied access, including locked or guarded buildings, gated communities, and other controlled access situations.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2011 and 2012.

Table B.4 Weighted Percentages and Sample Sizes for 2011 and 2012 NSDUHs, by Final Interview Code

Final Interview Code	12+ Sample Size 2011	12+ Sample Size 2012	12+ Weighted Percentage 2011	12+ Weighted Percentage 2012	12-17 Sample Size 2011	12-17 Sample Size 2012	12-17 Weighted Percentage 2011	12-17 Weighted Percentage 2012	18+ Sample Size 2011	18+ Sample Size 2012	18+ Weighted Percentage 2011	18+ Weighted Percentage 2012
TOTAL	88,536	87,656	100.00	100.00	27,911	27,147	100.00	100.00	60,625	60,509	100.00	100.00
70 - Interview Complete	70,109	68,309	74.38	73.04	23,549	22,492	84.95	82.84	46,560	45,817	73.22	72.00
71 - No One at Dwelling Unit	1,159	1,147	1.36	1.26	227	192	0.72	0.67	932	955	1.43	1.33
72 - Respondent Unavailable	1,758	1,445	2.06	1.75	337	276	1.19	1.00	1,421	1,169	2.16	1.83
73 - Break-Off	31	21	0.04	0.05	6	0	0.01	0.00	25	21	0.05	0.06
74 - Physically/ Mentally Incompetent	1,003	1,023	2.01	1.95	219	274	0.74	1.16	784	749	2.15	2.04
75 - Language Barrier - Hispanic	114	116	0.20	0.17	7	9	0.03	0.02	107	107	0.22	0.18
76 - Language Barrier - Other	383	419	1.12	1.24	17	30	0.08	0.15	366	389	1.24	1.36
77 - Refusal	10,773	11,488	17.25	18.63	890	900	2.81	3.37	9,883	10,588	18.83	20.25
78 - Parental Refusal	2,538	2,787	0.89	0.97	2,538	2,787	9.02	10.06	0	0	0.00	0.00
91 - Fraudulent Case	29	158	0.05	0.22	7	44	0.05	0.17	22	114	0.05	0.22
Other[1]	639	743	0.64	0.73	114	143	0.37	0.56	525	600	0.66	0.75

[1] "Other" includes eligible person moved, data not received from field, too dangerous to interview, access to building denied, computer problem, and interviewed wrong household member.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2011 and 2012.

Table B.5 Response Rates and Sample Sizes for 2011 and 2012 NSDUHs, by Demographic Characteristics

Demographic Characteristic	Selected Persons 2011	Selected Persons 2012	Completed Interviews 2011	Completed Interviews 2012	Weighted Response Rate 2011	Weighted Response Rate 2012
TOTAL	88,536	87,656	70,109	68,309	74.38%	73.04%
AGE IN YEARS						
12-17	27,911	27,147	23,549	22,492	84.95%	82.84%
18-25	28,589	28,639	23,083	22,762	80.48%	79.26%
26 or Older	32,036	31,870	23,477	23,055	71.96%	70.76%
GENDER						
Male	43,436	42,942	33,779	32,869	72.49%	71.24%
Female	45,100	44,714	36,330	35,440	76.14%	74.71%
RACE/ETHNICITY						
Hispanic	13,441	13,906	10,993	11,168	77.58%	74.95%
White	57,389	56,374	44,629	43,165	73.42%	72.19%
Black	10,607	10,074	8,979	8,433	79.78%	79.06%
All Other Races	7,099	7,302	5,508	5,543	67.74%	67.06%
REGION						
Northeast	17,251	18,301	13,090	13,773	69.86%	69.59%
Midwest	24,570	24,499	19,258	19,142	73.92%	74.27%
South	28,122	26,279	22,980	20,886	76.88%	74.22%
West	18,593	18,577	14,781	14,508	74.41%	72.75%
COUNTY TYPE						
Large Metropolitan	38,889	39,096	30,113	29,918	72.75%	71.21%
Small Metropolitan	31,671	30,250	25,457	23,859	75.84%	75.23%
Nonmetropolitan	17,976	18,310	14,539	14,532	76.98%	75.05%

NOTE: Estimates are based on demographic information obtained from screener data and are not consistent with estimates on demographic characteristics presented in the 2011 and 2012 sets of detailed tables.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2011 and 2012.

Table B.6 Final SMI Prediction Models in the 2008-2012 MHSSs

	Beta	Beta SE	*T* Statistic	*P* Value	*DF*	Wald *P* Value[1]
WHODAS Sample (2008A-2012)						
Intercept	-5.9726640	0.3201	-18.6586	0.0000		
Alt PY K6	0.0873416	0.0248	3.5247	0.0009	1	0.0009
Alt WHODAS	0.3385193	0.0349	9.7034	0.0000	1	0.0000
PY Suicidal Thoughts	1.9552664	0.2164	9.0342	0.0000	1	0.0000
PY MDE	1.1267330	0.2196	5.1308	0.0000	1	0.0000
Age1830	0.1059137	0.0244	4.3380	0.0001	1	0.0001
WHODAS and SDS Samples (2008-2012)[2]						
Intercept	-5.7736246	0.3479	-16.5960	0.0000		
Alt PY K6	0.1772067	0.0190	9.3251	0.0000	1	0.0000
PY Suicidal Thoughts	1.8392433	0.1941	9.4781	0.0000	1	0.0000
PY MDE	1.6428623	0.2119	7.7528	0.0000	1	0.0000
Age1830	0.1231266	0.0259	4.7482	0.0000	1	0.0000

Age1830 = recoded age variable; Alt = alternative; *DF* = degrees of freedom; K6 = Kessler-6, a six-item psychological distress scale; MDE = major depressive episode; MHSS = Mental Health Surveillance Study; PY = past year; SDS = Sheehan Disability Scale; SE = standard error; SMI = serious mental illness; WHODAS = eight-item World Health Organization Disability Assessment Schedule.

[1] The *p* value is obtained from the overall model fitting.

[2] The model is fit over the WHODAS and SDS samples in 2008-2012, but is used only to produce predictions for the 2008 SDS sample.

NOTE: Alternative past year K6 score: past year K6 score of < 8 recoded as 0; past year K6 score of 8 to 24 recoded as 1 to 17.

NOTE: Alternative WHODAS score: WHODAS item score of < 2 recoded as 0; WHODAS item score of 2 to 3 recoded as 1, then summed for a score ranging from 0 to 8.

NOTE: Past year suicidal thought: coded as 1 if had serious thoughts of suicide in the past year; coded as 0 otherwise.

NOTE: Past year MDE: coded as 1 if the criteria for past year MDE were met; coded as 0 otherwise.

NOTE: Age1830: coded as age minus 18 if aged 18 to 30; coded as 12 otherwise.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2012.

Appendix C: Other Sources of Mental Health Data

The National Survey on Drug Use and Health (NSDUH) provides estimates of mental disorders and related behavior (mental illness, major depressive episode [MDE], and suicidal thoughts and behavior) for the civilian, noninstitutionalized population aged 12 or older in the United States. A variety of surveys and data systems other than NSDUH also produce estimates of mental health indicators. Integrating information from national data sources, such as those included in this appendix, can provide useful information about the mental health of the U.S. population. Therefore, it is useful to consider the estimates produced from other data sources when discussing NSDUH estimates. When comparing estimates between surveys, it is important to understand the methodological differences between surveys and the impact that these differences could have on estimates of mental health. That is, the goals and approaches for various sources of mental health data are often different, making comparisons between them difficult. Some methodological differences that may affect comparisons include, but are not limited to, the populations covered, timing of data collection, sample design, mode of data collection, instruments used, operational definitions, and estimation methods.

This appendix briefly describes several data systems that produce estimates of mental health indicators and presents selected comparisons of estimates with 2012 NSDUH estimates. Further information about these and other data systems can be found in a report comparing NSDUH mental health data and methods with those from other data sources (Hedden et al., 2012). This appendix also describes surveys on mental health in populations not covered by NSDUH.

NSDUH estimates of any mental illness (AMI) and serious mental illness (SMI) in 2012 that are presented in this appendix are based on the results of changes to estimation procedures that were described in Section B.4.3 in Appendix B of this report. For this reason, NSDUH estimates of AMI and SMI in this appendix are not comparable with corresponding estimates from mental health findings reports prior to 2012.

C.1 Definition of Mental Illness

In order to compare estimates of mental illness produced from NSDUH with other surveys, it is useful first to define SMI as specified by the Substance Abuse and Mental Health Services Administration (SAMHSA). SMI among persons aged 18 or older is defined as having a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association [APA], 1994) that has resulted in serious functional impairment, which substantially interferes with or limits one or more major life activities. See the second section of Chapter 2 in this report for the statutory requirement for SAMHSA to develop an operational definition of SMI. Similarly, NSDUH uses the following operational definition for the estimation of AMI among adults: having (currently or at any time in the past year) a diagnosable mental, behavioral,

or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within the DSM-IV, regardless of functional impairment.

Clinical interview data on psychiatric disorders and impairment in carrying out daily activities due to these disorders were collected from a subset of adult NSDUH respondents. Mental illness among adults in the civilian, noninstitutionalized population was estimated by prediction models that used the clinical interview data from the subset of adult NSDUH respondents and responses to screening questions on distress and impairment, past year MDE, past year suicidal thoughts, and age from the overall adult NSDUH sample. See Section B.4.3 in Appendix B of this report for additional details on the estimation procedures for mental illness among adults.

C.2 National Surveys Collecting Data on Mental Health in the Civilian, Noninstitutionalized Population

National Comorbidity Survey (NCS)

Conducted by the University of Michigan's Survey Research Center, the National Comorbidity Survey (NCS) was sponsored by the National Institute of Mental Health (NIMH), the National Institute on Drug Abuse (NIDA), and the W.T. Grant Foundation. It was designed to measure in the general population the prevalence, risk factors, and consequences of psychiatric morbidity and comorbidity. The first wave of the NCS was an interviewer-administered household survey of persons in the continental United States (i.e., excluding Alaska and Hawaii) that collected data from 8,098 respondents aged 15 to 54 using paper-and-pencil interviewing (PAPI). These responses were weighted to produce nationally representative estimates. The interviews took place between 1990 and 1992. The NCS used a modified version of the Composite International Diagnostic Interview (the University of Michigan [UM]-CIDI) to estimate the prevalence of mental disorders according to the criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd revised edition (DSM-III-R) (APA, 1987).

The NCS data allow estimates to be produced from the following classes of disorders: affective disorders, anxiety disorders, substance use disorders, and nonaffective psychosis. A published estimate of the prevalence of having at least one or more of the disorders assessed in the NCS (including substance use disorders) was 29.5 percent in the past 12 months among adults aged 18 to 54 (Kessler et al., 1994). The NSDUH estimate for the prevalence of AMI (excluding substance use disorders) was 18.6 percent in 2012. The estimate of any disorder produced using NCS data included respondents with substance use disorders; as noted previously, the operational definition of AMI in NSDUH excludes substance use disorders. Methodological differences between the two surveys that could affect the estimates include the following: (a) *age ranges of the target populations* (18 or older for NSDUH vs. 18 to 54 for the NCS); (b) *the modes of administration* (audio computer-assisted self-interviewing [ACASI] for NSDUH vs. PAPI for the NCS); and (c) *differences in the instruments and estimation methods* used to estimate the prevalence of mental disorders (clinical interview data from a subset of adult respondents in combination with data on age, psychological distress, functional impairment, suicidal thoughts, and depression for all adult NSDUH respondents vs. the UM-CIDI for the NCS). Further, given that data from the surveys were collected at different times (2012 for

NSDUH vs. 1990 to 1992 for the NCS), differences in estimates could reflect changes in population prevalence.

National Comorbidity Survey Replication (NCS-R)

There have been several follow-ups to and replications of the original NCS, including a replication study (the National Comorbidity Survey Replication, NCS-R) conducted in 2001 to 2003 with a newly recruited, nationally representative multistage, clustered-area probability sample of 9,282 U.S. respondents aged 18 or older (Kessler et al., 2004a). As in the NCS, the sample for the NCS-R excluded Alaska and Hawaii. Conducted by the University of Michigan's Survey Research Center, the NCS-R was sponsored by the NIMH, with supplemental support from NIDA, SAMHSA, the Robert Wood Johnson Foundation, and the John W. Alden Trust. Interviews were conducted using computer-assisted personal interviewing (CAPI). Unlike the NCS, which used DSM-III-R criteria, the NCS-R used DSM-IV criteria for measuring mental disorders. Specifically, the NCS-R used a modified version of the World Mental Health Version of the Composite International Diagnostic Interview (the WMH-CIDI) (Kessler & Üstün, 2004) to generate diagnoses according to the definitions and criteria of the DSM-IV. Disorders assessed in the NCS-R included anxiety disorders, mood disorders, intermittent explosive disorder, and substance use disorders.

In an analysis of the NCS-R data, the presence of past year SMI was indicated if a respondent with a 12-month mental disorder (excluding substance use disorder) had at least one of the following: bipolar I or nonaffective psychosis, suicide attempt, at least two areas in which severe role impairment occurred as measured by the Sheehan Disability Scale (SDS; Leon et al., 1997), or the presence of functional impairment consistent with a Global Assessment of Functioning (GAF) (Endicott et al., 1976) score of 50 or less (Kessler et al., 2006). This produced an estimate of SMI among adults of 5.8 percent in the past year. Furthermore, 26.2 percent of respondents aged 18 or older were estimated to have any disorder in the past 12 months (including substance use disorders) (Kessler et al., 2006); when substance use disorders were excluded, the estimate of any disorder was 24.8 percent (Druss et al., 2009; Kessler et al., 2006). In addition to the SMI estimate of 4.1 percent among adults, the 2012 NSDUH estimated that 18.6 percent of adults had AMI in the past year (see Chapter 2 in this report).

Differences in estimates of SMI and AMI between the NCS-R and NSDUH could be due in part to various methodological differences between the surveys. In addition to the different years represented in each survey (the NCS-R data were collected in 2001-2002 vs. NSDUH's in 2012), the NCS-R data were collected using interviewer-administered questionnaires, while NSDUH employs self-administration. The NCS-R and NSDUH also used different methods for estimating SMI and AMI. The NSDUH estimates for SMI and AMI were based on prediction models estimated from a subsample of respondents from the 2012 NSDUH and based on revisions to the models in 2012 (see Section B.4.3 in Appendix B). That is, information derived from the NSDUH interview (age, psychological distress, functional impairment, suicidal thoughts, and depression) was used to create independent variables in a statistical model of mental illness based on in-depth structured clinical interviews conducted by trained clinical interviewers. The model was used to produce estimates of SMI and AMI in the full NSDUH

sample. In contrast, the NCS-R measures were directly estimated based on structured, diagnostic interviews by lay interviewers.

The definitions and disorders covered by NSDUH and the NCS-R also differ somewhat. Several published estimates of any disorder that used NCS-R data have included persons with substance use disorders (Kessler et al., 2006), while NSDUH's estimates of AMI exclude persons with substance use disorders. The NCS-R also included mental disorders that were not assessed in the subsample of NSDUH adults who received clinical interviews. In addition, several estimates of SMI have been published with NCS-R data using various operational definitions (Kessler et al., 2006) that differ slightly from those that use NSDUH data for estimates of SMI.

Estimates of past year MDE (7.6 percent), serious thoughts of suicide (2.6 percent), and suicide plans (0.7 percent) and attempts (0.4 percent) among adults also have been produced using the NCS-R data. The estimate of past year MDE was lower for the 2012 NSDUH (6.9 percent) compared with the NCS-R's estimate. NSDUH estimates of suicidal thoughts and suicide plans were 3.9 and 1.1 percent, respectively (see Chapter 3). Although the items used to develop the MDE estimate from NSDUH are based on the items used in the NCS-R, slight revisions to the items were required for the ACASI environment. Also, given that data from the surveys were collected at different times (2012 for NSDUH vs. 2001 to 2002 for the NCS-R), the differences in estimates could reflect changes in population prevalence. The different modes of survey administration (ACASI in NSDUH vs. interviewer administration in the NCS-R) also could affect responses to the MDE items.

In addition, differences existed in the items used in the NCS-R and NSDUH to assess serious thoughts of suicide and suicidal behavior. The NCS-R first required respondents to report lifetime suicidal thoughts, plans, or behavior before they were asked whether these occurred in the past 12 months. In NSDUH, adult respondents are asked directly about suicidal thoughts and behavior in the past 12 months.

For further details, see the NCS Web site at http://www.hcp.med.harvard.edu/ncs/.

National Comorbidity Survey Replication Adolescent Supplement (NCS-A)

The National Comorbidity Survey Replication Adolescent Supplement (NCS-A) was designed to estimate the lifetime and current prevalence, age of onset, course, and comorbidity of DSM-IV disorders among adolescents in the United States; to identify risk and protective factors for the onset and persistence of these disorders; to describe patterns and correlates of service use for these disorders; and to lay the groundwork for subsequent follow-up studies that can be used to identify early expressions of adult mental disorders. Similar to the NCS-R, the NCS-A was conducted by the University of Michigan's Survey Research Center and was sponsored by the NIMH, with supplemental support from NIDA, SAMHSA, the Robert Wood Johnson Foundation, and the John W. Alden Trust. The NCS-A consisted of a sample, collected from 2001 to 2004, of adolescents aged 13 to 17. The sample included 904 adolescents from households that participated in the NCS-R and 9,244 respondents from a nationally representative sample of 320 schools (Kessler et al., 2009). Similar to the NCS and NCS-R,

the sample for the NCS-A excluded Alaska and Hawaii. All adolescents were interviewed in their homes using CAPI.[39]

Findings from the NCS-A indicated that 8.2 percent of adolescents aged 13 to 17 had major depression or dysthymia[40] in the past 12 months (Kessler et al., 2012). The 2012 NSDUH estimate of MDE in the past year among adolescents aged 12 to 17 was 9.1 percent. Estimates from these surveys could be affected by differences in mode of administration (ACASI for NSDUH vs. CAPI for the NCS-A) and differences between when the data were collected (2012 for NSDUH vs. 2001 to 2004 for the NCS-A).

Uniform Reporting System (URS)

The NCS data mentioned previously have been used by the Uniform Reporting System (URS) of the Center for Mental Health Services (CMHS) to produce State-level SMI estimates (Kessler et al., 2003a, 2003b, 2006). Using data from the NCS and the Baltimore site of the Epidemiologic Catchment Area (ECA) research project, methods were developed to estimate SMI (Kessler et al., 1996, 1998, 2001). The definition of SMI was operationalized as respondents having met the following criteria: (1) presence of a "severe" and persistent mental illness as defined by the National Advisory Mental Health Council of the NIMH (National Advisory Mental Health Council, 1993) or (2) respondents with another past 12-month DSM-III-R mental disorder (excluding "V" codes in the DSM,[41] substance use disorder, and developmental disorders) and a planned suicide, attempted suicide, lack of a productive role, serious role impairment, or serious interpersonal impairment (Kessler et al., 1996, 2001). Impairment was assessed using questions that were included in the NCS and the ECA for other purposes (Kessler et al., 2001; Narrow, Rae, Robins, & Regier, 2002). The SMI prevalence for the total population aged 18 or older based on the NCS and the ECA was 5.4 percent (Kessler et al., 1996).

Specifically, the URS selected a method for estimating State-level SMI prevalence that used the combined NCS data and data from the Baltimore site of the ECA by applying a model that controlled for demographic and geographic characteristics and corresponding census data (Kessler et al., 1998, 2004b). CMHS (1999) announced this methodology in the *Federal Register* as its final procedure for estimating the number of adults with SMI within each State. Through the URS, the CMHS has continued to provide State and national estimates of the prevalence of SMI among the civilian population aged 18 years or older that fixes the national SMI prevalence at 5.4 percent. Estimates of SMI by State are updated annually by applying updated population

[39] The school sample frame for the NCS-A was used to identify students for sample selection. As for the adolescents from households that participated in the NCS-R, adolescents selected from the school sample were interviewed in their homes.

[40] The DSM-IV (APA, 1994) defines dysthymic disorder in children as a chronically depressed or irritable mood that causes clinically significant functional impairment and occurs most of the day for more days than not for at least 1 year. At least two of the following symptoms must accompany the depressed or irritable mood: (1) poor appetite or overeating; (2) insomnia or hypersomnia; (3) low energy or fatigue; (4) low self-esteem; (5) poor concentration and/or difficulty making decisions; and (6) feelings of hopelessness; there cannot be more than a 2-month period of time when the dysthymia symptoms were in remission. In addition, the diagnosis of dysthymic disorder in children can be made only if the initial 1-year period of symptoms does not include an MDE.

[41] V codes denote conditions that are a focus of clinical attention or treatment but are not attributable to a mental disorder (e.g., marital problems).

characteristics when new population data become available through the U.S. Census Bureau. Notably, this estimation method assumes that the prevalence of SMI in the adult population within the modeled demographic and geographic categories is homogeneous across States and does not change over time.

In contrast to the estimated prevalence of 5.4 percent among adults based on the NCS and the ECA, the estimated prevalence of SMI based on 2012 NSDUH data was 4.1 percent among adults. Several important differences between NSDUH and URS that could affect estimates of mental health warrant discussion. Most importantly, the URS assumes a national prevalence of SMI of 5.4 percent that is based on research conducted in the mid-1990s and the assumption that estimates for Baltimore hold true for the rest of the Nation. In contrast, the 2012 NSDUH estimates are based on a statistical model that used clinical interview data from a subsample of NSDUH respondents that were collected in 2008 to 2012, in combination with data from NSDUH interviews for all adults that were conducted in 2012. Further differences between the two surveys that could affect estimates of SMI include the different methods for measuring functional impairment between the NCS/ECA and NSDUH. The NCS/ECA defined impairment according to information about disability and duration associated with individual disorders, planned or attempted suicide, vocational interference (as measured by unemployment or lost time from work due to mental health problems), and impairment of interpersonal relationships (based on self-reports about confiding relationships, frequency of interactions with friends or relatives, or the quality of interpersonal relationships). The 2012 NSDUH used a reduced set of questions based on a standard screening scale for impairment (see Section B.4.3 in Appendix B) that specifically asked about difficulty in carrying out specific tasks or responsibilities because of their emotions, nerves, or mental health, along with clinical interview information on impairment from a subset of adult respondents. In addition, the NCS and the ECA both were designed to estimate the lifetime prevalence of mental disorders; therefore, the emphasis of the diagnosis was on lifetime over past year assessment. The 2012 NSDUH was designed to estimate past year SMI. Also, SMI estimates using the pooled NCS and ECA data used DSM-III and DSM-III-R diagnostic criteria. NSDUH interview data were based on DSM-IV criteria. Furthermore, the mode of survey administration differed for the NCS and the ECA (interviewer administration) versus the NSDUH (ACASI).

National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)

The first wave of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) was conducted using CAPI in 2001 and 2002 by the U.S. Bureau of the Census for the National Institute on Alcohol Abuse and Alcoholism (NIAAA). The NESARC sample of adults aged 18 or older was designed to make inferences for the adult civilian, noninstitutionalized population of the United States, including Alaska, Hawaii, and the District of Columbia, and including persons living in noninstitutional group quarters. NESARC is longitudinal in design. The first wave was conducted in 2001 and 2002, with a final sample size of 43,093 respondents aged 18 or older. The second wave was conducted in 2004 and 2005, in which 34,653 respondents were re-interviewed (Grant & Dawson, 2006; NIAAA, 2010). A 1-year data collection period for NESARC-III began in 2012 with a new cohort of approximately 46,500 adults.

The study contains assessments of alcohol and illegal drug use, dependence and abuse, and associated mental disorders. NESARC included an extensive set of questions based on DSM-IV criteria (APA, 1994) and was designed to assess the presence of symptoms of alcohol or drug dependence or abuse in persons' lifetimes and during the prior 12 months. In addition, estimates of the prevalence of major mental disorders based on the DSM-IV were generated using the Alcohol Use Disorder and Associated Disabilities Interview Schedule-version 4 (AUDADIS-IV), which is a structured, diagnostic interview that captures major DSM-IV axis I and axis II disorders. Mood disorders assessed in NESARC included major depression, dysthymia, mania, and hypomania. Anxiety disorders that were assessed included panic disorder (with or without agoraphobia), social phobia, specific phobia, and generalized anxiety disorder (Grant et al., 2004).

Based on Wave 1 of the NESARC data, 9.2 percent of adults were estimated to have a DSM-IV mood disorder in the past year, and 11.1 percent were estimated to have a DSM-IV anxiety disorder in that period. In addition, 7.1 percent of adults were estimated to have had MDE in the past year based on the 2001-2002 NESARC data (Compton, Conway, Stinson, & Grant, 2006; Grant et al., 2004). The estimate of past year MDE among adults in the 2012 NSDUH was 6.9 percent. The NESARC estimate excluded depressive symptoms induced by substance use, a medical illness, or bereavement; these exclusions were not made for the NSDUH estimate of MDE.[42] In addition, the main NSDUH interview does not include questions to assess anxiety disorders or mood disorders other than MDE. A number of other methodological differences also may contribute to differences in estimates produced by NSDUH and NESARC, including differences in the mode of data collection (questions about sensitive topics in NSDUH are self-administered, while similar questions are interviewer administered in NESARC), mental health instrumentation, and time frames of data collection.

National Survey of Children's Health (NSCH)

The National Survey of Children's Health (NSCH) is a cross-sectional telephone survey of households in the United States with at least one child aged 0 to 17 years living in the household at the time of the interview. The NSCH provides national and State-level prevalence estimates for a variety of physical, emotional, and behavioral child health indicators among children in the United States. The survey most recently was conducted during 2011 and 2012, with previous administrations in 2003 to 2004 and 2007 to 2008. Primary funding for the 2011-2012 NSCH was provided by the Maternal and Child Health Bureau within the Health Resources and Services Administration. The National Center for Health Statistics (NCHS) within the Centers for Disease Control and Prevention (CDC) oversaw the sampling and telephone interviews. The NSCH collects data using random-digit-dialing (RDD) methods from a large national probability sample in all 50 States and the District of Columbia (e.g., nearly 96,000 child-level interviews nationally in 2011 and 2012, with approximately 1,850 interviews per State). Beginning with the 2011-2012 NSCH, the survey included a dual-frame sample for landline and cellular phone numbers.[43] Households containing one or more children aged 0 to 17

[42] The NESARC estimate reported by Grant et al. (2004) excluded substance-induced depression, while the estimate reported by Compton et al. (2006) did not. However, Compton et al. noted that the prevalence of substance-induced depression was low and not likely to have a large effect on estimates of MDE.

[43] The NSCH used the same sampling frame as the CDC's National Immunization Survey (NIS) and immediately followed the NIS interview in selected households, using the NIS sample for efficiency and economy.

years are identified from sampled telephone numbers, and one child within these households is randomly selected to be the subject of the interview. The adult parent or guardian in the household who knows the most about the child's health and health care is asked to complete an interview using computer-assisted telephone interviewing (CATI); in addition to English, respondents could complete the interview in Spanish, Mandarin, Cantonese, Vietnamese, or Korean.[44] NSCH results are weighted to represent the population of noninstitutionalized children aged 0 to 17 years nationally and in each State.

If the sampled child in the household is aged 2 to 17, the parent being interviewed is asked whether a doctor or other health professional ever told the parent that the child had specific mental health conditions, including depression. If the parent reported being told that the child ever had depression, the parent is asked whether the child currently has depression, and if so, whether the adult would describe the child's depression as mild, moderate, or severe. Based on NSCH data for 2011 and 2012, the estimated prevalence of current depression nationally among adolescents aged 12 to 17 was 4.0 percent, and 1.8 percent of adolescents were described as currently having moderate or severe depression.[45] The 2012 NSDUH estimate of MDE in the past year among adolescents aged 12 to 17 was 9.1 percent, and 6.3 percent had MDE with severe impairment.

Methodological differences between the two surveys that could affect the estimates of depression among adolescents include the following: (a) *the modes of administration and available languages* (ACASI in English or Spanish for NSDUH vs. CATI and availability of the interview in Asian languages in addition to English or Spanish for the NSCH); (b) *the source of information* about an adolescent's health (direct self-reports from an adolescent respondent in NSDUH vs. parental reports in NSCH); (c) *differences in measures* for estimating the prevalence and severity of depression (specific symptoms of depression, frequency of symptoms, and interference of depression with adolescents' life activities [see Section B.4.4 in Appendix B] in NSDUH vs. reports in the NSCH of whether the parent was told that the child had depression and the parent's self-assessment of the severity of current depression); and (d) *differences in the reference period* for recent depression (past 12 months in NSDUH vs. "currently" in the NSCH). Response rates also have been higher in NSDUH than in the NSCH (e.g., 38.2 percent for the landline sample in 2011 and 2012, 15.5 percent for the cellular phone sample, and 23.0 percent for the combined dual-frame sample) (NCHS, 2013), which could result in differential nonresponse bias patterns in the two surveys.

For further details, see the NSCH Web site at http://www.cdc.gov/nchs/slaits/nsch.htm.

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[44] Most interviews in 2011 or 2012 that were not conducted in English were conducted in Spanish (NCHS, 2013).

[45] NSCH data can be analyzed online at http://www.childhealthdata.org/learn/NSCH by selecting "Browse the Data" and "Browse by Survey & Topic." Data on current depression for a given year of the NSCH are available by selecting "Physical and Dental Health" from "Child Health Measures," then selecting "Prevalence of current depression, age 2-17 years" from the list of topics for "1.9b: Prevalence of current chronic health conditions." The online analysis tool allows estimates to be shown by age group.

C.3 Surveys of Populations Not Covered by NSDUH

Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel

The 2011 Department of Defense (DoD) Health Related Behaviors Survey of Active Duty Military Personnel (HRB Survey) was updated extensively since the last iteration of the survey in 2008. For the first time, the survey was administered using a Web-based individual self-administered questionnaire rather than through an onsite group administration of paper-and-pencil questionnaires. Because of this change in survey administration, the 2011 sample was no longer clustered geographically. The questionnaire also was revised to allow the use of skip logic to reduce respondent burden and additional alignment with questions in national surveys of civilian populations. The 2011 HRB survey sample consisted of 39,877 active-duty, nondeployed service members in the Army, Navy, Marine Corps, Air Force, and Coast Guard (Barlas, Higgins, Pflieger, & Diecker, 2013). The survey provides information about the use of alcohol, illicit drugs, and tobacco and about mental health issues among military personnel. Because of changes to procedures for sampling, data collection (including questionnaire changes), weighting, data processing, and analysis, estimates from the 2011 HRB survey are not directly comparable with estimates from prior HRB survey administrations. Consequently, the 2011 HRB survey represents a new baseline.

In 2011, 9.6 percent of military personnel in all services (including the Coast Guard) reported symptoms that suggested a high level of depression in the past week, 3.9 percent reported suicidal ideation in the past year, and 0.5 percent reported a suicide attempt in that period. In addition, 25.6 percent of military personnel perceived the need for mental health counseling in the past year, and 24.9 percent received counseling (Barlas et al., 2013).

Survey of Inmates in State and Federal Correctional Facilities (SISCF, SIFCF)

The Survey of Inmates in State Correctional Facilities (SISCF) and the Survey of Inmates in Federal Correctional Facilities (SIFCF) have provided nationally representative data on State prison inmates and sentenced Federal inmates held in federally owned and operated facilities. The Survey of State Inmates was conducted in 1974, 1979, 1986, 1991, 1997, and 2004, and the Survey of Federal Inmates in 1991, 1997, and 2004. The SISCF was conducted for the Bureau of Justice Statistics (BJS) by the U.S. Census Bureau, which also conducted the SIFCF for the BJS and the Federal Bureau of Prisons. Both surveys provide information about current offense and criminal history, family background and personal characteristics, prior drug and alcohol use and treatment, gun possession, and prison treatment, programs, and services. The surveys are the only national source of detailed information on criminal offenders, particularly special populations such as drug and alcohol users and offenders who have mental health problems. Systematic random sampling was used to select the inmates, and the SISCF and SIFCF in 2004 were administered through CAPI. In 2004, 14,499 State prisoners in 287 State prisons and 3,686 Federal prisoners in 39 Federal prisons were interviewed.

In 2004, 56 percent of inmates in State prisons and 45 percent of inmates in Federal prisons had a mental health problem in the past year. More than two fifths of State prisoners (43 percent) reported symptoms of mania disorder, 24 percent reported symptoms of major

depression, and 15 percent reported symptoms of a psychotic disorder. Comparable percentages for inmates in Federal prisons were 35, 16, and 10 percent, respectively (James & Glaze, 2006). However, these inmate surveys asked about depression symptoms only for the past 12 months and did not assess the duration of symptoms. Therefore, measures of depression from these surveys are not strictly comparable with measures of MDE in NSDUH.

For further details, see BJS's "All Data Collections" Web page at http://bjs.ojp.usdoj.gov/index.cfm?ty=dca.

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Appendix E: List of Contributors

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