Results from the 2009 National Survey on Drug Use and Health: Mental Health Findings

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Substance Abuse and Mental Health Services Administration
Office of Applied Studies

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Highlights

- In 2009, there were an estimated 45.1 million adults aged 18 or older in the United States with any mental illness in the past year. This represents 19.9 percent of all adults in this country. Among adults aged 18 or older in 2009, the percentage having serious mental illness (SMI) in the past year was 4.8 percent (11.0 million adults).

- Women aged 18 or older were more likely than men aged 18 or older to have past year any mental illness (23.8 vs. 15.6 percent) and SMI (6.4 vs. 3.2 percent).

- In 2009, an estimated 8.4 million adults (3.7 percent) aged 18 or older had serious thoughts of suicide in the past year. Among adults aged 18 or older, 2.2 million (1.0 percent) made suicide plans in the past year, and 1.0 million (0.5 percent) attempted suicide in the past year.

- Among the 45.1 million adults aged 18 or older with any mental illness in the past year, 19.7 percent (8.9 million adults) met criteria for substance dependence or abuse in that period compared with 6.5 percent (11.9 million adults) among those who did not have mental illness in the past year. Among the 11.0 million adults aged 18 or older with SMI in the past year, 25.7 percent also had past year substance dependence or abuse compared with 6.5 percent of adults who did not have mental illness.

- Among the 45.1 million adults aged 18 or older with any mental illness in 2009, 17.1 million (37.9 percent) received mental health services in the past year. Among the 11.0 million adults aged 18 or older with SMI in 2009, 6.6 million (60.2 percent) received mental health services in the past year.

- In 2009, 30.2 million adults (13.3 percent of the population 18 years or older) received mental health services during the past 12 months.

- Among the 2.8 million adults aged 18 or older in 2009 with both SMI and substance dependence or abuse in the past year, 62.4 percent received substance use treatment at a specialty facility or mental health treatment in that period. Included in the 62.4 percent are 13.5 percent who received both mental health treatment and specialty substance use treatment, 47.3 percent who received mental health treatment only, and 1.6 percent who received specialty substance use treatment only.

- In 2009, there were 2.0 million youths (8.1 percent of the population aged 12 to 17) who had major depressive episode (MDE) during the past year. Among youths aged 12 to 17 in 2009 who had past year MDE, 35.7 percent used illicit drugs in the past year compared with 18.0 percent among youths who did not have past year MDE.

- In 2009, 2.9 million youths aged 12 to 17 (12.0 percent) received treatment or counseling for problems with emotions or behavior in a specialty mental health setting (inpatient or outpatient care). The most common reason for receiving services among youths was feeling depressed (46.0 percent).

1. Introduction

This report presents results pertaining to mental health from the 2009 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 serious mental illness (SMI), any mental illness, suicidal thoughts and behaviors, 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 2008 and 2009 and differences across population subgroups in 2009. A separate report focusing on 2009 substance use data was published in September 2010.

1.1. 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 by administering questionnaires to a representative sample of the population through face-to-face interviews 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 Office of Applied Studies (OAS). Data collection and analysis are conducted under contract with RTI International, Research Triangle Park, North Carolina.[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 E describes surveys that provide mental health data for populations outside 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

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

about other sensitive topics, including mental health issues. Less sensitive items are administered by interviewers using computer-assisted personal interviewing (CAPI).

The 2009 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) were designated as large sample States (California, Florida, Illinois, Michigan, New York, Ohio, Pennsylvania, and Texas) and had a sample size of about 3,600 each. For the remaining 42 States and the District of Columbia, the sample size was about 900 per State. The design oversampled youths and young adults, so that 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 143,565 addresses, and 68,700 completed interviews were obtained. The survey was conducted from January through December 2009. Weighted response rates for household screening and for interviewing were 88.8 and 75.7 percent, respectively. See Appendix B for more information on NSDUH response rates.

1.2. 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 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 with a past 12-month time frame. SAMHSA previously used the K6 data 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. Both of these measures are needed to determine whether a respondent can be categorized as having SMI. Information on the presence of a diagnosable disorder also is needed to determine whether a respondent can be categorized as having any mental illness, regardless of the level of functional impairment.

To address SAMHSA's need for estimates of SMI and any mental illness, as well as data on suicidal ideation and behavior, OAS modified the NSDUH adult mental health items in 2008 to obtain these data. Scales were added that assessed impairment caused by mental problems. OAS also expanded the K6 questions to ask about the past 30 days (the time frame for which the K6 was originally designed). A Mental Health Surveillance Study (MHSS) was initiated in which a subsample of adults (about 1,500 in 2008 and 500 in 2009) 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 SMI and any mental illness status. Using both clinical interview and computer-assisted interview data for the respondents who completed the clinical interview, statistical models were developed that then were applied to data from adult respondents who had not completed the interviews to produce SMI and any mental illness estimates for the adult civilian, noninstitutionalized population. See Section B.4.3 in Appendix B for a more complete discussion of the MHSS procedures and analyses. Estimates from the

expanded adult mental health questions for 2008 and 2009 (including those for SMI, any mental illness, and suicidal thoughts, plans, and attempts) are included in Chapters 2 and 4 of this report.

Although information on MDE has been collected since 2004, the questionnaire changes caused discontinuities in trends for MDE. Analyses of these data have determined that the 2008 and 2009 data for MDE are not comparable with 2007 and earlier data (see Sections B.4.2 and B.4.4 in Appendix B). Therefore, estimates of MDE among adults before 2008 are not included in this report. No questionnaire changes were made in 2008 that affected adult mental health service utilization questions; therefore, estimates of mental health service utilization presented in this report reflect trends from 2002 to 2009.

For youths aged 12 to 17, no questionnaire changes were made in 2008 that affected 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). Estimates of MDE and mental health service utilization among youths in 2009 are presented in Chapters 3 and 4 of this report. The discussion of estimates for these measures in this report includes comparisons with prior years' data for youths.

1.3. Format of Report

Estimates presented in this report are based on data from a comprehensive set of tables of national mental health estimates that are referred to as "mental health detailed tables."[2] This report has separate chapters that discuss the national findings of mental disorders and service utilization for adults aged 18 or older, youths aged 12 to 17, and both adults and youths with mental disorders that co-occurred with substance use or with substance use disorders. A final chapter describes key findings in relation to other research and survey results and future plans for estimation of mental health measures. Technical appendices presented in this report describe the survey (Appendix A), provide technical details on the statistical methods and measurement (Appendix B), offer key NSDUH definitions (Appendix C), provide a supplementary analysis of the receipt of mental health treatment among adults with different levels of mental illness (Appendix D), discuss other sources of related data (Appendix E), and list the references cited in the report (Appendix F). A list of contributors to the production of this report also is provided (Appendix G).

Text and figures 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 2009 estimates are significantly different from 2008 or earlier estimates.

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 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

[2] This comprehensive set of tables is available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs.

difference," "same," or "remained steady" to describe the relationship between estimates denote that a difference is not statistically significant. In addition, a set of estimates for survey years or population subgroups may be presented without a statement of comparison, in which case a statistically significant difference between these estimates is not implied and testing was not 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 figures or text. Subgroups with 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 current guidelines for collecting and reporting race and ethnicity data (Office of Management and Budget [OMB], 1997). Because respondents were allowed to choose more than one racial group, a "two or more races" category is presented that includes persons who reported more than one category among the basic groups listed in the survey question (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 mentioned above are classified in the combined "Native Hawaiian or Other Pacific Islander" category instead of the "two or more races" category. It should be noted that, except for the "Hispanic or Latino" group, the racial/ethnic groups discussed in this report include only non-Hispanics. The category "Hispanic or Latino" includes Hispanics of any race.

1.4. Other NSDUH Reports and Data

Other reports focusing on specific topics of interest will be produced using the 2009 NSDUH data and made available on SAMHSA's Web site. The mental health detailed tables described previously are also available through the Internet at http://www.oas.samhsa.gov. 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.

Brief descriptive reports and in-depth analytic reports focusing on specific issues or population groups also are produced by OAS. A complete listing of previously published reports from NSDUH and other data sources is available from OAS. Most of these reports also are available through the Internet (http://www.oas.samhsa.gov). In addition, OAS makes public use data files available to researchers through the Substance Abuse and Mental Health Data Archive (SAMHDA, 2010) at http://www.datafiles.samhsa.gov. Currently, files are available from the 1979 to 2008 surveys.[3] The 2009 NSDUH public use file will be available by the end of 2010.

[3] See http://www.icpsr.umich.edu/icpsrweb/SAMHDA/series/64.

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 and mental health problems in the United States, including the percentage of adults aged 18 or older with serious mental illness (SMI), any mental illness, suicidal thoughts and behavior, 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 SMI, any mental illness, 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.

Serious Mental Illness

Public Law No. 102-321, the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) 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 the Substance Abuse and Mental Health Services Administration (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 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.

In order to generate estimates of SMI in the United States, SAMHSA designed and implemented the Mental Health Surveillance Study (MHSS). As part of the MHSS, a split-sample design was used in 2008 to administer the 12-month Kessler-6 (K6) psychological distress scale and either an abbreviated World Health Organization Disability Assessment Schedule (WHODAS) or the Sheehan Disability Scale (SDS) to each respondent aged 18 or older. A subsample of approximately 1,500 adults in 2008 selected from the main study participated in the MHSS by agreeing to undergo additional mental health assessment using the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP) (First, Spitzer, Gibbon, & Williams, 2002) via a telephone interview administered by a trained mental health clinician. An analysis was conducted in 2008 to determine the statistical models (using the K6 in combination with the WHODAS or the K6 in combination with the SDS) that accurately predicted SMI status as determined by the clinical interview. The analysis found that the K6 in combination with the WHODAS performed better than the K6 in combination with the SDS for predicting SMI. Therefore, the WHODAS has been retained as the only impairment scale in the survey instrument for 2009 going forward. Using the statistical model parameters determined in 2008, estimates of SMI were generated for the full NSDUH sample. Approximately 500 adults in 2009 were selected from the main study to

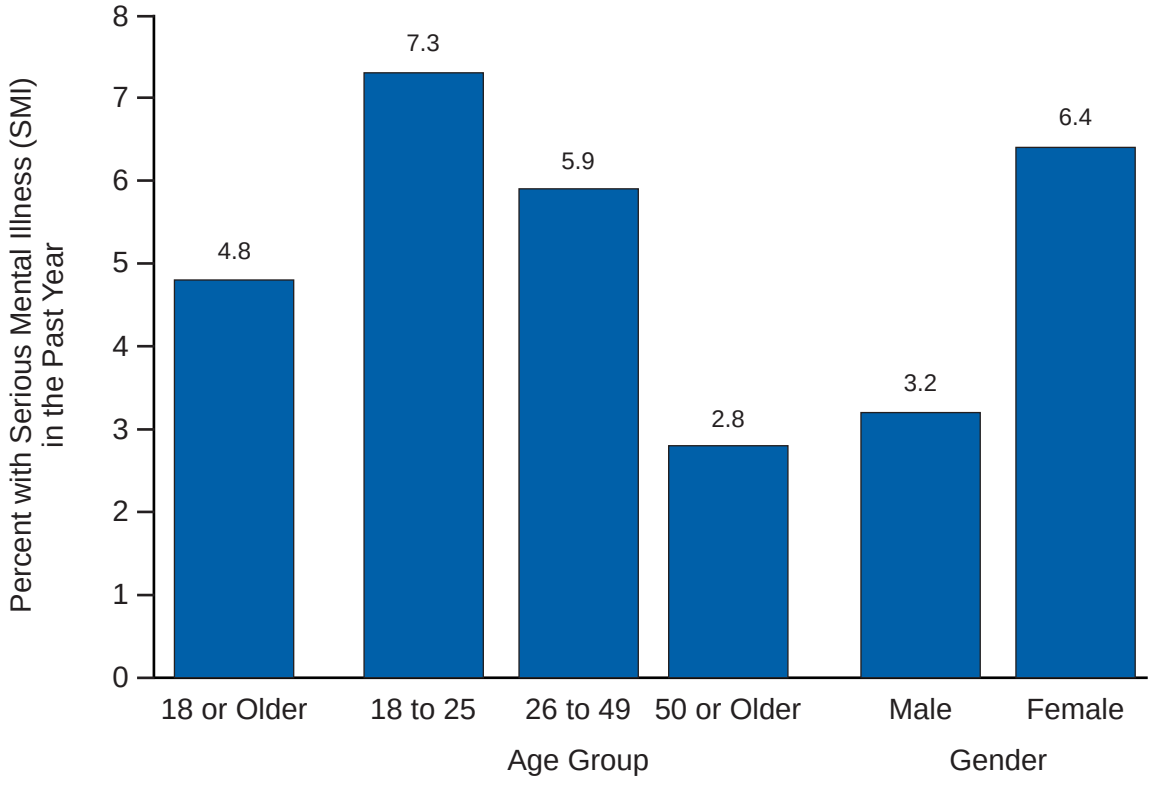
participate in the MHSS. However, data from these 500 clinical interviews were not used in the estimation of SMI in 2009. To facilitate comparisons between 2008 and 2009 estimates, statistical models developed from the 1,500 clinical interviews completed in 2008 were used to generate both 2008 and 2009 estimates. A description of the MHSS design, analyses, and results may be found in Section B.4.3 in Appendix B.

- In 2009, there were an estimated 11.0 million adults aged 18 or older in the United States with SMI in the past year. This represents 4.8 percent of all adults in this country (Figure 2.1). Among adults, the percentage having SMI in 2009 was slightly higher than the percentage having SMI in 2008 (4.4 percent or 9.8 million adults).

- The percentage of adults with past year SMI in 2009 was highest among adults aged 18 to 25 (7.3 percent), followed by adults aged 26 to 49 (5.9 percent), then by adults aged 50 or older (2.8 percent).

- Past year SMI was more likely among women aged 18 or older than among men in that age group (6.4 vs. 3.2 percent).

Figure 2.1 Serious Mental Illness in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2009



- In 2009, the percentage of adults 18 years or older with past year SMI was 2.0 percent among Asians, 3.7 percent among African Americans, and 4.0 percent among Hispanics. For other racial/ethnic groups, past year SMI was 5.3 percent among whites, 5.8 percent among American Indians or Alaska Natives, and 9.7 percent among persons reporting two or more races. The estimate of past year SMI among adult Native Hawaiians or Other Pacific Islanders could not be reported due to low precision.

- The percentage of past year SMI in 2009 was higher among adults aged 18 or older who were unemployed (7.1 percent) than among adults who were employed full time (3.6 percent) or part time (5.6 percent).

- Among adults aged 18 or older, the percentage having past year SMI was higher among adults on probation in the past year (11.8 percent or 605,000 adults) compared with adults who were not on probation in the past year (4.7 percent). Similarly, among adults on parole or supervised release in the past year, the percentage having SMI was 9.7 percent, which was over 2 times the percentage of adults with SMI who were not on parole or supervised release in the past year (4.8 percent).

Any Mental Illness

Any mental illness among adults aged 18 or older is defined as currently or at any time in the past year 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 DSM-IV (APA, 1994). Adults who had a diagnosable mental, behavioral, or emotional disorder in the past year, regardless of their level of functional impairment, were defined as having any mental illness.

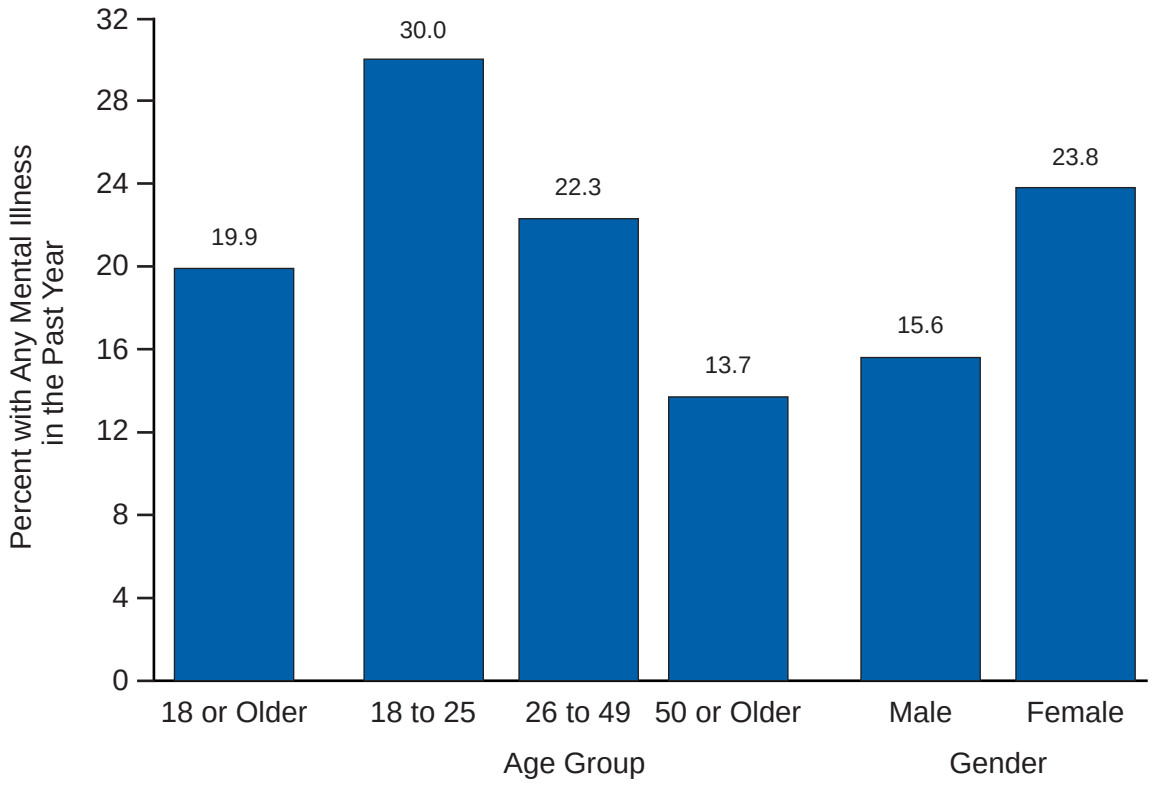
Similar to the SMI estimates, estimates of any mental illness in the United States were generated via the MHSS using a statistical model developed from the clinical interview data collected in 2008. However, any mental illness estimates in 2008 were based on the WHODAS half sample because an acceptable model for any mental illness based on the SDS half sample was not identified. For details on the modeling and estimation of any mental illness, see Section B.4.3 in Appendix B.

- In 2009, there were an estimated 45.1 million adults aged 18 or older in the United States with any mental illness in the past year. This represents 19.9 percent of all adults in this country (Figure 2.2). The percentage of adults who had any mental illness was similar to the percentage in 2008 (19.5 percent or 43.8 million adults).

- The percentage of adults aged 18 or older with any mental illness in the past year was highest for adults aged 18 to 25 (30.0 percent), followed by adults aged 26 to 49 (22.3 percent), then by adults aged 50 or older (13.7 percent).

- Among adults aged 18 or older, the percentage having any mental illness in the past year was significantly higher among women than among men (23.8 vs. 15.6 percent).

Figure 2.2 Any Mental Illness in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2009



- In 2009, past year any mental illness was 15.5 percent among Asians aged 18 or older, 16.7 percent among Native Hawaiians or Other Pacific Islanders, 17.8 percent among Hispanics, and 17.9 percent among African Americans. Among other racial/ethnic groups, any mental illness was 20.7 percent among whites, 21.6 percent among American Indians or Alaska Natives, and 32.7 percent among persons reporting two or more races.

- The percentage of adults aged 18 or older with any mental illness in 2009 was higher among adults who were unemployed (27.7 percent) than among adults who were employed full time (17.1 percent) or part time (23.4 percent).

- Among adults aged 18 or older, the percentage having past year any mental illness was 37.5 percent (1.9 million adults) among those on probation in the past year, which was higher than the percentage having any mental illness among those who were not on probation in the past year (19.5 percent). Similarly, among adults on parole or supervised release in the past year, the percentage having any mental illness was 32.2 percent, which was higher than the percentage having any mental illness among adults who were not on parole or supervised release in the past year (19.8 percent).

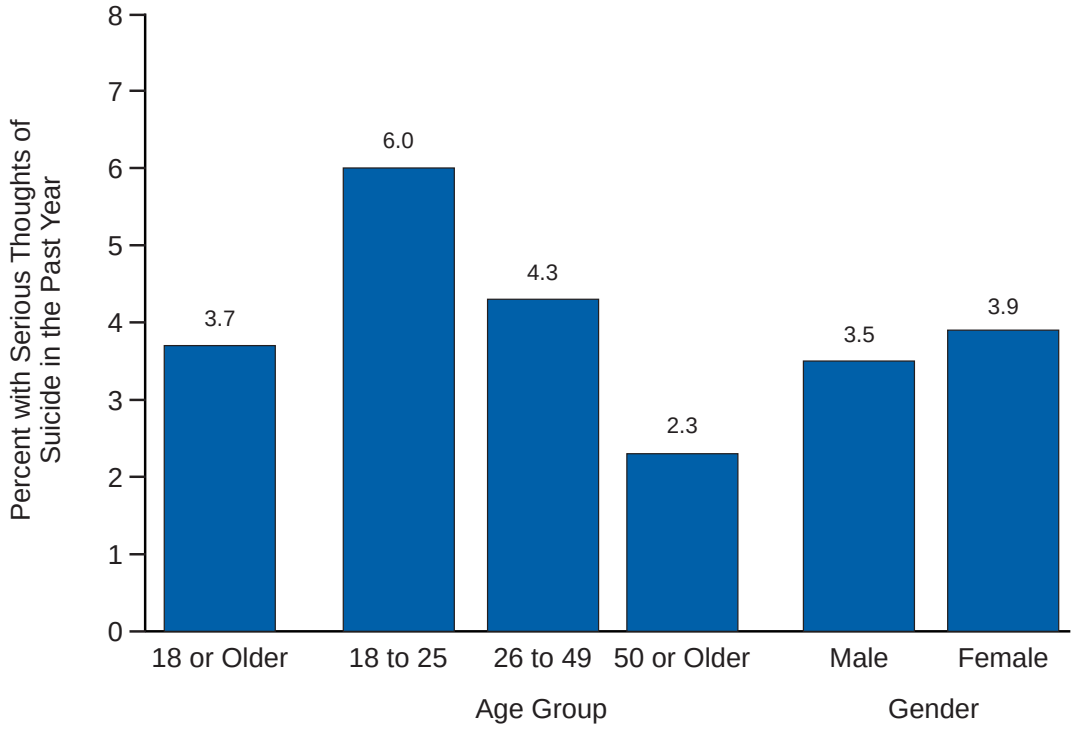
Suicidal Thoughts and Behavior

Responding to a need for national data on the prevalence of suicidal thoughts and behavior, a set of questions was added beginning with the 2008 NSDUH questionnaire. These questions ask all adult respondents if at any time during the past 12 months they had serious thoughts of suicide, and among those with suicidal ideation, whether they made suicide plans or attempts in the past year. If an attempt was made, additional items asked whether the respondent received medical attention or hospitalization as a result of attempted suicide.

- In 2009, an estimated 8.4 million adults (3.7 percent) aged 18 or older had serious thoughts of suicide in the past year (Figure 2.3). The estimate was similar to the percentage in 2008 (3.7 percent or 8.3 million adults).

- In 2009, the percentage of adults 18 years or older with serious thoughts of suicide in the past year was 3.9 percent among women and 3.5 percent among men. Having serious thoughts of suicide was highest among young adults aged 18 to 25 (6.0 percent), followed by adults aged 26 to 49 (4.3 percent), then by adults aged 50 or older (2.3 percent).

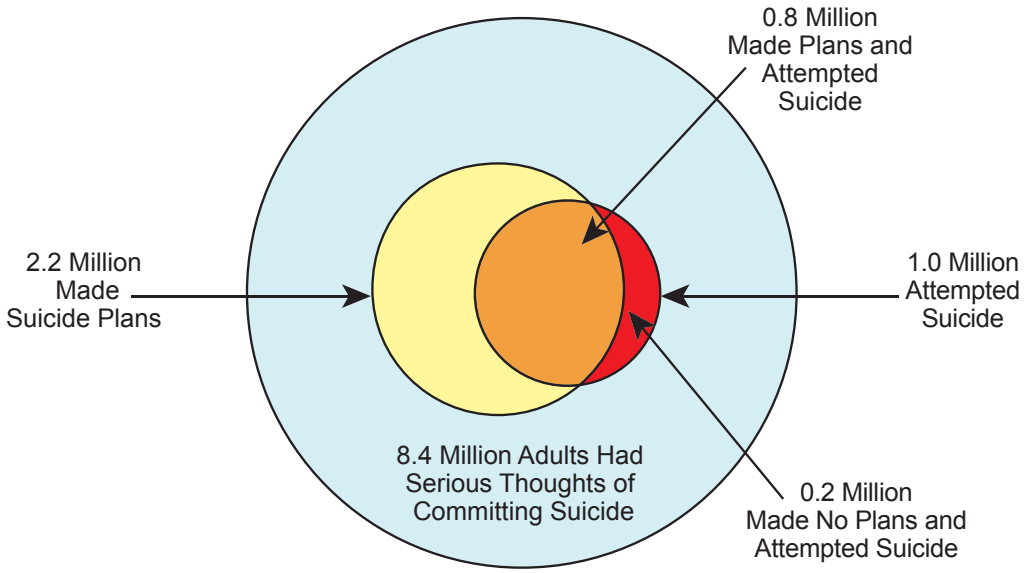
Figure 2.3 Suicidal Thoughts in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2009



- Among adults aged 18 or older, 2.2 million (1.0 percent) made suicide plans in the past year. The percentage of adults who made suicide plans in the past year was highest among 18 to 25 year olds (1.9 percent), followed by 26 to 49 year olds (1.0 percent), then by adults aged 50 or older (0.6 percent).

- In 2009, 1.0 million adults (0.5 percent) aged 18 or older attempted suicide in the past year (Figure 2.4). Among those persons, 0.8 million reported having made plans for suicide, while 0.2 million had not made suicide plans.

Figure 2.4 Suicidal Thoughts and Behavior in the Past Year among Adults Aged 18 or Older: 2009



- In 2009, the percentage of adults aged 18 or older having serious thoughts of suicide in the past year was 2.0 percent among Asians, 3.3 percent among Hispanics, 3.5 percent among African Americans, 3.9 percent among whites, 5.0 percent among American Indians or Alaska Natives, and 7.6 percent among persons reporting two or more races. The estimate of serious thoughts of suicide among Native Hawaiians or Other Pacific Islanders could not be reported due to low precision.

- Adults aged 18 or older who were unemployed in the past year were more likely than adults who had full-time employment in the past year to have serious thoughts of suicide (6.6 vs. 3.1 percent), make suicide plans (2.3 vs. 0.7 percent), and attempt suicide (1.1 vs. 0.3 percent).

- In 2009, the percentage of adults aged 18 or older having serious thoughts of suicide in the past year was 4.6 percent among adults with less than a high school education, 3.9 percent among adults who completed high school, 3.8 percent among adults with some college, and 3.0 percent among adults who completed college.
- In 2009, college-aged adults (i.e., those aged 18 to 22) were less likely to have serious thoughts of suicide in the past year than in 2008 (6.3 vs. 7.2 percent). Full-time college students aged 18 to 22 were less likely than other adults aged 18 to 22 to have serious thoughts of suicide (5.5 vs. 7.0 percent), make suicide plans (1.5 vs. 2.7 percent), and attempt suicide (0.8 vs. 1.5 percent) in the past year.
- Among adults aged 18 or older, 617,000 (0.3 percent) received medical attention for their suicide attempt in the past year, and 428,000 (0.2 percent) stayed overnight or longer in a hospital as a result of their suicide attempt in the past year.

Major Depressive Episode

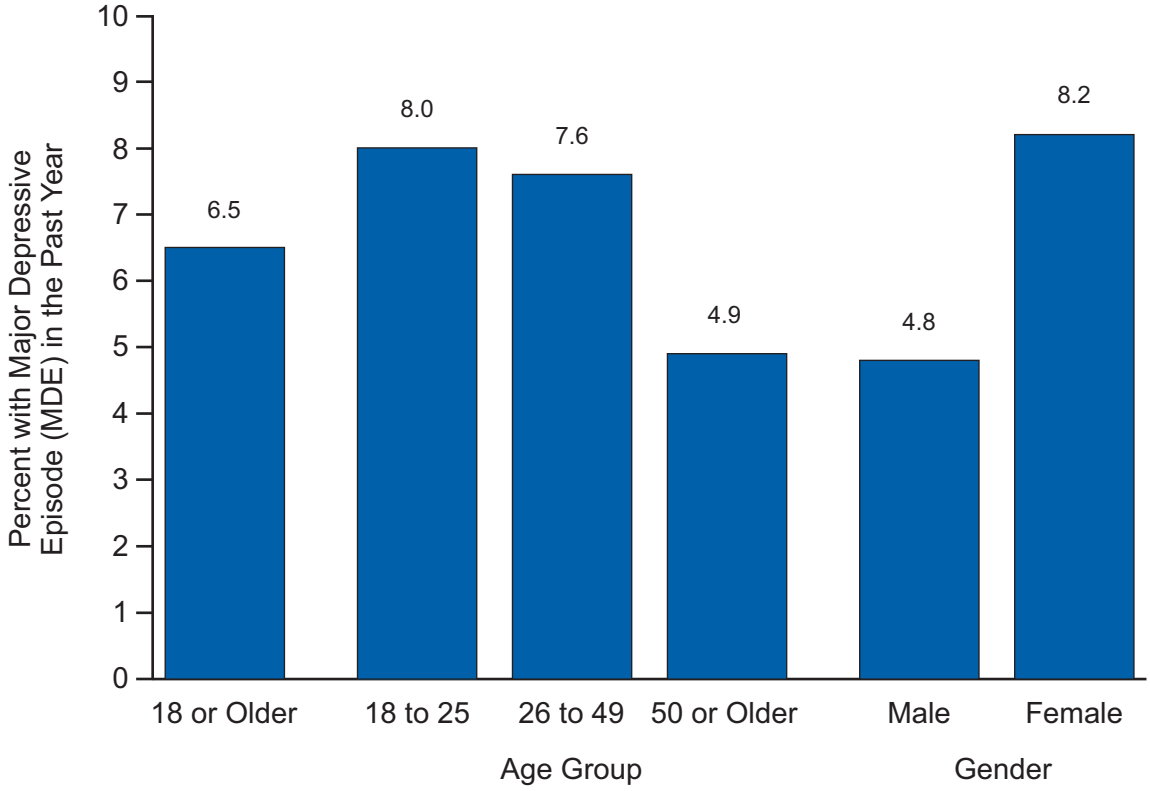
A NSDUH module designed to obtain measures of lifetime and past year prevalence of MDE and treatment for depression has been administered to adults aged 18 or older since 2004. Some questions in the adult depression module differ slightly from the adolescent depression module. Therefore, the adult data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

Persons with MDE in the past year first needed to meet criteria for having lifetime MDE. 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. Consistent with the DSM-IV (APA, 1994), persons with past year MDE had lifetime MDE, had a period of at least 2 weeks when they experienced a depressed mood or loss of interest or pleasure in daily activities, and reported having "some of the other problems" that they reported for lifetime 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 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 in Appendix B.

A consequence of adding new adult mental health questions in 2008 (i.e., the past 30-day K6 scale, the functional impairment scale[s], and the suicidal thoughts and behavior items) is the effect they may have had on respondents' reporting of symptoms in the adult MDE module; for further discussion, see Sections B.4.4 and B.4.7 in Appendix B of the 2008 NSDUH's national findings report (Office of Applied Studies [OAS], 2009). As a result, direct comparison with previous years of data may be compromised, requiring that a new adult MDE trend begin with the 2008 data. To facilitate comparison with the 2009 adult MDE estimates, estimates of adult MDE that are presented in this report for 2008 are based only on the sample of adults in that year who received the WHODAS items.

- In 2009, 6.5 percent of adults aged 18 or older (14.8 million people) had at least one MDE in the past year (Figure 2.5).

Figure 2.5 Major Depressive Episode in the Past Year among Adults Aged 18 or Older, by Age and Gender: 2009



- Among adults 18 years or older, the percentage having past year MDE in 2009 was lower for those aged 50 or older (4.9 percent) compared with those aged 18 to 25 (8.0 percent) and those aged 26 to 49 (7.6 percent).

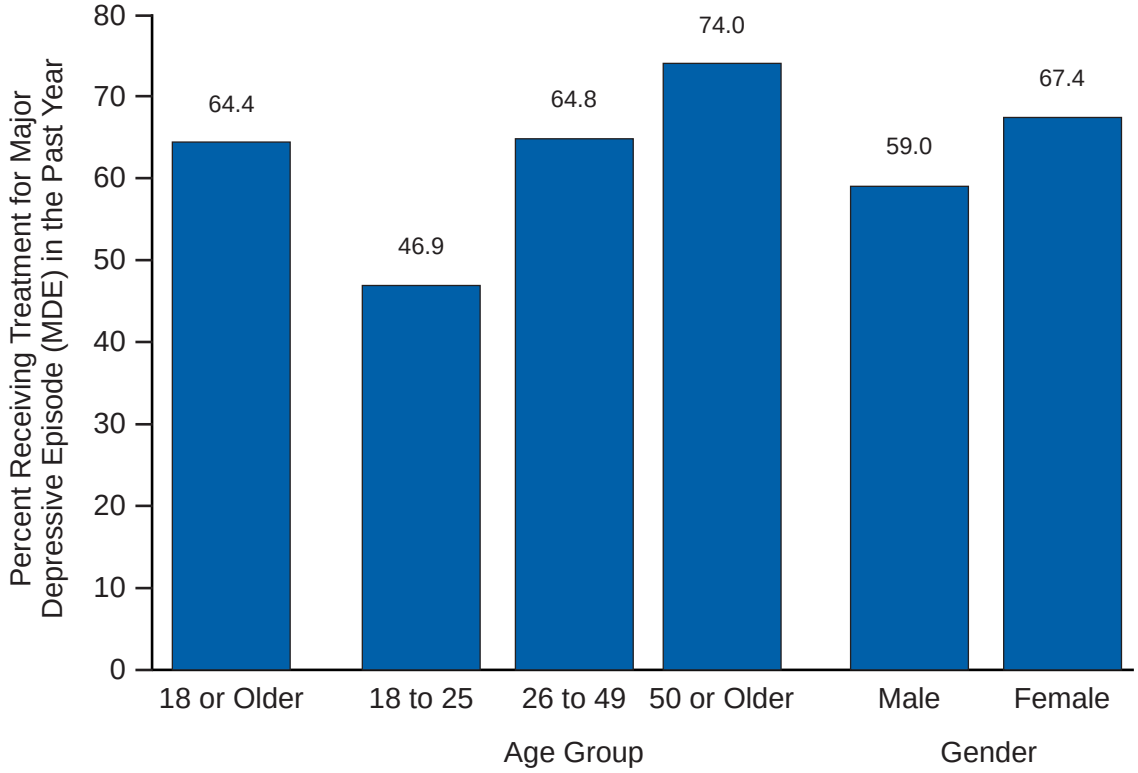
- The percentage of adults aged 18 or older with past year MDE was higher among women than among men (8.2 vs. 4.8 percent). Among women, the percentages having MDE were higher in the younger age groups (10.5 percent for 18 to 25 year olds and 9.6 percent for 26 to 49 year olds) compared with those aged 50 or older (6.0 percent).

- Among adults aged 18 or older, past year MDE varied by race/ethnicity in 2009. The percentage of adults with past year MDE was 3.2 percent among Asians, 5.4 percent among African Americans, 6.5 percent among American Indians or Alaska Natives, 7.0 percent among whites, 5.9 percent among Hispanics, and 10.4 percent among persons reporting two or more races. The estimate of past year MDE among Native Hawaiians or Other Pacific Islanders could not be reported due to low precision.

- Among adults aged 18 or older in 2009, the percentage having past year MDE was highest among unemployed persons (9.7 percent) compared with persons who were retired or otherwise not in the labor force (7.5 percent), persons employed part time (7.3 percent), and persons employed full time (5.4 percent).

- Among the 14.8 million adults aged 18 or older who had MDE in the past year, 64.4 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 2.6).

Figure 2.6 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: 2009



- In 2009, the percentage of adults aged 18 or older receiving treatment for depression among those with MDE was significantly lower than the percentage in 2008 (64.4 vs. 71.0 percent, respectively).

- In 2009, 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 (67.4 vs. 59.0 percent).

- Adults aged 50 years or older with past year MDE were more likely to receive treatment for depression (74.0 percent) than younger adults with MDE (64.8 percent of adults aged 26 to 49 and 46.9 percent of adults aged 18 to 25).

- Among adults aged 18 or older with past year MDE in 2009, about two thirds of those with private insurance (65.1 percent) received treatment for depression in the past year compared with a lower percentage for those with no insurance (47.8 percent) and higher percentages for those with Medicaid or CHIP (78.6 percent) and adults with other health insurance (72.1 percent), including Medicare, CHAMPUS, TRICARE, CHAMPVA, VA, military health care, or other types of health insurance.

- Among adults aged 18 or older with past year MDE and no health insurance coverage, the receipt of treatment for depression decreased between 2008 and 2009 (64.1 vs. 47.8 percent). Similarly, the percentage of treatment for depression decreased for adults with MDE and other forms of health insurance between 2008 and 2009 while remaining similar among adults with MDE and private insurance or Medicaid/CHIP.

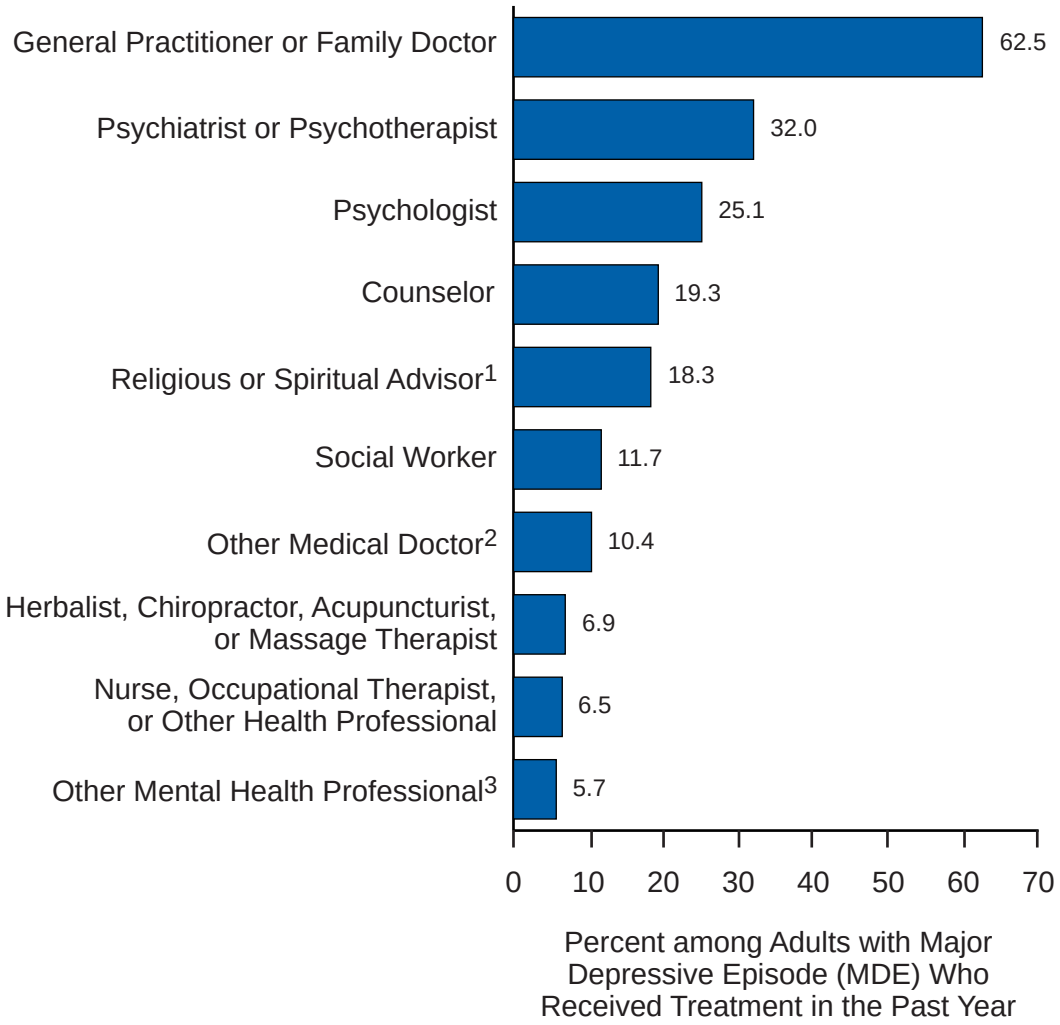
- Of the 8.7 million adults aged 18 or older in 2009 with MDE who saw or talked to a medical doctor or other professional about depression in the past year, the most likely type of professional seen was a general practitioner or family doctor (62.5 percent), followed by a psychiatrist or psychotherapist (32.0 percent), a psychologist (25.1 percent), or a counselor (19.3 percent) (Figure 2.7).

- In 2009, 44.6 percent of adults with past year MDE received treatment for depression through a combination of seeing or talking to a medical doctor or other professional and using prescription medication. In contrast, 14.3 percent saw or talked only to a medical doctor or other professional, and 5.4 percent used only prescription medication.

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. The relevant mental health service utilization questions are asked of adult respondents regardless of mental illness status. 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. 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." It is possible for a respondent to have indicated receipt of treatment for depression without having indicated that he or she received services for any problems with emotions, nerves, or mental health.

Figure 2.7 Type of Professional Seen among Adults Aged 18 or Older with a Major Depressive Episode Who Received Treatment in the Past Year: 2009



[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.

Estimates of the receipt of mental health services are presented by level of mental illness for adults. These include any mental illness and three levels of mental illness among those with any mental illness: low (mild) mental illness, moderate mental illness, and SMI. Definitions for any mental illness and SMI among persons aged 18 or older were described previously (also see the entry for "mental illness" in Appendix C). As was done for SMI, both low (mild) mental illness and moderate mental illness were defined using the mental health questionnaire items in NSDUH and estimates of SMI from data collected using a gold-standard, structured clinical interview in a statistical model. 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 levels of functioning in the clinical interviews that were used to define adults as having low (mild) mental illness, moderate mental illness, or SMI, as well as methods used for the estimation of mental illness.

Also described in this section are estimates of the unmet perceived need for mental health services and reasons for not receiving mental health services among adults aged 18 or older. 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.

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. Persons who were hospitalized or institutionalized for a period of time during the survey period, but who resided in households during the rest of the survey period, were included in the sample.

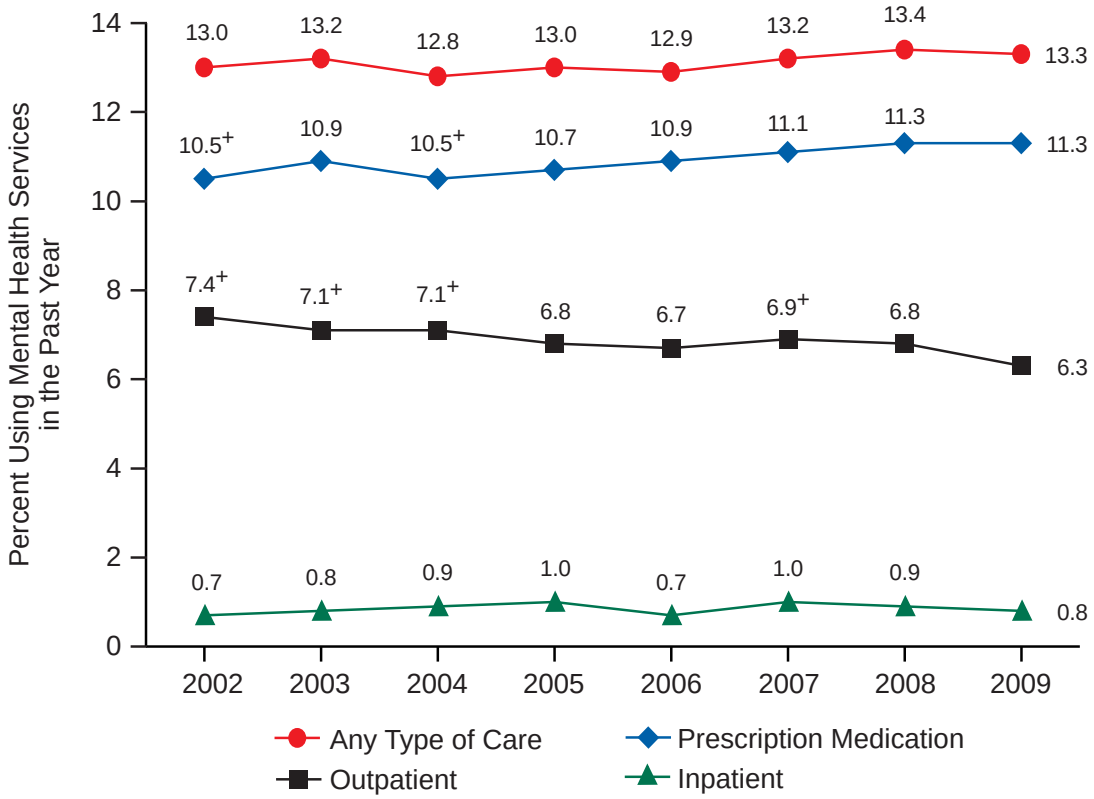
- In 2009, 30.2 million adults (13.3 percent of the population 18 years or older) received mental health services during the past 12 months (Figure 2.8). This was similar to the percentage in 2008 (13.4 percent).

- Among adults aged 18 or older, women were more likely to use mental health services in the past year than men (17.1 vs. 9.2 percent).

- Use of mental health services in the past year varied by age for adults aged 18 or older. Mental health service use was highest among adults aged 26 to 49 (14.6 percent), followed by adults aged 50 or older (12.8 percent), then by adults aged 18 to 25 (11.1 percent).

- Among racial/ethnic groups, past year mental health service use among adults aged 18 or older in 2009 was 3.5 percent for Asians, 7.3 percent for Hispanics, 7.7 percent for African Americans, 16.0 percent for whites, and 19.1 percent for persons reporting two or more races. Estimates of mental health service use among American Indians or Alaska Natives and Native Hawaiians or Other Pacific Islanders were not reported due to low precision.

Figure 2.8 Past Year Mental Health Service Use among Adults Aged 18 or Older, by Type of Care: 2002-2009



[+] Difference between this estimate and the 2009 estimate is statistically significant at the .05 level.

- In 2009, the receipt of mental health services in the past year was higher among adults aged 18 or older with Medicaid or CHIP (23.6 percent) compared with adults with other forms of health insurance coverage (14.0 percent), private health insurance (12.7 percent), and no health insurance coverage (9.1 percent).

- In 2009, the type of mental health services most often received by adults aged 18 or older in the past year was prescription medication (11.3 percent or 25.6 million adults), followed by outpatient services (6.3 percent or 14.3 million adults), then by inpatient services (0.8 percent or 1.9 million adults). Percentages of adults who used prescription medication, outpatient services, and inpatient services in 2009 were similar to those in 2008 (11.3, 6.8, and 0.9 percent, respectively). Note that respondents could report receiving more than one type of mental health care.

- Between 2002 and 2009, the percentage of adults aged 18 or older receiving outpatient services in the past year declined from 7.4 to 6.3 percent, while the percentage receiving prescription medication increased from 10.5 to 11.3 percent (Figure 2.8).

- Adult men aged 18 or older were less likely than adult women to receive outpatient mental health services (4.3 vs. 8.2 percent) and prescription medication (7.6 vs. 14.7 percent) for mental health problems in the past year.

- Among adults aged 18 or older who reported receiving mental health services in the past year, 64.3 percent received one type of care (inpatient, outpatient, or prescription medication), 32.7 percent received two types of care, and 2.9 percent received all three types of care.

- Among adults aged 18 or older who received past year outpatient mental health services in 2009, several types of locations where services were received were reported. These included an office of a private therapist, psychologist, psychiatrist, social worker, or counselor that was not part of a clinic (53.9 percent); a doctor's office that was not part of a clinic (23.4 percent); an outpatient mental health clinic or center (21.6 percent); and an outpatient medical clinic (8.7 percent). Also, the most likely sources of payment for outpatient mental health services among adults were private health insurance (40.2 percent) and self-payment or payment by a family member living in the household (35.0 percent), followed by Medicare (15.1 percent), Medicaid (11.2 percent), and an employer (9.2 percent).

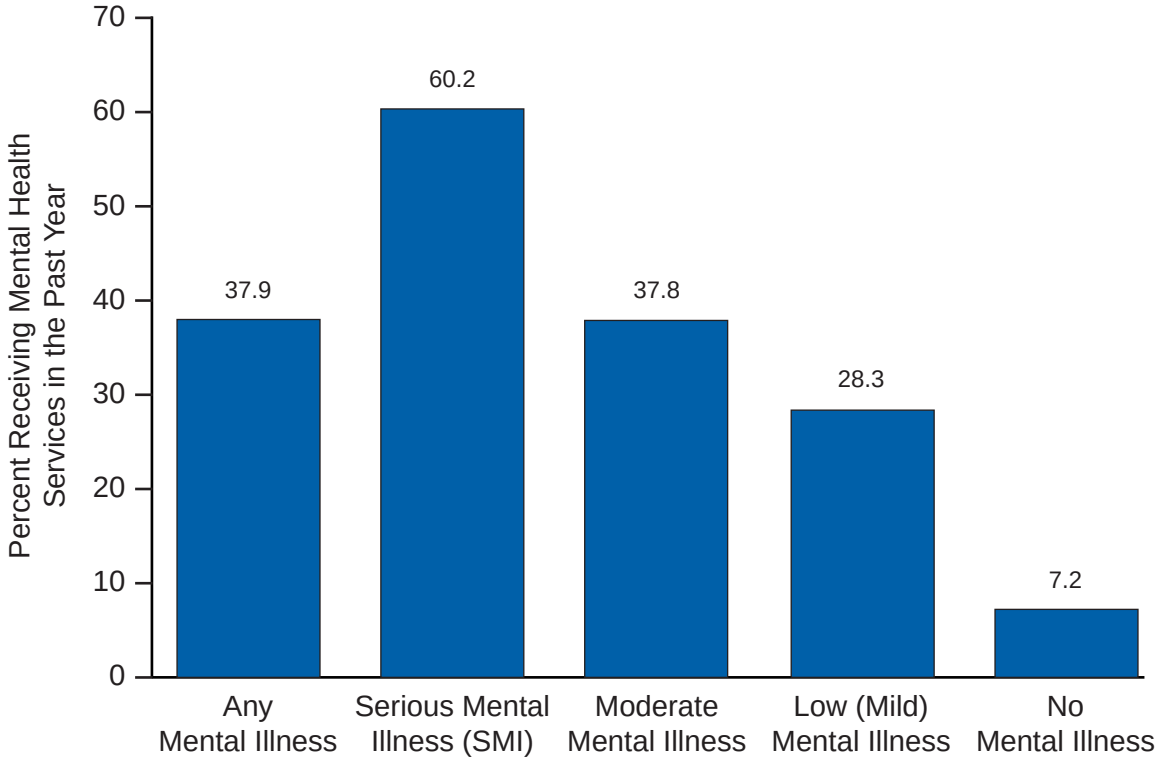
- Among the 45.1 million adults aged 18 or older with any mental illness in 2009, 17.1 million (37.9 percent) received mental health services in the past year (Figure 2.9). Also, among the 11.0 million adults aged 18 or older with SMI in 2009, 6.6 million (60.2 percent) received mental health services in the past year. Mental health services were received by 37.8 and 28.3 percent of adults with moderate mental illness and low (mild) mental illness, respectively.

- Compared with estimates in 2008, the percentage of adults aged 18 or older receiving past year mental health services in 2009 was similar among adults with SMI (58.7 percent in 2008 vs. 60.2 percent in 2009) and among adults with past year any mental illness (37.2 vs. 37.9 percent).

- Among adults with SMI, mental health service use was lower among adults aged 18 to 25 (44.6 percent) than among adults aged 26 to 49 (62.5 percent) or adults aged 50 or older (69.6 percent). Although less likely than SMI, a similar pattern of mental health service use by age group was evident among adults with moderate mental illness and low (mild) mental illness. Specifically, service use among adults aged 18 to 25 with moderate mental illness and low (mild) mental illness (26.6 and 17.2 percent, respectively) was less likely than among adults aged 26 to 49 (37.8 and 29.8 percent, respectively) and adults aged 50 or older (47.5 and 33.7 percent, respectively).

- Among all adults aged 18 or older with past year any mental illness, 32.4 percent received prescription medication, 21.2 percent received outpatient services, and 3.1 percent received inpatient services for a mental health problem in the past year. In 2009, the percentages for receiving prescription medication, outpatient services, and inpatient services among adults with past year SMI were 54.0, 38.0, and 6.8 percent, respectively. Respondents could report more than one type of service used.

Figure 2.9 Receipt of Mental Health Services among Adults Aged 18 or Older, by Level of Mental Illness: 2009

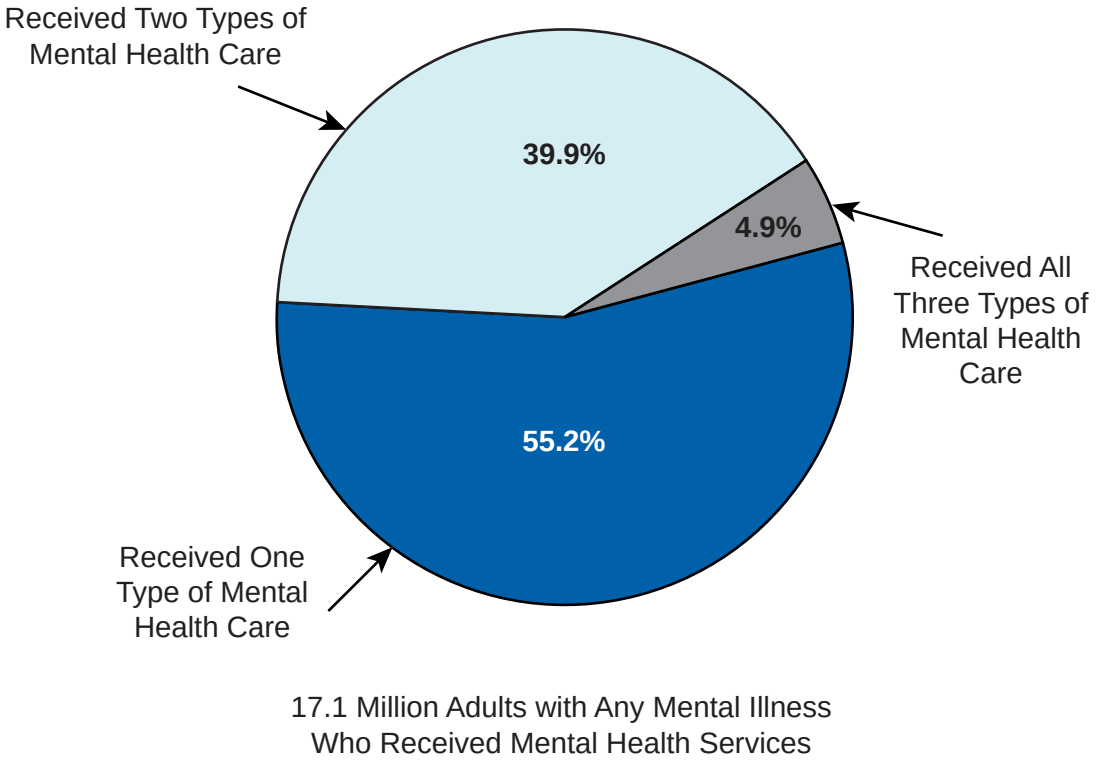


- Among the 17.1 million adults aged 18 or older with past year any mental illness who reported receiving mental health services in the past year, 55.2 percent received one type of care (inpatient, outpatient, or prescription medication), 39.9 percent received two types of care, and 4.9 percent received all three types of care (Figure 2.10).

- Among the 6.6 million adults aged 18 or older with past year SMI who reported receiving mental health services in the past year, 44.7 percent received one type of care (inpatient, outpatient, or prescription medication), 46.2 percent received two types of care, and 9.1 percent received all three types of care (Figure 2.11).

- Among adults aged 18 or older who reported receiving mental health services in the past year, the percentage receiving one type of mental health service (inpatient, outpatient, or prescription medication) was 44.7 percent among adults with past year SMI, 56.5 percent among adults with past year moderate mental illness, and 64.3 percent among adults with past year low (mild) mental illness.

Figure 2.10 Number of Types of Mental Health Services Received among Persons Aged 18 or Older with Past Year Any Mental Illness Who Received Mental Health Services in the Past Year: 2009

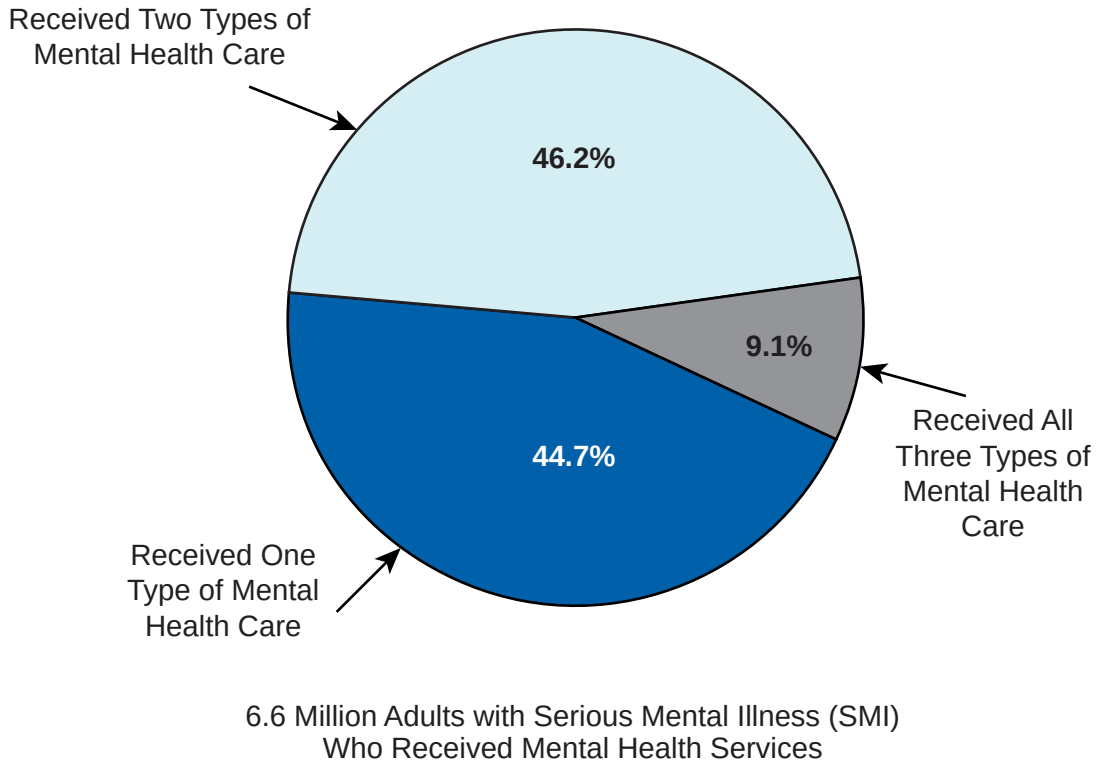


Note: The three types of mental health care are receiving inpatient care, outpatient care, or prescription medication.

- Among adults aged 18 or older who reported receiving prescription medication and either inpatient or outpatient services in the past year, the percentage of mental health service utilization was 45.8 percent among adults with past year SMI, 39.9 percent among adults with past year moderate mental illness, and 33.8 percent among adults with past year low (mild) mental illness.

- In 2009, there were 12.0 million adults aged 18 or older (5.3 percent) who reported an unmet need for mental health care in the past year. These included 6.1 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, 19.6 percent (5.9 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.)

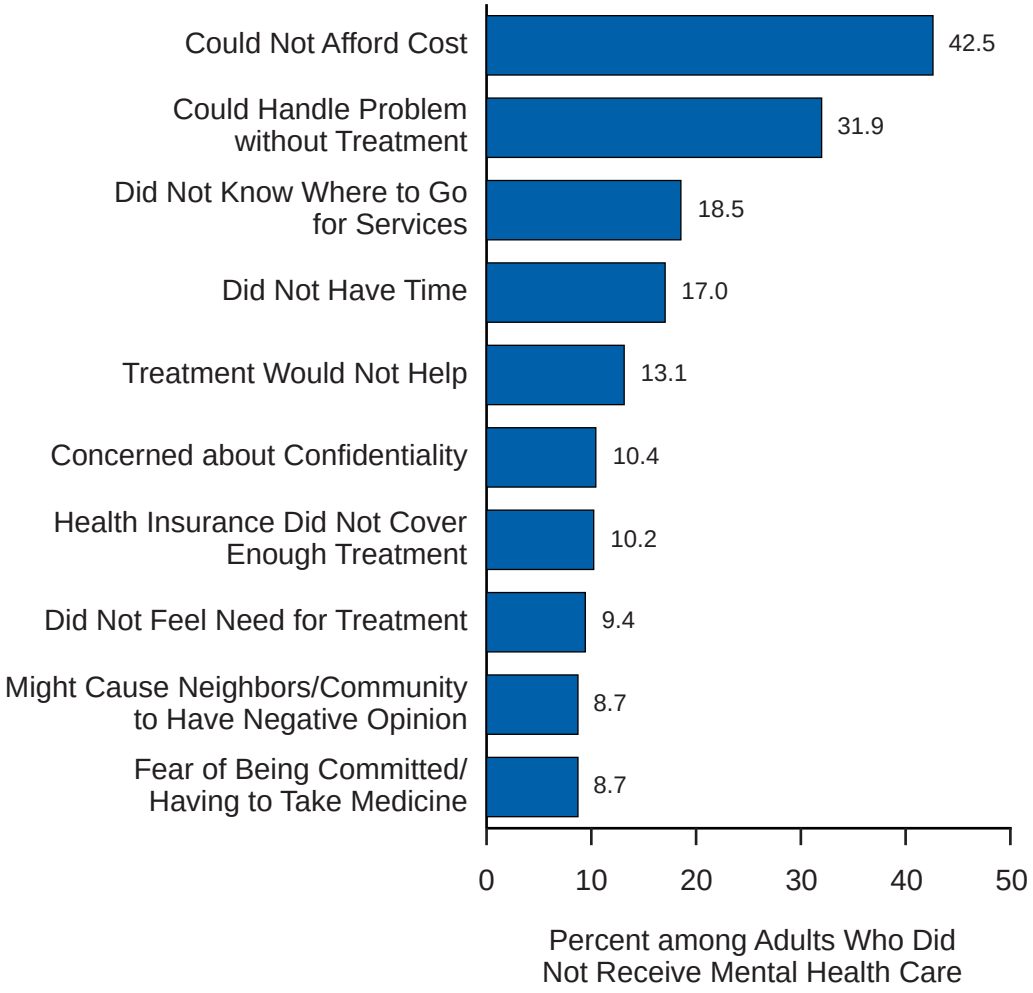
Figure 2.11 Number of Types of Mental Health Services Received among Persons Aged 18 or Older with Past Year Serious Mental Illness Who Received Mental Health Services in the Past Year: 2009



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

- Among the 6.1 million adults aged 18 or older who reported an unmet need for mental health care and did not receive mental health services in the past year, several barriers to care were reported. These included an inability to afford care (42.5 percent), believing at the time that the problem could be handled without care (31.9 percent), not knowing where to go for care (18.5 percent), and not having the time to go for care (17.0 percent) (Figure 2.12).

Figure 2.12 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: 2009



3. 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, and the percentage receiving treatment for depression among youths aged 12 to 17 in the United States. Also reported in this chapter are findings on mental health service utilization among youths.

Major Depressive Episode, 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 has been administered to youths aged 12 to 17 since 2004. Some questions in the adolescent depression module differ slightly from the adult depression module to make them more appropriate for youths as described below. Therefore, these data should not be compared or combined with MDE data for adults.

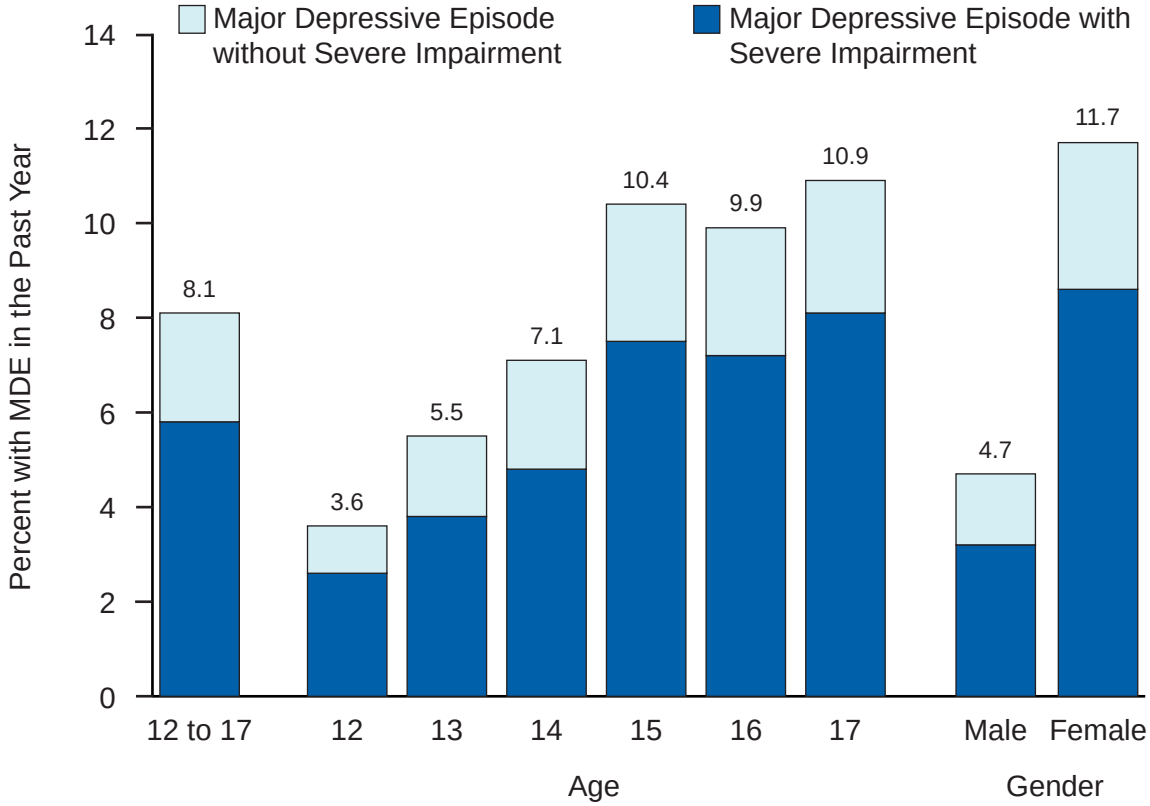
MDE is defined as a period of at least 2 weeks when a person experienced a depressed mood or loss of interest or pleasure in daily activities and had at least four of seven additional symptoms reflecting the criteria as described in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association [APA], 1994). 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. Severe impairment is defined by the level of role interference reported to be caused by MDE in the past 12 months. The role domains for youths aged 12 to 17 are slightly modified to be made age appropriate, but are assessed on the same 0 to 10 scale described for adults. 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. 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 in Appendix B.

- In 2009, there were 2.0 million youths (8.1 percent of the population aged 12 to 17) who had MDE during the past year. This was similar to the percentages in 2005 to 2008 (8.8, 7.9, 8.2, and 8.3 percent, respectively) and lower than the percentage in 2004 (9.0 percent).

- An estimated 1.4 million youths aged 12 to 17 (5.8 percent) had past year MDE with severe impairment in one or more role domains (i.e., chores at home, school or work, close relationships with family, or social life) in 2009.

- Among youths aged 12 to 17 in 2009, past year MDE generally increased with age, from 3.6 percent among 12 year olds to 10.9 percent among those aged 17 (Figure 3.1). Similarly, past year MDE with severe impairment generally increased with age, from 2.6 percent among 12 year olds to 8.1 percent among 17 year olds.

Figure 3.1 Major Depressive Episode in the Past Year among Youths Aged 12 to 17, by Severe Impairment, Age, and Gender: 2009

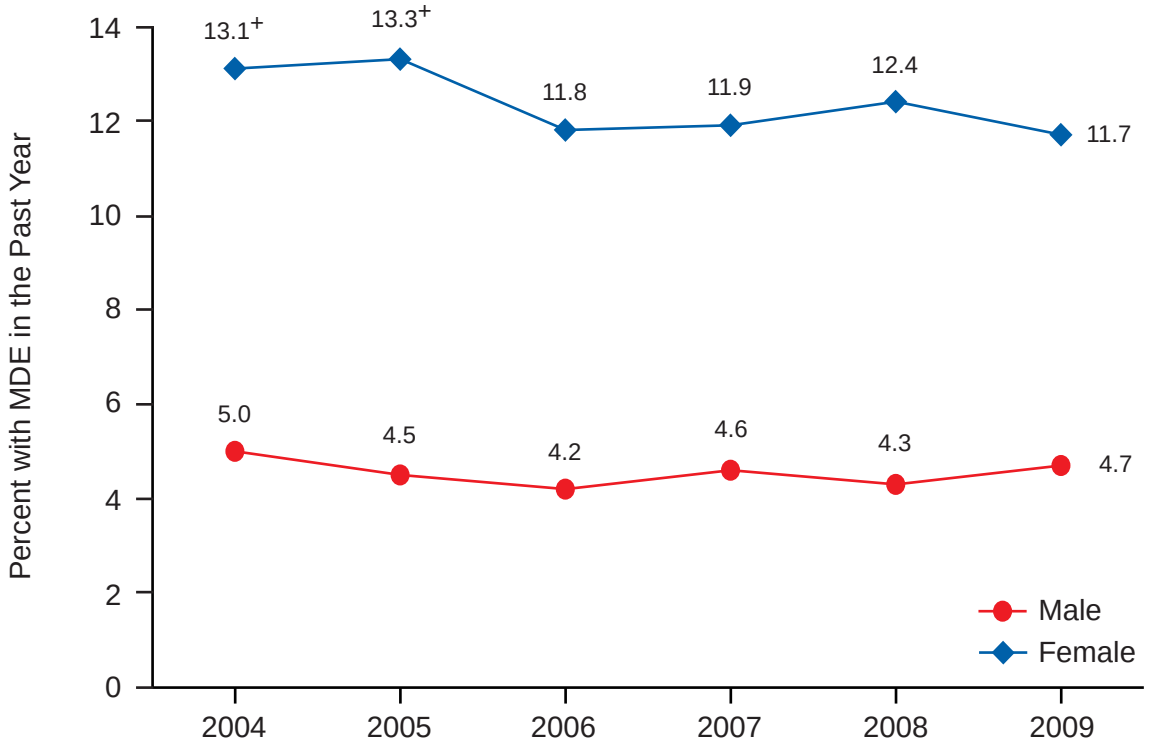


Note: Respondents with an unknown level of impairment were included in the estimates for Major Depressive Episode without Severe Impairment.

- Among youths aged 12 to 17 in 2009, females were more likely than males to have past year MDE and MDE with severe impairment. In 2009, MDE among female youths was 11.7 percent, over 2 times the percentage for male youths in the same age range (4.7 percent) (Figure 3.1). MDE with severe impairment among females was 8.6 percent, which was over 2 times the percentage for males (3.2 percent).

- Between 2004 and 2009, past year MDE was stable among male youths aged 12 to 17 (varying between 4.2 and 5.0 percent). Past year MDE among female youths aged 12 to 17 decreased from 13.1 percent in 2004 to 11.7 percent in 2009 (Figure 3.2).

Figure 3.2 Major Depressive Episode in the Past Year among Youths Aged 12 to 17, by Gender: 2004-2009



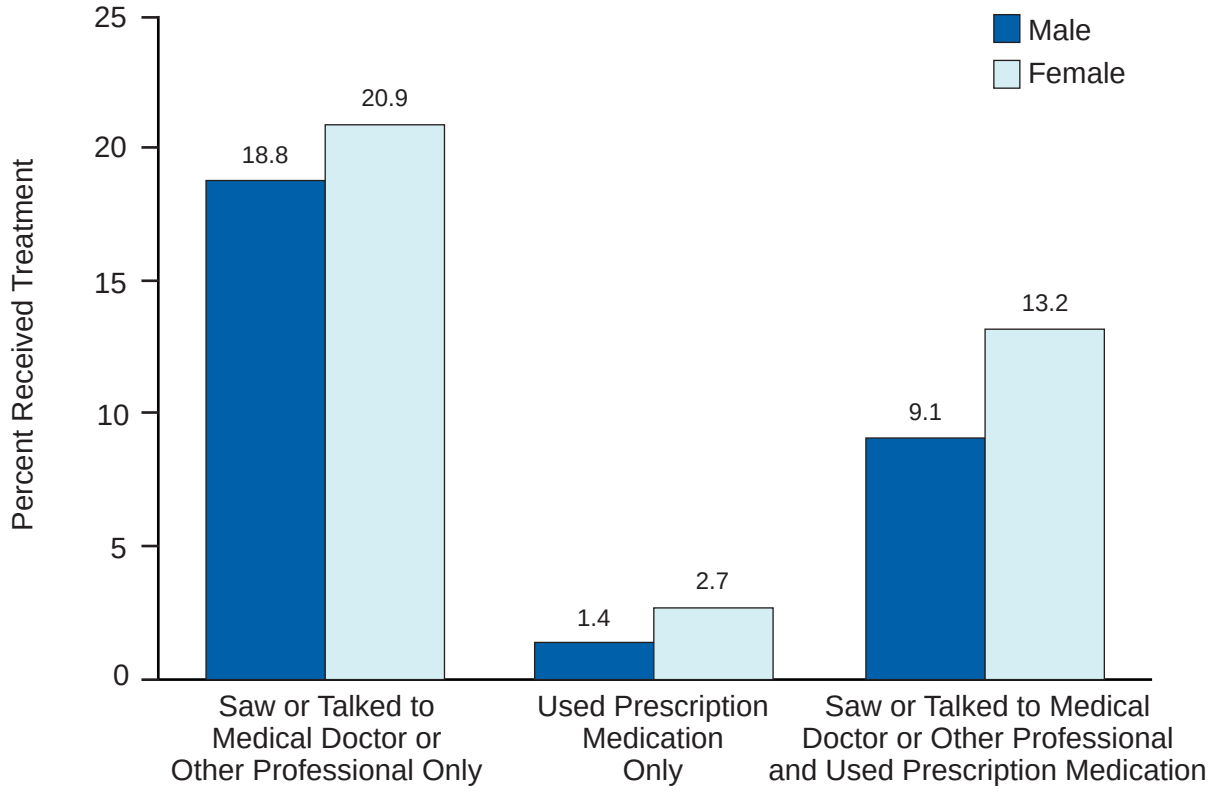
+ Difference between this estimate and the 2009 estimate is statistically significant at the .05 level.

- In 2009, 34.7 percent of youths aged 12 to 17 with past year MDE received treatment for depression (i.e., saw or talked to a medical doctor or other professional or used prescription medication).

- In 2009, among youths aged 12 to 17 with past year MDE, 20.3 percent saw or talked to a medical doctor or other professional only, 2.3 percent used prescription medication only, and 12.0 percent received treatment from both sources for depression in the past year.

- Among male youths aged 12 to 17 with past year MDE, 18.8 percent saw or talked to a medical doctor or other professional only, 1.4 percent used prescription medication only, and 9.1 percent received treatment from both sources for depression in the past year (Figure 3.3). Among female youths with past year MDE, 20.9 percent saw or talked to a medical doctor or other professional only, 2.7 percent used prescription medication only, and 13.2 percent received treatment from both sources for depression in the past year.

Figure 3.3 Type of Treatment Received for Major Depressive Episode in the Past Year among Youths Aged 12 to 17, by Gender: 2009



Mental Health Service Utilization

Initiated in 2000, the mental health service utilization module is asked of respondents regardless of MDE status. In NSDUH, questions designed to assess mental health service utilization asked of youths differ from those asked of adults. In 2009, revisions to the mental health service utilization module included revisions to the sources of youth mental health education services and an added question on mental health service utilization in the juvenile justice setting.

Youths aged 12 to 17 are asked 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; received special education services while in a regular school for students; or placed in a special school or program for students with emotional or behavioral problems); (c) the *general medical setting* (pediatrician or family physician care for emotional or behavior problems); or (d) the *juvenile justice setting*

(detention center, prison, or jail). Furthermore, youths are asked about the number of nights spent in overnight facilities, the number of visits they had to outpatient mental health providers, and the reason(s) for the most recent stay or visit.

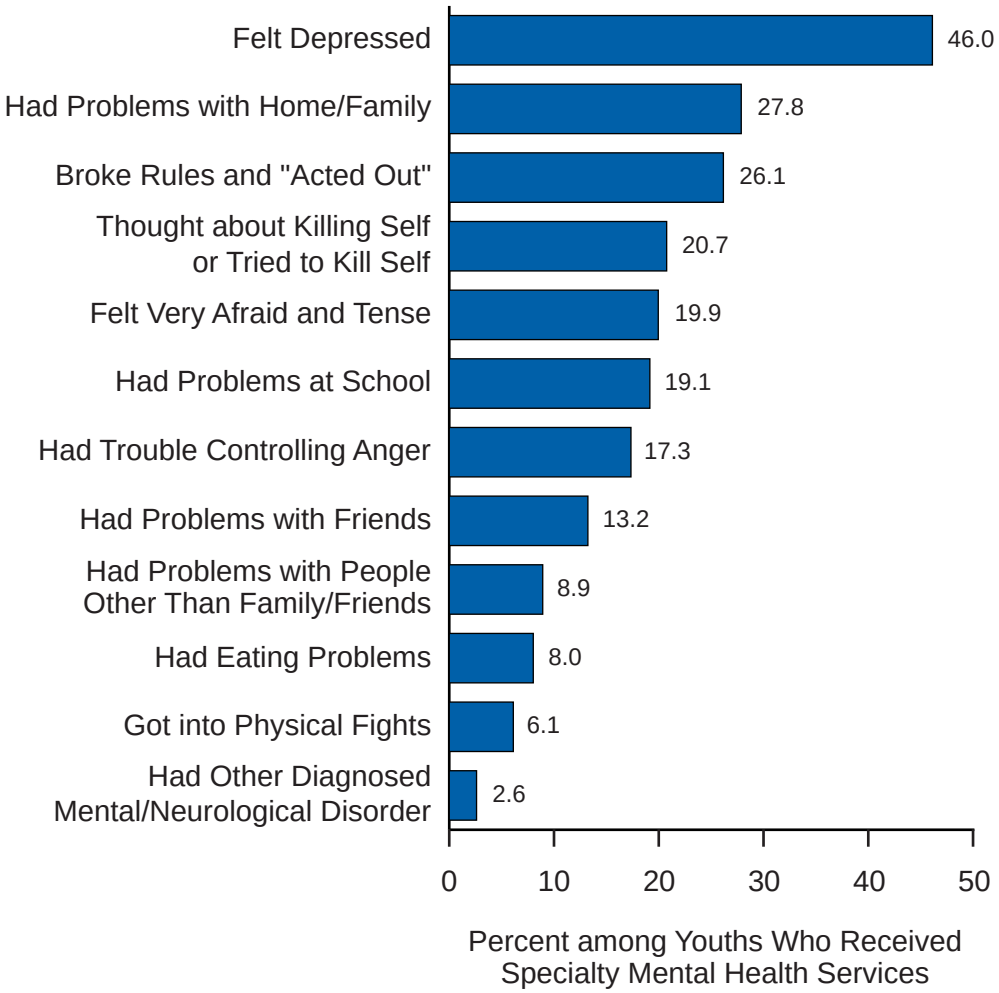
- In 2009, 2.9 million youths aged 12 to 17 (12.0 percent) received treatment or counseling for problems with emotions or behavior in a specialty mental health setting (inpatient or outpatient care). Also, 12.1 percent (2.9 million youths) received mental health services in an education setting, 2.5 percent (603,000 youths) received mental health services in a general medical setting, and 0.4 percent (109,000 youths) received mental health services in a juvenile justice setting in the past 12 months. Mental health services were received in both a specialty setting and either an education or a general medical setting (i.e., care within multiple settings) by 4.9 percent of youths.

- Of the 2.9 million youths aged 12 to 17 who received specialty mental health services, the most likely reason for receiving services was feeling depressed (46.0 percent), followed by having problems with home or family (27.8 percent), breaking rules and "acting out" (26.1 percent), and thinking about or attempting suicide (20.7 percent) (Figure 3.4).

- Among youths aged 12 to 17 who received specialty mental health services in the past year, youths who received inpatient services were more likely to report receiving services due to having thought about or attempted suicide compared with youths who received outpatient services (37.5 vs. 19.3 percent).

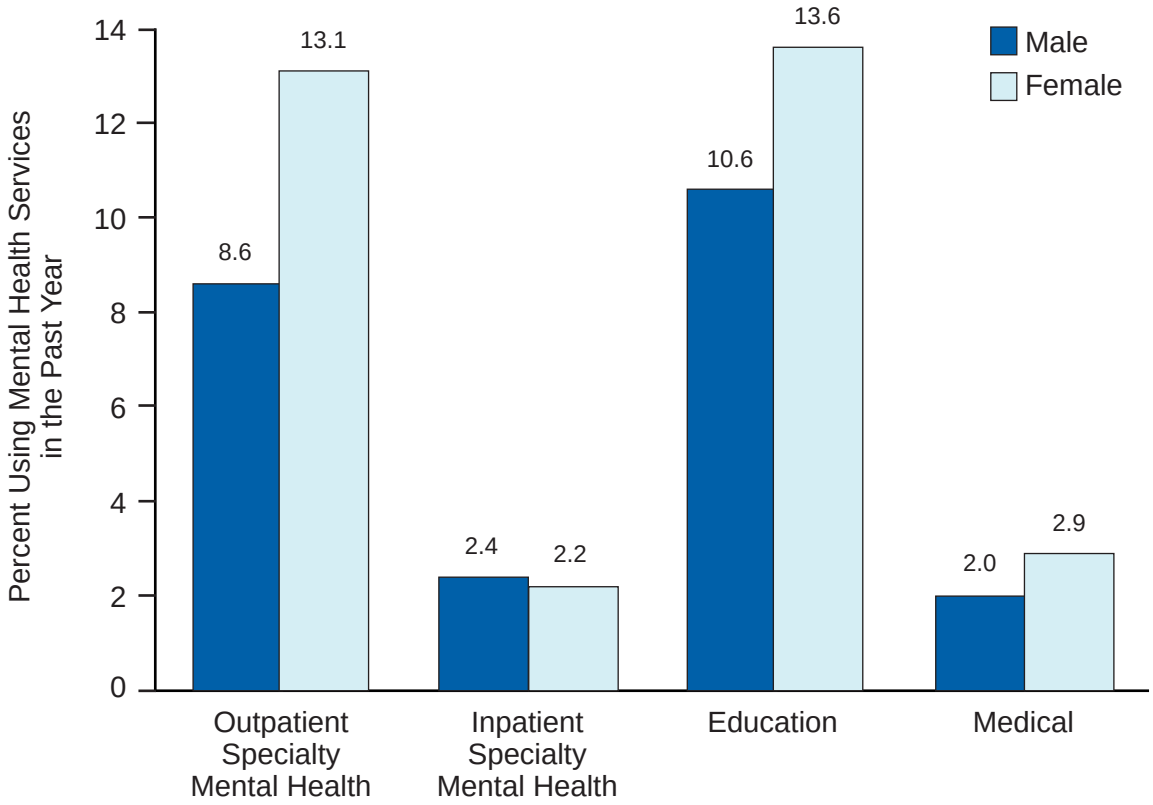
- Of the 2.9 million youths aged 12 to 17 who received mental health services in the education setting, the most likely reason for receiving services was feeling depressed (36.2 percent), followed by breaking rules and "acting out" (24.9 percent), having problems at school (21.1 percent), and having problems with friends (21.0 percent). Among youths who received specialty mental health services in the general medical setting (603,000), the most likely reason for receiving services was feeling depressed (48.0 percent), followed by feeling very afraid or tense (21.3 percent), having thought about or attempted suicide (15.0 percent), breaking rules and "acting out" (14.0 percent), and having problems at school (13.6 percent).

Figure 3.4 Reasons for Receiving Specialty Mental Health Services among Youths Aged 12 to 17 Who Received Mental Health Services in the Past Year: 2009



- Female youths aged 12 to 17 were more likely than male youths to use outpatient specialty mental health services (13.1 vs. 8.6 percent), education services (13.6 vs. 10.6 percent), and general medical-based services (2.9 vs. 2.0 percent), but the use of inpatient specialty mental health care did not differ by gender (Figure 3.5).

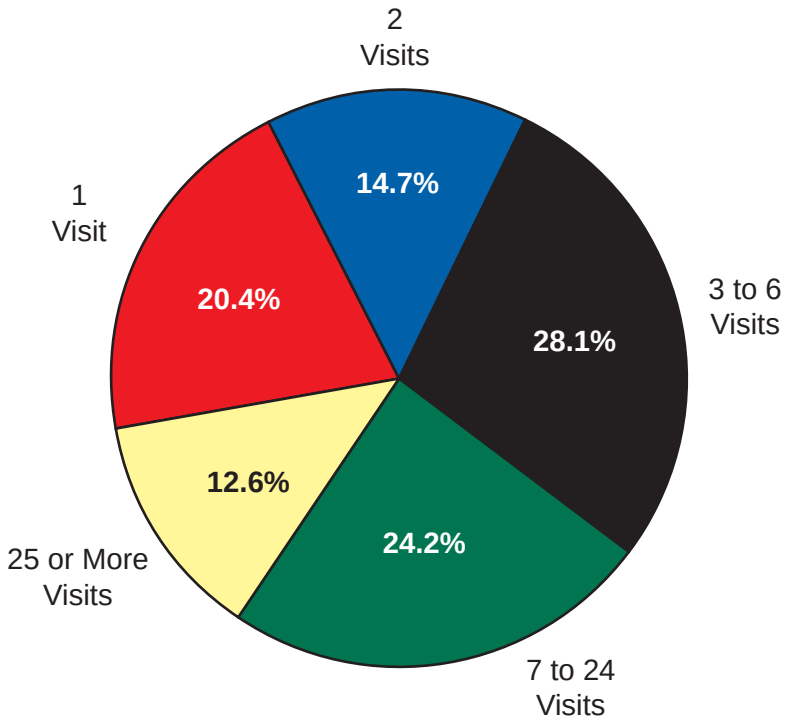
Figure 3.5 Past Year Mental Health Service Use among Youths Aged 12 to 17, by Gender: 2009



- Of the 2.6 million youths aged 12 to 17 who received outpatient specialty mental health services in the past 12 months, 20.4 percent reported having 1 visit, 14.7 percent reported having 2 visits, 28.1 percent reported having 3 to 6 visits, 24.2 percent reported having 7 to 24 visits, and 12.6 percent reported having 25 or more visits (Figure 3.6).

- Of the 565,000 youths aged 12 to 17 who received inpatient or residential specialty mental health services in the past 12 months, about one third (34.0 percent) reported staying overnight 1 night, 33.7 percent reported staying 2 to 6 nights, 17.5 percent reported staying 7 to 24 nights, and 14.7 percent reported staying 25 or more nights.

Figure 3.6 Number of Outpatient Visits in the Past Year among Youths Aged 12 to 17 Who Received Outpatient Specialty Mental Health Services: 2009



2.6 Million Youths Who Received Outpatient Specialty Mental Health Services

4. Co-Occurrence of Mental Illness and Substance Use

This chapter presents findings from the 2009 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; suicidal thoughts, plans, or attempts; 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 [APA], 1994), with or without functional impairment. Functional impairment is the interference with or limitation of one or more major life activities. Any mental illness encompasses mental disorders without regard to functional impairment. Levels of any mental illness 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 (see Chapter 2 for more details and Appendix C for specific definitions of terms used in this report).

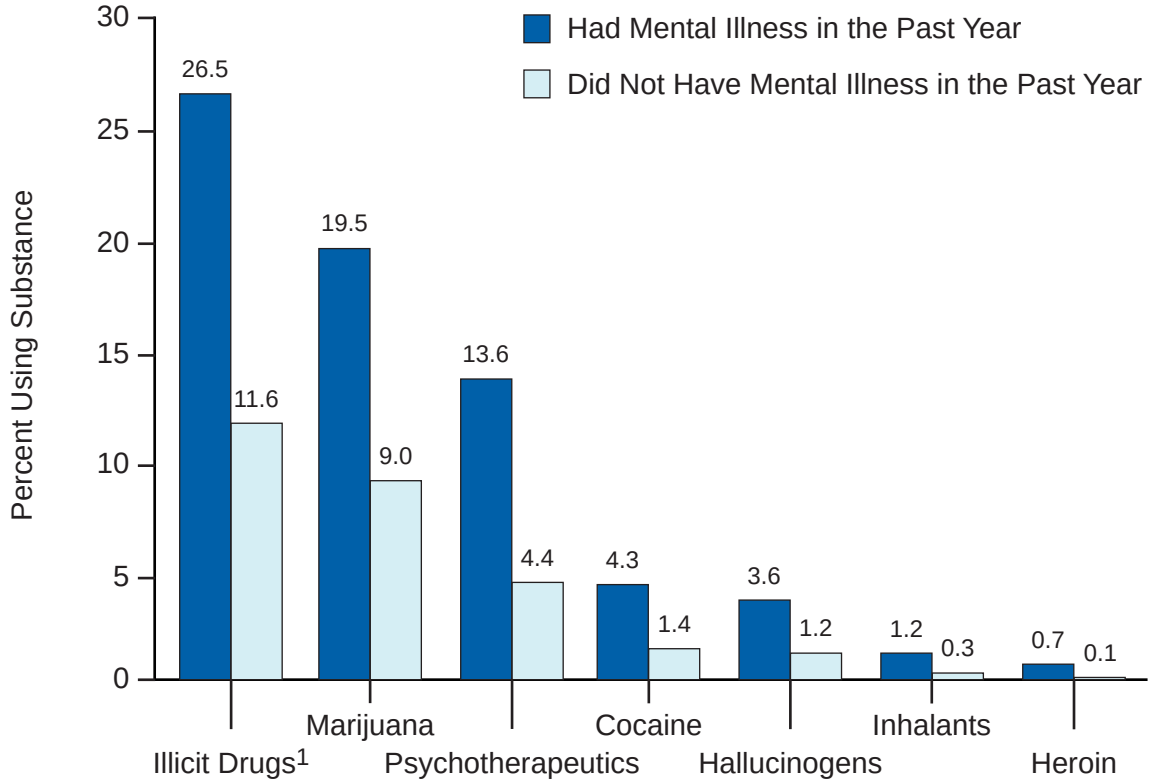
Mental Illness and Substance Use among Adults

- In 2009, the use of illicit drugs in the past year was more likely among adults aged 18 or older with past year any mental illness (26.5 percent) than it was among adults who did not have mental illness in the past year (11.6 percent) (Figure 4.1). 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 any mental illness compared with adults who did not have mental illness (36.9 vs. 21.9 percent).

- Among adults aged 18 or older with any mental illness in the past year, 29.8 percent were binge alcohol users in the past month, which was higher than the percentage of past month binge alcohol users among adults who did not have mental illness in the past year (24.1 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.

Figure 4.1 Past Year Substance Use among Adults Aged 18 or Older, by Any Mental Illness: 2009



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

- Adults aged 18 or older with any mental illness in the past year were more likely than adults who did not have mental illness to have heavy alcohol use in the past month (9.4 vs. 6.8 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. Illicit drug use in the past year among adults aged 18 or older was highest among adults with past year SMI (31.3 percent), followed by adults with moderate mental illness (29.6 percent), those with low (mild) mental illness (23.2 percent), then by those who did not have past year mental illness (11.6 percent).

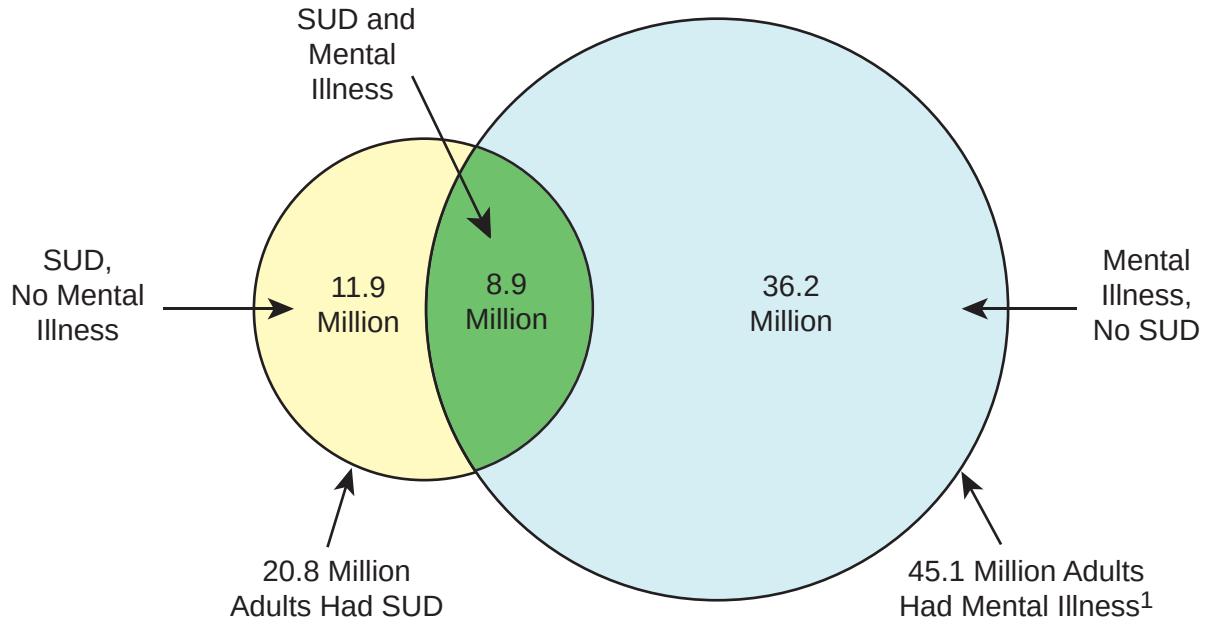
- Adults aged 18 or older with SMI were more than twice as likely as those who did not have mental illness in the past year to be past month cigarette users (47.0 vs. 21.9 percent).

- Adults aged 18 or older with SMI in 2009 were more likely to have past month binge alcohol use or heavy alcohol use compared with adults who did not have mental illness in the past year. An estimated 29.4 percent of adults with SMI had past month binge alcohol use compared with 24.1 percent of adults who did not have mental illness. The percentage having heavy alcohol use in the past month among adults with SMI was 9.9 percent compared with 6.8 percent among adults without mental illness.

Mental Illness and Substance Use Disorder among Adults

- Among the 20.8 million adults with a past year substance use disorder, 42.8 percent (8.9 million adults) had a co-occurring mental illness in 2009 (Figure 4.2). In comparison, among adults without a substance use disorder, 17.6 percent had any mental illness.

Figure 4.2 Past Year Substance Dependence or Abuse and Mental Illness among Adults Aged 18 or Older: 2009



SUD = substance use disorder.

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

- Among the 45.1 million adults aged 18 or older with any mental illness in the past year, 19.7 percent (8.9 million adults) met criteria for substance dependence or abuse in that period compared with 6.5 percent (11.9 million adults) who did not have mental illness in the past year.

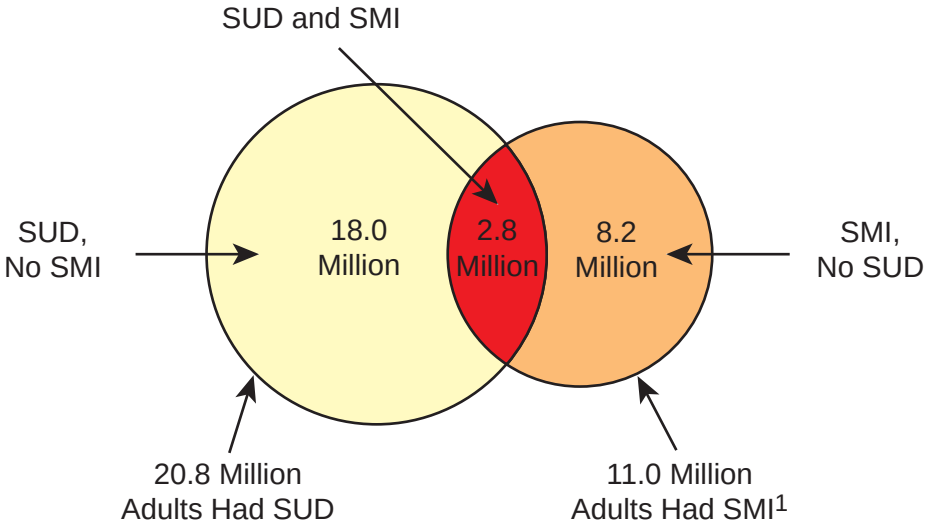
- Among adults aged 18 or older with any mental illness in the past year, the percentage meeting criteria for substance dependence or abuse was highest among adults with any mental illness who were aged 18 to 25 (31.6 percent), followed by adults aged 26 to 49 (20.8 percent), then by adults aged 50 or older (8.5 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 (25.1 percent), then by those aged 50 or older (13.8 percent).

- Among the 20.8 million adults aged 18 or older with a past year substance use disorder, 13.5 percent (2.8 million adults) also had SMI (Figure 4.3).

- Among the 11.0 million adults aged 18 or older with SMI in the past year, 25.7 percent also had past year substance dependence or abuse compared with 21.3 percent of adults with moderate mental illness, 16.5 percent of adults with low (mild) mental illness, and 6.5 percent of adults who did not have mental illness (Figure 4.4).

- In 2009, 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 9.1 percent of adults with moderate mental illness, 5.5 percent of adults with low (mild) mental illness, and 1.4 percent of adults who did not have mental illness (Figure 4.5).

Figure 4.3 Past Year Substance Dependence or Abuse and Serious Mental Illness among Adults Aged 18 or Older: 2009



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

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

Figure 4.4 Past Year Substance Dependence or Abuse among Adults Aged 18 or Older, by Level of Mental Illness: 2009

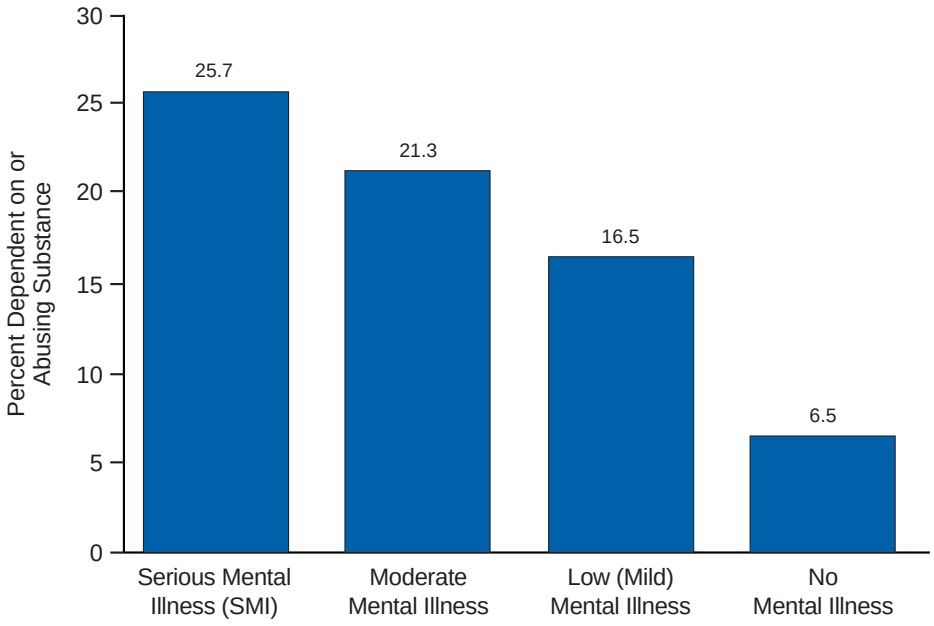
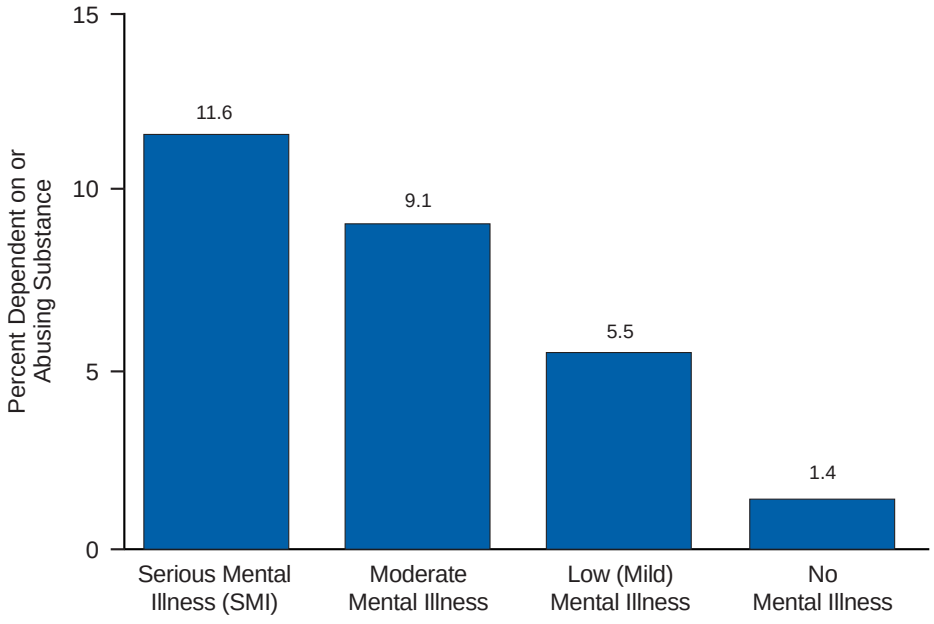
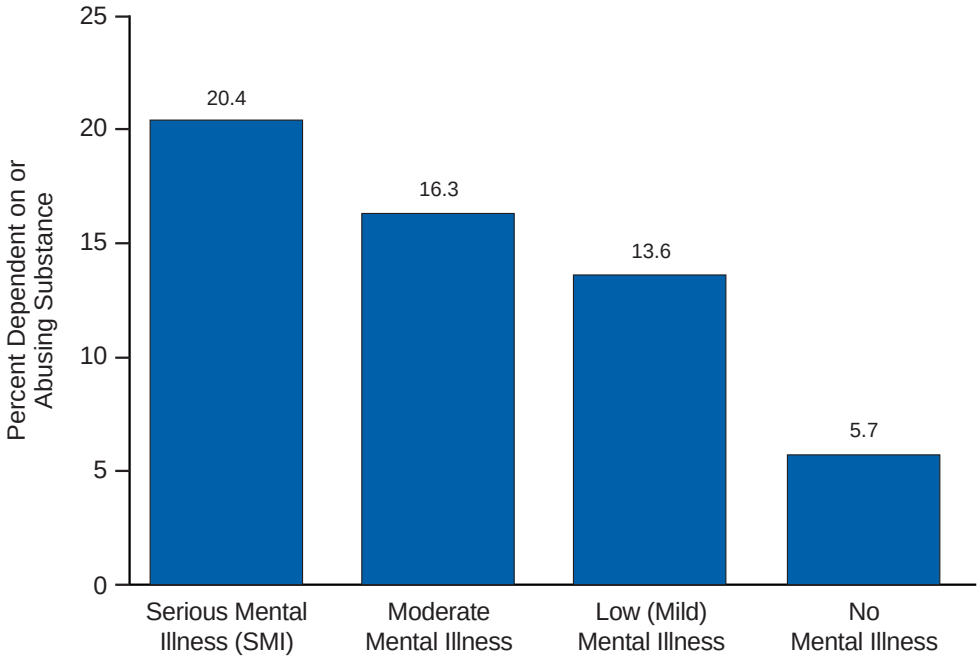


Figure 4.5 Past Year Illicit Drug Dependence or Abuse among Adults Aged 18 or Older, by Level of Mental Illness: 2009



- Among adults aged 18 or older with SMI in the past year, 20.4 percent also had past year alcohol dependence or abuse compared with 16.3 percent of adults with moderate mental illness, 13.6 percent of adults with low (mild) mental illness, and 5.7 percent of adults who did not have mental illness (Figure 4.6).

Figure 4.6 Past Year Alcohol Dependence or Abuse among Adults Aged 18 or Older, by Level of Mental Illness: 2009

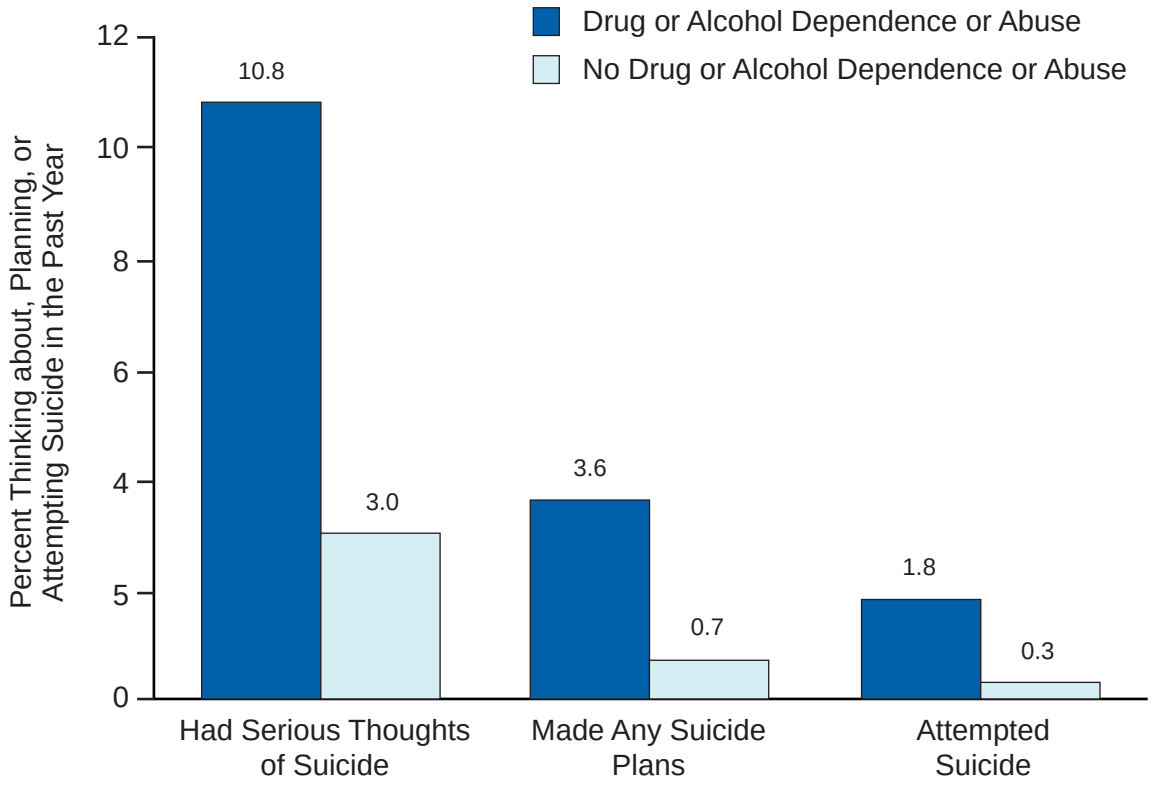


Serious Thoughts, Plans, and Attempts of Suicide and Substance Use Disorder among Adults

- In 2009, 2.2 million adults aged 18 or older with past year illicit drug or alcohol dependence or abuse had serious thoughts of suicide in the past year (10.8 percent of adults with a substance use disorder) (Figure 4.7).

- Adults aged 18 or older with past year illicit drug or alcohol dependence or abuse were more likely than those without past year illicit drug or alcohol dependence or abuse to have had serious thoughts about suicide in the past year (10.8 vs. 3.0 percent) (Figure 4.7). Adults with past year substance dependence or abuse also were more likely to make suicide plans compared with adults without substance dependence or abuse (3.6 vs. 0.7 percent) and were more likely to attempt suicide compared with adults without substance dependence or abuse (1.8 vs. 0.3 percent).

Figure 4.7 Suicide Thoughts, Plans, and Attempts in the Past Year among Adults Aged 18 or Older, by Substance Dependence or Abuse: 2009



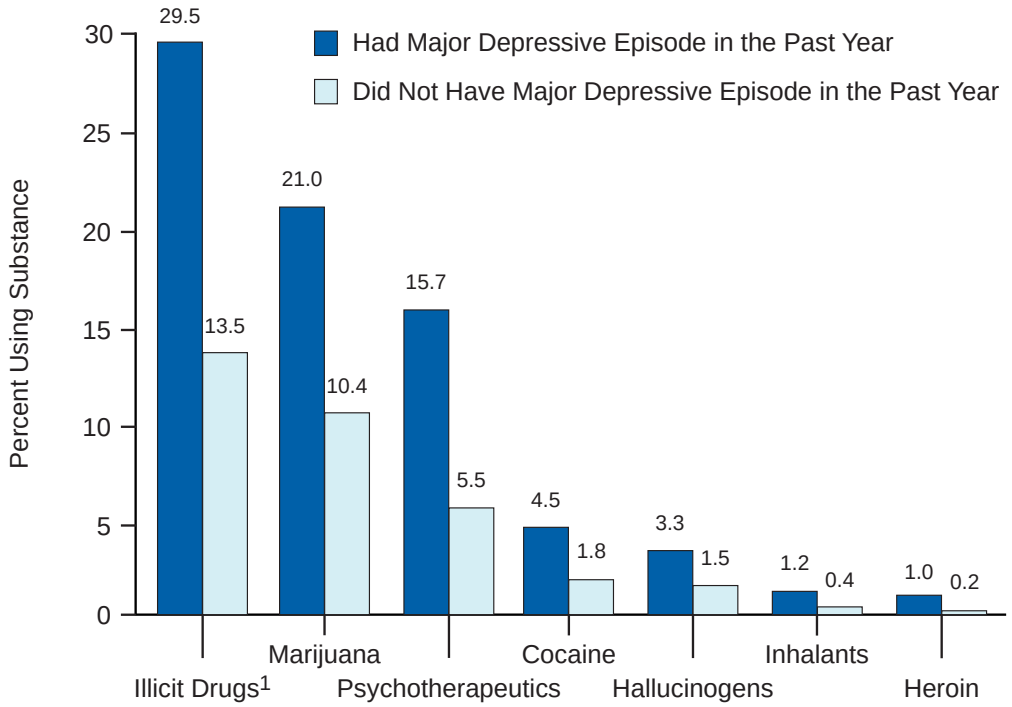
- Among adults aged 18 or older in 2009, those who had co-occurring SMI and substance dependence or abuse in the past year were more likely to have made suicide plans than were adults with SMI alone (15.8 vs. 10.2 percent). Similarly, adults with co-occurring SMI and substance dependence or abuse were more than twice as likely as those with SMI but no substance use disorders to have attempted suicide in the past year (8.4 vs. 3.9 percent).

- In 2009, the percentage of adults aged 18 or older with substance dependence or abuse who attempted suicide differed by level of mental illness. Among adults with substance dependence or abuse in the past year, 8.4 percent attempted suicide compared with 3.3 percent of adults with moderate mental illness, 1.5 percent with low (mild) mental illness, and 0.2 percent with no mental illness.

Major Depressive Episode and Substance Use among Adults

- In 2009, 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 (29.5 vs. 13.5 percent) (Figure 4.8). 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.

Figure 4.8 Past Year Substance Use among Adults Aged 18 or Older, by Major Depressive Episode in the Past Year: 2009



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

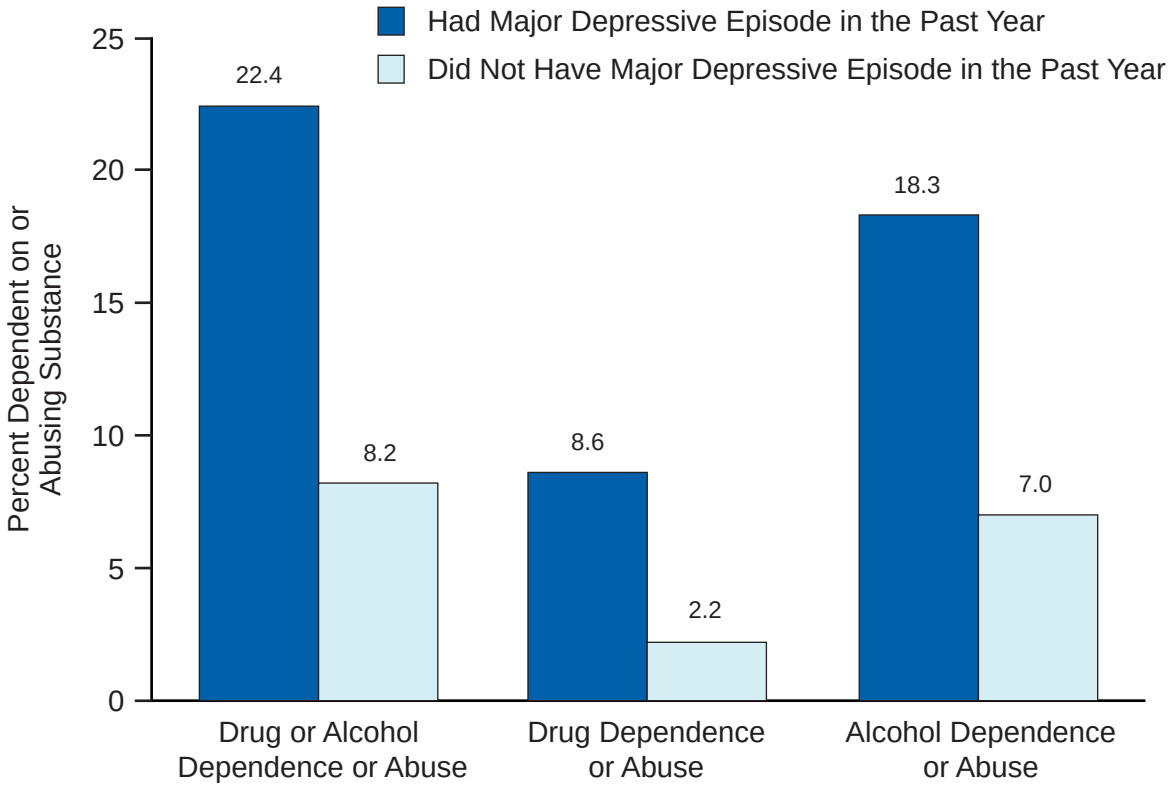
- Among adults aged 18 older with MDE in the past year, 9.2 percent were heavy alcohol users in the past month compared with 7.2 percent among adults without MDE in the past year.

- The percentage using cigarettes daily in the past month among adults aged 18 or older with past year MDE was 25.6 percent. Among adults without past year MDE, 14.8 percent were daily cigarette users.

Major Depressive Episode and Substance Use Disorder among Adults

- In 2009, 3.3 million adults aged 18 or older (22.4 percent) with past year substance dependence or abuse had MDE in the same period (Figure 4.9). Among adults with past year substance dependence, 16.4 percent (2.4 million adults) also had MDE in the past year.

Figure 4.9 Past Year Substance Dependence or Abuse among Adults Aged 18 or Older, by Major Depressive Episode in the Past Year: 2009



- Adults aged 18 or older who had MDE in the past year were more likely to have co-occurring substance dependence or abuse compared with adults who did not have past year MDE (Figure 4.9). Among adults in 2009 who had MDE in the past year, 22.4 percent also were dependent on or abused alcohol or illicit drugs in that same period. In comparison, 8.2 percent of adults without MDE in the past year were dependent on or abused alcohol or illicit drugs.

- Among adults aged 18 or older who had MDE in the past year, the percentage meeting criteria for illicit drug dependence or abuse was 8.6 percent compared with 2.2 percent among adults without MDE in the past year. Also, the percentage meeting criteria for alcohol dependence or abuse in the past year was 18.3 percent among adults with MDE in the past year compared with 7.0 percent among adults without MDE in the past year.

- In 2009, adults aged 18 or older with past year MDE were more likely than adults without past year MDE to meet criteria for dependence on illicit drugs (6.9 vs. 1.5 percent), dependence on alcohol (11.9 vs. 3.1 percent), and dependence on 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 8.9 million adults aged 18 or older who had any mental illness in the past year and a past year substance use disorder, 44.2 percent received substance use treatment at a specialty facility or mental health treatment in the past year (Figure 4.10). Included in the 44.2 percent are 7.4 percent who received both mental health treatment and specialty substance use treatment, 32.9 percent who received only mental health treatment, and 3.8 percent who received only specialty substance use treatment. 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.

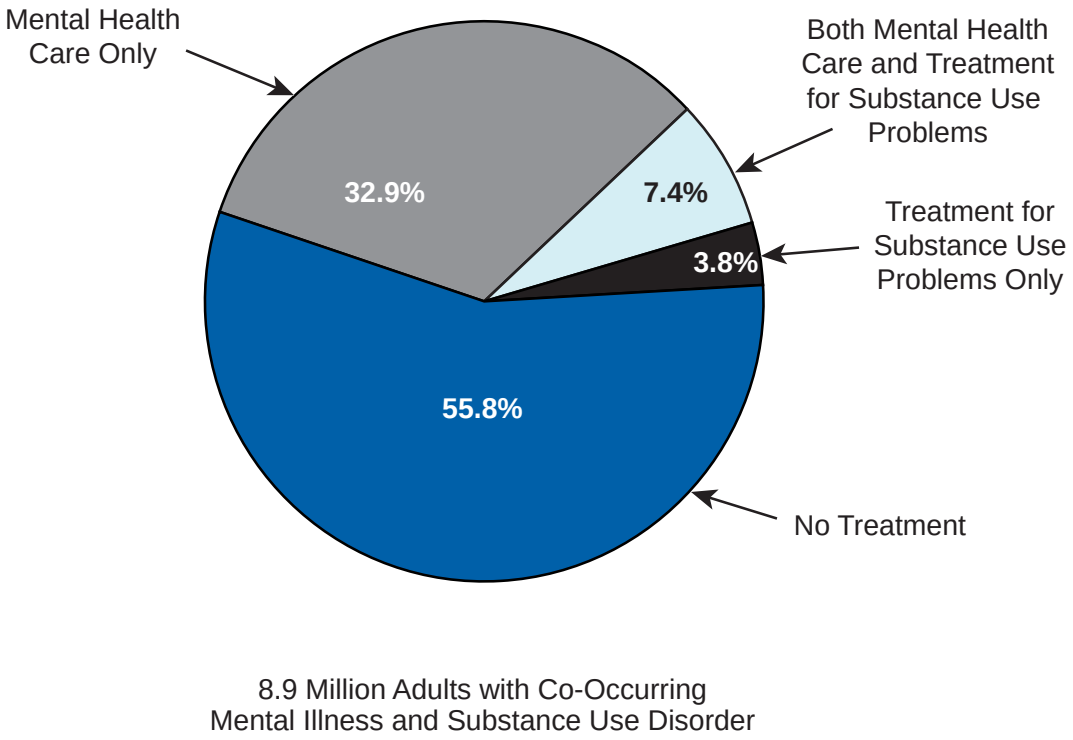
- Among the 2.8 million adults aged 18 or older in 2009 with both SMI and substance dependence or abuse in the past year, 62.4 percent received substance use treatment at a specialty facility or mental health treatment in that period (Figure 4.11). Included in the 62.4 percent are 13.5 percent who received both mental health treatment and specialty substance use treatment, 47.3 percent who received mental health treatment only, and 1.6 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 (62.4 percent) compared with their counterparts who had moderate mental illness (39.5 percent), low (mild) mental illness (34.1 percent), or no mental illness in the past year (14.8 percent).

Major Depressive Episode and Substance Use among Youths

- Among youths aged 12 to 17 in 2009 who had past year MDE, 35.7 percent used illicit drugs in the past year (Figure 4.12) compared with 18.0 percent of youths who did not have past year MDE. This pattern was similar for most specific types of illicit drug use, including the use of marijuana, inhalants, hallucinogens, cocaine, or heroin and the nonmedical use of prescription-type psychotherapeutics.

Figure 4.10 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: 2009

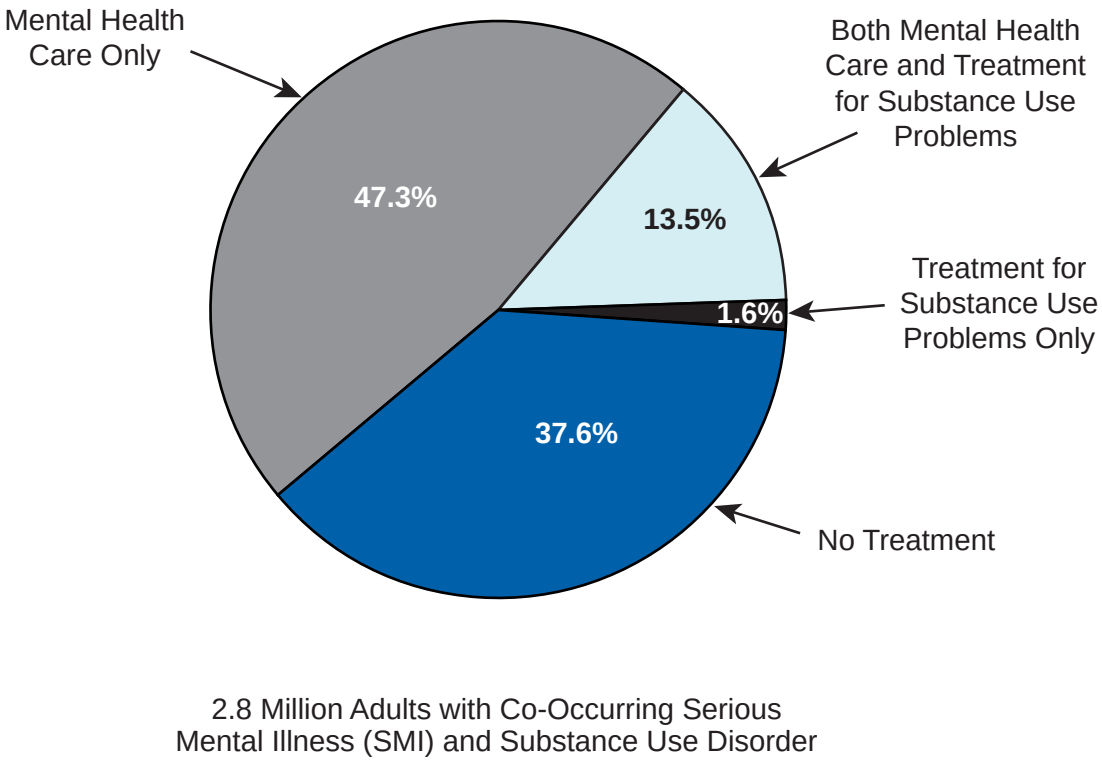


Note: Mental health care is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Treatment for substance use problems refers to treatment at a hospital (inpatient), rehabilitation facility (inpatient 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.

- In 2009, 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 (3.6 vs. 1.9 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 (4.2 vs. 1.9 percent).

Figure 4.11 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: 2009



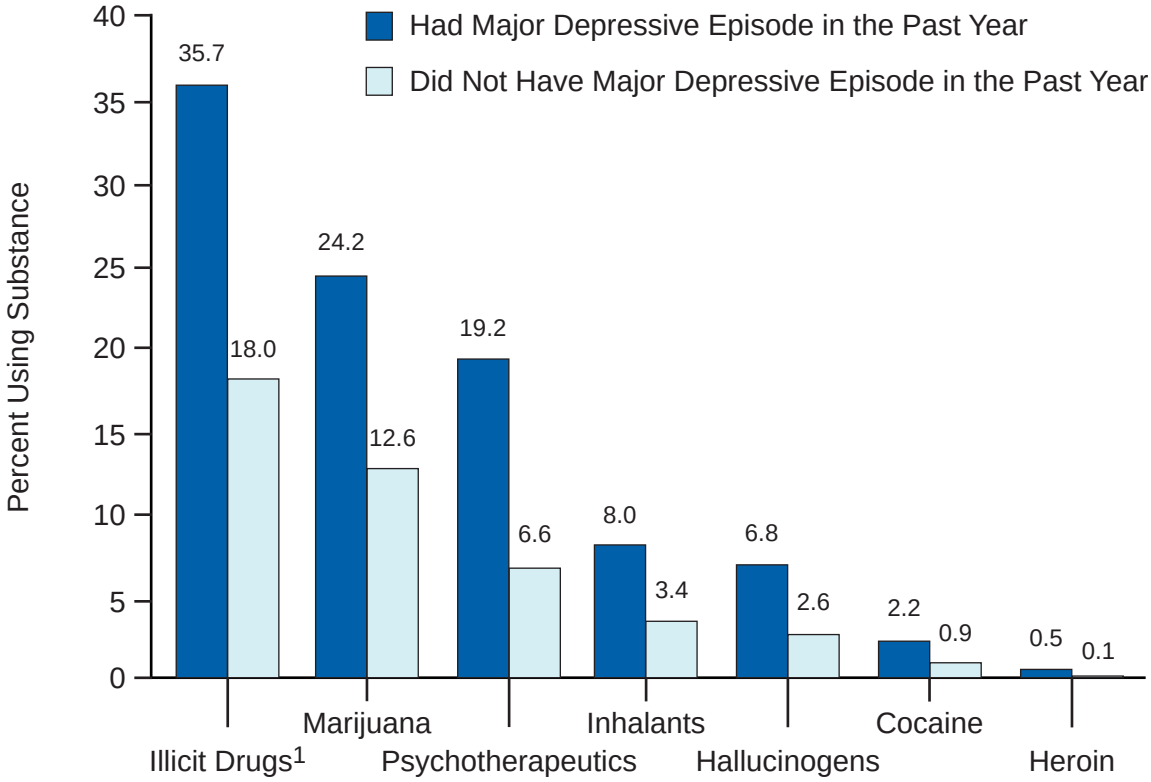
Note: Mental health care is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Treatment for substance use problems refers to treatment at a hospital (inpatient), rehabilitation facility (inpatient 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.

Major Depressive Episode and Substance Use Disorder among Youths

- In 2009, 18.9 percent of youths aged 12 to 17 (368,000 youths) with substance dependence or abuse in the past year also had past year MDE (Figure 4.13). The prevalence of past year MDE among youths with past year substance dependence was 12.2 percent (237,000 youths).

- Youths aged 12 to 17 with MDE in the past year were more likely than those without MDE to have a co-occurring substance use disorder in the past year (18.9 vs. 6.0 percent).

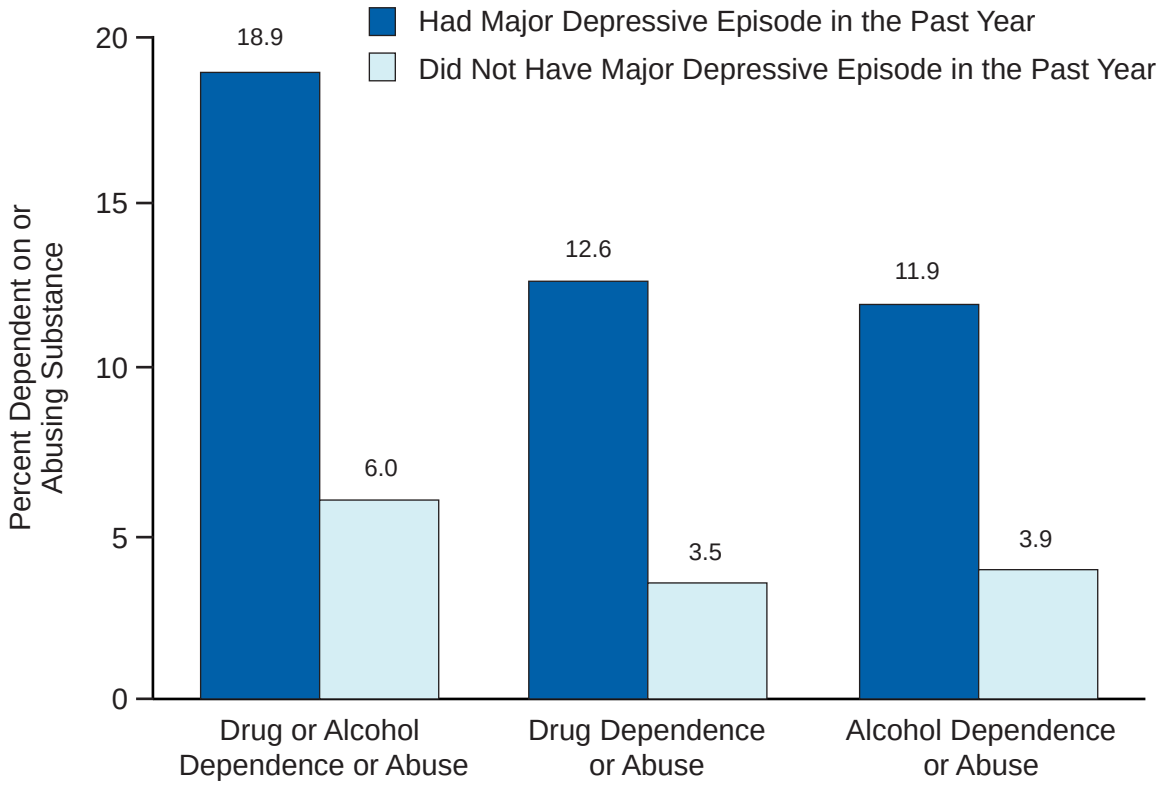
Figure 4.12 Past Year Substance Use among Youths Aged 12 to 17, by Major Depressive Episode in the Past Year: 2009



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

- Youths aged 12 to 17 with past year MDE were more likely than those without past year MDE to be dependent on illicit drugs (8.4 vs. 1.8 percent), dependent on alcohol (6.5 vs. 1.5 percent), or dependent on both illicit drugs and alcohol (2.7 vs. 0.4 percent).

Figure 4.13 Past Year Substance Dependence or Abuse among Youths Aged 12 to 17, by Major Depressive Episode in the Past Year: 2009



5. Discussion

This chapter provides a discussion of the mental health estimates from the National Survey on Drug Use and Health (NSDUH), including the limitations of the methodology used, how NSDUH estimates compare with those from other studies, and future plans for producing estimates of mental illness from the survey.

Comparison of Mental Health Estimates between NSDUH and Other Surveys

An important step in the analysis and interpretation of NSDUH or any other survey data is to compare the results with those from other data sources. This can be difficult because other surveys typically have different purposes and therefore different sampling designs, modes of data collection, measures, and estimation methods. Research has established that surveys of substance use, mental disorders, and other sensitive topics often produce inconsistent results because of the different methods used. Thus, it is important to understand that conflicting estimates often reflect differing methodologies, not incorrect results. Despite this limitation, comparisons can be very useful. Consistency across surveys can confirm or support conclusions about prevalence and trends in mental disorders, and inconsistent results can point to areas for further study.

In addition to NSDUH, several other large-scale population surveys collect data on mental health problems. Appendix E summarizes the major studies that produce estimates of the prevalence of mental disorders. Comparisons with NSDUH are difficult because of the different measures used by the various studies, but the National Comorbidity Survey Replication (NCS-R) has produced estimates of several of the same measures that NSDUH now produces. Despite the difference in time frames between the two studies (the NCS-R was conducted in 2001-2003), it is useful to compare the data and methods between the two surveys.

Estimates of selected mental health measures from NSDUH and the NCS-R are shown in Table 5.1. A number of methodological differences between the surveys may affect the estimates produced from each survey. In addition to the different years in which data were collected, a major difference is the mode of data collection. Although both surveys collected data face-to-face in respondents' homes, NCS-R data were collected using interviewer-administered questionnaires, while NSDUH employs self-administration. Research has shown that self-administration in most cases results in higher reporting of sensitive behaviors. Another important difference is the estimation method for serious mental illness (SMI) and any mental illness. The NSDUH estimates for SMI and any mental illness are based on responses to brief screeners (a measure of psychological distress in combination with a measure of functional impairment) that are combined in a statistical model that predicts SMI and any mental illness based on linking the screener data with data from a subsample of in-depth, structured clinical interviews conducted by clinical interviewers. 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. For example, an estimate of "any disorder" may be obtained from the NCS-R data and is defined similarly to estimates of any mental illness produced using NSDUH data. Published estimates of

Table 5.1. Estimates of Mental Health Measures for NSDUH and the NCS-R among Adults Aged 18 or Older: Percentages

Measure	NSDUH (2009)[1]	NCS-R (2001-2003)[2]
Past Year Serious Mental Illness	4.8	5.8[a]
Past Year Any Mental Illness	19.9	24.8[b]
Past Year Major Depressive Episode	6.5	7.6[b]
Past Year Suicidality		
Ideation	3.7	2.6[b]
Plans	1.0	0.7[b]
Attempts	0.5	0.4

NCS-R = National Comorbidity Survey Replication; NSDUH = National Survey on Drug Use and Health.

NOTE: Because of variations in method, measures, or mode, caution should be taken in interpreting differences between the estimates from NSDUH and the NCS-R.

[a] The standard error for the estimate of past year serious mental illness was not available. Therefore, the difference between the NSDUH estimate and the NCS-R estimate could not be tested.

[b] The difference between the NSDUH estimate and the NCS-R estimate is statistically significant at the .05 level.

[1] NSDUH data are from SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2009.

[2] NCS-R data on past year serious mental illness are from Kessler et al. (2006). NCS-R data on past year any mental illness are from Druss et al. (2009). NCS-R data on past year major depressive episode are from Kessler et al. (2003b). NCS-R data on past year suicidality are from Borges et al. (2006).

any disorder that used NCS-R data have included persons with substance use disorders (Kessler et al., 2006), whereas estimates of any mental illness produced by the Substance Abuse and Mental Health Services Administration (SAMHSA) using NSDUH data exclude persons with substance use disorders. One published estimate of any mental illness that used data from the NCS-R was 26.2 percent. This estimate included any respondent who had one or more of the following past 12-month disorders: anxiety, mood, intermittent explosive, or substance use disorder (Kessler et al., 2006). When excluding respondents with substance use disorders that do not have a co-occurring mental disorder, the estimate reduces to 24.8 percent (Druss et al., 2009; Kessler et al., 2006). Although the NCS-R estimate of the presence of mental disorders other than substance use disorders was greater than the NSDUH estimate of any mental illness, the NCS-R included disorders that were not assessed in the subsample of NSDUH adults who received clinical interviews. Furthermore, several estimates of SMI have been published with the NCS-R data that have used various operational definitions (Kessler et al., 2006) and that differ from SAMHSA's operational definition of SMI. As shown in Table 5.1, estimates of SMI and any mental illness were higher in the NCS-R than in NSDUH, although comparisons of the SMI estimates could not be tested because of incomplete information about the properties of the NCS-R measure of SMI.

Various methodological differences between NSDUH and the NCS-R also may affect estimates of major depressive episode (MDE). Although the questions used to develop MDE estimates from NSDUH are based on the questions used in the NCS-R, slight revisions were made to the questions. For example, all of the NCS-R respondents were asked about MDE in the past year, whereas the NSDUH respondents were asked about MDE in the past year only if they indicated that at some point in their life they had a period of time lasting 2 weeks or longer when

they felt sad, empty, or depressed for most of the day. As Table 5.1 shows, the NCS-R estimate of MDE was higher than the NSDUH estimate.

Both NSDUH and the NCS-R include items that may be used to estimate past year suicidal thoughts, plans, and attempts (Kessler, Berglund, Borges, Nock, & Wang, 2005a). The statistically significant higher percentages of suicidal ideation and planning in NSDUH compared with those in the NCS-R (see Table 5.1) could reflect the variation in the suicide items in each survey. The NCS-R measures of past year suicidal thoughts and behaviors require two responses: Questions about the recency of suicidal thoughts and behaviors required to determine a past year prevalence were asked only of those who reported lifetime suicidal thoughts and behaviors. NSDUH, on the other hand, requires only a single response: The full sample was asked about past year suicidal thoughts and behaviors. Estimates of suicide attempts from the two surveys were not statistically different.

Past, Present, and Future Estimation of Mental Health Measures in NSDUH

In response to Public Law No. 102-321, the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) Reorganization Act of 1992, SAMHSA defined SMI for persons aged 18 or older as those 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 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. Using this definition, the Mental Health Surveillance Study (MHSS) was initiated in conjunction with the 2008 NSDUH to provide annual, accurate estimates of SMI among adults 18 years or older in the United States.

Because of the limitations on interview time in NSDUH and multiple data needs, it is not possible to conduct a structured diagnostic interview in its entirety to assess mental illness or SMI on approximately 45,000 adult respondents each year. Therefore, the approach adopted by SAMHSA is to utilize short scales in the questionnaire that measure psychological distress and functional impairment and that accurately predict whether or not a respondent has a mental disorder or SMI. Prediction models are developed using a subsample of NSDUH respondents who have completed the NSDUH interview and are administered a gold-standard diagnostic interview, the Structured Clinical Interview for the DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP) (First et al., 2002), which was adapted for NSDUH, and a gold-standard measure of functional impairment, the Global Assessment of Functioning (GAF) (Endicott, Spitzer, Fleiss, & Cohen, 1976). Both the SCID-I/NP and GAF are administered by trained mental health clinicians via paper and pencil over the telephone. The primary goal of the MHSS is to produce SMI estimates that are accurate and precise and that use similar methodologies such that it is possible to examine trends over time. A secondary goal is to produce consistent measures of any mental illness, defined similarly to SMI with respect to diagnosable disorders, regardless of the level of functional impairment.

In 2008, brief scales of psychological distress and functional impairment were administered to the full NSDUH sample. All adult NSDUH respondents were administered the measure of psychological distress, the Kessler-6 (K6) scale (Kessler et al., 2003a). To assess the

performance of the two functional impairment scales, a split-sample design was incorporated into the 2008 NSDUH in which a random half of the sample received an abbreviated version of the World Health Organization Disability Assessment Schedule (WHODAS; Novak, Colpe, Barker, & Gfroerer, 2010; Rehm et al., 1999) and the other half received the Sheehan Disability Scale (SDS; Leon, Olfson, Portera, Farber, & Sheehan, 1997). Also, a subsample consisting of approximately 1,500 adult NSDUH respondents was recruited for the follow-up clinical interview. The randomization of the functional impairment scales was maintained within this subsample, referred to as the MHSS sample, so that about half of the MHSS sample participants (approximately 750) were administered the WHODAS scale and half were administered the SDS. Statistical models then were developed to produce predicted probabilities of SMI by using the brief scales (either the K6 and WHODAS scales or the K6 scale and the SDS) as predictors of SMI determined using the SCID-I/NP and GAF data collected from the MHSS subsample. The model estimates then were retained to produce a predicted probability of SMI for each adult in the NSDUH full sample (for more details, see Section B.4.3 in Appendix B). These predicted probabilities were dichotomized using a cut point to produce estimates of SMI in the full NSDUH sample. The overall conclusion from the analysis of 2008 NSDUH data for the full 12 months of data collection was that, when added to models with the K6 scale, the WHODAS scale improved the prediction of SMI. Furthermore, the WHODAS scale was a better predictor of SMI than the SDS and was continued as the measure of functional impairment in future NSDUHs (Aldworth et al., 2010). Nevertheless, using the final models, SMI estimates based on the SDS in the 2008 full dataset were very similar to those based on the WHODAS scale, indicating that the estimates from the two half samples could be combined to form single estimates. Using data from both half samples, the estimate of SMI among adults 18 years or older was 4.4 percent in 2008.

In 2008, approximately 750 respondents in the WHODAS half sample participated in the MHSS clinical follow-up and were used to develop the WHODAS SMI prediction model. In 2009, a subsample of approximately 500 adult NSDUH respondents participated in the MHSS clinical interview and could be used for the 2009 modeling analysis. Given that both samples were relatively small and therefore subject to large sampling errors, SAMHSA decided to use the prediction model developed with 2008 data to produce the estimate of SMI for 2009. Specifically, the 2008 prediction model parameters and cut points estimated using the 2008 WHODAS subsample were used to estimate SMI in the 2009 NSDUH sample. If a new model had been estimated using the 2009 MHSS subsample and if new terms and/or cut points had been chosen for the prediction model for 2009 SMI estimates, true changes in the underlying measure of SMI between 2008 and 2009 could not have been differentiated from differences due to the sampling errors associated with the model parameters. Using this methodology, the estimate of SMI in 2009 was 4.8 percent among adults 18 years or older. Further analysis of the data indicated a slight, but statistically significant increase in SMI from 4.4 percent in 2008 to 4.8 percent in 2009 (t-test [df] = 2.188 [900], p = 0.0289).

Although a statistically significant increase in SMI was detected between the two years of data, the results should be interpreted within the context of the data and the methods used for the estimation of SMI. That is, the subsamples used to produce the models for estimating SMI in 2008 and 2009, although randomly selected, are relatively small (approximately 750 respondents for each of the two half samples).

Future plans for the MHSS include further methodological work to validate and to potentially improve current estimates and estimation methods for SMI. For example, NSDUH data will be used to compare statistical models used for the estimation of SMI in order to validate current SMI estimates. This research will be facilitated by an expansion of the MHSS clinical interview subsample supported by funds from the National Institute of Mental Health. The subsample will be increased to 1,500 in 2011 and 2012. The MHSS expansion also will be used to refine methods used to precisely estimate the proportion of the population with SMI. Also, statistical models will be examined for their adequacy in producing accurate estimates of SMI from NSDUH data collected from 2005 forward. Furthermore, the collection of MHSS data over time will allow for the examination of trends in estimates of SMI in order to determine whether true variations in SMI exist over multiple time points.

Further investigations of MDE are also in progress. Questions about MDE were first asked in the 2004 NSDUH in one half of a split sample for adults aged 18 or older and for all youths aged 12 to 17. Beginning in 2005, MDE questions were included for both adults and youths in the entire NSDUH sample. Although the MDE questions did not change over the years, the context in which they appeared did change, and this seems to have had an impact on the resulting estimates. In the 2008 NSDUH, several changes were introduced in the mental health module for adults, most notably the inclusion of the WHODAS and SDS impairment scales, and in the 2009 NSDUH, only the WHODAS impairment scale was included. Subsequent analyses indicated that estimates of lifetime and past year MDE among adults derived from the 2005-2007 surveys were significantly higher than those derived from the 2009 survey or the WHODAS half sample of the 2008 survey. In addition, although estimates of lifetime and past year MDE among adults derived from the WHODAS half sample of the 2008 survey were similar to those derived from the 2009 survey, this was not true of those derived from the SDS half sample of the 2008 survey even though the difference in overall estimates was not statistically significant. Methods using statistical models have been developed to adjust the 2005-2007 estimates and the 2008 SDS half-sample estimates for adults for context effects such that they may be compared with the 2008 WHODAS half sample and the 2009 estimates. Therefore, future reports on mental health may contain estimates of MDE combining both of the half samples in 2008 and estimates of MDE over multiple points in time (i.e., from 2005 forward).

Appendix A: Description of the Survey

A.1 Sample Design

The 2009 National Survey on Drug Use and Health (NSDUH)[4] is part of a coordinated 5-year sample design providing estimates for all 50 States plus the District of Columbia for the years 2005 through 2009. The respondent universe is the civilian, noninstitutionalized population aged 12 years old or older residing within the United States. The survey includes persons living in noninstitutionalized group quarters (e.g., shelters, rooming/boarding houses, college dormitories, migratory workers' camps, halfway houses), and civilians living on military bases. Persons excluded from the survey include 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.

Although there is no planned overlap with the 1999 through 2004 samples, a coordinated design for 2005 through 2009 facilitates 50 percent overlap in second-stage units (area segments) within each successive 2-year period from 2005 through 2009. Because the 2005 through 2009 design enables 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 reporting variable.

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 2009, sample sizes in these States ranged from 3,557 to 3,707. For the remaining 42 States and the District of Columbia, the target sample size was 900. Sample sizes in these States ranged from 886 to 984 in 2009. This approach ensures there is sufficient sample in every State to support small area estimation (SAE)[5] while at the same time maintaining efficiency for national estimates.

States were first stratified into a total of 900 State sampling (SS) regions (48 regions in each large sample State and 12 regions in each small sample State). These regions were contiguous geographic areas designed to yield the same number of interviews on average.[6] 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

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

[5] SAE is a hierarchical Bayes modeling technique used to make State-level estimates for approximately 20 measures related to substance use. For more details, see the *State Estimates of Substance Use from the 2007-2008 National Surveys on Drug Use and Health* (Hughes, Muhuri, Sathe, & Spagnola, 2010).

[6] Sampling areas were defined using 2000 census geography. Dwelling units (DUs) and population counts were obtained from the 2000 census data supplemented with revised population counts from Claritas.

selection for the 2005 through 2009 NSDUHs was census tracts.[7] This stage was included to contain sample segments within a single census tract to the extent possible.[8]

Within each SS region, 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 to support the 5-year sample and any supplemental studies that the Substance Abuse and Mental Health Services Administration (SAMHSA) may choose to field. Of these segments, 24 were designated for the coordinated 5-year sample and 24 were designated as "reserve" segments. Eight sample segments per SS region were fielded during the 2009 survey year.

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 was selected from two segments in each calendar quarter so that the survey was essentially continuous in the field. In each of the area segments, a listing of all addresses was made from which a national sample of 195,132 addresses was selected. Of the selected addresses, 161,321 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 143,565. 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 a rate of 86.2 percent and 18 to 25 year olds at a rate of 73.5 percent on average, when they were present in the sampled households or group quarters. Persons in age groups 26 or older were sampled at rates of 28.5 percent or less, with persons in the eldest age group (50 years or older) sampled at a rate of 8.2 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, 0.02 percent for 35 to 49 year olds, and 0.01 percent for those 50 or older. Because of the large sample size, there was no need to oversample racial/ethnic groups, as was done on surveys prior to 1999. Nationwide, 85,429 persons were selected. Consistent with previous surveys in this series, the final respondent sample of 68,700 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.

The survey covers residents of households (living in houses/townhouses, apartments, condominiums, etc.), persons in noninstitutional group quarters (e.g., shelters, rooming/boarding houses, college dormitories, migratory workers' camps, halfway houses), and civilians living on military bases. Although the survey covers residents of these types of units (they are given a nonzero probability of selection), the sample sizes of most specific groups are too small to provide separate estimates.

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

[8] 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.

More information on the sample design can be found in the 2009 NSDUH sample design report by Morton, Martin, Chromy, Foster, and Hirsch (2010).

A.2 Data Collection Methodology

The data collection method used in NSDUH involves in-person interviews with sample persons, incorporating procedures that would be likely to increase respondents' cooperation and willingness to report 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 is available in English and 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.

Interviewers attempt to conduct the NSDUH interview immediately 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. Both adults and youths 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 or 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 are asked these questions only if they are asked the more detailed questions about MDE. Questions that are asked of youths but not adults pertain to the past 12 months and 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. More detailed definitions for many of these terms also are included in Appendix C.

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. It should be noted that 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).

Thus, 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 is captured in the CAI record for the respondent. FIs transmit the completed interview data to RTI in Research Triangle Park, North Carolina, via home telephone lines.

After the data are transmitted to RTI, cases are selected for verification. The verification process involves contacting respondents 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 screening, 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 in 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 FI who falsified data are reworked by the FI conducting the field verification.

A.3 Data Processing

Computers at RTI direct the information to a raw data file (i.e., in which no logical editing of the data had been done) that consists of one record for each completed interview. Cases are retained only if respondents provided data on lifetime use of cigarettes and at least nine other substances in the core section of the questionnaire. Written responses to questions (e.g., names of other drugs that were used) are assigned numeric codes as part of the data processing procedures. 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 2009 will appear in the *2009 NSDUH Methodological Resource Book*, which is in process. Until that volume becomes available, refer to the *2008 NSDUH Methodological Resource Book* (RTI International, 2010).

A.3.1 Data Coding and Logical Editing

With the exception of industry and occupation data (which were coded by staff at the U.S. Census Bureau), coding of written answers that respondents or interviewers typed was performed at RTI for the 2009 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 2009 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.

Coding of the "OTHER, Specify" variables at RTI was accomplished 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 important 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 2009 NSDUH (Office of Applied Studies [OAS], 2010b, 2010c).

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 used in this report were not imputed. Consequently, these variables will continue to have some amount of missing data after they have been 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 "use 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 used in all subsequent survey years. The PMN method offers a rigorous and flexible method that was implemented to improve the quality of estimates and allow more variables to be imputed. Some additional key reasons for implementing this method include the following: (1) the ability to use covariates to determine donors is greater than that offered in the hot deck, (2) the relative importance of covariates can be determined by standard estimating equation 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 requiring imputation 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. A weighted regression imputation is used to impute some of the missing values in the nicotine dependence variables.

In the modeling stage of PMN, the model chosen depends on the nature of the response variable Y. In the 2009 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 at a time. In this (multivariate) case, the distance metric is a Mahalanobis distance (Manly, 1986) rather than a relative Euclidean distance. 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. If no donors are available who meet these conditions, these likeness constraints can be loosened. For example, donors for the age at first use variable are required to be of the same age as recipients, if at all possible. Further details on the PMN methodology are provided by Singh, Grau, and Folsom (2001, 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.

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. Similar to the 2007 and 2008 NSDUHs, the 2009 NSDUH 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, for the 2009 NSDUH incorporated 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 (ℓ_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

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

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 Hispanicity 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.

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, and then the calibration process provides an objective way of deciding the extent of adjustment (or truncation) within the specified bounds. A step was added to poststratify the household-level weights to obtain census-consistent estimates based on the household rosters from all screened households; these household roster-based estimates then provided the control totals needed to calibrate the respondent pair weights for subsequent planned analyses. 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 final step poststratified the respondent person sample to external census data (defined within the State whenever possible, as discussed above).

For certain populations of interest, 2 years of NSDUH data were combined to obtain annual averages. The person-level weights for estimates based on the annual averages were obtained by dividing the analysis weights for the 2 specific years by a factor of 2.

Except where noted below, estimates presented in this report used the analysis weight (ANALWT) for the full sample of respondents in 2008 or 2009. For the mental health section in the 2008 questionnaire, however, a split-sample design was used for adult respondents aged 18 or older, where a random half of the sample received an abridged version of the World Health Organization Disability Assessment Schedule (WHODAS; Rehm et al., 1999) and the other half received the Sheehan Disability Scale (SDS; Leon et al., 1997). Therefore, a separate analysis weight (MHSAMPWT) was created for producing estimates based on the WHODAS or SDS half sample for 2008 data. Estimates of serious mental illness (SMI) in 2008 that are presented in

this report for adults used data from all adult respondents and the ANALWT analysis weight variable. However, estimates in this report for any mental illness and major depressive episode (MDE) for 2008 used the MHSAMPWT variable for the half sample who received the WHODAS (see Appendix C for definitions). MHSAMPWT was created by incorporating the inverse quarterly sampling fractions associated with the random sample splits for the two samples into the weights after the person-level nonresponse adjustment. Each subsample then was poststratified separately to the census estimates of the civilian, noninstitutionalized population aged 18 or older for various domains defined by age group, race/ethnicity, gender, and State. MHSAMPWT was set to zero for respondents aged 12 to 17 and for 10 adult respondents who broke off the interview before they could be assigned to either half sample. See Section B.4.3 in Appendix B for further discussion of the modeling procedures for SMI and any mental illness.

Appendix B: Statistical Methods and Measurement

B.1 Target Population

An important limitation of estimates of the prevalence of mental disorders and substance use from the National Survey on Drug Use and Health (NSDUH) is that they are only designed to describe the target population of the survey—the civilian, noninstitutionalized population aged 12 or older living in the United States. Although this population includes almost 98 percent of the total U.S. population aged 12 or older, it excludes some important and unique subpopulations who 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. Persons living in institutional group quarters, such as prisons and residential mental health or substance abuse treatment centers, represent other subpopulations that are not included in NSDUH. 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. Appendix E describes other surveys that provide mental health data for these populations.

B.2 Sampling Error and Statistical Significance

Estimates presented in this report are based on data in a comprehensive set of tables of national mental health estimates that are referred to as "mental health detailed tables."[9] The national estimates, along with the associated standard errors (SEs), were computed for all mental health detailed tables using a multiprocedure package, SUDAAN® Software for Statistical Analysis of Correlated Data. SUDAAN was designed for the statistical analysis of data collected using stratified, multistage cluster sampling designs, as well as other observational and experimental studies involving repeated measures or studies subject to cluster correlation effects (RTI International, 2008). The final, nonresponse-adjusted, and poststratified analysis weights were used in SUDAAN to compute unbiased design-based estimates.

The sampling error (i.e., the standard error or SE) 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.

[9] This comprehensive set of tables is available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs.

With the use of probability sampling methods in NSDUH, it is possible to develop estimates of sampling error from the survey data. These estimates 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 sampling errors are used to identify unreliable estimates and to test for the statistical significance of differences between estimates.

B.2.1 Variance Estimation for Totals

Although the SEs of estimates of means and proportions can be calculated appropriately in SUDAAN using a Taylor series linearization approach, SEs of estimates of totals may be underestimated in situations where the domain size is poststratified to data from the U.S. Census Bureau. Because of this underestimation, alternatives for estimating SEs of totals were implemented.

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* (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

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

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. For a more detailed explanation of the weight calibration process, see Section A.3.3 in Appendix A. In addition, more detailed information about the weighting procedures for 2009 will appear in the *2009 NSDUH Methodological Resource Book*, which is in process. Until that volume becomes available, refer to the *2008 NSDUH Methodological Resource Book* (RTI International, 2010).

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 various subsets of estimates, the above approach yielded an underestimate of the variance of a total because $\hat{N}_d$ was subject to considerable variation. 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 method of SE calculation to domains (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 other estimates within the same table (available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs). 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 a list of domains with a fixed $\hat{N}_d$. 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 1.5 in the mental health detailed tables (available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs) present estimates of any mental illness and serious mental illness, respectively, among persons aged 18 or older within the domains of gender, Hispanic origin and race, education, 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. It is important to note that estimates presented in this report for racial groups are among non-Hispanics. For instance, the domain for whites is actually non-Hispanic whites and is therefore a two-way interaction.

B.2.2 Suppression Criteria for Unreliable Estimates

As has been done in past NSDUH reports, direct survey estimates produced for this study that are considered to be unreliable because of unacceptably large sampling errors are not shown in this report and are noted by asterisks (*) in the mental health detailed tables containing such estimates (tables available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs). The criteria used for suppressing all direct survey estimates were based on the 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.

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

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

or

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

Using a first-order Taylor series approximation to estimate $\text{RSE}[-1\text{n}(\hat{p})]$ and $\text{RSE}[-1\text{n}(1-\hat{p})]$, the following equation was derived and used for computational purposes when developing 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

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

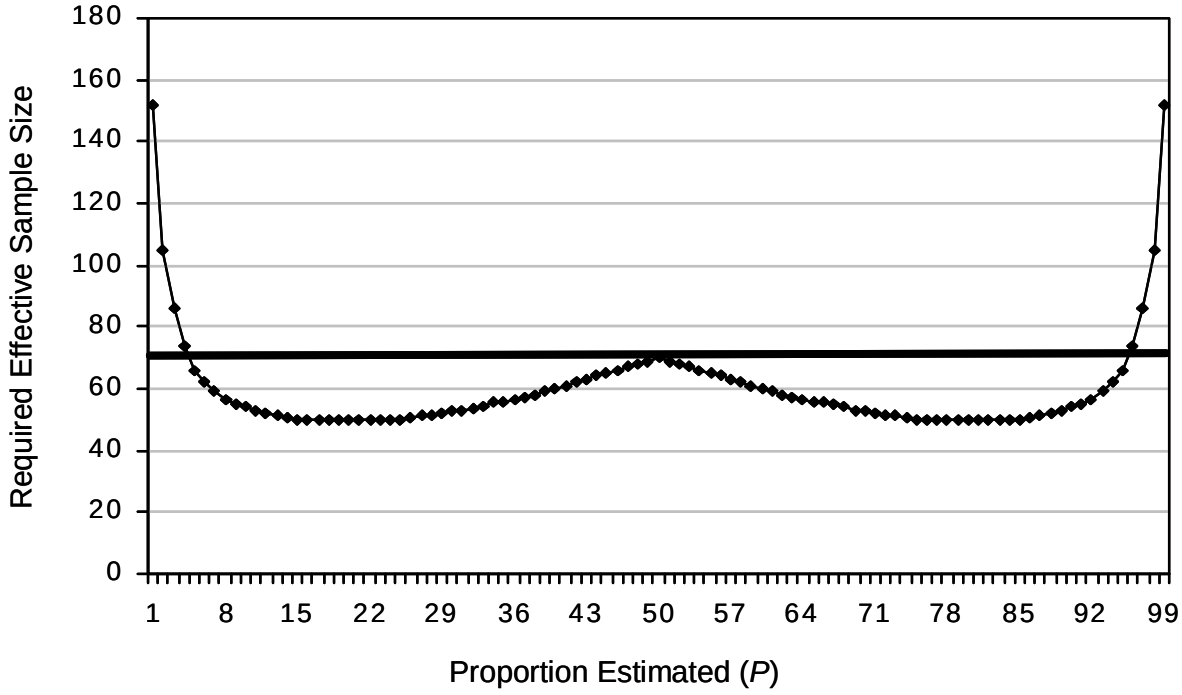
The separate formulas for $\hat{p} \leq .5$ and $\hat{p} > .5$ produce a symmetric suppression rule; that is, if $\hat{p}$ is suppressed, $1-\hat{p}$ will be suppressed as well (see Figure B.1). When $.05 < \hat{p} < .95$, the symmetric properties of the rule produce a local minimum of 50 at $\hat{p}$ = .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 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 $\hat{p} \geq .99995$).

Estimates of other totals (e.g., number of initiates) along with means and rates that are not bounded between 0 and 1 (e.g., mean age at first use and incidence rates) were suppressed if the RSEs of the estimates were larger than .5. Additionally, estimates of the mean age at first use were suppressed if the sample size was smaller than 10 respondents. Also, the estimated incidence rate and number of initiates were suppressed if they rounded to 0.

The suppression criteria for various NSDUH estimates are summarized in Table B.2 at the end of this appendix.

Figure B.1 Required Effective Sample in the 2009 NSDUH as a Function of the Proportion Estimated



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 (e.g., 2002, 2003, 2004, 2005, 2006, 2007, or 2008) becomes the first prevalence estimate, and the prevalence estimate from the later year (e.g., 2003, 2004, 2005, 2006, 2007, 2008, or 2009) becomes the second prevalence estimate.

Under the null hypothesis, *Z* is asymptotically distributed as a 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; however, it should be noted that because it was necessary to calculate the SE outside of SUDAAN for domains 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 2009, 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[10] 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 161,321 eligible households sampled for the 2009 NSDUH, 143,565 were screened successfully, for a weighted screening response rate of 88.8 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 pass the usable case rule.[11] In the 143,565 screened households, a total of 85,429 sample persons were selected, and completed interviews were obtained from 68,700 of these sample persons, for a weighted IRR of 75.7 percent (Table B.4). A total of 11,585 (17.0 percent) sample persons were classified as refusals or parental refusals, 3,024 (3.5 percent) were not available or never at home, and 2,120 (3.8 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 (85.7 percent), females (77.1 percent), blacks (80.7 percent), persons in the South (77.4 percent), and residents of nonmetropolitan areas (77.9 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 67.2 percent in 2009. 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

[10] 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.

[11] 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.

nature of accessing heavy drug users. In a study that matched 1990 census data to 1990 NHSDA nonrespondents,[12] 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 2009 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. Similarly, about 0.3 percent of adults had missing data for questions about suicidal thoughts and behavior. About 0.5 to 0.8 percent of adults had missing data for questions about specific lifetime symptoms of depression; the highest percentage of missing data (0.8 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 0.5 percent of adults had missing data for these lifetime depression symptom questions because they had answers of "don't know" or "refused" for preceding questions that needed to be answered affirmatively in order for respondents to be asked the questions about depression symptoms, or because they broke off the interview before reaching these questions. Information on item nonresponse for questions used to measure psychological distress and functional impairment among adults is presented in Section B.4.3 of this appendix.

For respondents aged 12 to 17 in the 2009 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 1.6 percent of youths had missing data for these lifetime depression symptom questions because they had answers of "don't know" or "refused" for preceding questions that youths needed to answer affirmatively in order to be asked the questions about depression symptoms, or because they broke off the interview before reaching these questions.

In addition, the logic in the 2009 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

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

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 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 reported an age at onset for their worst period of depression symptoms that was greater than their current age, the inconsistent age-at-onset variable was set to a missing value.

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 2009 also will appear in the *2009 NSDUH Methodological Resource Book*, which is in process. Until that volume becomes available, refer to the *2008 NSDUH Methodological Resource Book* (RTI International, 2010).

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).

Results for the reliability of selected variables related to substance use and demographic characteristics are presented in Table B.6. Reliability is expressed in the table 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):

- poor agreement for kappas less than 0.00,
- slight agreement for kappas of 0.00 to 0.20,
- fair agreement for kappas of 0.21 to 0.40,
- moderate agreement for kappas of 0.41 to 0.60,
- substantial agreement for kappas of 0.61 to 0.80, and
- almost perfect agreement for kappas of 0.81 to 1.00.

None of the values for the substance use variables presented in Table B.6 fell below 0.82, indicating substantial to nearly perfect response consistency on these measures. Reliability statistics for the major depressive episode (MDE) measures were moderate to substantial, while substance abuse treatment and mental health treatment variables showed almost perfect consistency.

The kappa values for the past year mental health treatment variables for adults showed almost perfect response consistency (Table B.6). Reliability statistics for the MDE measures for adults were moderate to substantial. Among persons aged 12 or older, lifetime and past year substance use variables (marijuana use, alcohol use, and cigarette use) all showed almost perfect response consistency. The value obtained for the substance dependence or abuse measure in the past year showed substantial agreement (0.67), while the substance use treatment variable showed almost perfect consistency in both the lifetime and past year.

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.[13] 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 1.00 for gender to 0.95 for current enrollment in school. For further information on the reliability of a wide range of measures contained in NSDUH, see the complete methodology report (Chromy et al., 2010).

[13] 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.

B.4 Measurement Issues

Several measurement issues associated with the 2009 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 2009 NSDUH CAI instrumentation included questions that were designed to measure dependence on and abuse of illicit drugs and alcohol. For these substances,[14] 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.
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. A respondent was defined as having dependence if he or she met three or more of seven dependence criteria. The seventh withdrawal criterion is defined by a respondent reporting having experienced a certain number of withdrawal symptoms that vary by substance (e.g., having trouble sleeping, cramps, hands tremble).

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

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

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

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 the dependence and abuse questions during the interview included responses from the core substance use questions and the frequency of substance use questions, as well as the noncore substance use questions. 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. This may have resulted in responses to the dependence and abuse questions that were 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. 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.

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, inconsistencies could have occurred when the response to a core substance use question indicated no use in the past year, but responses to dependence and abuse questions indicated substance dependence or abuse for the respective substance.

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,[15] 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 on or abuse of any other substance (e.g., pain relievers,

[15] 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.

tranquilizers, or sedatives for the psychotherapeutic drug grouping), then they were categorized as NOT having past year dependence on or abuse of psychotherapeutics, illicit drugs, illicit drugs or alcohol, and 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, DMT, AMT, Foxy, or *Salvia divinorum*; stimulant dependence and abuse if they reported additionally using Adderall®; and sedative dependence and abuse if they reported additionally using Ambien®. Complying with the previous decision to exclude respondents whose methamphetamine use was based solely on responses in a noncore module from being classified as having stimulant dependence or abuse, respondents who indicated past year hallucinogen, stimulant, or sedative use based solely on these special drug questions were categorized as NOT having past year dependence on 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 dependent on or abusing 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 not included in 2009.
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, the questions that were removed from the YMHSU module were replaced in 2009 with seven questions that asked about receipt of mental health services in the education and justice system sectors.

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, OAS 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).

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 behaviors 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.

Adolescents aged 12 to 17 could be asked up to three questions (YDS21, YDS22, and YDS23) to determine whether they should be asked further questions about lifetime and past year MDE. All adolescents were asked question YDS21 ("Have you ever in your life had a period of time lasting several days or longer when most of the day you felt sad, empty, or depressed?"). Those who did not answer question YDS21 as "yes" then were asked question YDS22 ("Have you ever had a period of time lasting several days or longer when most of the day you felt very discouraged or hopeless about how things were going in your life?"). Youths who did not answer either question YDS21 or YDS22 as "yes" then were asked question YDS23 ("Have you ever had a period of time lasting several days or longer when you lost interest and became bored with most things you usually enjoy, like work, hobbies, and personal relationships?"). Any adolescents who gave an affirmative answer in questions YDS21, YDS22, or YDS23 then were administered additional depression-related items that also were used to determine lifetime and past year MDE.

This analysis used data from the first 6 months of the 2009 NSDUH and sought to determine whether changes in the YMHSU module affected responses to the first three adolescent depression questions and the lifetime and past year MDE estimates. To determine whether potential differences between the 2008 and 2009 surveys were unusual (and, therefore, due to more than just true changes), comparisons between consecutive years beginning in 2005 also were carried out. For consistency with the 2009 data, comparisons were limited to the first 6 months of data from other survey years.

None of the differences in estimated responses to the three lead adolescent MDE items or estimates of adolescent lifetime and past year MDE between 2008 and 2009 was statistically significant. There also was no apparent trend between 2005 and 2009 for the lifetime and past year MDE estimates or for the variable corresponding to question YDS23. That is, 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 (RTI International, 2009).

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

Background. In NSDUH reports prior to 2004, the Kessler-6 (K6) distress scale was used to measure SMI. However, SAMHSA discontinued producing SMI estimates with the release of the 2004 data because of concerns about the validity of using only the K6 distress scale without an impairment scale; see Section B.4.4 of Appendix B in the 2004 NSDUH national findings report (OAS, 2005) for a discussion. The SMI estimates presented in this report for 2008 and 2009 are not comparable with the SMI estimates produced from NSDUH in earlier years.

On May 20, 1993, SAMHSA's Center for Mental Health Services (CMHS) published its definition of SMI in the *Federal Register*:

> Pursuant to Section 1912(c) of the Public Health Services 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 December 2006, a technical advisory group (TAG) meeting of expert consultants was convened by CMHS to solicit recommendations for mental health surveillance data collection

strategies among the U.S. population. The panel recommended that NSDUH should be used to produce estimates of SMI among adults using NSDUH's mental health measures and a gold-standard clinical psychiatric interview. In response, SAMHSA's OAS initiated a Mental Health Surveillance Study (MHSS) under its NSDUH contract with RTI International to develop and implement methods to estimate SMI.

To develop methods for estimating SMI and other measures of mental illness, the MHSS was initiated as part of the 2008 NSDUH design and analysis. Because of constraints on the interview time in NSDUH and the need for trained mental health clinicians, it was not possible to administer a full structured diagnostic clinical interview to assess mental illness on all 45,000 adult respondents; therefore, the approach adopted by SAMHSA was to utilize short scales separately measuring psychological distress (K6) and functional impairment (WHODAS or SDS) that could be used in a statistical model to accurately predict whether a respondent had mental illness. To create the statistical models, a subsample of approximately 1,500 adult NSDUH participants in 2008 was recruited for a follow-up clinical interview consisting of a gold-standard diagnostic assessment for mental disorders and functional impairment. Also, in order to determine the optimal scale to measure functional impairment, a split-sample design was incorporated into the full 2008 NSDUH data collection in which half of the adult respondents received the WHODAS and half received the SDS. Statistical models using the data from the subsample of respondents collected as part of the MHSS then were developed for each half sample in which the short scales (the K6 in combination with the WHODAS or the K6 in combination with the SDS) were used as predictors in models of mental illness assessed via the clinical interviews. The model parameter estimates then were used to predict 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). For the 2009 NSDUH, the WHODAS was retained as the measure of functional impairment for the full adult NSDUH sample. Also in 2009, a subsample of approximately 500 adult NSDUH participants was recruited for a follow-up clinical interview.

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

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

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

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

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

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

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

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

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

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

To create a score, the six items (NERV30, HOPE30, FIDG30, NOCHR30, EFFORT30, and DOWN30) on the K6 scale were recoded from 0 to 4 so that "all of the time" was coded 4, "most of the time" 3, "some of the time" 2, "a little of the time" 1, and "none of the time" 0, with "don't know" and "refused" also coded as 0. Summing across the transformed responses in these six items resulted in a score with a range from 0 to 24.

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

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

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 NSDUH 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 2009 NSDUH Public Use File codebook (OAS, 2010a).

In addition, an alternative WHODAS total score was created in which individual WHODAS item scores 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 WHODAS score was driven by the idea that results of dichotomous responses dividing severely impaired from less severely impaired respondents might fit better than a linear continuous measure in models predicting SMI.

SDS. The SDS consists of four questions that ask respondents how much their emotions, nerves, or mental health interfered with their daily activities over the past year. The following four domains were covered by the questions: (1) home management, (2) work, (3) close relationships with others, and (4) social life. For each of the four items, respondents were asked to select a number from 0 to 10 on a visual analog scale, where 0 means no interference, 1 to 3 means mild interference, 4 to 6 means moderate interference, 7 to 9 means severe interference, and 10 means very severe interference. Responses of "don't know" or "refused" were coded as 0. Summing across the responses for the four items resulted in a total score with a range from 0 to 40.

For the same reasons described previously for creating an alternative WHODAS total score, an alternative SDS total score also was created. Individual SDS item scores less than 7 were recoded as 0, and item scores of 7 to 10 were recoded as. 1. The individual alternative item scores then were summed to yield a total alternative score ranging from 0 to 4.

MHSS Clinical Interviews. As described previously, a subsample of approximately 1,500 adult NSDUH participants in 2008 completed follow-up clinical interviews to provide data for the statistical modeling of the NSDUH interview data of psychological distress and functional impairment on mental health status. The MHSS sample respondents were administered clinical interviews within 4 weeks of the NSDUH main interview to assess the presence of mental disorders and functional impairment. Specifically, each participant was assessed by a trained clinical interviewer (master's or doctoral-level clinician, counselor, or social worker) via paper-and-pencil interviewing (PAPI) over the telephone. The clinical interview used was an adapted version of the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP) (First et al., 2002). 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. In addition, the presence of psychotic symptoms was assessed. Substance use disorders also were assessed, although these disorders were not included in the estimates of mental illness.

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

- Respondents were defined as having *any mental illness* if they were determined to have any of the mental disorders assessed in the SCID, regardless of the level of functional impairment.
- Respondents were defined as having *low (mild) mental illness* if they had any of the mental disorders assessed in the SCID, 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, 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, and these disorders resulted in substantial impairment in carrying out major life activities, based on GAF scores of 50 or below.

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

MHSS Sampling, Weighting, and Data Processing. The 2008 MHSS sample was stratified based on respondents' K6 scores to optimize the MHSS sample allocation for the statistical modeling. To optimize the MHSS sample allocation within seven scoring bands, assumed SMI rates were estimated using K6 score distribution data from the 2006 NSDUH and raw K6 score and clinical case data from the National Comorbidity Survey Replication (NCS-R) clinical calibration study.[16] Strata were constructed according to the seven scoring bands shown in Table B.7. Sampling rates for the 2008 study were substantially lower for K6 scores 0 to 7 under the assumption that fewer clinical positives for SMI would be identified in that scoring range when the K6 data were used in combination with the impairment data to estimate SMI.

The probability sample of 1,500 clinical follow-up interviews in 2008 was distributed across four calendar quarters with a slightly larger sample in the first quarter (425 follow-up interviews); the remaining sample was equally divided among the remaining quarters (approximately 358 interviews in each of quarters 2 through 4). The larger sample in quarter 1 was intended to provide some cushion should clinical interview response rates be lower than anticipated. In addition, SAMHSA wanted a slightly larger sample size in quarter 1 to allow for preliminary analyses of the data. The 2008 MHSS projected an 85 percent agreement rate for the clinical follow-up interview and a 90 percent participation rate among those who agreed to complete the interview.

A total of 1,506 respondents completed the clinical interview in 2008. An estimated 86 percent of selected persons agreed to participate in the MHSS, and 76 percent of those persons completed the clinical interview. However, four cases were not used in the analysis because of unusual weights or because all mental health item scores were missing. Consequently, the 2008 MHSS dataset consisted of 1,502 records, with 761 belonging to the WHODAS half sample and 741 belonging to the SDS half sample. More information about the sample design outcomes for

[16] R. C. Kessler, "Scidsmi-table-073107 (2) (2).doc," personal communication via e-mail to L. J. Colpe, August 1, 2007.

the 2008 MHSS can be found in Section B.4.6 of Appendix B in the 2008 NSDUH national findings report (OAS, 2009).

The 2009 MHSS sample in the first two quarters was allocated to seven K6 scoring bands in the same proportions as the 2008 MHSS sample. Midway through the year, the decision was made to allocate the sample based on any mental illness rather than SMI. This decision was motivated by the desire to reduce the impact of extreme weights while maintaining the analytic ability of the MHSS. A new optimal allocation was developed using data from the 2008 NSDUH and 2008 MHSS. Because any mental illness is detected in every K6 scoring band, this revised optimal allocation put more sample in the lower K6 ranges and therefore reduced the size of the weights in those K6 groups. Table B.7 shows the expected sample distribution for the 250 clinical follow-up interviews and the expected number of those with positive SMI status in the first two quarters of 2009. Table B.8 shows the expected sample distribution for the 250 clinical follow-up interviews and the expected number of those with positive any mental illness status in the last two quarters of 2009. Note how the expected sampling distribution changes from Table B.7 to Table B.8, particularly in the lower scoring bands for the K6 scores.

The probability sample of 500 clinical follow-up interviews for the 2009 MHSS was distributed across four calendar quarters with approximately 125 follow-up interviews per quarter. Based on data from quarters 1 through 4 of the 2008 MHSS, the 2009 MHSS projected an 86 percent agreement rate for the clinical follow-up interview and a 76 percent participation rate among those who agreed to complete the interview.

In comparison, the actual number of final respondents selected was 771, and 665 agreed to participate (86.3 percent), which was consistent with the projected agreement rate. Of the 665 who agreed to participate, 521 completed the interview (78.3 percent), which was slightly higher than the projected completion rate.[17] As noted in Section B.4.2, the WHODAS was chosen for measuring impairment in the 2009 NSDUH in order to predict SMI in combination with the K6 scale. More information about the decision to choose the WHODAS for measuring impairment based on the 2008 MHSS analysis can be found in Aldworth et al. (2009).

As described previously, 521 completed interviews were obtained in 2009. However, one case was excluded from the MHSS analyses because all K6 and WHODAS item scores were missing. Hence, there were 520 "analyzable" cases. The unweighted and weighted response rates for each of the seven K6 score categories for the 2009 MHSS are given in Table B.9.

Special MHSS analysis weights in 2008 and 2009 were created as the product of the following four weight components: (1) NSDUH analysis weight, (2) inverse of probability of selection for clinical follow-up, (3) nonresponse adjustment applied to all NSDUH respondents selected for the MHSS but who did not complete the clinical interview (i.e., includes those who refused to participate and those who agreed to participate but did not complete the clinical interview), and (4) poststratification adjustments by gender, age, and race/ethnicity using data from the main NSDUH interview. For further details about the NSDUH weighting procedures, see Section A.3.3 in Appendix A of this report. The remainder of this section provides further

[17] This number of final respondents for the 2009 MHSS differs slightly from the 515 respondents reported in the 2009 sample design report for the 2009 MHSS (Morton et al., 2010). The number in the 2009 sample design report was preliminary at the time that report was prepared in early 2010.

details on weighting for the 2009 MHSS and data processing for the 2009 NSDUH mental health variables for adults.

The same stratification and clustering design variables used in the 2009 NSDUH to account for the sample design also were used within the MHSS dataset. However, the smaller size of the MHSS dataset resulted in some empty stratification and clustering cells, so these variables were collapsed to remove all empty cells. For further details about the NSDUH design variables, see Morton et al. (2010).

In the NSDUH main interview for 2009, all respondents with missing K6 or WHODAS item scores had their missing values imputed as zeros. This included cases where all item scores were missing and where the skip pattern allowed all WHODAS questions to be skipped when the sum of all K6 item scores was zero. Specifically, of the 46,074 adult respondents in the 2009 NSDUH, 470 (1.0 percent) had missing data for at least one of the six past month K6 item scores. A total of 83 respondents had missing data for all six item scores (17.7 percent of the 470 respondents with missing data for at least one K6 item score and 0.2 percent of all adult respondents). There were 8,484 respondents (18.4 percent) who were skipped out of the WHODAS questions because the sum of all K6 item scores was zero. A total of 482 respondents (1.0 percent) had missing data for at least one of the eight WHODAS item scores. A total of 79 respondents had missing data for all eight WHODAS item scores (16.4 percent of the 482 respondents with missing data for at least one WHODAS item score and 0.2 percent of adult respondents). Although missing data for individual K6 or WHODAS items were imputed as zeros, K6 and WHODAS scores still were computed for the 387 respondents who did not have missing data for at least one other K6 item and for the 403 respondents who did not have missing data for at least one other WHODAS item. Consequently, these respondents with missing data for some but not all K6 or WHODAS items did not necessarily have scores of zero for the respective scales.

Because the imputation method used in the adult main study NSDUH data may bias total scores downward, an alternative unbiased imputation method was applied to respondents in the 2009 MHSS sample (n = 521) for the purpose of the MHSS analyses. This alternative method is described as follows:

- Respondents whose WHODAS item scores were recorded as missing because they were skipped (i.e., had a K6 score of zero) had those missing values imputed as zeros (i.e., no change from the adult NSDUH data).

- Of the remaining respondents, who were administered the WHODAS but had missing item scores, five had *some but not all* missing K6 and WHODAS item scores. For each of these five cases, a donor pool of respondents from the full adult NSDUH data that had identical values for all remaining nonmissing K6 and WHODAS items was identified. A rounded average value from the donor pool then was used as an imputed value for each missing K6 or WHODAS value for the five cases in question.

- One respondent had missing values for *all* K6 and WHODAS item scores. Because it was not possible to create donor pools for this case, it was not included in the MHSS analyses.

Because one record was not included for the purpose of the 2009 MHSS analysis, two MHSS datasets were created as follows:

1. *The completed MHSS dataset* in which all respondents who completed the follow-up interview were included (n = 521).

2. *An MHSS dataset* that was a subset of completed MHSS dataset, minus the case with all of its K6 and WHODAS item scores missing (n = 520).

Consequently, two sets of analysis weights were created corresponding to the two MHSS datasets for 2009. The set of weights for the completed MHSS dataset was constructed as described above, and the set of weights for the analyzable MHSS dataset was similarly constructed, except that the case that was not included in the calibration analysis was treated as a nonrespondent. All subsequent descriptive analysis and statistical modeling used the analyzable MHSS dataset.

2008 MHSS Estimation of SMI. Using the combined clinical interview and standard NSDUH CAI data for the 1,500 MHSS respondents in 2008, statistical models were developed that used the SCID-based SMI status as a dependent variable and the short scales (the K6 in combination with the WHODAS or SDS) as independent variables. For estimating SMI in the past year, the "past year K6 total score," defined as the higher of the past 30-day K6 total score and the worst month in past 12-month K6 total score (where applicable), was used as described previously. A variety of models was evaluated to identify the single best model (one for each half sample) to use for the production of SMI estimates. Each model allowed the predicted probability of having SMI for each respondent to be calculated, and an optimal cut point was identified that equalized the weighted number of false positives and false negatives by comparing SMI estimates measured using the SCID with those based on the model and cut point (i.e., predicted probabilities at or above the cut point were coded as SMI positive).

Descriptive analyses examined the distribution of respondent characteristics in the clinical interview sample to check for imbalances between the two half samples. Analyses were conducted to develop prediction models based on the K6 scale and each of the impairment scales in turn, and receiver operating characteristic (ROC) analyses were used to select the optimal cut point for determining SMI status. Models were evaluated based on three criteria: (1) model robustness (e.g., preference given to parsimonious models that could be generalized to data beyond that used in the modeling process); (2) minimization of misclassification errors in SMI prediction (i.e., exhibiting reasonable ROC statistics, such as sensitivity and AUC, defined as the area under the ROC curve based on an optimal cut point [(sensitivity + specificity)/2]); and (3) reasonable SMI estimates based on the full 12-month dataset (i.e., balanced across several demographic subgroups and across the WHODAS and the SDS half samples). Initial modeling analysis, done with the first 6 months of data collected under the 2008 MHSS, showed that the WHODAS provided more accurate prediction of SMI in NSDUH. Consequently, this impairment scale was chosen for administration in the 2009 and subsequent surveys. Final models chosen for SMI estimation with the 2008 dataset are described below. More details can be obtained from Aldworth et al. (2009).

Statistical modeling involved development of separate weighted logistic regression prediction models for the K6 and for each of the two impairment scales. With SMI status based on having a SCID diagnosis plus a GAF less than or equal to 50, the response variable Y was defined so that $Y = 1$ when an SMI diagnosis is positive; otherwise, $Y = 0$. If $\mathbf{X}$ is a vector of explanatory variables, then the response probability $\pi = \Pr(Y = 1 | \mathbf{X})$ can be estimated using weighted logistic regression models for the WHODAS and SDS half samples. The final 2008 WHODAS and SDS calibration models, respectively, were determined as follows:

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

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

where $\hat{\pi}$ refers to an estimate of the SMI response probability π for the WHODAS and SDS models (indicated by the "w" subscript for the WHODAS and the "s" subscript for the SDS). The X_k, X_w, and X_s terms refer to the alternative K6, WHODAS, and SDS scores that were described previously:

- X_k = *Alternative Past Year K6 Score*: Past year K6 score less than 8 recoded as 0; past year K6 score 8 to 24 recoded as 1 to 17.
- X_w = *Alternative WHODAS Score*: WHODAS item scores less than 2 recoded as 0; WHODAS item scores 2 to 3 recoded as 1, then summed for a score ranging from 0 to 8.
- X_s = *Alternative SDS Score*: SDS item scores less than 7 recoded as 0; SDS item scores 7 to 10 recoded as 1, then summed for a score ranging from 0 to 4.

Rearranging terms of the two models provided a direct calculation of the *predicted probability* of SMI:

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

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

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

The modeling and ROC statistics of these models for 2008 are given in Tables B.10, B.11, and B.12. ROC statistics are provided for subgroups of four demographic variables. Table B.13 shows the levels of WHODAS, SDS, and K6 that are necessary to classify a respondent as

having SMI. Note that SMI estimates in this report for 2008 were based on both the WHODAS and SDS half samples.

The final WHODAS and SDS models described above were selected from a set of candidate models based on model fit statistics, sensitivity, and parsimony. The modeling analysis showed that in terms of model fit statistics and sensitivity, models with the WHODAS and the K6 improved the prediction of SMI over models with only the K6. To a lesser extent, this was also true of models with the SDS and the K6. Model fit statistics and various sensitivity analyses indicated that in combination with the K6, the WHODAS was a better predictor of SMI than the SDS. Consequently, the decision was made to continue with the WHODAS as the measure of impairment for all adults in future NSDUHs. Nevertheless, for the final models, SMI estimates based on the SDS in the 2008 full dataset were very similar to those based on the WHODAS, indicating that the estimates from the two half samples could be combined to form single estimates.

2009 MHSS Estimation of SMI. Because an important objective of the 2009 MHSS was to determine whether true differences in estimates of SMI existed between 2008 and 2009, the decision was made to use the WHODAS model (i.e., model 1 described previously), parameter estimates, and cut points determined in 2008 for the 2009 MHSS estimation of SMI.

In 2008, a subsample of approximately 750 respondents in the WHODAS half sample participated in the MHSS clinical follow-up and were used to develop the WHODAS SMI prediction model. In 2009, a subsample of approximately 500 adult NSDUH respondents participated in the MHSS clinical interview and could be used for the 2009 modeling analysis. Given that both samples were relatively small and therefore subject to large sampling errors, SAMHSA decided to use the prediction model developed with 2008 data to produce estimates of SMI for 2009. Specifically, the 2008 prediction model parameters and cut points estimated using the 2008 WHODAS subsample were used to estimate SMI in the 2009 NSDUH sample. If a new model had been estimated using the 2009 MHSS subsample and if new terms and/or cut points had been chosen for the prediction model for the 2009 SMI estimates, true changes in the underlying measure of SMI between 2008 and 2009 could not have been differentiated from differences due to the sampling errors associated with the model parameters.

2008 and 2009 MHSS Estimation of Any Mental Illness, Low (Mild) Mental Illness, and Moderate Mental Illness. Various methods to estimate any mental illness were investigated in the 2008 MHSS. These methods were subject to the constraint that they would have no effect on the SMI estimates produced by the models discussed above. The methods investigated included logistic models based on any mental illness as the response variable, SMI as the response variable, and multilogistic models based on a multilevel mental illness variable from which both SMI and any mental illness could be derived. Analyses suggested that models based on SMI as the response variable provided almost identical results to those of the other models, so this method was chosen to estimate any mental illness. The same method was chosen to estimate the cumulative category that included both SMI and moderate mental illness.

As noted previously, SMI estimates for 2008 were based on both the WHODAS and SDS half samples because estimates of SMI were comparable between half samples. Because estimates of any mental illness based on the SDS half sample were not comparable with those

based on the WHODAS half sample, however, the decision was made to base estimates of any mental illness, low (mild) mental illness, and moderate mental illness for 2008 only on the WHODAS half sample. Therefore, the text below describes the WHODAS cut points that were used to estimate any mental illness, low (mild) mental illness, and moderate mental illness for 2008 and 2009.

Estimates of any mental illness were obtained from the SMI-predicted probabilities calculated using the WHODAS model described above. Respondents with an SMI-predicted probability greater than the cut point of 0.02400 for any mental illness were classified as having any mental illness. Estimates of the cumulative category for SMI *or* moderate mental illness were similarly obtained, except that a cut point of 0.10965 was used.

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 cumulative category of having SMI *or* moderate mental illness, but they did not belong to the SMI category. Respondents were classified as belonging to the low (mild) mental illness category if they belonged to the any mental illness category, but not to the SMI or moderate mental illness categories.

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 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; Harvard School of Medicine, 2005), and the questions for youths were adapted from the depression section of the National Comorbidity Survey Adolescent (NCS-A; Harvard School of Medicine, 2005). To make the modules developmentally appropriate for youths, there are minor wording differences in a few questions between the adult and youth modules. Revisions to the questions in both modules were made primarily to reduce its length and to modify the NCS questions, which are interviewer-administered, to the audio computer-assisted self-interviewing (ACASI) format used in NSDUH. In addition, some revisions, based on cognitive testing, were made to improve comprehension. 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.

Since 2004, the NSDUH questions that determine MDE have remained unchanged. In the 2008 questionnaire, however, changes were made in other mental health items that precede the MDE questions (K6, suicide, and impairment). 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 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 were not compared with NSDUH

estimates prior to 2008 for trend purposes in this report. 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, 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 previously 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 are available for adolescents aged 12 to 17.

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

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 [worse/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

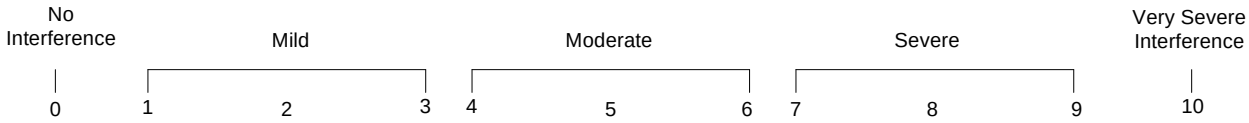
a. Did you often think about death, either your own, someone else's, or death in general?
b. During that period, did you ever think it would be better if you were dead?
c. Did you think about committing suicide?

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 line, where 0 corresponds to no interference, 1 to 3 correspond to mild interference, 4 and 5 correspond to moderate interference, 7 to 9 correspond to severe interference, and 10 corresponds to very severe interference. 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**?

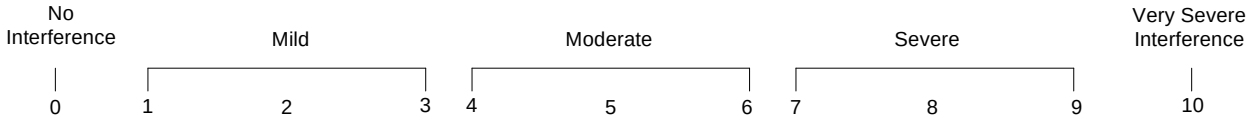
ASDSREL How much did your [depression symptoms] interfere with your **ability to form and maintain close relationships** with other people during that period of time?

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?

Table B.1 Demographic and Geographic Domains Forced to Match Their Respective U.S. Census Bureau Population Estimates through the Weight Calibration Process, 2009

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
Gender	(e.g., Males Aged 12 to 17)
Male	
Female	
	Age Group × Hispanic Origin
Hispanic Origin	(e.g., Hispanics or Latinos Aged 18 to 25)
Hispanic or Latino	
Not Hispanic or Latino	
	Age Group × Race
Race	(e.g., Whites Aged 26 or Older)
White	
Black or African American	
	Age Group × Geographic Region
Geographic Region	(e.g., Persons Aged 12 to 25 in the Northeast)
Northeast	
Midwest	
South	**Age Group × Geographic Division**
West	(e.g., Persons Aged 65 or Older in New England)
Geographic Division	
New England	**Gender × Hispanic Origin**
Middle Atlantic	(e.g., Not Hispanic or Latino Males)
East North Central	
West North Central	
South Atlantic	**Hispanic Origin × Race**
East South Central	(e.g., Not Hispanic or Latino Whites)
West South Central	
Mountain	
Pacific	

[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.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2009.

Table B.2 Summary of 2009 NSDUH Suppression Rules

Estimate	Suppress if:
Prevalence Rate, $\hat{p}$, with Nominal Sample Size, *n*, and Design Effect, *deff* $\left(deff = \frac{n\left[SE(\hat{p})\right]^2}{\hat{p}(1-\hat{p})} \right)$	(1) The estimated prevalence rate, $\hat{p}$, is $< .00005$ or $\geq .99995$, or (2) $\frac{\mathrm{SE}(\hat{p}) \ / \ \hat{p}}{-\ln(\hat{p})} > .175$ when $\hat{p} \leq .5$, or $\frac{\mathrm{SE}(\hat{p}) \ / \ (1 - \hat{p})}{-\ln(1 - \hat{p})} > .175$ when $\hat{p} > .5$, or (3) $Effective\ n < 68$, where $Effective\ n = \frac{n}{deff} = \frac{\hat{p}(1-\hat{p})}{\left[SE(\hat{p})\right]^2}$, 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) $\mathrm{RSE}(\bar{x}) > .5$, or (2) $n < 10$.

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

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2009.

Table B.3 Weighted Percentages and Sample Sizes for 2008 and 2009 NSDUHs, by Final Screening Result Code

Final Screening Result Code	Sample Size 2008	Sample Size 2009	Weighted Percentage 2008	Weighted Percentage 2009
TOTAL SAMPLE	194,815	195,132	100.00	100.00
Ineligible Cases	34,682	33,811	17.50	17.27
Eligible Cases	160,133	161,321	82.50	82.73
INELIGIBLES	34,682	33,811	17.50	17.27
10 - Vacant	19,308	18,933	56.04	55.68
13 - Not a Primary Residence	7,189	7,279	20.63	22.15
18 - Not a Dwelling Unit	2,582	2,547	7.32	7.35
22 - All Military Personnel	340	347	1.01	1.09
Other, Ineligible[1]	5,263	4,705	14.99	13.74
ELIGIBLE CASES	160,133	161,321	82.50	82.73
Screening Complete	142,938	143,565	89.04	88.77
30 - No One Selected	83,422	84,727	51.22	51.78
31 - One Selected	32,213	31,874	20.30	19.79
32 - Two Selected	27,303	26,964	17.52	17.20
Screening Not Complete	17,195	17,756	10.96	11.23
11 - No One Home	3,111	2,951	1.82	1.76
12 - Respondent Unavailable	401	451	0.26	0.27
14 - Physically or Mentally Incompetent	358	419	0.23	0.28
15 - Language Barrier - Hispanic	91	107	0.05	0.06
16 - Language Barrier - Other	468	579	0.33	0.41
17 - Refusal	11,611	11,910	7.47	7.60
21 - Other, Access Denied[2]	1,113	1,269	0.77	0.79
24 - Other, Eligible	14	15	0.01	0.01
27 - Segment Not Accessible	0	0	0.00	0.00
33 - Screener Not Returned	15	23	0.01	0.01
39 - Fraudulent Case	13	27	0.01	0.03
44 - Electronic Screening Problem	0	5	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, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table B.4 Weighted Percentages and Sample Sizes for 2008 and 2009 NSDUHs, by Final Interview Code

Final Interview Code	12+ Sample Size 2008	12+ Sample Size 2009	12+ Weighted Percentage 2008	12+ Weighted Percentage 2009	12-17 Sample Size 2008	12-17 Sample Size 2009	12-17 Weighted Percentage 2008	12-17 Weighted Percentage 2009	18+ Sample Size 2008	18+ Sample Size 2009	18+ Weighted Percentage 2008	18+ Weighted Percentage 2009
TOTAL	86,435	85,429	100.00	100.00	26,501	26,377	100.00	100.00	59,934	59,052	100.00	100.00
70 - Interview Complete	68,736	68,700	74.45	75.68	22,559	22,644	84.73	85.73	46,177	46,056	73.29	74.59
71 - No One at Dwelling Unit	1,366	1,252	1.46	1.56	230	202	0.78	0.71	1,136	1,050	1.54	1.65
72 - Respondent Unavailable	1,940	1,772	2.23	1.96	363	324	1.38	1.07	1,577	1,448	2.33	2.05
73 - Break-Off	68	21	0.11	0.03	10	4	0.04	0.02	58	17	0.12	0.03
74 - Physically/ Mentally Incompetent	876	847	1.88	1.83	205	208	0.77	0.78	671	639	2.01	1.94
75 - Language Barrier - Hispanic	199	155	0.23	0.23	7	7	0.03	0.03	192	148	0.25	0.25
76 - Language Barrier - Other	383	430	1.00	1.08	39	29	0.18	0.11	344	401	1.10	1.18
77 - Refusal	9,883	9,498	16.87	16.15	765	756	2.77	2.92	9,118	8,742	18.46	17.60
78 - Parental Refusal	2,192	2,087	0.88	0.80	2,192	2,087	8.71	8.16	0	0	0.00	0.00
91 - Fraudulent Case	10	6	0.01	0.01	0	1	0.00	0.01	10	5	0.01	0.01
Other[1]	782	661	0.86	0.67	131	115	0.61	0.46	651	546	0.89	0.69

[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, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table B.5 Response Rates and Sample Sizes for 2008 and 2009 NSDUHs, by Demographic Characteristics

Demographic Characteristic	Selected Persons 2008	Selected Persons 2009	Completed Interviews 2008	Completed Interviews 2009	Weighted Response Rate 2008	Weighted Response Rate 2009
TOTAL	86,435	85,429	68,736	68,700	74.45%	75.68%
AGE IN YEARS						
12-17	26,501	26,377	22,559	22,644	84.73%	85.73%
18-25	29,091	28,444	23,468	23,248	80.67%	81.70%
26 or Older	30,843	30,608	22,709	22,808	72.00%	73.34%
GENDER						
Male	42,460	42,008	33,120	33,282	72.39%	74.21%
Female	43,975	43,421	35,616	35,418	76.37%	77.07%
RACE/ETHNICITY						
Hispanic	13,079	12,779	10,395	10,502	74.61%	78.70%
White	56,842	56,052	45,003	44,601	74.43%	75.14%
Black	9,947	9,804	8,327	8,315	78.75%	80.70%
All Other Races	6,567	6,794	5,011	5,282	66.66%	65.91%
REGION						
Northeast	17,336	17,503	13,594	13,772	72.48%	73.44%
Midwest	24,383	23,827	19,314	19,133	74.93%	75.97%
South	25,641	25,560	20,877	20,976	76.59%	77.39%
West	19,075	18,539	14,951	14,819	72.24%	74.50%
COUNTY TYPE						
Large Metropolitan	38,682	38,216	30,133	30,160	72.46%	73.97%
Small Metropolitan	29,254	29,404	23,478	23,926	76.40%	77.55%
Nonmetropolitan	18,499	17,809	15,125	14,614	77.19%	77.92%

Note: Estimates are based on demographic information obtained from screener data and are not consistent with estimates on demographic characteristics presented in the 2008 and 2009 sets of detailed tables (available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs).

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table B.6 Kappa Statistics for Selected Mental Health, Substance Use, Substance Use Treatment, and Demographic Variables: 2006 NSDUH Reliability Study

Variable[1]	Lifetime	Past Year	At Time of Survey
MENTAL HEALTH VARIABLES, AGED 18 OR OLDER			
Major Depressive Episode (MDE)[2]	0.67	0.52	NA
Outpatient Mental Health Treatment or Counseling[3]	--	0.85	NA
Prescription Medication Mental Health Treatment	--	0.85	NA
K6 Score of 13 or Higher[4]	--	0.64	NA
SUBSTANCE USE AND RELATED VARIABLES, AGED 12 OR OLDER			
Marijuana Use	0.93	0.82	NA
Alcohol Use	0.83	0.90	NA
Cigarette Use	0.92	0.93	NA
Substance Dependence or Abuse[5]	--	0.67	NA
Substance Use Treatment[6]	0.89	0.87	NA
DEMOGRAPHIC CHARACTERISTIC VARIABLES[7]			
Gender	NA	NA	1.00
Hispanic, Latino, or Spanish Origin or Descent	NA	NA	0.99
Currently Enrolled in Any School	NA	NA	0.95
Currently Married	NA	NA	0.97

-- Not available.

NA: Not applicable.

[1] Variables used in the analysis were raw variables that had been only minimally edited for ease in analysis and had not been imputed.

[2] 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 a majority of the symptoms for depression as described in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Lifetime MDE is based on multiple questions comprising nine MDE criteria and multiple gatekeeper questions. Past year MDE was asked only of respondents who had lifetime MDE or met the suicidal ideation criterion.

[3] Outpatient Mental Health Treatment or Counseling is defined as having received treatment at any of the following locations for problems with emotions, nerves, or mental health: outpatient mental health clinic or center or office of a private therapist, psychologist, psychiatrist, social worker, or counselor that was not part of a clinic.

[4] Respondents aged 18 or older were administered six items in 2006 (the K6 scale) that measured symptoms of psychological distress during the one month in the past 12 months when respondents were at their worst emotionally. A score of 13 or higher on the K6 scale was used in NSDUHs prior to 2008 to define a measure of serious psychological distress among adults.

[5] Substance Dependence or Abuse is dependence on or abuse of illicit drugs or alcohol and is based on definitions in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Dependence or abuse estimates presented in the Reliability Study are among past year users only, which differ from estimates in the NSDUH mental health detailed tables (available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs). Also, unlike the standard definition of abuse used in the NSDUH mental health detailed tables, abuse was defined independently from dependence in the Reliability Study, meaning that a respondent could be classified as having dependence and as having abused.

[6] Substance Use Treatment refers to treatment received in order to reduce or stop illicit drug or alcohol use, or for medical problems associated with illicit drug or alcohol use. It includes treatment received at any location, such as a hospital, rehabilitation facility (inpatient or outpatient), mental health center, emergency room, private doctor's office, self-help group, or prison/jail. Substance Use Treatment questions were asked only of respondents who previously indicated ever using alcohol or drugs and having ever received treatment for alcohol or drug use.

[7] Aged 12 or older, except for Currently Married (aged 15 or older).

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2006 Reliability Study (n = 3,136).

Table B.7 2009 MHSS Sample Allocation for Quarters 1 and 2 (*n* = 250)

K6 Score	Percent of Population[1]	Assumed SMI Rate (Percent)[2]	Expected Sample Size	Expected SMI Count	Sampling Rate (Percent)
0 to 3	53.10	0.03	15	0	0.00128
4 to 5	13.98	0.30	15	0	0.00473
6 to 7	9.35	0.30	19	0	0.00889
8 to 9	6.08	10.00	33	3	0.02426
10 to 11	4.52	13.00	39	5	0.03872
12 to 15	6.77	40.00	73	29	0.04802
16 or Higher	6.21	67.00	56	37	0.03979
TOTAL	**100.00**	**8.15**	**250**	**74**	

K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study; SMI = serious mental illness.

[1] Source: 2008 National Survey on Drug Use and Health.

[2] Source: National Comorbidity Survey Replication (NCS-R).

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2009.

Table B.8 2009 MHSS Sample Allocation for Quarters 3 and 4 (*n* = 250)

K6 Score	Percent of Population[1]	Assumed Any Mental Illness Rate (Percent)[2]	Expected Sample Size	Expected Any Mental Illness Count	Sampling Rate (Percent)
0 to 3	53.10	3.00	80	2	0.00672
4 to 5	13.98	13.42	42	6	0.01343
6 to 7	9.35	13.95	29	4	0.01365
8 to 9	6.08	33.84	25	9	0.01864
10 to 11	4.52	43.43	20	9	0.01953
12 to 15	6.77	53.78	30	16	0.01965
16 or Higher	6.21	76.04	24	18	0.01682
TOTAL	**100.00**	**17.15**	**250**	**64**	

K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study.

[1] Source: 2008 National Survey on Drug Use and Health.

[2] Source: 2008 Mental Health Surveillance Study.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2009.

Table B.9 2009 MHSS Response Rates (Unweighted and Weighted), by K6 Score Category

K6 Score	Completed Cases (Number Selected)	Completed Cases (Number Completed)	Completed Cases (URR, Percent)	Completed Cases (WRR, Percent)	Analyzable Cases (Number Selected)	Analyzable Cases (Number Completed)	Analyzable Cases (URR, Percent)	Analyzable Cases (WRR, Percent)
0 to 3	105	59	56.2	56.0	105	59	56.2	56.0
4 to 5	60	40	66.7	66.0	60	40	66.7	66.0
6 to 7	75	53	70.7	74.4	75	53	70.7	74.4
8 to 9	91	65	71.4	45.6	91	65	71.4	45.6
10 to 11	96	65	67.7	73.2	96	65	67.7	73.2
12 to 15	193	143	74.1	68.4	193	143	74.1	68.4
16 or Higher	151	96	63.6	65.4	151	95	62.9	65.2
TOTAL	**771**	**521**	**67.6**	**60.5**	**771**	**520**	**67.4**	**60.5**

K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study; URR = unweighted response rate; WRR = weighted response rate.

NOTE: The set of analyzable cases excludes one case from the 2009 MHSS sample because all mental health item scores were missing.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2009.

Table B.10 Final WHODAS and SDS Models in the 2008 MHSS

WHODAS Model	Beta	Beta SE	*T* Statistic	*P* Value	*DF*	Wald *P* Value
Intercept	-4.7500	0.3517	-13.5072	0.0000		
Alt PY K6	0.2098	0.0755	2.7769	0.0060	1	0.0060
Alt WHODAS	0.3839	0.1248	3.0750	0.0024	1	0.0024
SDS Model						
Intercept	-4.4924	0.5223	-8.6011	0.0000		
Alt PY K6	0.2960	0.0956	3.0957	0.0023	1	0.0023
Alt SDS	0.2242	0.3918	0.5721	0.5679	1	0.5679

Alt = alternative; DF = degrees of freedom; K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study; PY = past year; SDS = four-item Sheehan Disability Scale; SE = standard error; WHODAS = eight-item World Health Organization Disability Assessment Schedule.

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

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

NOTE: Alternative SDS Score: SDS item scores < 7 recoded as 0; SDS item scores 7-10 recoded as 1, then summed for a score ranging from 0 to 4.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008.

Table B.11 Final ROC Statistics of Final WHODAS Model in the 2008 MHSS: Weighted Numbers in Thousands

Demographic Subset for Final WHODAS Model: Alternative Past Year K6 Score + Alternative WHODAS Score	Cut Point	P	N	Pred_P	Pred_N	TP	TN	FP	FN	Sens	Spec	AUC	PPV	NPV
TOTAL	0.26972	4,977	108,453	5,116	108,314	2,516	105,853	2,600	2,461	0.506	0.976	0.741	0.492	0.977
GENDER														
Male	0.26972	1,724	56,524	1,759	56,490	814	55,579	945	911	0.472	0.983	0.728	0.463	0.984
Female	0.26972	3,253	51,928	3,358	51,824	1,703	50,273	1,655	1,551	0.523	0.968	0.746	0.507	0.970
AGE														
18-25	0.26972	881	15,652	1,466	15,068	496	14,682	970	386	0.562	0.938	0.750	0.338	0.974
26-49	0.26972	2,375	44,385	2,459	44,301	1,162	43,088	1,298	1,213	0.489	0.971	0.730	0.472	0.973
50+	0.26972	1,721	48,415	1,191	48,945	859	48,082	333	863	0.499	0.993	0.746	0.721	0.982
RACE/ETHNICITY														
White, Not Hispanic	0.26972	4,538	68,714	4,384	68,868	2,228	66,558	2,156	2,310	0.491	0.969	0.730	0.508	0.966
Black, Not Hispanic	0.26972	286	13,860	483	13,663	230	13,606	253	56	0.804	0.982	0.893	0.476	0.996
Other, Not Hispanic	0.26972	33	11,163	153	11,043	23	11,032	130	10	0.686	0.988	0.837	0.148	0.999
Hispanic	0.26972	120	14,716	96	14,740	35	14,655	60	85	0.293	0.996	0.644	0.368	0.994
EDUCATION														
< High School	0.26972	693	8,876	737	8,833	455	8,594	282	239	0.656	0.968	0.812	0.618	0.973
High School Graduate	0.26972	2,028	32,772	1,506	33,294	812	32,079	694	1,216	0.401	0.979	0.690	0.539	0.963
Some College	0.26972	1,251	33,258	1,772	32,737	651	32,137	1,121	600	0.520	0.966	0.743	0.367	0.982
College Graduate	0.26972	1,005	33,546	1,102	33,450	598	33,043	504	407	0.595	0.985	0.790	0.543	0.988

AUC = area under receiver operating characteristic (ROC) curve based on optimal cut point [(sensitivity + specificity)/2]; FN = number of false negatives based on prediction; FP = number of false positives based on prediction; K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study; N = number of negative SMI cases; NPV = negative predictive value (TN/Pred_N); P = number of positive SMI cases; PPV = positive predictive value (TP/Pred_P); Pred_N = number of predicted negative cases; Pred_P = number of predicted positive cases; Sens = sensitivity (TP/P); Spec = specificity (TN/N); TN = number of true negatives based on prediction; TP = number of true positives based on prediction; WHODAS = eight-item World Health Organization Disability Assessment Schedule.

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

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

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008.

Table B.12 Final ROC Statistics of Final SDS Model in the 2008 MHSS: Weighted Numbers in Thousands

Demographic Subset for Final SDS Model: Alternative Past Year K6 Score + Alternative SDS Score	Cut Point	P	N	Pred_P	Pred_N	TP	TN	FP	FN	Sens	Spec	AUC	PPV	NPV
TOTAL	0.26657	4,744	106,748	4,837	106,655	1,782	103,693	3,055	2,963	0.376	0.971	0.673	0.368	0.972
GENDER														
Male	0.26657	2,636	47,669	1,801	48,504	895	46,763	906	1,741	0.340	0.981	0.660	0.497	0.964
Female	0.26657	2,109	59,079	3,036	58,152	887	56,930	2,150	1,222	0.421	0.964	0.692	0.292	0.979
AGE														
18-25	0.26657	787	15,618	1,331	15,074	596	14,883	735	191	0.758	0.953	0.855	0.448	0.987
26-49	0.26657	1,737	51,335	2,507	50,565	879	49,707	1,628	858	0.506	0.968	0.737	0.351	0.983
50+	0.26657	2,220	39,795	999	41,017	306	39,102	693	1,914	0.138	0.983	0.560	0.307	0.953
RACE/ETHNICITY														
White, Not Hispanic	0.26657	2,740	78,741	2,925	78,556	1,325	77,141	1,600	1,415	0.484	0.980	0.732	0.453	0.982
Black, Not Hispanic	0.26657	1,373	9,847	531	10,688	33	9,349	498	1,339	0.024	0.949	0.487	0.063	0.875
Other, Not Hispanic	0.26657	539	2,753	1,211	2,081	394	1,935	818	145	0.731	0.703	0.717	0.325	0.930
Hispanic	0.26657	92	15,408	170	15,330	30	15,268	140	63	0.323	0.991	0.657	0.176	0.996
EDUCATION														
< High School	0.26657	1,690	9,137	424	10,403	197	8,909	227	1,493	0.116	0.975	0.546	0.464	0.856
High School Graduate	0.26657	627	39,117	1,147	38,597	430	38,400	717	197	0.686	0.982	0.834	0.375	0.995
Some College	0.26657	1,454	27,081	1,803	26,731	527	25,804	1,276	927	0.363	0.953	0.658	0.292	0.965
College Graduate	0.26657	973	31,414	1,463	30,924	628	30,579	835	345	0.645	0.973	0.809	0.429	0.989

AUC = area under receiver operating characteristic (ROC) curve based on optimal cut point [(sensitivity + specificity)/2]; FN = number of false negatives based on prediction; FP = number of false positives based on prediction; K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study; N = number of negative SMI cases; NPV = negative predictive value (TN/Pred_N); P = number of positive SMI cases; PPV = positive predictive value (TP/Pred_P); Pred_N = number of predicted negative cases; Pred_P = number of predicted positive cases; SDS = four-item Sheehan Disability Scale; Sens = sensitivity (TP/P); Spec = specificity (TN/N); TN = number of true negatives based on prediction; TP = number of true positives based on prediction.

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

NOTE: Alternative SDS Score: SDS item scores < 7 recoded as 0; SDS item scores 7-10 recoded as 1, then summed for a score ranging from 0 to 4.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008.

Table B.13 K6 Cut Points for Each WHODAS and SDS Total Score in the 2008 MHSS

Alternative WHODAS Total Score	Alternative Worst K6 SMI Cut Point	Worst K6 SMI Cut Point
0	17	24
1	17	24
2	15	22
3	13	20
4	11	18
5	9	16
6	7	14
7	6	13
8	4	11
Alternative SDS Total Score	**Alternative Worst K6 SMI Cut Point**	**Worst K6 SMI Cut Point**
0	12	19
1	11	18
2	11	18
3	10	17
4	9	16

K6 = six-item psychological distress scale; MHSS = Mental Health Surveillance Study; SDS = four-item Sheehan Disability Scale; SMI = serious mental illness; WHODAS = eight-item World Health Organization Disability Assessment Schedule.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008.

Appendix C: Key Definitions, 2009

This appendix provides definitions for many of the measures and terms used in this report on the 2009 National Survey on Drug Use and Health (NSDUH). Where relevant, cross-references also are provided. For some key terms, specific question wording, including "feeder questions" that precede the question(s), is provided for clarity.

Abuse

Abuse of illicit drugs or alcohol was defined as meeting one or more of the four criteria for abuse included in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association [APA], 1994) and if the definition for dependence was not met for that substance. Additional criteria for alcohol and marijuana abuse include the use of these substances on 6 or more days in the past 12 months. These questions have been included in the survey since 2000. Responses to the dependence or abuse questions based only on the past year use of methamphetamine, Ambien®, Adderall®, or specific hallucinogens from the routing patterns added between 2005 and 2008 were not included in these measures. See Section B.4.1 of Appendix B for additional details.

SEE: "Dependence" and "Prevalence."

Adult Education

SEE: "Education."

Age

Age of the respondent was defined as "age at time of interview." The interview program calculated the respondent's age from the date of birth and interview date. The interview program prompts the interviewer to confirm the respondent's age after it has been calculated.

Alcohol Use

Measures of use of alcohol in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last drank an alcoholic beverage?"

Feeder question: "The next questions are about alcoholic beverages, such as beer, wine, brandy, and mixed drinks. Listed on the next screen are examples of the types of beverages we are interested in. Please review this list carefully before you answer these questions. These questions are about drinks of alcoholic beverages. Throughout these questions, by a 'drink,' we mean a can or bottle of beer, a glass of wine or a wine cooler, a shot of liquor,

or a mixed drink with liquor in it. We are not asking about times when you only had a sip or two from a drink. Have you ever, even once, had a drink of any type of alcoholic beverage? Please do not include times when you only had a sip or two from a drink."

SEE: "Binge Use of Alcohol," "Current Use," "Heavy Use of Alcohol," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

American Indian or Alaska Native

American Indian or Alaska Native only, not of Hispanic, Latino, or Spanish origin (including North American, Central American, or South American Indian); does not include respondents reporting two or more races. (Respondents reporting that they were American Indians or Alaska Natives and of Hispanic, Latino, or Spanish origin were classified as Hispanic.)

SEE: "Hispanic" and "Race/Ethnicity."

Any Mental Illness

SEE: "Mental Illness."

Asian

Asian only, not of Hispanic, Latino, or Spanish origin; does not include respondents reporting two or more races. (Respondents reporting that they were Asian and of Hispanic, Latino, or Spanish origin were classified as Hispanic.) Specific Asian groups that were asked about were Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, and "Other Asian."

SEE: "Hispanic" and "Race/Ethnicity."

Binge Use of Alcohol

Binge use of alcohol was 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.

Feeder question: "How long has it been since you last drank an alcoholic beverage?"

SEE: "Alcohol Use" and "Heavy Use of Alcohol."

Black

Black/African American only, not of Hispanic, Latino, or Spanish origin; does not include respondents reporting two or more races. (Respondents reporting that they were black or African American and of Hispanic, Latino, or Spanish origin were classified as Hispanic.)

SEE: "Hispanic" and "Race/Ethnicity."

Cash Assistance

Cash assistance was defined as receipt of direct monetary payments due to low income, such as Temporary Assistance for Needy Families (TANF), welfare, or other public assistance. Since 2008, all respondents have received a single question asking whether anyone in the family received cash assistance from a State or county welfare program.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Welfare Assistance."

Cigar Use

Measures of use of cigars (including cigarillos and little cigars) in the respondent's lifetime, the past year, and the past month were developed from responses to the questions about cigar use in the past 30 days and the recency of use (if not in the past 30 days): "Now think about the past 30 days—that is, from [DATEFILL] up to and including today. During the past 30 days, have you smoked part or all of any type of cigar?" and "How long has it been since you last smoked part or all of any type of cigar?" Responses to questions about use of cigars with marijuana in them (blunts) were not included in these measures.

Feeder question: "The next questions are about smoking cigars. By cigars we mean any kind, including big cigars, cigarillos, and even little cigars that look like cigarettes. Have you ever smoked part or all of any type of cigar?"

SEE: "Cigarette Use," "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," "Recency of Use," "Smokeless Tobacco Use," and "Tobacco Product Use."

Cigarette Use

Measures of use of cigarettes in the respondent's lifetime, the past year, and the past month were developed from responses to the questions about cigarette use in the past 30 days and the recency of use (if not in the past 30 days): "Now think about the past 30 days—that is, from [DATEFILL] up to and including today. During the past 30 days, have you smoked part or all of a cigarette?" and "How long has it been since you last smoked part or all of a cigarette?"

Feeder question: "These questions are about your use of tobacco products. This includes cigarettes, chewing tobacco, snuff, cigars, and pipe tobacco. The first questions are about cigarettes only. Have you ever smoked part or all of a cigarette?"

SEE: "Cigar Use," "Current Use," "Lifetime Use," "Past Month Daily Cigarette Use," "Past Month Use," "Past Year Use," "Prevalence," "Recency of Use," "Smokeless Tobacco Use," and "Tobacco Product Use."

Cocaine Use

Measures of use of cocaine in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used any form of cocaine?"

Feeder question: "These questions are about cocaine, including all the different forms of cocaine such as powder, crack, free base, and coca paste. Have you ever, even once, used any form of cocaine?"

SEE: "Crack Use," "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

College Enrollment Status

This measure was computed only for college-aged respondents (i.e., respondents aged 18 to 22). Respondents in this age group were classified as full-time college students or as some other status (including part-time students, students in other grades, or nonstudents). Respondents were classified as full-time college students if they reported that they were attending (or will be attending) their first through fifth or higher year of college or university and that they were (or will be) a full-time student. Respondents whose current enrollment status was unknown were excluded from this variable.

Core

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. Supplemental or "noncore" questions, or modules, can be revised, dropped, or added from year to year and make up the latter part 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.

SEE: "Noncore."

County Type

Counties were grouped based on the "Rural/Urban Continuum Codes" developed by the U.S. Department of Agriculture (2003). Each county is in either a metropolitan statistical area (MSA) or outside of an MSA (also see Butler & Beale, 1994). Large metropolitan (large metro) areas have a population of 1 million or more. Small metropolitan (small metro) areas have a population of fewer than 1 million. Nonmetropolitan (nonmetro) areas are outside of MSAs and include urbanized counties with a population of 20,000 or more in urbanized areas, less urbanized counties with a population of at least 2,500 but fewer than 20,000 in urbanized areas, and completely rural counties with a population of fewer than 2,500 in urbanized areas. Estimates based on county-type information presented in this report use the 2003 revised definition of an MSA; estimates for 2002 in this report, therefore, are not directly comparable with those presented in the 2002 NSDUH report (Office of Applied Studies [OAS], 2003).

Crack Use

Measures of use of crack cocaine in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used *crack*?"

Feeder questions: "These questions are about cocaine, including all the different forms of cocaine such as powder, *crack*, free base, and coca paste. Have you ever, even once, used any form of cocaine?"

"The next questions are about *crack*, that is cocaine in rock or chunk form, and not the other forms of cocaine. Have you ever, even once, used *crack*?"

SEE: "Cocaine Use," "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Current Use

Any reported use of a specific substance in the past 30 days.

SEE: "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Dependence

Dependence on illicit drugs or alcohol was defined as meeting three out of seven dependence criteria (for substances that included questions to measure a withdrawal criterion) or three out of six dependence criteria (for substances that did not include withdrawal

questions) for that substance, based on criteria included in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (APA, 1994). Additional criteria for alcohol and marijuana dependence since 2000 included the use of these substances on 6 or more days in the past 12 months. Responses to the dependence or abuse questions based only on the past year use of methamphetamine, Ambien®, Adderall®, or specific hallucinogens from the routing patterns added between 2005 and 2008 were not included in these measures. See Section B.4.1 in Appendix B for additional details.

SEE: "Abuse" and "Prevalence."

Depression

SEE: "Major Depressive Episode."

Distress

SEE: "K6 Scale."

Ecstasy Use

Measures of use of Ecstasy or MDMA (methylenedioxy-methamphetamine) in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used *Ecstasy*, also known as MDMA?"

SEE: "Current Use," "Hallucinogen Use," "Lifetime Use," "LSD Use," "Past Month Use," "Past Year Use," "PCP Use," "Prevalence," and "Recency of Use."

Education

This is the measure of educational attainment among respondents who are aged 18 or older. It is based on respondents' reports of their highest grade or year of school that they completed. Response alternatives were presented in terms of single years of education, ranging from 0 if respondents never attended school to 17 if respondents completed 5 or more years at the college or university level. Respondents were classified into four categories based on their answers: less than high school, high school graduate, some college, and college graduate. Persons indicating having completed the 12th grade were classified as high school graduates, and persons who indicated completing 4 or more years at the college or university level were defined as being college graduates.

Employment

Respondents were asked to report whether they worked in the week prior to the interview, and if not, whether they had a job despite not working in the past week. Respondents who worked in the past week or who reported having a job despite not working were asked whether they usually work 35 or more hours per week. Respondents who did not work in the past week but had a job were

asked to look at a card that described why they did not work in the past week despite having a job. Respondents who did not have a job in the past week were asked to look at a different card that described why they did not have a job in the past week.

Full-time "Full-time" includes respondents who usually work 35 or more hours per week and who worked in the past week or had a job despite not working in the past week.

Part-time "Part-time" includes respondents who usually work fewer than 35 hours per week and who worked in the past week or had a job despite not working in the past week.

Unemployed "Unemployed" refers to respondents who did not have a job and were looking for work or who were on layoff. For consistency with the Current Population Survey definition of unemployment, respondents who reported that they did not have a job but were looking for work needed to report making specific efforts to find work in the past 30 days, such as sending out resumes or applications, placing ads, or answering ads.

Other "Other" includes all responses defined as not being in the labor force, including being a student, keeping house or caring for children full time, retired, disabled, or other miscellaneous work statuses. Respondents who reported that they did not have a job and did not want one also were classified as not being in the labor force. Similarly, respondents who reported not having a job and looking for work also were classified as not being in the labor force if they did not report making specific efforts to find work in the past 30 days. Those respondents who reported having no job and provided no additional information could not have their labor force status determined and were therefore assigned to the "Other" employment category.

Ethnicity SEE: "Race/Ethnicity."

Ever Use SEE: "Lifetime Use."

Family Income

Family income was ascertained by asking respondents about their total personal income and total family income, based on the following questions: "Of these income groups, which category best represents (your /SAMPLE MEMBER's) total personal income during [the previous calendar year]?" and "Of these income groups, which category best represents (your/SAMPLE MEMBER's) total combined family income during [the previous calendar year]?" Family is defined as any related member in the household, including all foster relationships and unmarried partners (including same-sex partners). It excludes roommates, boarders, and other nonrelatives.

NOTE: If no other family members were living with the respondent, total family income was based on information about the respondent's total personal income. For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

Food Stamps

Food stamps are government-issued coupons that can be used to purchase food. Instead of coupons, some States issue a special card that can be used like a credit card to purchase food in grocery stores. Since 2008, all respondents have received a single question asking whether anyone in the family received food stamps.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Welfare Assistance."

Functional Impairment

SEE: "Global Assessment of Functioning (GAF)," "Mental Illness," "Sheehan Disability Scale (SDS)," and "World Health Organization Disability Assessment Schedule (WHODAS)."

Global Assessment of Functioning (GAF)

As indicated in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association [APA], 1994), mental health clinicians use the Global Assessment of Functioning (GAF) to consider a person's psychological, social, and occupational functioning on a hypothetical continuum.

Clinicians do not include impairment in functioning due to physical or environmental limitations. When adequate information is available, numeric ratings for the GAF range from 1 to 100. Lower values on the rating scale indicate a greater extent of impairment due to the presence of a diagnosable mental, behavioral, or emotional disorder. In clinical interviews that were conducted with a subset of adult NSDUH respondents, clinicians rated respondents' worst period of functioning in the past 12 months.

SEE: "Mental Illness," "Sheehan Disability Scale (SDS)," and "World Health Organization Disability Assessment Schedule (WHODAS)."

Hallucinogen Use

Measures of use of hallucinogens in the respondent's lifetime, the past year, and the past month were developed from responses to the core question about recency of use: "How long has it been since you last used any hallucinogen?" Responses to noncore questions about the use of the following drugs, which were added to the survey in 2006, were not included in these measures: ketamine, DMT (dimethyltryptamine), AMT (alpha-methyltryptamine), 5-MeO-DIPT (5-methoxy-diisopropyltryptamine, also known as "Foxy"), and *Salvia divinorum*.

Feeder questions: "The next questions are about substances called hallucinogens. These drugs often cause people to see or experience things that are not real... Have you ever, even once, used LSD, also called *acid*? Have you ever, even once, used PCP, also called *angel dus*t or phencyclidine? Have you ever, even once, used peyote? Have you ever, even once, used mescaline? Have you ever, even once, used psilocybin, found in mushrooms? Have you ever, even once, used *Ecstasy*, also known as MDMA? Have you ever, even once used any other hallucinogen besides the ones that have been listed?"

SEE: "Core," "Current Use," "Ecstasy Use," "Lifetime Use," "LSD Use," "Noncore," "Past Month Use," "Past Year Use," "PCP Use," "Prevalence," and "Recency of Use."

Health Insurance Status

A series of questions was asked to identify whether respondents currently were covered by Medicare, Medicaid, the State Children's Health Insurance Program (SCHIP), military health care (such as TRICARE or CHAMPUS), private health insurance, or any kind of health insurance (if respondents reported not being covered by any of the above). If respondents did not currently have

health insurance coverage, questions were asked to determine the length of time they were without coverage and the reasons for not being covered.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Medicaid" and "Medicare."

Heavy Use of Alcohol

Heavy use of alcohol was 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 each of 5 or more days in the past 30 days. Heavy alcohol users also were defined as binge users of alcohol.

Feeder question: "How long has it been since you last drank an alcoholic beverage?"

SEE: "Alcohol Use" and "Binge Use of Alcohol."

Heroin Use

Measures of use of heroin in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used heroin?"

Feeder question: "These next questions are about heroin. Have you ever, even once, used heroin?"

SEE: "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Hispanic

Hispanic was defined as anyone of Hispanic, Latino, or Spanish origin. Respondents were classified as Hispanic in the race/ethnicity measure regardless of race.

SEE: "American Indian or Alaska Native," "Asian," "Black," "Race/Ethnicity," "Two or More Races," and "White."

Illicit Drugs

Illicit drugs include marijuana or hashish, cocaine (including crack), inhalants, hallucinogens (including phencyclidine [PCP], lysergic acid diethylamide [LSD], and Ecstasy [MDMA]), heroin, or prescription-type psychotherapeutics used nonmedically, which include stimulants, sedatives, tranquilizers, and pain relievers. Illicit drug use refers to use of any of these drugs based on responses to questions only in the core sections and does not

include data from the noncore methamphetamine items that were added in 2005 and 2006. Responses to questions about the use of the following drugs, which were added to the survey beginning in 2006, were not included in these measures: GHB (gamma hydroxybutyrate), Adderall®, Ambien®, nonprescription cough or cold medicines, ketamine, DMT (dimethyltryptamine), AMT (alpha-methyltryptamine), 5-MeO-DIPT (5-methoxy-diisopropyltryptamine, also known as "Foxy"), and *Salvia divinorum*.

SEE: "Core," "Current Use," "Lifetime Use," "Noncore," "Past Month Use," "Past Year Use," "Prevalence," "Psychotherapeutic Drugs," and "Recency of Use."

Illicit Drugs Other Than Marijuana

These drugs include cocaine (including crack), inhalants, hallucinogens (including phencyclidine [PCP], lysergic acid diethylamide [LSD], and Ecstasy [MDMA]), heroin, or prescription-type psychotherapeutics used nonmedically, which include stimulants, sedatives, tranquilizers, and pain relievers. This measure includes marijuana users who used any of the above drugs in addition to using marijuana, as well as users of those drugs who have not used marijuana. The measure for illicit drugs other than marijuana is defined based on responses to questions only in the core sections and does not include responses based on the noncore methamphetamine items that were added in 2005 and 2006. Responses to questions about the use of the following drugs, which were added to the survey beginning in 2006, were not included in these measures: GHB (gamma hydroxybutyrate), Adderall®, Ambien®, nonprescription cough or cold medicines, ketamine, DMT (dimethyltryptamine), AMT (alpha-methyltryptamine), and 5-MeO-DIPT (5-methoxy-diisopropyltryptamine, also known as "Foxy"), and *Salvia divinorum*.

SEE: "Core," "Current Use," "Lifetime Use," "Noncore," "Past Month Use," "Past Year Use," "Prevalence," "Psychotherapeutic Drugs," and "Recency of Use."

Income

SEE: "Family Income."

Inhalant Use

Measures of use of inhalants in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used any inhalant for kicks or to get high?"

Feeder questions: "These next questions are about liquids, sprays, and gases that people sniff or inhale to get high or to make them feel good... Have you ever, even once, inhaled [INHALANT NAME] for kicks or to get high?" Respondents were asked about the following inhalants: (a) amyl nitrite, "poppers," locker room odorizers, or "rush"; (b) correction fluid, degreaser, or cleaning fluid; (c) gasoline or lighter fluid; (d) glue, shoe polish, or toluene; (e) halothane, ether, or other anesthetics; (f) lacquer thinner or other paint solvents; (g) lighter gases, such as butane or propane; (h) nitrous oxide or whippits; (i) spray paints; (j) some other aerosol spray; and (k) any other inhalants besides the ones that have been listed.

SEE: "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

K6 Scale

The K6 scale consists of six questions that gather information on how frequently adult respondents experienced symptoms of psychological distress during the one month in the past year when they were at their worst emotionally (Kessler et al., 2003a). These questions use five categories to ask about the frequency of feeling (1) nervous; (2) hopeless; (3) restless or fidgety; (4) sad or depressed; (5) that everything was an effort; and (6) no good or worthless. The survey since 2008 has first asked adults about these symptoms for the past 30 days (the time frame for which the K6 was originally designed). Adults also are asked if they had a period in the past 12 months when they felt more depressed, anxious, or emotionally stressed than they felt during the past 30 days. If so, they also are asked the K6 questions for the one month in the past 12 months when they felt the worst. Responses to these six questions for the past 30 days and (if applicable) the past 12 months are coded and summed to produce a score ranging from 0 to 24; if respondents are asked the K6 questions for both the past 30 days and past 12 months, the higher of the two scores is chosen as the final score. Higher K6 total scores indicate greater distress. 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; both of these are needed to determine whether a respondent can be categorized as having serious mental illness (SMI). Therefore, NSDUH interview data from the K6 and impairment scales were calibrated to data from clinical interviews that served as a "gold standard" for measuring mental disorders and impairment. See Section B.4.3 in Appendix B for more information about the K6 and its scoring, as well as the methods and results of the calibration analyses.

SEE: "Global Assessment of Functioning (GAF)," "Mental Illness," "Sheehan Disability Scale (SDS)," and "World Health Organization Disability Assessment Schedule (WHODAS)."

Large Metro

SEE: "County Type."

Lifetime Use

Lifetime use indicates use of a specific substance at least once in the respondent's lifetime. This measure includes respondents who also reported last using the substance in the past 30 days or past 12 months.

SEE: "Current Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Low (Mild) Mental Illness

SEE: "Mental Illness."

Low Precision

Prevalence estimates based on only a few respondents or with relatively large standard errors were not shown in this report. In the mental health detailed tables, these estimates have been replaced with an asterisk (*) and noted as "low precision" (tables available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs). Such estimates have been omitted because one cannot place a high degree of confidence in their accuracy. See Table B.2 in Appendix B for a complete list of the rules used to determine low precision.

LSD Use

Measures of use of lysergic acid diethylamide (LSD) in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used LSD?"

SEE: "Current Use," "Ecstasy Use," "Hallucinogen Use," "Lifetime Use," "Past Month Use," "Past Year Use," "PCP Use," "Prevalence," and "Recency of Use."

Major Depressive Episode

A person was defined as having had a lifetime major depressive episode (MDE) if he or she had at least five or more of the following nine symptoms in the same 2-week period in his or her lifetime, in which at least one of the symptoms was a depressed mood or loss of interest or pleasure in daily activities: (1) depressed mood most of the day, nearly every day; (2) markedly diminished interest or pleasure in all or almost all activities most of the day, nearly every day; (3) significant weight loss when not dieting or weight gain or decrease or increase in appetite nearly

every day; (4) insomnia or hypersomnia nearly every day; (5) psychomotor agitation or retardation nearly every day; (6) fatigue or loss of energy nearly every day; (7) feelings of worthlessness nearly every day; (8) diminished ability to think or concentrate or indecisiveness nearly every day; and (9) recurrent thoughts of death or recurrent suicide ideation.

This definition is based on the definition found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (APA, 1994). A person was defined as having an MDE in the past year if he or she (a) had a lifetime MDE; (b) had a period of time in the past 12 months when he or she felt depressed or lost interest or pleasure in daily activities for 2 weeks or longer; and (c) reported during this period of 2 weeks or longer in the past 12 months that he or she had "some of the other problems" that he or she reported for a lifetime MDE.

In 2008, a split-sample design randomly assigned adults aged 18 or older to one of two impairment scales: a reduced set of questions from the World Health Organization Disability Assessment Schedule (WHODAS) or the Sheehan Disability Scale (SDS). For comparability purposes, estimates for MDE for 2008 are based only on the WHODAS half sample. All estimates for 2009 are based on the full sample. See Section B.4.4 of Appendix B for additional details regarding the measurement of MDE.

SEE: "Severe Impairment Due to Major Depressive Episode."

Marijuana Use

Measures of use of marijuana in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used marijuana or hashish?" Responses to questions about use of cigars with marijuana in them (blunts) were not included in these measures.

Feeder question: "The next questions are about marijuana and hashish. Marijuana is also called pot or grass. Marijuana is usually smoked, either in cigarettes called joints, or in a pipe. It is sometimes cooked in food. Hashish is a form of marijuana that is also called *hash*. It is usually smoked in a pipe. Another form of hashish is hash oil. Have you ever, even once, used marijuana or hashish?"

SEE: "Current Use," "Illicit Drugs," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Medicaid

Medicaid is a public assistance program that pays for medical care for low-income and disabled persons. Respondents were asked specifically about the Medicaid program in the State where they lived. Respondents aged 12 to 19 were asked specifically about the State Children's Health Insurance Program (SCHIP) in their State. Respondents aged 12 to 19 who reported that they were covered by the SCHIP in their State also were classified as being covered by Medicaid. Respondents aged 65 or older who reported that they were covered by Medicaid were asked to verify that their answer was correct.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Health Insurance Status" and "Medicare."

Medicare

Medicare is a health insurance program for persons aged 65 or older and for certain disabled persons. Respondents under the age of 65 who reported that they were covered by Medicare were asked to verify that their answer was correct.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Health Insurance Status" and "Medicaid."

Mental Health Service Utilization

For adults aged 18 or older, mental health service utilization is defined as receiving treatment or counseling for any problem with emotions, nerves, or mental health in the 12 months prior to the interview in any inpatient or outpatient setting, or the use of prescription medication for treatment of any mental or emotional condition. Estimates for adults are based only on responses to items in the module on adult mental health service utilization.

For youths aged 12 to 17, mental health service utilization is defined as receiving within the 12 months prior to the interview treatment or counseling for any emotional or behavioral problem in the specialty mental health setting (inpatient or outpatient

services); the education setting (school-based services); the general medical setting (pediatrician or family physician services); or the juvenile justice setting (juvenile detention center, prison, or jail).

Treatment for only a substance use problem is not included for adults or youths.

SEE: "Prevalence" and "Unmet Need for Mental Health Services."

Mental Health Treatment

SEE: "Mental Health Service Utilization" and "Treatment for Major Depressive Episode."

Mental Illness

Mental illness among persons aged 18 or older is defined according to two dimensions: (1) the presence of a diagnosable mental, behavioral, or emotional disorder in the past year (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) (APA, 1994); and (2) the level of interference with or limitation of one or more major life activities resulting from a disorder (functional impairment). Adult NSDUH respondents' mental illness was determined based on modeling their responses to questions on distress (K6 scale) and impairment (truncated version of the World Health Organization Disability Assessment Schedule [WHODAS] for half the sample in 2008 and the Sheehan Disability Scale [SDS] for the other half). In 2009, the WHODAS was adopted as the NSDUH assessment for measuring functional impairment, and the questions comprising the SDS were removed from the survey. See Section B.4.3 in Appendix B for additional details on model specifications and on specification of levels of impairment for mental illness variables.

Mental illness, differentiated by the level of functional impairment, is defined as follows:

Any Any mental illness among adults is defined 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 as defined above, regardless of the level of impairment in carrying out major life activities.

Low (mild) Low (mild) mental illness among adults is defined 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 as defined above, but resulting in no more than mild impairment in carrying out major life activities, based on clinical interview Global Assessment of Functioning (GAF) scores of greater than 59.

Moderate Moderate mental illness among adults is defined 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 as defined above and resulting in moderate impairment in carrying out major life activities, based on GAF scores of 51 to 59.

Serious Serious mental illness (SMI) among adults is defined in Public Law 102-321 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 as defined above and resulting in substantial impairment in carrying out major life activities, based on GAF scores of 50 or less.

SEE: "Global Assessment of Functioning (GAF)," "K6 Scale," "Prevalence," "Severe Impairment Due to Major Depressive Episode," "Sheehan Disability Scale (SDS)," and "World Health Organization Disability Assessment Schedule (WHODAS)."

Methamphetamine Use Measures of use of methamphetamine (also known as crank, crystal, ice, or speed), Desoxyn®, or Methedrine® in the respondent's lifetime, the past year, and the past month were developed from responses to the core question about recency of use: "How long has it been since you last used methamphetamine, Desoxyn, or Methedrine?" In this report, estimates for the methamphetamine use measures from 2006 onward also include responses based on the noncore methamphetamine use items that were added in 2005 and 2006; estimates for 2002 through 2005 have been adjusted to make them comparable with estimates from 2006 onward that include responses to the noncore methamphetamine items.

SEE: "Core," "Current Use," "Lifetime Use," "Noncore," "Past Month Use," "Past Year Use," "Prevalence," "Recency of Use," and "Stimulant Use."

Midwest Region

The States included are those in the East North Central Division—Illinois, Indiana, Michigan, Ohio, and Wisconsin—and the West North Central Division—Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and South Dakota.

SEE: "Region."

Mild Mental Illness

SEE: "Mental Illness."

Moderate Mental Illness

SEE: "Mental Illness."

Native Hawaiian or Other Pacific Islander

Native Hawaiian or Other Pacific Islander, not of Hispanic, Latino, or Spanish origin; does not include respondents reporting two or more races. (Respondents reporting that they were Native Hawaiian or Other Pacific Islander and of Hispanic, Latino, or Spanish origin were classified as Hispanic.)

SEE: "Hispanic" and "Race/Ethnicity."

Noncash Assistance

Noncash assistance refers to assistance that is not in the form of direct monetary payments due to low income, such as help getting a job, placement in an education or job training program, or help with transportation, child care, or housing. Since 2008, all respondents have received a single question asking whether anyone in the family received noncash assistance.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Cash Assistance" and "Welfare Assistance."

Noncore

A core set of unaltered questions (consisting of demographic items and modules on the use of tobacco, alcohol, marijuana, cocaine, crack cocaine, heroin, hallucinogens, inhalants, pain relievers, tranquilizers, stimulants, and sedatives) is critical for basic trend measurement of prevalence estimates. This core set remains in the survey every year and comprises the first part of the interview. Supplemental or "noncore" questions, or modules, can be revised, dropped, or added from year to year and make up the latter part of the interview. Supplemental topics in the remaining 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 health care issues, and mental health issues. Supplemental demographic questions (which are interviewer-administered and follow the audio computer-assisted self-interviewing [ACASI] questions) address such topics as immigration, current school enrollment, employment and workplace issues, health insurance coverage, and income. It should be noted that some of the supplemental portions of the interview have remained in the survey, relatively unchanged, from year to year (e.g., current health insurance coverage, employment).

SEE: "Core."

Nonmedical Use of Psychotherapeutics

A core section of the interview instrument deals with nonmedical use of four classes of prescription-type psychotherapeutics: pain relievers, sedatives, stimulants, and tranquilizers. Nonmedical use is defined as use of at least one of these medications without a prescription belonging to the respondent or use that occurred simply for the experience or feeling the drug caused. In this report, estimates for the measures of nonmedical use of psychotherapeutics from 2006 onward also include responses based on the noncore methamphetamine use items that were added in 2005 and 2006; estimates for 2002 through 2005 have been adjusted to make them comparable with estimates from 2006 onward that include responses to the noncore methamphetamine items. Responses to questions about the nonmedical use of Adderall® (a stimulant) and Ambien® (a sedative), which were added to the survey in 2006, were not included in these measures.

Measures of use of nonmedical psychotherapeutic agents in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used any prescription [pain reliever, sedative, stimulant, or tranquilizer] that was not prescribed for you or that you took only for the experience or feeling it caused?"

Feeder question: "Now we have some questions about drugs that people are supposed to take only if they have a prescription from a doctor. We are only interested in your use of a drug if the drug was not prescribed for you, or if you took the drug only for the experience or feeling it caused."

NOTE: The pill card contains pictures and names of specific drugs within each psychotherapeutic category. For example,

pictures and the names of Valium®, Librium®, and other tranquilizers are shown when the section on tranquilizers is introduced.

SEE: "Core," "Current Use," "Lifetime Use," "Methamphetamine Use," "Noncore," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Pill Cards," "Prevalence," "Psychotherapeutic Drugs," "Recency of Use," "Sedative Use," "Stimulant Use," and "Tranquilizer Use."

Nonmetro

SEE: "County Type."

Northeast Region

The States included are those in the New England Division—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont—and the Middle Atlantic Division—New Jersey, New York, and Pennsylvania.

SEE: "Region."

OxyContin® Use

Measures of use of the prescription pain reliever OxyContin® in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used OxyContin that was not prescribed for you or that you took only for the experience or feeling it caused?"

SEE: "Current Use," "Lifetime Use," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Pain Reliever Use

Measures of the nonmedical use of prescription-type pain relievers in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used any prescription pain reliever that was not prescribed for you, or that you took only for the experience or feeling it caused?"

Feeder question: "These questions are about the use of pain relievers. We are not interested in your use of *over-the-counter* pain relievers such as aspirin, Tylenol, or Advil that can be bought in drug stores or grocery stores without a doctor's prescription. Card A shows pictures of some different types of prescription pain relievers and lists the names of some others. These pictures show only pills, but we are interested in your use of any form of prescription pain relievers that were not prescribed for you or that you took only for the experience or feeling they caused."

The following prescription pain relievers were listed on Pill Card A (Pain Relievers): (1) Darvocet®, Darvon®, or Tylenol® with Codeine; (2) Percocet®, Percodan®, or Tylox®; (3) Vicodin®, Lortab®, or Lorcet®/Lorcet Plus®; (4) Codeine; (5) Demerol®; (6) Dilaudid®; (7) Fioricet®; (8) Fiorinal®; (9) Hydrocodone; (10) Methadone; (11) Morphine; (12) OxyContin®; (13) Phenaphen® with Codeine; (14) Propoxyphene; (15) SK-65®; (16) Stadol® (no picture); (17) Talacen®; (18) Talwin®; (19) Talwin NX®; (20) Tramadol (no picture); and (21) Ultram®.

SEE: "Current Use," "Lifetime Use," "Nonmedical Use of Psychotherapeutics," "OxyContin® Use," "Past Month Use," "Past Year Use," "Pill Cards," "Prevalence," "Psychotherapeutic Drugs," "Recency of Use," "Sedative Use," "Stimulant Use," and "Tranquilizer Use."

Past Month Daily Cigarette Use

A respondent was defined as being a past month daily cigarette user if he or she smoked part or all of a cigarette on each of the past 30 days.

Feeder question: "Now think about the past 30 days – that is, from [DATEFILL] up to and including today. During the past 30 days, have you smoked part or all of a cigarette?"

SEE: "Cigarette Use."

Past Month Use

This measure indicates use of a specific substance in the 30 days prior to the interview. Respondents who indicated past month use of a specific substance also were classified as lifetime and past year users.

SEE: "Current Use," "Lifetime Use," "Past Year Use," "Prevalence," and "Recency of Use."

Past Year Use

This measure indicates use of a specific substance in the 12 months prior to the interview. This definition includes those respondents who last used the substance in the 30 days prior to the interview. Respondents who indicated past year use of a specific substance also were classified as lifetime users.

SEE: "Current Use," "Lifetime Use," "Past Month Use," "Prevalence," and "Recency of Use."

PCP Use

Measures of use of phencyclidine (PCP) in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used PCP?"

SEE: "Current Use," "Ecstasy Use," "Hallucinogen Use," "Lifetime Use," "LSD Use," "Past Month Use," "Past Year Use," "Prevalence," and "Recency of Use."

Percentages

In the mental health detailed tables, which were used as the basis for the estimates in this report, percentages are based on weighted data (tables available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs).

SEE: "Rounding."

Pill Cards

The pill cards contain pictures and names of specific drugs within each psychotherapeutic category. For example, pictures and the names of Valium®, Librium®, and other tranquilizers are shown when the questionnaire section on tranquilizers is introduced.

SEE: "Current Use," "Lifetime Use," "Nonmedical Use of Psychotherapeutics," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Prevalence," "Psychotherapeutic Drugs," "Recency of Use," "Sedative Use," "Stimulant Use," and "Tranquilizer Use."

Prevalence

Prevalence is a general term used to describe the estimates for lifetime, past year, and past month substance use, dependence or abuse, or other behaviors of interest within a given period (e.g., the past 12 months). Other behaviors of interest include mental health service utilization, treatment for a substance use problem, unmet need for mental health services, and mental illness.

SEE: "Abuse," "Current Use," "Dependence," "Mental Health Service Utilization," "Mental Illness," "Recency of Use," "Treatment for a Substance Use Problem," and "Unmet Need for Mental Health Services."

Psychotherapeutic Drugs

Psychotherapeutic drugs are prescription-type medications with legitimate medical uses as pain relievers, tranquilizers, stimulants, and sedatives. The interview instrument covers nonmedical use of these drugs, which involves use without a prescription belonging to the respondent or use that occurred simply for the experience or feeling the drug caused. In this report, estimates for psychotherapeutic drug measures from 2006 onward include

responses based on the core questions about nonmedical use of psychotherapeutics and the noncore methamphetamine use items that were added in 2005 and 2006; estimates for 2002 through 2005 have been adjusted to make them comparable with estimates from 2006 onward that include responses to the noncore methamphetamine items.

SEE: "Core," "Current Use," "Lifetime Use," "Methamphetamine Use," "Noncore," "Nonmedical Use of Psychotherapeutics," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Pill Cards," "Prevalence," "Recency of Use," "Sedative Use," "Stimulant Use," and "Tranquilizer Use."

Race/Ethnicity

Race/ethnicity is used to refer to the respondent's self-classification of racial and ethnic origin and identification. For Hispanic origin, respondents were asked, "Are you of Hispanic, Latino, or Spanish origin or descent?" For race, respondents were asked, "Which of these groups best describes you?" Response alternatives were (1) white, (2) black/African American, (3) American Indian or Alaska Native, (4) Native Hawaiian, (5) Other Pacific Islander, (6) Asian, and (7) Other. Categories for a combined race/ethnicity variable included Hispanic; non-Hispanic groups where respondents indicated only one race (white, black, American Indian or Alaska Native, Native Hawaiian or Other Pacific Islander, Asian); and non-Hispanic groups where respondents reported two or more races. These categories are based on classifications developed by the U.S. Census Bureau.

SEE: "American Indian or Alaska Native," "Asian," "Black," "Hispanic," "Native Hawaiian or Other Pacific Islander," "Two or More Races," and "White."

Recency of Use

The recency question for each substance was the source for the lifetime, past year, and past month prevalence estimates.

The question was essentially the same for all classes of substances. The question was: "How long has it been since you last used [substance name]?" For the four classes of psychotherapeutics, the phrase "that was not prescribed for you or only for the experience or feeling it caused" was added after the name of the drug.

For tobacco products (cigarettes, snuff, chewing tobacco, or cigars), a question first was asked about use in the past 30 days. If the respondent did not use the product in the past 30 days, the recency question was asked as above, with the response

alternatives (1) more than 30 days ago but within the past 12 months; (2) more than 12 months ago but within the past 3 years; and (3) more than 3 years ago. For the remaining substances, the response alternatives were (1) within the past 30 days; (2) more than 30 days ago but within the past 12 months; and (3) more than 12 months ago.

SEE: "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," and "Prevalence."

Region

Four regions, Northeast, Midwest, South, and West, are based on classifications developed by the U.S. Census Bureau.

SEE: "Midwest Region," "Northeast Region," "South Region," and "West Region."

Rounding

The decision rules for the rounding of percentages were as follows. If the second number to the right of the decimal point was greater than or equal to 5, the first number to the right of the decimal point was rounded up to the next higher number. If the second number to the right of the decimal point was less than 5, the first number to the right of the decimal point remained the same. Thus, a prevalence estimate of 16.55 percent would be rounded to 16.6 percent, while an estimate of 16.44 percent would be rounded to 16.4 percent. Although the percentages discussed in the text and shown in the mental health detailed tables generally total 100 percent, the use of rounding sometimes produces a total of slightly less than or more than 100 percent (tables available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs).

SEE: "Percentages."

Sedative Use

Measures of the nonmedical use of prescription-type sedatives in the respondent's lifetime, the past year, and the past month were developed from responses to the core question about recency of use: "How long has it been since you last used any prescription sedative that was not prescribed for you, or that you took only for the experience or feeling it caused?" Responses to noncore questions about use of the prescription sedative Ambien®, which were added to the survey in 2006, were not included in these measures.

Feeder question: "These next questions ask about the use of sedatives or barbiturates. These drugs are also called *downers* or *sleeping pills*. People take these drugs to help them relax or to help them sleep. We are not interested in the use of *over-the-counter*

sedatives such as Sominex, Unisom, Nytol, or Benadryl that can be bought in drug stores or grocery stores without a doctor's prescription. Card D shows pictures of different kinds of prescription sedatives and lists the names of some others. These pictures show only pills, but we are interested in your use of any form of prescription sedatives that were not prescribed for you or that you took only for the experience or feeling they caused."

The following prescription sedatives were listed on Pill Card D (Sedatives): (1) Methaqualone (includes Sopor®, Quaalude®) (no picture); (2) Nembutal®, Pentobarbital (no picture), Seconal®, Secobarbital (no picture), or Butalbital (no picture); (3) Restoril® or Temazepam; (4) Amytal®; (5) Butisol®; (6) Chloral Hydrate (no picture); (7) Dalmane®; (8) Halcion®; (9) Phenobarbital; (10) Placidyl®; and (11) Tuinal®.

SEE: "Core," "Current Use," "Lifetime Use," "Noncore," "Nonmedical Use of Psychotherapeutics," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Pill Cards," "Prevalence," "Psychotherapeutic Drugs," "Recency of Use," "Stimulant Use," and "Tranquilizer Use."

Self-Help Group

NSDUH has collected data on self-help groups because they may be potential locations of treatment for a substance use problem. Respondents who reported that they received treatment for their use of alcohol or drugs in the past 12 months were asked whether they received treatment in a self-help group, such as Alcoholics Anonymous or Narcotics Anonymous; these groups were not considered specialty substance use treatment facilities. Beginning with the 2006 survey, respondents also were asked whether they attended self-help groups in the past 12 months to receive help for their alcohol or drug use, regardless of whether they previously reported receiving any treatment in the past 12 months.

SEE: "Specialty Substance Use Treatment Facility" and "Treatment for a Substance Use Problem."

Serious Mental Illness (SMI)

SEE: "Mental Illness."

Severe Impairment Due to Major Depressive Episode

Severe impairment in adults is defined by the level of role interference reported to be caused by major depressive episode (MDE) in the past 12 months. The Sheehan Disability Scale (SDS) role domains are assessed on a 0 to 10 visual analog scale with

impairment categories of "none" (0), "mild" (1-3), "moderate" (4-6), "severe" (7-9), and "very severe" (10). For adults aged 18 or older, the SDS role domains are (1) home management, (2) work, (3) close relationships with others, and (4) social life. For youths aged 12 to 17, the SDS role domains are (1) chores at home, (2) school or work, (3) close relationships with family, and (4) social life. Ratings of 7 or greater in one or more role domains are classified as severe impairment. See Section B.4.4 of Appendix B for additional details.

SEE: "Major Depressive Episode," "Mental Illness," and "Sheehan Disability Scale (SDS)."

Sheehan Disability Scale (SDS)

The Sheehan Disability Scale (SDS) consists of a series of four questions that are used to measure impairment in a person's daily functioning. The SDS role domains are assessed on a 0 to 10 visual analog scale with impairment categories of "none" (0), "mild" (1-3), "moderate" (4-6), "severe" (7-9), and "very severe" (10). For adults aged 18 or older, the SDS role domains are (1) home management, (2) work, (3) close relationships with others, and (4) social life. For youths aged 12 to 17, the SDS role domains are (1) chores at home, (2) school or work, (3) close relationships with family, and (4) social life. Ratings of 7 or greater are classified as severe impairment. In 2009, respondents were asked about interference caused by past year major depressive episode (MDE). Summing across the four responses resulted in a total score with a range from 0 to 40.

SEE: "Mental Illness," "Prevalence," "Severe Impairment Due to Major Depressive Episode," and "World Health Organization Disability Assessment Schedule (WHODAS)."

Significance

For comparison of trends over time, statistically significant differences between estimates from two different time points (e.g., 2008 and 2009) were identified at two levels: 0.05 and 0.01. Thus, estimates with different values that did not meet the criteria for statistical significance were not considered to be different from one another. In addition, for discussion in the text of this report, a significance level of 0.05 was used to determine whether estimates from different demographic subgroups were statistically different.

Small Metro

SEE: "County Type."

Smokeless Tobacco Use

Measures of use of smokeless tobacco in the respondent's lifetime, the past year, and the past month were developed from responses to the questions about snuff and chewing tobacco use in the past 30 days and the recency of use (if not in the past 30 days): "Now think about the past 30 days—that is, from [DATEFILL] up to and including today. During the past 30 days, have you used snuff, even once?" "How long has it been since you last used snuff?" "Now think about the past 30 days—that is, from [DATEFILL] up to and including today. During the past 30 days, have you used chewing tobacco, even once?" and "How long has it been since you last used chewing tobacco?"

Feeder questions: "These next questions are about your use of snuff, sometimes called dip... Have you ever used snuff, even once?" and "These next questions are only about chewing tobacco... Have you ever used chewing tobacco, even once?"

SEE: "Cigar Use," "Cigarette Use," "Current Use," "Lifetime Use," "Past Month Use," "Past Year Use," "Prevalence," "Recency of Use," and "Tobacco Product Use."

South Region

The States included are those in the South Atlantic Division—Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia; the East South Central Division—Alabama, Kentucky, Mississippi, and Tennessee; and the West South Central Division—Arkansas, Louisiana, Oklahoma, and Texas.

SEE: "Region."

Specialty Substance Use Treatment Facility

Defined as a drug or alcohol rehabilitation facility (inpatient or outpatient), a hospital (inpatient services only), or a mental health center.

SEE: "Self-Help Group" and "Treatment for a Substance Use Problem."

Stimulant Use

Measures of nonmedical use of prescription-type stimulants in the respondent's lifetime, the past year, and the past month were developed from responses to the core questions about recency of use: "How long has it been since you last used any prescription stimulant that was not prescribed for you or that you took only for the experience or feeling it caused?" and "How long has it been since you last used Methamphetamine, Desoxyn, or Methedrine?" In this report, estimates for the stimulant use measures from 2006

onward included responses based on the noncore methamphetamine use items that were added in 2005 and 2006; estimates for 2002 through 2005 have been adjusted to make them comparable with estimates from 2006 onward that include responses to the noncore methamphetamine items. However, measures of stimulant use do not include data from noncore questions added to the survey in 2006 about the use of the prescription stimulant Adderall®.

Feeder question: "These next questions are about the use of drugs such as amphetamines that are known as stimulants, *uppers*, or *speed*. People sometimes take these drugs to lose weight, to stay awake, or for attention deficit disorders. We are not interested in the use of *over-the-counter* stimulants such as Dexatrim or No-Doz that can be bought in drug stores or grocery stores without a doctor's prescription. Card C shows pictures of some different kinds of prescription stimulants and lists the names of some others. These pictures show only pills, but we are interested in your use of any form of prescription stimulants that were not prescribed for you or that you took only for the experience or feeling it caused."

The following prescription stimulants were listed on Pill Card C (Stimulants): (1) Methamphetamine (crank, crystal, ice, or speed) (no picture), Desoxyn®, or Methedrine® (no picture); (2) Amphetamines (no picture), Benzedrine®, Biphetamine®, Fastin®, or Phentermine; (3) Ritalin® or Methylphenidate; (4) Cylert®; (5) Dexedrine®; (6) Dextroamphetamine (no picture); (7) Didrex®; (8) Eskatrol®; (9) Ionamin®; (10); Mazanor®; (11) Obedrin-LA® (no picture); (12) Plegine®; (13) Preludin®; (14) Sanorex®; and (15) Tenuate®.

SEE: "Core," "Current Use," "Lifetime Use," "Methamphetamine Use," "Noncore," "Nonmedical Use of Psychotherapeutics," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Pill Cards," "Prevalence," "Psychotherapeutic Drugs," "Recency of Use," "Sedative Use," and "Tranquilizer Use."

Substance Use Treatment

SEE: "Treatment for a Substance Use Problem."

Suicide

Adults aged 18 or older were asked whether they had seriously thought about, made any plans, or attempted to kill themselves at any time during the past 12 months, or if they had received medical attention from a health professional or stayed overnight in a hospital in the past 12 months because of a suicide attempt.

SEE: "Prevalence."

Supplemental Security Income (SSI)

Supplemental Security Income (SSI) is a governmental program that makes assistance payments to low-income, aged, blind, and disabled persons. Since 2008, all respondents have received a single question asking whether anyone in the family received SSI.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Welfare Assistance."

Tobacco Product Use

This measure indicates use of any tobacco product: cigarettes, chewing tobacco, snuff, cigars, and pipe tobacco. Tobacco product use in the past year includes past month pipe tobacco use. Tobacco product use in the past year does not include use of pipe tobacco more than 30 days ago but within 12 months of the interview because the survey did not capture this information. Measures of tobacco product use in the respondent's lifetime, the past year, or the past month also do not include use of cigars with marijuana in them (blunts).

SEE: "Cigar Use," "Cigarette Use," and "Smokeless Tobacco Use."

Total Family Income

SEE: "Family Income."

Tranquilizer Use

Measures of the nonmedical use of prescription-type tranquilizers in the respondent's lifetime, the past year, and the past month were developed from responses to the question about recency of use: "How long has it been since you last used any prescription tranquilizer that was not prescribed for you, or that you took only for the experience or feeling it caused?"

Feeder question: "These next questions ask about the use of tranquilizers. Tranquilizers are usually prescribed to relax people, to calm people down, to relieve anxiety, or to relax muscle spasms. Some people call tranquilizers *nerve pills*. Card B shows pictures of some different kinds of prescription tranquilizers. These pictures show only pills, but we are interested in your use of any form of prescription tranquilizers that were not prescribed for you, or that you took only for the experience or feeling they caused."

The following prescription tranquilizers were listed on Pill Card B (Tranquilizers): (1) Klonopin® or Clonazepam; (2) Xanax®, Alprazolam, Ativan®, or Lorazepam; (3) Valium® or Diazepam; (4) Atarax®; (5) BuSpar®; (6) Equanil®; (7) Flexeril®; (8) Librium®; (9) Limbitrol®; (10) Meprobamate; (11) Miltown®; (12) Rohypnol®; (13) Serax®; (14) Soma®; (15) Tranxene®; and (16) Vistaril®.

SEE: "Current Use," "Lifetime Use," "Nonmedical Use of Psychotherapeutics," "Pain Reliever Use," "Past Month Use," "Past Year Use," "Pill Cards," "Prevalence," "Psychotherapeutic Drugs," "Recency of Use," "Sedative Use," and "Stimulant Use."

Treatment for Depression

Treatment for depression is defined as seeing or talking to a medical doctor or other professional or using prescription medication in the past year for depression.

Treatment for Major Depressive Episode

Treatment for major depressive episode (MDE) is the same as treatment for depression. In this report, treatment for depression refers to treatment among those classified with past year MDE.

SEE: "Major Depressive Episode" and "Treatment for Depression."

Treatment for a Substance Use Problem

Respondents were asked whether they had received treatment for illicit drug use, alcohol use, or both illicit drug and alcohol use in the past 12 months in any of the following locations: a hospital overnight as an inpatient, a residential drug or alcohol rehabilitation facility where they stayed overnight, a drug or alcohol rehabilitation facility as an outpatient, a mental health facility as an outpatient, an emergency room, a private doctor's office, a prison or jail, a self-help group, or some other place.

SEE: "Alcohol Use," "Illicit Drugs," "Prevalence," "Self-Help Group," and "Specialty Substance Use Treatment Facility."

Two or More Races

Respondents were asked to report which racial group describes them. Response alternatives were (1) white, (2) black or African American, (3) American Indian or Alaska Native, (4) Native Hawaiian, (5) Other Pacific Islander, (6) Asian, and (7) Other. Respondents were allowed to choose more than one of these groups. Persons who chose both the "Native Hawaiian" and "Other

Pacific Islander" categories (and no additional categories) were classified in a single category: Native Hawaiian or Other Pacific Islander. Otherwise, persons reporting two or more of the above groups and that they were not of Hispanic, Latino, or Spanish origin were included in a "Two or More Races" category. This category does not include respondents who reported more than one Asian subgroup but who reported "Asian" as their only race. Respondents reporting two or more races and reporting that they were of Hispanic, Latino, or Spanish origin were classified as Hispanic.

SEE: "Hispanic" and "Race/Ethnicity."

Unmet Need for Mental Health Services

Unmet need for mental health services is defined as a perceived need for mental health treatment in the past 12 months that was not received. 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.

Feeder question: "During the past 12 months, was there any time when you needed mental health treatment or counseling for yourself but didn't get it?"

SEE: "Mental Health Service Utilization" and "Prevalence."

Welfare Assistance

Household participation in one or more government (welfare) assistance programs during the prior calendar year was defined as one or more family members receiving Supplemental Security Income (SSI), food stamps, cash, or noncash assistance. SSI provides payments to low-income, aged, blind, and disabled persons. Food stamps are government-issued coupons used to purchase food. Cash assistance refers to cash payments through Temporary Assistance for Needy Families (TANF), welfare, or other public assistance. Noncash assistance refers to services, such as help getting a job, placement in an education or job-training program, or help with transportation, child care, or housing. Since 2008, all respondents have received single versions of the welfare assistance questions that asked whether anyone in the household received each of the welfare services described above.

NOTE: For youths aged 12 to 17 and those respondents who were unable to respond to the insurance or income questions, proxy responses were accepted from a household member identified as being better able to give the correct information about insurance and income.

SEE: "Cash Assistance," "Food Stamps," "Noncash Assistance," and "Supplemental Security Income (SSI)."

West Region

The States included are those in the Mountain Division—Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming; and the Pacific Division—Alaska, California, Hawaii, Oregon, and Washington.

SEE: "Region."

White

White, not of Hispanic, Spanish, or Latino origin; does not include respondents reporting two or more races. (Respondents reporting that they were white and of Hispanic, Latino, or Spanish origin were classified as Hispanic.)

SEE: "Hispanic" and "Race/Ethnicity."

World Health Organization Disability Assessment Schedule (WHODAS)

The World Health Organization Disability Assessment Schedule (WHODAS) consists of a series of questions that are used for assessing disturbances in social adjustment and behavior (i.e., functional impairment). A reduced set of WHODAS items was used in NSDUH (Novak et al., 2010; Rehm et al., 1999). Respondents were asked if they had difficulty doing any of the following eight activities during the 1 month when their emotions, nerves, or mental health interfered most with their daily activities: (1) remembering to do things they needed to do; (2) concentrating on doing something important when other things were going on around them; (3) going out of the house and getting around on their own; (4) dealing with people they did not know well; (5) participating in social activities; (6) taking care of household responsibilities; (7) taking care of daily responsibilities at work or school; and (8) getting daily work done as quickly as needed. These eight items were assessed on a 0 to 3 scale with categories of "no difficulty," "don't know," and "refuse" (0); "mild difficulty" (1); "moderate difficulty" (2); and "severe difficulty" (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 the eight responses resulted in a total score with a range from 0 to 24.

SEE: "Mental Illness," "Prevalence," "Severe Impairment Due to Major Depressive Episode," and "Sheehan Disability Scale (SDS)."

Appendix D: Supplementary Analysis of Data on Receipt of Mental Health Treatment

D.1 Introduction and Background

Analyses presented in this appendix are based on combined data from the 2008 and 2009 National Surveys on Drug Use and Health (NSDUHs). An annual average of 30.1 million adults aged 18 or older in 2008 and 2009, or 13.3 percent of adults, received mental health treatment in the past year (see Exhibit D.1 below and Table D.1 at the end of this appendix). Among adults with any mental illness in the past year,[18] 16.7 million (37.6 percent of those with any mental illness) received mental health treatment in the past year, including 6.2 million adults with serious mental illness (SMI) in the past year who received mental health treatment (59.5 percent of those with SMI). Furthermore, an estimated 13.5 million of the 30.1 million adults who received mental health treatment in the past year did not meet criteria for any mental illness in the past year.[19] This estimated number of adults without mental illness who received treatment is equivalent to 7.4 percent of the adult population without mental illness in the past year and nearly 45 percent of adults who received mental health treatment in the past year.[20]

Exhibit D.1. Receipt of Mental Health Treatment in the Past Year, by Level of Mental Illness: Numbers in Thousands and Percentages, Annual Averages Based on 2008-2009 Data

Level of Mental Illness	Number Receiving Treatment	Percentage Receiving Treatment
Total Aged 18 or Older	30,090	13.3
Any Mental Illness	16,659	37.6
Serious Mental Illness	6,156	59.5
No Mental Illness	13,458	7.4

Note: For details on the methodology, see Section B.4.3 in Appendix B of this report. For definitions, see Appendix C.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

[18] See Appendix C for definitions of mental illness.

[19] Estimated numbers of adults with any mental illness or without mental illness from the 2008 NSDUH data who received mental health treatment or counseling in the past 12 months are based on the half sample who received the impairment questions from the World Health Organization Disability Assessment Schedule (WHODAS). Corresponding estimated numbers of adults from the 2009 NSDUH are based on the full adult sample. In addition, the overall annual average estimated numbers of adults who received mental health treatment or counseling in the past year (i.e., regardless of mental illness classification) from both 2008 and 2009 are based on the full sample of adults. Therefore, estimated numbers of adults with any mental illness or without mental illness who received mental health treatment in the past year do not sum to the estimated 30.1 million adults overall who received treatment or counseling.

[20] Because the estimated numbers of all adults who received mental health treatment or counseling that are shown in Exhibit D.1 and Table D.1 are based on the full sample of adults from 2008 and 2009, percentages of adults who received mental health treatment and had any mental illness or did not have mental illness were calculated using the WHODAS half sample of adults for 2008 and the full sample of adults for 2009.

In order to elucidate the finding that 13.5 million persons without mental illness received mental health treatment in the past year, an analysis was conducted based on the data available in the 2008 and 2009 NSDUHs. One factor that was investigated was the level of treatment received, with the hypothesis that adults without mental illness received less intensive treatment than those with any mental illness or those with SMI. Other factors that were investigated were the possible presence of mental health problems that are below the threshold for classifying an adult as having mental illness and possible misspecification of the models and cut points used to categorize persons as having SMI or any mental illness. The latter analyses investigated whether some adults who received mental health treatment in the past year may have been misclassified in the modeling as not having mental illness in the past year.

These analyses should be viewed as an initial exploration of this issue rather than an exhaustive investigation of the explanations for the receipt of mental health treatment in the past year among adults without mental illness. Additional analyses may provide further understanding of this finding.

D.2 Previous Studies

Several surveys of the epidemiology of mental illness have found that a sizable proportion of persons who received mental health treatment did not meet criteria for mental disorders included in the survey. For example, Druss et al. (2007) reviewed literature indicating that in the 1980 Epidemiologic Catchment Area (ECA) study (Regier et al., 1993), the 1990-1992 National Comorbidity Survey (NCS; Kessler et al., 1994, 2005b), and the National Comorbidity Survey Replication (NCS-R; Wang et al., 2005), approximately half of the respondents who obtained treatment for mental health or substance use disorders in the year before the interview did not meet criteria for any of the disorders assessed in these surveys. Moreover, this pattern does not appear to be unique to the United States. Persons without diagnosed disorders have comprised substantial proportions of treated cases in mental health needs assessment surveys in both developed and developing nations (Bijl et al., 2003; Demyttenaere et al., 2004; Kessler et al., 1997).

In an analysis of data from the NCS-R, Druss et al. (2007) reported that 61.2 percent of adult respondents who received mental health or substance abuse services in the past 12 months had a 12-month diagnosis based on the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV; American Psychiatric Association [APA], 1994), leaving 38.8 percent who did not have a 12-month diagnosis. An estimated 21.1 percent of respondents who received services had a lifetime but not a 12-month diagnosis, and 9.7 percent had some other indication of potential need, such as the presence of symptoms below the threshold for a diagnosis, a serious stressor in the past 12 months, or a lifetime hospitalization for a mental health or substance abuse problem. Among the remaining 8.0 percent with none of these indicators of need, 73.5 percent of their visits were classified as outside of the health care system, involving services either from a human services professional, such as a religious or spiritual advisor or a social worker in a setting other than a specialty mental health setting (30.7 percent), or from a complementary and alternative medicine provider (42.8 percent). Although this study presented combined data for mental health and substance use disorders and use of either mental health or substance abuse services, Druss et al. concluded that most of these services in the United States are provided to adults with some indication of need.

D.3 Types of Treatment Received

Analyses were conducted to determine whether individuals without mental illness differed from those with any mental illness or SMI in the type and amount of treatment received, as well as the perceived need for additional treatment. As shown in Table D.1, an estimated 11.2 million of the 13.5 million adults without mental illness in the past year who received mental health treatment in the past 12 months took medication that had been prescribed for them to treat a mental or emotional condition,[21] or about 83 percent of these adults without mental illness who received mental health treatment. In addition, the only mental health treatment for 8.0 million of these adults without mental illness was prescription medication. These 8.0 million adults comprised about 60 percent of adults without mental illness who received mental health treatment and about 72 percent of adults without mental illness who took prescribed medication. These adults without mental illness could have been prescribed medication without having a diagnosed mental disorder or could have included persons with prior symptoms of mental illness (but not in the past year) who were currently receiving medication to maintain their status. NSDUH also does not collect information about the number of medications that were prescribed or the frequency of taking prescribed medication.

Adults without mental illness were less likely than their counterparts with any mental illness or SMI to have received outpatient or inpatient mental health treatment in the past 12 months. An estimated 5.1 million adults without mental illness received outpatient mental health treatment or counseling in the past 12 months, or about 38 percent of the 13.5 million adults without mental illness who received mental health treatment. In comparison, 9.5 million of the 16.7 million adults with any mental illness who received mental health treatment, or about 57 percent, received outpatient mental health treatment. Also, 4.1 million of the 6.2 million adults with SMI who received mental health treatment (66 percent) received outpatient treatment. In addition, fewer than 500,000 adults without mental illness were estimated to have received mental health treatment or counseling as inpatients, or about 3 percent of adults without mental illness who received mental health treatment or counseling. Among adults with any mental illness who received mental health treatment, 1.3 million received inpatient mental health treatment (8 percent). About 700,000 adults with SMI received inpatient treatment (12 percent of adults with SMI who received mental health treatment).[22]

Taking prescribed medication also was the most common form of mental health treatment among the 16.7 million adults with any mental illness who received mental health treatment in the past 12 months (14.4 million adults, or about 87 percent of adults with any mental illness). Unlike adults without mental illness, however, prescription drug treatment for adults with any mental illness tended to be accompanied by other treatment. An estimated 6.7 million adults with any mental illness who received mental health treatment received only prescription medication, or about 41 percent of all adults with any mental illness who received mental health treatment and about 47 percent of adults with any mental illness who received prescription medication. About 2.0 million adults with SMI received prescription drug medication but not inpatient or

[21] Adult respondents were asked, "During the past 12 months, did you take any prescription medication that was prescribed for you to treat a mental or emotional condition?"

[22] Estimated numbers of persons in Table D.1 who received outpatient and inpatient mental health treatment could include persons who received both types of services.

outpatient treatment (32 percent of adults with SMI who received any mental health treatment and 36 percent of adults with SMI who received prescription medication).

In addition, data from Table D.1 suggest that adults without mental illness who received outpatient treatment or counseling received fewer outpatient visits compared with their counterparts with any mental illness or SMI. An estimated 36.8 percent of adults without mental illness who received outpatient treatment had only one or two outpatient visits in the past 12 months compared with 23.6 percent of their counterparts who had any mental illness and 19.3 percent of those with SMI.[23] At the other end of the continuum, only 6.3 percent of adults without mental illness who received outpatient treatment had 25 or more outpatient visits in the past 12 months compared with 14.9 percent of those with any mental illness and 21.1 percent of those with SMI.

Adults without mental illness who received mental health treatment in the past year also were less likely than those with any mental illness or SMI to perceive a need for additional treatment. Only 4.9 percent of those without mental illness who received mental health treatment or counseling perceived a need for additional treatment compared with 28.6 percent of those with any mental illness and 45.4 percent of those with SMI.

Taken together, these results indicate that the majority of the adults without mental illness who received mental health treatment in the past 12 months received only prescription medication. When adults without mental illness received outpatient treatment, they tended to receive fewer sessions of outpatient treatment compared with those with any mental illness or SMI. Adults without mental illness who received treatment also were less likely than those with any mental illness or SMI to perceive a need for additional treatment.

D.4 Other Mental Health and Substance Use Measures and Indicators of Impairment

Additional analyses were conducted to examine other mental health problems, substance use, and impairment among the 13.5 million adults who were not classified with any mental illness in the past year but who had received mental health treatment or counseling in that period. The purpose of these analyses was to determine the extent to which receipt of treatment could be explained by histories of mental or substance use disorders or the presence of symptoms, despite these adults not having a diagnosable condition in the past 12 months.

Of the adults who were not classified with any mental illness and who had received mental health treatment or counseling in the past year, 19.5 percent had a major depressive episode (MDE) in their lifetime, 9.8 percent were dependent on or abused alcohol or illicit drugs in past year, and 2.3 percent had serious thoughts of suicide in the past year (Table D.2). An estimated 3.8 percent were classified as subthreshold for mental illness, meaning that their data were close to but below the cut point for being defined as having any mental illness. Altogether, 30.2 percent of adults without mental illness who received mental health treatment had one or more of these characteristics. In comparison, 70.1 percent of adults with any mental illness and

[23] When rounded to the nearest tenth of a percent, individual percentages in Table D.1 for one visit and two visits among adults without mental illness who received outpatient mental health treatment sum to 36.9 percent.

88.2 percent of those with SMI who received mental health treatment had one or more of these characteristics. However, the subthreshold for mental illness classification by definition does not apply to any mental illness and SMI.

Table D.3 presents annual average scores and associated standard errors for adults' impairment in carrying out important life activities, as measured by a reduced set of items from WHODAS (Rehm et al., 1999) that were used in NSDUH. Impairment scales ranged from 0 to 24 (WHODAS scale) or from 0 to 8 (WHODAS alternative scale). Mean impairment scores for adults without mental illness who received mental health treatment were lower than the corresponding mean scores for adults with any mental illness or SMI who received treatment. Among adults without mental illness, however, the mean impairment scores for adults who received mental health treatment were higher than the mean scores for their counterparts who did not receive treatment.

In summary, these analyses indicate that despite the lack of a diagnosable mental disorder, more than 30 percent of adults without mental illness who received mental health treatment in the past year showed other symptoms that might indicate a need for mental health treatment. In addition, these adults without mental illness who received treatment also showed a higher average level of impairment in carrying out major life activities due to problems with their emotions, nerves, or mental health compared with adults without mental illness who did not receive mental health treatment. It also is possible that adults without mental illness in the past year who had a lifetime history of disorders, such as MDE, and who received prescription medication in the past year could have been prescribed medication to reduce their symptoms or to maintain them at subclinical levels. Similarly, adults without mental illness but who were classified as subthreshold for mental illness in the past year could have been prescribed medications to prevent the development or return of additional symptoms.

D.5 Possible Misclassification Bias Introduced by Using Model-Based Estimates of Mental Illness

Section B.4.3 in Appendix B of this report presents details about the methods involved in the estimation of mental illness among adults using mental health data from NSDUH and clinical interview data from a subsample of NSDUH adult respondents (referred to as the Mental Health Surveillance Study, or MHSS). In brief, samples of about 1,500 adults in the 2008 MHSS and about 500 adults in the 2009 MHSS were administered clinical interviews over the telephone. Trained clinical interviewers assessed MHSS respondents for the presence of mental disorders and functional impairment. These clinical assessments were considered to be the "gold standard" for measuring mental illness in NSDUH.

A full clinical interview could not be incorporated into the NSDUH design for all adult respondents; therefore, adults in NSDUH were asked brief sets of screening questions for psychological distress and impairment (see Section B.4.3 for descriptions of these screeners). Data from these brief screeners were used as predictors in statistical models to develop estimates of mental illness using the clinical data from the MHSS sample. The estimates produced for these models were used to predict mental illness in the full sample of NSDUH adults in order to obtain national estimates of SMI and other mental illness measures among adults.

The model that was selected for the estimation of SMI and other mental illness measures, such as any mental illness, yielded estimates that are unbiased for the overall adult population because the weighted numbers of false-positive and false-negative counts were equalized for the selected model (see Section B.4.3). However, the false-positive and false-negative counts may not necessarily be equally distributed across the levels of other variables. Within some groups, therefore, the models might yield biased estimates of any mental illness. For example, 42.1 percent of adults with any mental illness were estimated to have received mental health treatment in the past year based on the Structured Clinical Interview for DSM-IV (SCID) subsamples for 2008 and 2009 and categories predicted from modeling analyses (see Table D.4). In comparison, an annual average of 37.6 percent of adults with any mental illness were estimated to have received mental health treatment based on the predictive model for the WHODAS half sample for 2008 and the full adult sample in 2009. This indicates a potential misclassification bias for adults with any mental illness who received mental health treatment or counseling in the past year.

Consequently, additional analyses investigated methods to provide bias-adjusted estimates of predicted any mental illness status cross-tabulated with other mental health variables. Both multiplicative and additive adjustment approaches were considered. Although the two approaches provided very similar adjusted estimates, the additive approach was preferred because the adjusted estimates over the levels of the two demographic variables under consideration (i.e., age group and gender) added up to the total adjusted estimate. In addition, the additive approach allows for a much simpler formulation of the variance estimator of adjusted estimates.

The adjusted prevalence estimates given in Table D.5 were obtained using the following procedure:

1. The unadjusted weighted *total* estimate of any mental illness within a domain of interest (e.g., treatment received) derived from the full NSDUH adult data was adjusted by subtracting the corresponding estimate derived from the MHSS subsample (which used gold-standard measures of any mental illness) and then adding the corresponding predicted estimate derived from the MHSS subsample.[24] In this step, the bias due to misclassification error was extrapolated from the MHSS subsample to the full adult sample.

2. The adjusted positive and negative estimates for any mental illness as described in Step 1 were determined, and those estimates were scaled so that they summed to the unadjusted total estimate. This step scales up the adjusted estimates in cases where, due to missing values, the positive and negative estimates for any mental illness did not add up to the total estimate.

3. To obtain an adjusted any mental illness weighted *percentage* estimate within a domain of interest, the total estimate obtained in Step 1 was divided by the unadjusted any mental illness weighted total estimate (i.e., the total obtained by summing across all domains of the other mental health variable), and multiplied by 100 percent.

[24] For further details on the composition of the MHSS subsample, see Aldworth et al. (2009).

4. Steps 1 to 3 were repeated for each of the age group and gender demographic domains.

Note that the MHSS analysis was implemented such that the estimates for any mental illness derived from the total sample were unbiased. However, there is no guarantee that all estimates will be unbiased for the demographic domains in question. This analysis assesses bias in any mental illness status among adults who received treatment by comparing misclassification-bias-adjusted estimates of any mental illness status among adults who received treatment with unadjusted estimates of any mental illness status among adults who received treatment.

As shown in Table D.5, this adjustment for misclassification bias resulted in an additional 2 million adults who received mental health treatment or counseling being classified as having any mental illness in the past year. The adjustment yielded an estimate of 61.9 percent of those who received treatment or counseling in the past year being classified as having any mental illness compared with 55.4 percent before the misclassification adjustment. Even after this adjustment was made, however, 38.1 percent of adults who received mental health treatment or counseling in the past year still were classified as not having mental illness. Consistent with the change in the estimated number of adults with any mental illness among those who received mental health treatment or counseling in the past year, the number of adults without mental illness who received treatment in the past year changed from an unadjusted estimate of 13.5 million adults to an adjusted estimate of 11.5 million. Therefore, these results indicate that possible misclassification as a result of the modeling process would account for relatively small numbers and percentages of those who received mental health treatment or counseling despite their not having mental illness.

D.6 Summary and Conclusions

Among the 30.1 million adults aged 18 or older who received mental health treatment in the past year, 13.5 million did not meet the criteria for mental illness in that period. Analyses were conducted to further investigate the reasons for this finding. Analyses showed that the majority of adults who were classified as not having mental illness but who received treatment received only prescription medication and were less likely than those classified with mental illness to receive outpatient or inpatient care. Further, those with no mental illness but who received treatment included persons with other problems (e.g., MDE, substance dependence or abuse, or serious thoughts of suicide) that would indicate a possible need for treatment. Persons without mental illness who received treatment also had greater levels of impairment than those with no mental illness who did not receive treatment. When adjustments were made for possible misclassification bias, the proportion of persons who received mental health treatment and were classified as having mental illness increased, but not substantially.

These analyses suggest that adults who did not meet the criteria for mental illness but received mental health treatment had a lower level of problem severity and received less intensive treatment than those classified with mental illness and who received treatment. Misclassification bias was not a major reason for the finding that some adults who received treatment did not meet the criteria for mental illness. Further research is needed on the characteristics of this population and on the measurement of mental illness.

Table D.1 Types of Mental Health Treatment or Counseling Received in the Past Year among Persons Aged 18 or Older, by Past Year Level of Mental Illness: Numbers in Thousands and Percentages, Annual Averages Based on 2008-2009 Data

Mental Health Treatment or Counseling Measure[1]	Total Number[2]	Total Percent[2]	Any Mental Illness Number[3]	Any Mental Illness Percent[3]	Serious Mental Illness Number	Serious Mental Illness Percent	No Mental Illness Number[3]	No Mental Illness Percent[3]
TOTAL	226,065	100.0	44,473	100.0	10,388	100.0	181,592	100.0
Received Mental Health Treatment or Counseling	30,090	13.3	16,659	37.6	6,156	59.5	13,458	7.4
Outpatient Mental Health Treatment or Counseling	14,787	6.6	9,464	21.3	4,051	39.2	5,061	2.8
Outpatient Mental Health Clinic or Center	3,208	1.4	2,253	5.1	1,169	11.3	841	0.5
Office of Private Therapist, Psychologist, Psychiatrist Social Worker, or Counselor - Not Part of a Clinic	8,196	3.6	5,232	11.8	2,184	21.2	2,804	1.5
Doctor's Office - Not Part of a Clinic	3,155	1.4	2,215	5.0	888	8.6	1,059	0.6
Outpatient Medical Clinic	1,287	0.6	936	2.1	421	4.1	384	0.2
Partial Day Hospital or Day Treatment Program	294	0.1	214	0.5	163	1.6	46	0.0
School or University Setting/Clinic/Center[4]	91	0.0	66	0.2	29	0.3	18	0.0
Some Other Place[5]	261	0.1	178	0.4	76	0.7	113	0.1
Inpatient Mental Health Treatment or Counseling	1,928	0.9	1,284	2.9	741	7.1	447	0.2
Prescription Drug Mental Health Treatment	25,497	11.3	14,425	32.5	5,529	53.3	11,204	6.2
Prescription Drug Mental Health Treatment without Inpatient or Outpatient Treatment or Counseling	14,440	6.4	6,747	15.2	1,977	19.1	8,043	4.4
Number of Outpatient Visits among Those Who Received Outpatient Treatment or Counseling								
1 Visit	2,083	14.6	1,166	12.7	397	10.2	917	18.7
2 Visits	1,932	13.5	996	10.9	353	9.1	893	18.2
3-6 Visits	4,662	32.6	2,916	31.9	1,039	26.7	1,718	35.0
7-24 Visits	3,992	27.9	2,709	29.6	1,278	32.9	1,080	22.0
25+ Visits	1,619	11.3	1,362	14.9	822	21.1	308	6.3
Unmet Need for Mental Health Treatment or Counseling among Those Who Received Mental Health Treatment (i.e., Perceived Need for Additional Treatment)[6]	5,636	18.8	4,761	28.6	2,791	45.4	656	4.9

* Low precision; no estimate reported.

NOTE: Mental Health Treatment or Counseling is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Respondents were not to include treatment for drug or alcohol use. Respondents with unknown treatment or counseling information were excluded. Estimates were based only on responses to items in the Adult Mental Health Service Utilization module.

NOTE: Mental Illness is defined as having a diagnosable mental, behavioral, or emotional disorder, other than a substance use disorder, that met the criteria found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Three categories of mental illness severity are defined based on the level of functional impairment: low (mild) mental illness, moderate mental illness, and serious mental illness (SMI). Any mental illness includes persons in any of the three categories. For details on the methodology, see Section B.4.3 in Appendix B of this report.

[1] For all measures, respondents with unknown mental health information were excluded.

[2] Estimates in the Total column represent persons aged 18 or older, including those with unknown information.

[3] In 2008, a split-sample design assigned adults aged 18 or older randomly to one of two impairment scales—the World Health Organization Disability Assessment Schedule (WHODAS) or the Sheehan Disability Scale (SDS). For comparability purposes, estimates for Any Mental Illness and No Mental Illness for 2008 are based only on the WHODAS half sample. All estimates for 2009, as well as 2008 estimates for SMI, are based on the full sample. For details, see Section B.4.3 in Appendix B of this report.

[4] Respondents were permitted to specify other locations for receiving outpatient mental health treatment or counseling. This location was the most commonly reported other location for receiving outpatient treatment or counseling.

[5] Respondents with unknown or invalid responses to the other-specify question on Some Other Place Received Outpatient Mental Health Treatment or Counseling were excluded.

[6] Unmet Need for Mental Health Treatment or Counseling is defined as a perceived need for treatment that was not received. Respondents with unknown unmet need information were excluded.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table D.2 Types of Specific Mental Health or Substance Use Problems among Persons Aged 18 or Older Who Received Mental Health Treatment or Counseling in the Past Year, by Past Year Level of Mental Illness: Numbers in Thousands and Percentages, Annual Averages Based on 2008-2009 Data

Mental Health Problem and/or Substance Use Problem	Total Number[1]	Total Percent[1]	Any Mental Illness Number[2]	Any Mental Illness Percent[2]	Serious Mental Illness Number	Serious Mental Illness Percent	No Mental Illness Number[2]	No Mental Illness Percent[2]
Received Mental Health Treatment or Counseling	30,090	100.0	16,659	100.0	6,156	100.0	13,458	100.0
and Had Past Year MDE[3]	8,145	27.4	7,308	44.3	4,216	69.3	763	5.7
and Had Lifetime MDE[3]	12,650	42.5	9,764	59.0	4,875	79.8	2,597	19.5
and Had Serious Thoughts of Suicide in Past Year[4]	4,043	13.5	3,561	21.5	2,230	36.4	315	2.3
and Made Suicide Plans in Past Year[4]	1,363	4.5	1,220	7.4	964	15.7	67	0.5
and Attempted Suicide in Past Year[4]	648	2.2	594	3.6	448	7.3	31	0.2
and Had Alcohol Dependence or Abuse in Past Year[5]	3,861	12.8	2,595	15.6	1,174	19.1	1,160	8.6
and Had Illicit Drug Dependence or Abuse in Past Year[5,6]	1,763	5.9	1,345	8.1	773	12.6	328	2.4
and Had Alcohol or Illicit Drug Dependence or Abuse in Past Year[5,6]	4,749	15.8	3,299	19.8	1,553	25.2	1,321	9.8
and Was Classified as Subthreshold for Mental Illness in Past Year[7]	744	2.5	N/A	N/A	N/A	N/A	506	3.8
and Had Lifetime MDE, Past Year Suicidal Thoughts, Alcohol or Illicit Drug Dependence or Abuse, or Was Classified as Subthreshold for Mental Illness[3,4,5,6,7]	16,214	54.3	11,623	70.1	5,415	88.2	4,015	30.2

* Low precision; no estimate reported.

N/A = Not applicable.

NOTE: Mental Health Treatment or Counseling is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Respondents were not to include treatment for drug or alcohol use. Respondents with unknown treatment or counseling information were excluded. Estimates were based only on responses to items in the Adult Mental Health Service Utilization module.

NOTE: Mental Illness is defined as having a diagnosable mental, behavioral, or emotional disorder, other than a substance use disorder, that met the criteria found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Three categories of mental illness severity are defined based on the level of functional impairment: low (mild) mental illness, moderate mental illness, and serious mental illness (SMI). Any mental illness includes persons in any of the three categories. For details on the methodology, see Section B.4.3 in Appendix B of this report.

[1] Estimates in the Total column represent persons aged 18 or older, including those with unknown information.

[2] In 2008, a split-sample design assigned adults aged 18 or older randomly to one of two impairment scales—the World Health Organization Disability Assessment Schedule (WHODAS) or the Sheehan Disability Scale (SDS). For comparability purposes, estimates for Any Mental Illness and No Mental Illness for 2008 are based only on the WHODAS half sample. All estimates for 2009, as well as 2008 estimates for SMI, are based on the full sample. For details, see Section B.4.3 in Appendix B of this report.

[3] Major Depressive Episode (MDE) is defined as in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV), which specifies a period of at least 2 weeks when a person experienced a depressed mood or loss of interest or pleasure in daily activities and had a majority of specified depression symptoms. In 2008, a split-sample design assigned adults aged 18 or older randomly to one of two impairment scales—the WHODAS or the SDS. For comparability purposes, estimates for MDE for 2008 are based only on the WHODAS half sample. All estimates for 2009 are based on the full sample. For details, see Section B.4.3 in Appendix B of this report.

[4] Estimates in these rows are based only on responses to suicide items in the Mental Health module. Respondents with unknown suicide information were excluded.

[5] Dependence or abuse is based on definitions found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV).

[6] Illicit Drugs include marijuana/hashish, cocaine (including crack), heroin, hallucinogens, inhalants, or prescription-type psychotherapeutics used nonmedically. These estimates are based on data from the original questions, not including methamphetamine items added in 2005 and 2006.

[7] Respondents classified as subthreshold for mental illness do not meet the criteria for any mental illness, but were close to the any mental illness cut point. These "borderline" cases were defined by a predicted serious mental illness probability (SMIPP) greater than or equal to 0.02 and less than 0.024 for respondents in the WHODAS sample within the 2008 and 2009 data and having an SMIPP greater than or equal to 0.02 and less than 0.026 for respondents in the SDS sample within the 2008 data. This category does not apply to persons with SMI or any mental illness.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table D.3 Mean World Health Organization Disability Assessment Schedule (WHODAS) and WHODAS Alternative Impairment Scale Scores and Standard Errors among Persons Aged 18 or Older, by Past Year Level of Mental Illness and Receipt of Mental Health Treatment or Counseling in the Past Year: Annual Averages Based on 2008-2009 Data

Level of Mental Illness/Receipt of Mental Health Treatment or Counseling in the Past Year	WHODAS Scale,[1] Mean	WHODAS Scale,[1] Standard Error	WHODAS Alternative Scale,[1] Mean	WHODAS Alternative Scale,[1] Standard Error
Total 18 or Older[2]				
Received Treatment	8.6	0.12	2.6	0.05
Did Not Receive Treatment	2.7	0.03	0.6	0.01
Any Mental Illness[3]				
Received Treatment	12.9	0.13	4.5	0.06
Did Not Receive Treatment	9.8	0.09	3.2	0.04
Serious Mental Illness				
Received Treatment	17.6	0.13	6.6	0.05
Did Not Receive Treatment	16.0	0.13	6.2	0.06
No Mental Illness[3]				
Received Treatment	3.2	0.09	0.3	0.02
Did Not Receive Treatment	1.5	0.02	0.1	0.00

* Low precision; no estimate reported.

NOTE: Mental Illness is defined as having a diagnosable mental, behavioral, or emotional disorder, other than a substance use disorder, that met the criteria found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Three categories of mental illness severity are defined based on the level of functional impairment: low (mild) mental illness, moderate mental illness, and serious mental illness (SMI). Any mental illness includes persons in any of the three categories. For details on the methodology, see Section B.4.3 in Appendix B of this report.

NOTE: Mental Health Treatment or Counseling is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Respondents were not to include treatment for drug or alcohol use. Respondents with unknown treatment or counseling information were excluded. Estimates were based only on responses to items in the Adult Mental Health Service Utilization module.

[1] The mean World Health Organization Disability Assessment Schedule (WHODAS) scale value is based on a WHODAS score that takes on values from 0 to 24. The alternative mean WHODAS scale value is based on a WHODAS score that takes on values from 0 to 8.

[2] Estimates in the Total rows represent persons aged 18 or older, including those with unknown information.

[3] In 2008, a split-sample design assigned adults aged 18 or older randomly to one of two impairment scales—the WHODAS or the Sheehan Disability Scale (SDS). All estimates for 2009, as well as 2008 estimates for SMI, are based on the full sample. For comparability purposes, estimates for Any Mental Illness and No Mental Illness for 2008 are based only on the WHODAS half sample. For this reason, impairment measures are shown only for the WHODAS. For details, see Section B.4.3 in Appendix B of this report.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table D.4 Receipt of Mental Health Treatment or Counseling in the Past Year, by Past Year Level of Mental Illness, Sample, and Calculation Method for Past Year Level of Mental Illness: Numbers in Thousands and Percentages, Annual Averages Based on 2008-2009 Data

Sample and Mental Health Assessment Method	Total Number[1]	Total Percentage[1]	Any Mental Illness Number[2]	Any Mental Illness Percentage[2]	Serious Mental Illness Number	Serious Mental Illness Percentage	No Mental Illness Number[2]	No Mental Illness Percentage[2]
Overall Sample with Mental Health Categories Predicted from Model	30,090	13.3	16,659	37.6	6,156	59.5	13,458	7.4
SCID Subsample with Mental Health Categories Predicted from Model[3]	32,381	14.4	19,765	42.1	*	*	15,660	8.8
SCID Subsample with SCID Gold-Standard Mental Health Categories[3]	32,381	14.4	*	*	*	*	13,684	8.1

* Low precision; no estimate reported.

NOTE: Mental Health Treatment or Counseling is defined as having received inpatient care or outpatient care or having used prescription medication for problems with emotions, nerves, or mental health. Respondents were not to include treatment for drug or alcohol use. Respondents with unknown treatment or counseling information were excluded. Estimates were based only on responses to items in the Adult Mental Health Service Utilization module.

NOTE: Mental Illness is defined as having a diagnosable mental, behavioral, or emotional disorder, other than a substance use disorder, that met the criteria found in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Three categories of mental illness severity are defined based on the level of functional impairment: low (mild) mental illness, moderate mental illness, and serious mental illness (SMI). Any mental illness includes persons in any of the three categories. For details on the methodology, see Section B.4.3 in Appendix B of this report.

NOTE: The mental illness measures predicted from a model correspond to the measures used in the mental health detailed tables (available at http://oas.samhsa.gov/WebOnly.htm#NSDUHtabs). The gold-standard mental illness measures are based on clinical interviews administered to a subset of respondents. See Section B.4.3 in Appendix B of this report.

[1] Estimates in the Total column represent persons aged 18 or older, including those with unknown information.

[2] In 2008, a split-sample design assigned adults aged 18 or older randomly to one of two impairment scales—the World Health Organization Disability Assessment Schedule (WHODAS) or the Sheehan Disability Scale (SDS). For comparability purposes, estimates for Any Mental Illness and No Mental Illness for 2008 are based only on the WHODAS half sample. All estimates for 2009, as well as 2008 estimates for SMI, are based on the full sample. For details, see Section B.4.3 in Appendix B of this report.

[3] Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP).

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009.

Table D.5 Misclassification Bias Adjustment for Receipt of Mental Health Treatment or Counseling in the Past Year among Persons Aged 18 or Older, by Past Year Mental Illness Status, Age Group, and Gender: Numbers in Thousands and Percentages, Annual Averages Based on 2008-2009 Data

Age/Gender	Total[1]	Any Mental Illness, Not Adjusted for Any Mental Illness Misclassification Bias	No Mental Illness, Not Adjusted for Any Mental Illness Misclassification Bias	Any Mental Illness, Adjusted for Any Mental Illness Misclassification Bias	No Mental Illness, Adjusted for Any Mental Illness Misclassification Bias
NUMBER IN THOUSANDS WHO RECEIVED TREATMENT	30,090	16,659	13,458	18,618	11,472
AGE					
18-25	3,626	2,509	1,114	1,821	1,805
26-49	14,176	8,461	5,569	11,663	2,513
50 or Older	12,288	5,690	6,775	5,198	7,091
GENDER					
Male	10,080	5,093	5,037	3,829	6,251
Female	20,010	11,566	8,421	14,804	5,206
PERCENTAGE WHO RECEIVED TREATMENT AMONG THE ADULT POPULATION	13.3	37.6	7.4	42.0	6.3
AGE					
18-25	10.9	24.9	4.8	18.0	7.8
26-49	14.3	39.4	7.2	54.4	3.2
50 or Older	13.2	44.5	8.4	40.6	8.8
GENDER					
Male	9.3	30.5	5.5	22.9	6.8
Female	17.2	41.9	9.5	53.6	5.8
PERCENTAGE WITH OR WITHOUT ANY MENTAL ILLNESS AMONG TREATMENT RECIPIENTS	100.0	55.4	44.7	61.9	38.1
AGE					
18-25	100.0	69.2	30.7	50.2	49.8
26-49	100.0	59.7	39.3	82.3	17.7
50 or Older	100.0	46.3	55.1	42.3	57.7
GENDER					
Male	100.0	50.5	50.0	38.0	62.0
Female	100.0	57.8	42.1	74.0	26.0

[1] Estimates in the Total column represent persons aged 18 or older, including those with unknown past year any mental illness or serious mental illness information.

Source: SAMHSA, Office of Applied Studies, National Survey on Drug Use and Health, 2008 and 2009, and Mental Health Surveillance Study (MHSS), 2008 and 2009.

Appendix E: Other Sources of Mental Health Data

The National Survey on Drug Use and Health (NSDUH) provides population-based prevalence estimates of mental disorders and related behavior (mental illness, major depressive episode [MDE], and suicidal thoughts and behavior) in the United States. A variety of surveys and data systems other than NSDUH collect data used to estimate mental health indicators. It is useful to consider the results of these other studies when discussing NSDUH data. 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. The goals and approaches of surveys are often different, making comparisons between them difficult. Some methodological differences that may affect comparisons include populations covered, sampling methods, modes of data collection, measures utilized, instrumentation, and estimation methods.

This appendix briefly describes several data systems that produce estimates of mental health and presents selected comparisons of estimates with 2009 NSDUH estimates. In addition, this appendix describes surveys on mental health in populations not covered by NSDUH.

E.1 Definition of Mental Illness

In order to compare estimates of mental illness produced from NSDUH with other surveys, it is useful to first define mental illness as specified by the Substance Abuse and mental Health Services Administration (SAMHSA). SAMHSA has defined persons aged 18 or older as having serious mental illness (SMI) if they currently have or at any time in the past year had 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 first 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 any mental illness among adults: currently or at any time in the past year having 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 modeling answers to screening questions on distress and impairment from the overall adult NSDUH sample to these clinical interview data. See Section B.4.3 in Appendix B of this report for additional details on the clinical interview procedures, distress and impairment screening

scales, model specifications, and specification of levels of impairment for mental illness variables.

E.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 collecting 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 any mental illness (excluding substance use disorders) was 19.9 percent in 2009. The estimate of any disorder produced using NCS data included respondents with substance use disorders; as noted previously, the operational definition of any mental illness in NSDUH excludes substance use disorders. Methodological differences between the two surveys that could affect the values of 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 short screeners on psychological distress and functional impairment in the questionnaire for all adult NSDUH respondents vs. the UM-CIDI for the NCS). Further, given that data from the surveys were collected at different times (2009 for NSDUH vs. 1990 to 1992 for the NCS), differences in estimates could reflect changes in population prevalence.

Uniform Reporting System (URS)

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,[25] 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 et al., 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).

The NCS data 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). 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, 2004). 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 based on this methodology assuming that the overall SMI prevalence is 5.4 percent. Estimates of SMI by State are updated annually by applying updated population 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 2009 NSDUH data was 4.8 percent among adults. 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 2009 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 that adults had 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 2009 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).

[25] 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).

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 and 2002 with a newly recruited, nationally representative multistage, clustered-area probability sample of 9,282 U.S. respondents aged 18 or older. 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 (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 4.8 percent among adults, the 2009 NSDUH estimated that 19.9 percent of adults had any mental illness in the past year (see Chapter 2 in this report).

Differences in estimates of SMI and any mental illness 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 2009), 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 any mental illness. The NSDUH estimates for SMI and any mental illness were based on prediction models estimated from a subsample of respondents from the 2009 NSDUH. That is, responses to brief screeners (a measure of psychological distress in combination with a measure of functional impairment) were used as 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 predict estimates of SMI and any mental illness in the full NSDUH sample (Aldworth et al., 2010). 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. Published estimates of any disorder that used NCS-R data have included persons with substance use disorders (Kessler et al., 2006), and NSDUH estimates of any mental illness exclude persons with substance use disorders. Although the NCS-R estimate of the presence of mental disorders

other than substance use disorders was greater than the NSDUH estimate of any mental illness, the NCS-R included 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 is lower for the 2009 NSDUH (6.5 percent) compared with the NCS-R's estimate. Also, NSDUH estimates of suicidal thoughts and suicide plans were 3.7 and 1.0 percent, respectively (see Chapter 5). 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 to maintain the logical processes of the ACASI environment. Also, given that data from the surveys were collected at different times (2009 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 to assess serious thoughts of suicide and behavior in the NCS-R and NSDUH. The NCS-R measures of past year suicidality first required respondents to report lifetime suicidality before they were asked questions about the recency of suicidal thoughts and behaviors to determine a past year prevalence. In NSDUH, adult respondents are asked directly about suicidal thoughts and behaviors in the past 12 months.

For further details, see the NCS Web site at http://www.hcp.med.harvard.edu/ncs/ (Harvard School of Medicine, 2005).

National Longitudinal Alcohol Epidemiologic Survey (NLAES) and National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)

The National Longitudinal Alcohol Epidemiologic Survey (NLAES) was conducted in 1991 and 1992 by the U.S. Bureau of the Census for the National Institute on Alcohol Abuse and Alcoholism (NIAAA). Face-to-face, interviewer-administered interviews were conducted with 42,862 respondents aged 18 or older in the contiguous United States. Despite the survey name, the design was cross-sectional.

The first wave of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) was conducted in 2001 and 2002, also by the U.S. Bureau of the Census for NIAAA, using a computerized interviewer-administered interview. The NESARC sample was designed to make inferences for persons aged 18 or older in the 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 (Grant & Dawson, 2006).

The study contains comprehensive 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. However, data for all of the same mental disorders were not collected for NSDUH. Therefore, potential estimates of any disorder produced using the NESARC dataset may not be comparable with estimates of any mental illness based on NSDUH data. 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). This estimate was higher than the 2009 NSDUH estimate of 6.5 percent. This 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.[26] A number of methodological differences may have contributed 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.

For further details about NLAES, see NIAAA (2009); for an overview of NESARC findings, see Grant et al. (2004).

E.3 Surveys of Populations Not Covered by NSDUH

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

The 2008 Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel was the 10th in a series of studies conducted since 1980. The sample consisted of 28,546 active-duty Armed Forces personnel worldwide who anonymously completed self-administered questionnaires that assessed substance use and other health behaviors. Members of the Coast Guard were included for the first time in the 2008 survey. (Bray et al., 2009). The survey provides information about the use of alcohol, illicit drugs, and tobacco and about mental health issues among military personnel.

In 2008, 21 percent of military personnel in all services (including the Coast Guard) reported symptoms that suggested the need for further depression evaluation, 5 percent reported

[26] 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.

having seriously considered suicide, and 2 percent reported having attempted suicide. In addition, 17 percent of military personnel had received mental health counseling in the past year.

For further details, see the DoD Lifestyle Assessment Program (DLAP) Web site at http://dlap.rti.org/ (DoD & RTI International, 2010).

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) are conducted every 5 years using the same data collection instrument. The two surveys provide 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 is conducted for the Bureau of Justice Statistics (BJS) by the U.S. Census Bureau, which also conducts the SIFCF for the BJS and the Federal Bureau of Prisons (FBOP). 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 survey was 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 (BJS, 2010).

Appendix F: References

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Appendix G: List of Contributors

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