

# **2011 MENTAL HEALTH SURVEILLANCE STUDY: DESIGN AND ESTIMATION REPORT**

Contract No. HHSS283200800004C  
RTI Project No. 0211838.212.008

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December 2012

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# Table of Contents

Chapter	Page
List of Tables .....	v
1. Introduction.....	1
2. Measuring Mental Illness and Impairment .....	5
2.1 Background.....	5
2.2 Scales in the Main NSDUH Interview.....	5
2.2.1 Psychological Distress Scale.....	5
2.2.2 Functional Impairment Scales.....	6
2.3 MHSS Mental Illness and Impairment Instrument.....	7
3. Sample Design and Selection.....	9
3.1 Background.....	9
3.2 Eligibility for MHSS Clinical Follow-Up Study .....	9
3.3 Sample Allocation in 2008 MHSS Clinical Follow-Up Study.....	9
3.4 Sample Allocation in 2009 MHSS.....	14
3.5 Sample Allocation in 2010 and 2011 MHSS.....	18
3.6 Issues that Affected the Clinical Follow-Up Sample Design .....	24
3.6.1 Zero Selection Probability .....	24
3.6.2 Noncoverage for Non-English Speakers.....	26
3.6.3 Gulf Coast Oversample.....	26
3.6.4 Falsified NSDUH Interviews.....	26
3.6.5 Respondents Excluded from MHSS Analyses.....	26
4. Sample Weighting.....	29
4.1 Background.....	29
4.2 Components of the MHSS Analysis Weights.....	29
4.2.1 NSDUH Person-Level Analysis Weights (ANALWT).....	29
4.2.2 Inverse of Probability of Selection for Clinical Follow-Up.....	29
4.2.3 Nonresponse Adjustment.....	29
4.2.4 Poststratification Adjustment.....	30
4.2.5 Weighting Management.....	31
5. Description of the MHSS Sample Characteristics .....	33
5.1 Background.....	33
5.2 Summary of Prior Descriptive Analyses.....	33
5.3 Results of 2011 Analyses.....	35
5.3.1 Demographic Characteristics .....	35
5.3.2 Mental Health Characteristics.....	36
5.3.3 Suicidal Experiences, Substance Use, and SCID Survey Characteristics.....	36
5.3.4 K6 and WHODAS Total Scores .....	37

## Table of Contents (continued)

Chapter	Page
6. Modeling Analyses .....	49
6.1 Background .....	49
6.2 Summary of Prior Modeling Analyses .....	49
6.3 Summary of Prior Sensitivity Analyses .....	50
6.4 Final 2008 WHODAS SMI Prediction Model .....	51
6.5 SMI Estimation for 2011 MHSS .....	52
6.6 Estimation of Other Categories of Mental Illness .....	56
7. Conclusions .....	63
References .....	65
 <b>Appendix</b>	
A Supplementary Tables .....	69
B K6 Module .....	79
C WHODAS Module .....	83
D Sheehan Disability Scale .....	87
E Structured Clinical Interview for DSM-IV Axis I Disorders .....	89

## List of Tables

Table	Page
1.1 Mental Illness Categories Defined by SCID Disorder Diagnosis and GAF Score.....	3
2.1 Diagnostic Modules in the MHSS SCID .....	7
3.1 2008 Mental Health Surveillance Study Sample Allocation ( $n = 1,500$ ) .....	11
3.2 Design Parameters for the 2008 Mental Health Surveillance Study, Quarter 1 .....	12
3.3 Design Parameters for the 2008 Mental Health Surveillance Study, Quarter 2 through Quarter 4.....	13
3.4 2008 Mental Health Surveillance Study, Quarters 1 to 4 Summary.....	14
3.5 2009 Mental Health Surveillance Study Sample Allocation: Modified Design ( $n =$ 500).....	15
3.6 Design Parameters for the 2009 Mental Health Surveillance Study, Quarters 1 and 2.....	16
3.7 Design Parameters for the 2009 Mental Health Surveillance Study, Quarters 3 and 4.....	17
3.8 2009 Mental Health Surveillance Study, Quarters 1 to 4 Summary.....	18
3.9 Mental Health Surveillance Study Age-Related Factors for 2010.....	19
3.10 Mental Health Surveillance Study Age-Related Factors for 2011.....	19
3.11 Projected Yields of Predicted Positive Cases, by Age Group: 2010 MHSS .....	21
3.12 Projected Yields of Predicted Positive Cases, by Age Group: 2011 MHSS .....	21
3.13 2010 Mental Health Surveillance Study Sample Allocation, by K6 Group .....	21
3.14 2011 Mental Health Surveillance Study Sample Allocation, by K6 Group .....	22
3.15 2010 Mental Health Surveillance Study Sample Allocation, by WHODAS Score.....	22
3.16 2011 Mental Health Surveillance Study Sample Allocation, by WHODAS Score.....	23
3.17 2010 Mental Health Surveillance Study, Quarters 1 to 4 Summary.....	24
3.18 2011 Mental Health Surveillance Study, Quarters 1 to 4 Summary.....	25
3.19 Falsified Cases Removed from the 2008 through 2010 MHSS.....	26
4.1 2008 to 2011 Mental Health Surveillance Study Analysis Weight Distribution .....	31
4.2 2008 Sample A, 2008 Sample B, and 2009 Mental Health Surveillance Study Analysis Weight Distribution after Weight Trimming .....	32
5.1 WHODAS Sample Sizes among Analyzable SCID Respondents, by Demographic Characteristics: 2008-2011 .....	39
5.2 WHODAS Sample Sizes among Analyzable SCID Respondents, by Demographic and Mental Health Characteristics: 2008-2011.....	40

## List of Tables (continued)

<b>Table</b>	<b>Page</b>
5.3	WHODAS Sample Sizes among Analyzable SCID Respondents, by Suicidal Experiences, Substance Use, and SCID Survey Characteristics: 2008-2011 .....41
5.4	Weighted WHODAS Analyzable SCID Respondents, by Demographic Characteristics (Numbers in Thousands): 2008-2011 .....42
5.5	Weighted WHODAS Analyzable SCID Respondents, by Demographic and Mental Health Characteristics (Numbers in Thousands): 2008-2011 .....43
5.6	Weighted WHODAS Analyzable SCID Respondents, by Suicidal Experiences, Substance Use, and SCID Survey Characteristics (Numbers in Thousands): 2008-2011 .....44
5.7	WHODAS Sample Sizes among Analyzable SCID Respondents, by Past Year K6 Score Frequency Distribution: 2008-2011 .....45
5.8	Weighted WHODAS Analyzable SCID Respondents, by Past Year K6 Score Frequency Distribution (Numbers in Thousands): 2008-2011 .....46
5.9	Weighted WHODAS Analyzable SCID Respondents, by K6 Scores: 2008-2011 .....47
5.10	Weighted WHODAS Past Year Total Score Frequency Distribution, by Sampling Period (Numbers in Thousands): 2008-2011 .....48
6.1	Weighted SMI Estimates for 2011, by Different Methods .....54
6.2	Standard Errors of Weighted SMI Estimates for 2011, by Different Methods .....55
6.3	Weighted SMI SCID-Based Estimates in the Analyzable MHSS Sample: 2008-2011 .....57
6.4	Weighted SMI Estimates Based on Cut Point Method in Adult NSDUH Sample: 2008-2011 .....58
6.5	Weighted SMMI SCID-Based Estimates in the Analyzable MHSS Sample: 2008-2011 .....59
6.6	Weighted SMMI Estimates Based on Cut Point Method in Adult NSDUH Sample: 2008-2011 .....60
6.7	Weighted AMI SCID-Based Estimates in the Analyzable MHSS Sample: 2008-2011 .....61
6.8	Weighted AMI Estimates Based on Cut Point Method in Adult NSDUH Sample: 2008-2011 .....62
A.1	WHODAS Sample Sizes among Completed SCID Respondents, by Demographic Characteristics: 2008-2011 .....70
A.2	WHODAS Sample Sizes among Completed SCID Respondents, by Demographic and Mental Health Characteristics: 2008-2011 .....71



## List of Tables (continued)

<b>Table</b>		<b>Page</b>
A.3	WHODAS Sample Sizes among Completed SCID Respondents, by Suicidal, Substance Use, and SCID Survey Characteristics: 2008-2011 .....	72
A.4	Weighted Completed SCID Respondents, by Demographic Characteristics (Numbers in Thousands): 2008-2011 .....	73
A.5	Weighted Completed SCID Respondents, by Demographic and Mental Health Characteristics (Numbers in Thousands): 2008-2011 .....	74
A.6	Weighted Completed SCID Respondents, by Suicidal, Substance Use, and SCID Survey Characteristics (Numbers in Thousands): 2008-2011 .....	75
A.7	WHODAS Sample Sizes among Completed SCID Respondents, by Past Year K6 Score Frequency Distribution: 2008-2011 .....	76
A.8	Weighted Completed SCID Respondents, by Past Year K6 Score Frequency Distribution (Numbers in Thousands): 2008-2011 .....	77



# 1. Introduction

The overarching goal of the Mental Health Surveillance Study (MHSS) of the National Survey on Drug Use and Health (NSDUH) is to provide accurate estimates of the prevalence of serious mental illness (SMI) among adults aged 18 or older at the national and State levels. Public Law No. 102-321, the Alcohol, Drug Abuse, and Mental Health Administration Reorganization Act of 1992, established a block grant for U.S. 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 and to produce national and State estimates. The MHSS was conducted to establish a method to generate estimates of SMI. However, the MHSS data have the potential to be used for a variety of important analyses beyond this primary purpose. Methods for estimating other categories of mental illness (e.g., "mild," "moderate," or "any" mental illness) have been developed. Furthermore, the MHSS data may be used to evaluate and validate the current model used to produce estimates of mental illness. The MHSS data also could be used to generate estimates of specific disorders.

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 illnesses.

In December 2006, a technical advisory group (TAG) meeting of expert consultants was convened by the Office of Applied Studies (OAS, now the Center for Behavioral Health Statistics and Quality [CBHSQ]) and 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 by including short scales in NSDUH's main interview that are strong predictors of SMI and that a "gold standard" clinical psychiatric interview be administered on a subset of respondents to provide the data for estimating a statistical model that predicts SMI. In response, SAMHSA's CBHSQ initiated the MHSS under its NSDUH contract with RTI International<sup>1</sup> to develop and implement a method to estimate SMI. At the time, NSDUH contained a six-item scale (Kessler-6 or K6) with five response options in each item that captured information on psychological distress in the past 12 months (Kessler et al., 2003). However, the K6 scale is not a diagnostic instrument and does not capture information on functional impairment, which is needed to determine whether a respondent can be categorized as having SMI under SAMHSA's definition. In consultation with the TAG, two candidate impairment scales were selected by SAMHSA to be added to the 2008 NSDUH. They were an abridged version of the World Health Organization Disability Assessment Schedule (WHODAS; Rehm et al., 1999) and the Sheehan Disability Scale (SDS; Leon, Olfson, Portera, Farber, & Sheehan, 1997). An initial MHSS step was to modify these scales for use in a general population survey, including changes to question wording and length, which resulted in an abbreviated eight-item version of the WHODAS (Novak, Colpe, Barker, & Gfroerer, 2010). Further details of the K6 scale are given in Appendix B, and details of the two impairment scales are given in Appendices C and D.

The MHSS clinical interviews were conducted first in 2008. A split-sample design was used in the 2008 NSDUH, for which all adult respondents received the K6, but a random half of the sample received the WHODAS and the other half received the SDS. In addition, a subsample of approximately 1,500 adult NSDUH participants completed a follow-up clinical interview to provide data for developing models to estimate mental illness using the NSDUH full-sample interview data. The randomization of the impairment scales was maintained within this clinical interview subsample, which is referred to in this report as the MHSS sample, so that about half of the MHSS sample participants were administered the WHODAS and half were administered the SDS (i.e., there were approximately 750 completed interviews from each half sample). Each participant in the 2008 MHSS was administered the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP or SCID) (First, Spitzer, Gibbon, & Williams, 2002), which was adapted for this study by mental health clinicians for paper-and-pencil interviewing over the telephone approximately 2 to 4 weeks after the NSDUH interview. Functional impairment ratings were assigned by clinical interviewers using the Global Assessment of Functioning (GAF) scale.<sup>2</sup> A respondent was coded positive for SMI if he or she was determined to have any of the mental disorders (not including developmental or

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<sup>1</sup> RTI International is a trade name of Research Triangle Institute.

<sup>2</sup> The GAF is a numeric scale (0 through 100) used to subjectively rate the social, occupational, and psychological functioning of adults, and is presented and described in the DSM-IV-TR (see p. 32 of American Psychiatric Publishing, Inc., 2000; also see Endicott, Spitzer, Fleiss, & Cohen, 1976). Lower scores represent higher levels of functional impairment. Descriptions of impairment are provided at 10-point intervals (e.g., 1 to 10, 11 to 20, and so on up to 91 to 100). For example, a GAF score between 51 and 60 is described as having moderate symptoms of impairment, while a score higher than 60 represents several categories of impairment ranging from none to slight, and a score lower than 51 represents several categories ranging from serious to extreme.

substance use disorders) assessed in the MHSS SCID *and* had a GAF score of 50 or below. The model estimation analyses used gold-standard measures (i.e., the SCID/GAF combination as the indicator of SMI) in evaluating which combination of K6 and impairment scale worked best in the scoring algorithm used to predict SMI status. The modified SCID questionnaire for the 2010 MHSS is available upon written request (for details, see Appendix E).

Based on an analysis of the 2008 MHSS data, it was determined that the WHODAS would be administered as the sole impairment scale in subsequent NSDUHs (starting in 2009) and that it would be used in combination with the K6 scale to predict SMI. For more details, refer to the 2008 MHSS analysis report by Aldworth et al. (2009).

In 2009, 2010, and 2011, the MHSS was conducted similarly to the 2008 MHSS, except for two major differences: (1) only the WHODAS impairment scale was administered, and (2) the sample size was approximately 500 in 2009 and 2010, and the sample size was approximately 1,500 in 2011.

The primary objective of the MHSS analysis is to produce annual national estimates of SMI prevalence that have sound psychometric properties, that are accurate, and that use similar methodologies such that it is possible to examine trends over time. Secondary objectives include predicting other categories of mental illness, such as mild (or low) mental illness (LMI), moderate mental illness (MMI), and any mental illness (AMI). These categories of mental illness, which are based on SCID disorder diagnoses and GAF scores, are defined in [Table 1.1](#). AMI is the category obtained by collapsing the first three categories in [Table 1.1](#) into a single category.

**Table 1.1 Mental Illness Categories Defined by SCID Disorder Diagnosis and GAF Score**

Mental Illness Category	SCID Disorder Diagnosis	GAF Score
Serious Mental Illness (SMI)	One or More	GAF $\leq$ 50 (severe or worse impairment)
Moderate Mental Illness (MMI)	One or More	50 < GAF $\leq$ 59 (moderate impairment) <sup>1</sup>
Mild Mental Illness (LMI)	One or More	59 < GAF (at most mild impairment)
No Mental Illness (No MI)	None	GAF score not applicable

GAF = DSM-IV Axis V Global Assessment of Functional Scale; SCID = Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition.

<sup>1</sup> DSM-IV description of moderate impairment based on GAF is 50 < GAF  $\leq$  60. The cutoff of 59 for MMI and LMI was chosen to conform to the corresponding cutoff selected by Kessler et al. (2003).

The remainder of the report is organized into six chapters. Chapter 2 describes the mental illness and impairment scales and instruments that are used to produce SMI estimates. Chapter 3 describes the sample design and methods for selecting respondents for the MHSS clinical interview. Chapter 4 describes the components of the MHSS analysis weights, including the methodology developed to prevent and manage extreme weights. Chapter 5 summarizes the results of the descriptive analyses that compare the key demographic and psychosocial characteristics across samples from different time periods. Chapter 6 investigates the estimation methods of producing SMI estimates and compares the estimates of SMI and other mental health categories from the 2008 to 2011 NSDUHs when different methods have been used. Chapter 7 summarizes the key findings from 2011 MHSS analyses, including both descriptive analyses and modeling analyses.



## **2. Measuring Mental Illness and Impairment**

### **2.1 Background**

This chapter describes the mental illness and impairment scales, as well as the clinical instrument, that were administered to adult respondents and used to produce estimates of serious mental illness (SMI). All adult respondents aged 18 or older in the National Survey on Drug Use and Health (NSDUH) are asked question on their level of psychological distress. If a respondent has a psychological distress score greater than zero, he or she is then directed to questions on the level of impairment. In the 2011 NSDUH, the Kessler-6 (K6) scale and the World Health Organization Disability Assessment Schedule (WHODAS) were the scales used to assess psychological distress and impairment in adult respondents.

A subsample of approximately 1,500 adult NSDUH participants participated in a follow-up clinical interview and were administered the Structured Clinical Interview for DSM-IV (SCID) (First et al., 2002), including a module assessing Axis I disorders, and the Global Assessment of Functioning (GAF) scale by trained clinical interviewers.

### **2.2 Scales in the Main NSDUH Interview**

#### **2.2.1 Psychological Distress Scale**

The K6 scale, used to capture nonspecific psychological distress (Kessler et al., 2003), consists of two sets of six questions that ask respondents how frequently they experienced symptoms of psychological distress during two different time periods: (1) during the past 30 days and (2) the one month in the past year when they were at their worst emotionally. Respondents were only asked about the second time period 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 domains covered by the questions corresponded to how often the respondent felt (1) nervous, (2) hopeless, (3) restless or fidgety, (4) sad or depressed, (5) that everything was an effort, and (6) worthless. To create a score, the six items related to the first time period were coded 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 "refuse" also coded as 0. Summing across the six responses resulted in a total score with a range from 0 to 24. The six items related to the second time period were coded identically, and the worst K6 total score was calculated as the maximum of the total scores from the two time periods and is considered the past year K6 total score. An alternative version of the past year K6 total score was formulated as follows: past year K6 total scores of less than 8 were recoded as 0, and past year K6 total scores from 8 to 24 were recoded as 1 to 17. The reason for the alternative version was that serious mental illness (SMI) prevalence was typically extremely low for respondents with past year K6 total scores of less than 8, and the prevalence rates were higher, in general, only for total scores of 8 or greater. See Appendix B for the specific K6 scale items.

### 2.2.2 Functional Impairment Scales

The abridged WHODAS, used to capture impairment (Rehm et al., 1999), consists of eight questions that ask respondents how much their emotions, nerves, or mental health caused them to have difficulties in daily activities over the past year (Novak et al., 2010). Eight domains were covered by the following questions: (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. To create a score, the eight items were coded from 0 to 3 so that "severe difficulty" was coded 3, "moderate difficulty" 2, "mild difficulty" 1, and "no difficulty" 0, with "don't know" and "refuse" also coded as 0. Some items had a fifth category to address "not applicable" responses. For example, the question about difficulties regarding taking care of daily responsibilities at work or school had a fifth category, "you didn't go to work or school." If this category was selected, then a further question was asked as to whether their emotions, nerves, or mental health caused them to be unable to go to work or school. A "yes" response to the follow-up question was coded 3, and a "no" response was coded 0. One exception to this coding related to the last WHODAS item on how much difficulty respondents had in getting their daily work done as quickly as needed. This item was only asked if in the previous item on assessing their ability to function at work or school they responded to any of the first four categories (i.e., implying that they went to work or school) and was coded similarly to the other items. If they responded to the fifth category (i.e., that they did not go to work or school), their response to this item was determined by the final code for the follow-up item on whether their emotions, nerves, or mental health caused them to be unable to go to work or school. Summing across the eight responses resulted in a total score with a range from 0 to 24. An alternative version of the WHODAS total score was formulated as follows: item scores of less than 2 were recoded as 0, and item scores from 2 to 3 were recoded as 1, then summed for a total score ranging from 0 to 8. The alternative version of the WHODAS total score was driven by the idea that a dichotomous measure dividing respondents who experienced moderate or severe difficulties from the remaining respondents might fit better than a linear continuous measure. See Appendix C for the actual questions used in the WHODAS.

The Sheehan Disability Scale (SDS), used only in the 2008 NSDUH to capture impairment (Leon et al., 1997), 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 mild interference, 4 to 6 moderate interference, 7 to 9 severe interference, and 10 very severe interference. Summing across the four responses resulted in a total score with a range from 0 to 40. An alternative version of the SDS total score was formulated as follows: item scores of less than 7 were recoded as 0, and item scores from 7 to 10 were recoded as 1, then summed for a total score ranging from 0 to 4. The alternative version of the SDS total score also was driven by the idea that a dichotomous measure dividing respondents who experienced severe or very severe interference from the remaining respondents might fit better than a linear continuous measure. See Appendix D for the actual questions used in the SDS.



## 2.3 MHSS Mental Illness and Impairment Instrument

Using procedures similar to those used in 2008, 2009, and 2010, each participant in the 2011 MHSS was administered standard clinical interview measures by mental health clinicians via paper-and-pencil interviewing over the telephone within 2 to 4 weeks of the NSDUH main interview. The MHSS clinical interview measure is the SCID (First et al., 2002), a semistructured interview that has been widely used in clinical calibration studies, such as the National Comorbidity Survey Replication (NCS-R; Kessler et al., 2004), the National Survey of American Life (Jackson, Neighbors, Nesse, Trierweiler, & Torres, 2004), and NSDUH's substance use disorders reappraisal study (Jordan, Karg, Batts, Epstein, & Wiesen, 2008). It has demonstrated good reliability (Segal, Kabacoff, Hersen, Van Hasselt, & Ryan, 1995; Zanarini et al., 2000; Zanarini & Frankenburg, 2001) and validity (Fennig, Craig, Lavelle, Kovasznay, & Bromet, 1994; Kranzler, Kadden, Babor, Tennen, & Rounsaville, 1996; Kranzler et al., 1995; Ramirez Basco et al., 2000; Shear et al., 2000; Steiner, Tebes, Sledge, & Walker, 1995). The interview was modified to assess past 12-month mental health disorders and functioning via telephone interview by a trained clinical interviewer.

Diagnostic modules in the MHSS version of the SCID are listed in [Table 2.1](#). The assessment of lifetime manic episode was included to provide a context for understanding whether a past 12-month major depressive episode (MDE) was experienced as part of a unipolar mood disorder or as a component of a bipolar disorder (regardless of whether a manic episode also was experienced in the past year). The module for lifetime MDE was included for a separate NSDUH analysis unrelated to the MHSS. The module to assess intermittent explosive disorder was obtained from the (optional) impulse control disorders section of the SCID. The module on substance use disorders was not used to determine estimates of SMI.

**Table 2.1 Diagnostic Modules in the MHSS SCID**

<p><b>MOOD DISORDERS</b></p> <ul style="list-style-type: none"> <li>Past Year Major Depressive Episode<sup>1</sup></li> <li>Lifetime Major Depressive Episode</li> <li>Past Year Manic Episode<sup>1</sup></li> <li>Lifetime Manic Episode</li> <li>Dysthymic Disorder<sup>1</sup></li> </ul>	<p><b>PAST YEAR EATING DISORDERS</b></p> <ul style="list-style-type: none"> <li>Anorexia Nervosa<sup>1</sup></li> <li>Bulimia Nervosa<sup>1</sup></li> </ul> <p><b>PAST YEAR IMPULSE CONTROL DISORDERS</b></p> <ul style="list-style-type: none"> <li>Intermittent Explosive Disorder<sup>1</sup></li> </ul>
<p><b>PAST YEAR PSYCHOTIC DISORDERS</b></p> <ul style="list-style-type: none"> <li>Psychotic Screen<sup>1</sup></li> </ul>	<p><b>PAST YEAR SUBSTANCE USE DISORDERS</b></p> <ul style="list-style-type: none"> <li>Alcohol Abuse</li> <li>Alcohol Dependence</li> <li>Non-Alcohol Substance Abuse</li> <li>Non-Alcohol Substance Dependence</li> </ul>
<p><b>PAST YEAR ANXIETY DISORDERS</b></p> <ul style="list-style-type: none"> <li>Posttraumatic Stress Disorder<sup>1</sup></li> <li>Panic Disorder with and without Agoraphobia<sup>1</sup></li> <li>Agoraphobia without History of Panic Disorder<sup>1</sup></li> <li>Social Phobia<sup>1</sup></li> <li>Specific Phobia<sup>1</sup></li> <li>Obsessive Compulsive Disorder<sup>1</sup></li> <li>Generalized Anxiety Disorder<sup>1</sup></li> </ul>	<p><b>PAST YEAR ADJUSTMENT DISORDERS</b></p> <ul style="list-style-type: none"> <li>Adjustment Disorder<sup>1</sup></li> </ul>

MHSS = Mental Health Surveillance Study; SCID = Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition.

<sup>1</sup> Disorder used to determine gold-standard measures of serious mental illness and other categories of mental illness.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008, 2009, 2010, and 2011.

In addition to the diagnostic modules, the MHSS SCID included four other modules:

1. an open-ended overview module, designed to elicit information about the respondent's diagnostic and treatment history and current status in a way that establishes some level of rapport between the interviewer and the respondent;
2. a screener module containing questions for several of the anxiety disorders and eating disorders (to minimize the risk of negative response bias when respondents give "no" answers to speed the interview along if they figure out that "yes" responses typically lead to additional questions);
3. a module containing the DSM-IV Axis V GAF scale (the clinical interviewer was instructed to rate the respondent's period of worst psychological, social, and occupational functioning during the past year); and
4. a module for documenting the clinical interviewer's impressions of the interview situation, including ratings of the respondent's level of privacy, cooperation, and comprehension, as well as the overall validity of the interview data (any interview deemed by the clinical interviewer or clinical supervision team to be of questionable validity was discarded).

For more details, see Appendix C and Colpe et al. (2010).

# 3. Sample Design and Selection

## 3.1 Background

Chapter 3 describes the sample design and methods for selecting respondents for the Mental Health Surveillance Study (MHSS) clinical interview. The MHSS sample was selected from the main National Survey on Drug Use and Health (NSDUH) study sample of approximately 45,000 adults. The target population for the MHSS excluded persons whose main study interview was conducted in Spanish. A probability sampling algorithm was programmed in the computer-assisted interviewing (CAI) instrument such that field interviewers (FIs) could, at the conclusion of the interview, recruit selected respondents for the subsequent clinical psychiatric interview conducted by telephone. This chapter describes, in detail, the annual MHSS sample selection process, which has evolved over the 2008 to 2011 data collection periods. Other issues related to the sample selection also are described.

## 3.2 Eligibility for MHSS Clinical Follow-Up Study

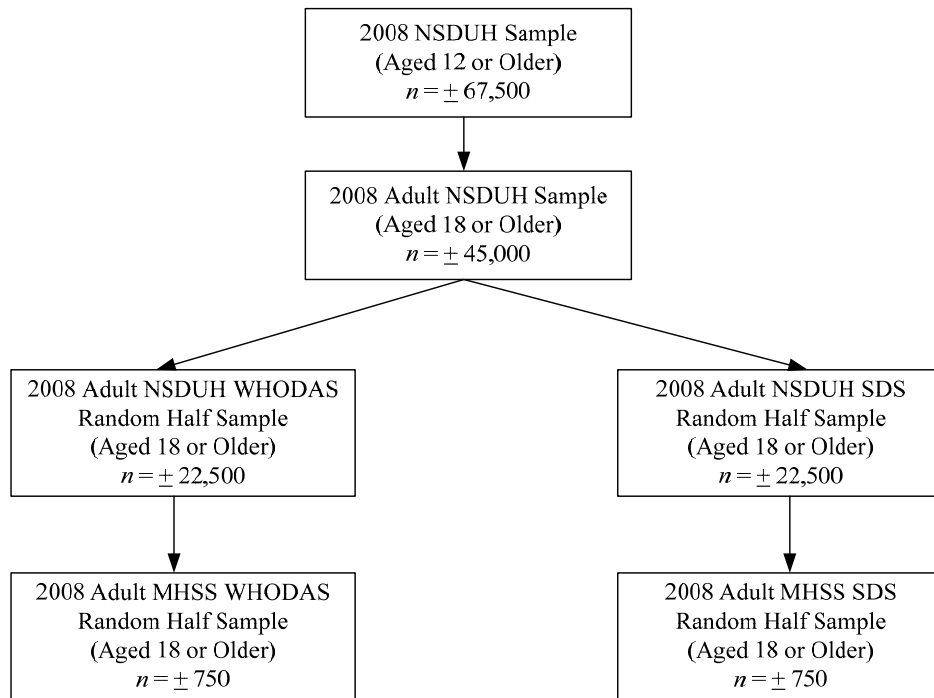
NSDUH respondents aged 18 or older who completed their interviews in English were eligible to be sampled for the MHSS clinical follow-up study. In 2008 and 2009, NSDUH respondents eligible for the MHSS were selected based on their Kessler-6 (K6) score. That is, NSDUH respondents were classified into seven mutually exclusive sampling strata based on their K6 scores. The probability of selection differed for each K6 stratum, with respondents in strata determined by greater scores on the K6 more likely to be selected. In 2010 and 2011, MHSS-eligible NSDUH respondents were stratified into 225 sampling strata based on both their K6 score and their World Health Organization Disability Assessment Schedule (WHODAS) score. Details of the MHSS selection probabilities are discussed in Sections 3.3, 3.4, and 3.5.

## 3.3 Sample Allocation in 2008 MHSS Clinical Follow-Up Study

The 2008 MHSS data collection included approximately 1,500 clinical follow-up interviews. In the 2008 NSDUH main study, adult respondents were randomly assigned to one of two functional impairment scales: the WHODAS and the Sheehan Disability Scale (SDS) (Leon et al., 1997). Approximately equal numbers of respondents received each of the functional impairment scales, and all received the K6 items. The randomization of the impairment scales was maintained within the MHSS sample so that about half of the MHSS respondents (approximately 750) were administered the WHODAS and half were administered the SDS. A diagram illustrating the structure of the 2008 MHSS sampling design is given in [Figure 3.1](#).

NSDUH respondents eligible for the MHSS subsample were stratified into seven sampling strata based on their K6 scores (0-3, 4-5, 6-7, 8-9, 10-11, 12-15, and 16+), and a subsample was selected for clinical follow-up with probabilities based on their K6 scores. The NSDUH CAI instrument included a sampling algorithm to indicate whether NSDUH main interview respondents had been sampled for the clinical follow-up study. If they had been selected, FIs would recruit sampled respondents for the subsequent clinical psychiatric interview that was conducted by telephone.

**Figure 3.1 Structure of Mental Health Surveillance Study Sampling Design**



MHSS = Mental Health Surveillance Study; NSDUH = National Survey on Drug Use and Health; SDS = Sheehan Disability Scale; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

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

To optimize the MHSS sample allocation within the seven scoring bands, assumed serious mental illness (SMI) rates were estimated using raw K6 scores and clinical case data from the National Comorbidity Survey Replication (NCS-R) clinical calibration study.<sup>3</sup> Assumed SMI rates for the 2008 study were set equal to the NCS-R rates except for K6 scores 0 through 7. Those rates were set substantially lower under the assumption that fewer clinical positives would be identified in that scoring range when the K6 data were used in combination with impairment data to estimate SMI. Population percentages by K6 group were estimated from the 2006 NSDUH. Using Neyman's optimal allocation (Lohr, 1999), a solution that minimized the design effect for prevalence of SMI was computed. Table 3.1 shows the expected sample distribution for the 1,500 clinical follow-up interviews, as well as the expected design effect,<sup>4</sup> effective sample size, and projected standard error (SE) and relative standard error (RSE) of the all-adult estimate of SMI prevalence.

<sup>3</sup> Kessler, R. C., attachment to a personal email communication to L. J. Colpe, August 1, 2007, Scidsmi-table-073107 (2) (2).doc.

<sup>4</sup> The expected design effect for the 2008 MHSS is the product of the usual design effect for adults in the main survey (about 3.0) and the design effect for the two-phase sample stratified by K6 scores (about 0.2).

**Table 3.1 2008 Mental Health Surveillance Study Sample Allocation (n = 1,500)**

<b>K6 Score</b>	<b>Percent of Population</b>	<b>Assumed SMI Rate (%)</b>	<b>Sample Size</b>	<b>Overall Design Effect</b>	<b>Effective Sample Size</b>	<b>Projected SE (%)</b>	<b>Projected RSE (%)</b>
0 to 3	48.04	0.03	96				
4 to 5	13.98	0.30	88				
6 to 7	11.16	0.30	110				
8 to 9	6.95	10.00	200				
10 to 11	5.53	13.00	214				
12 to 15	8.00	40.00	450				
16 or Higher	6.34	67.00	343				
<b>Total</b>	<b>100.00</b>	<b>8.95</b>	<b>1,501</b>	<b>0.6363</b>	<b>2,357</b>	<b>0.59</b>	<b>6.57</b>

K6 = Kessler-6, a 6-item psychological distress scale; SE = standard error; RSE = relative standard error; SMI = serious mental illness.

NOTE: The population source is the 2006 National Survey on Drug Use and Health (NSDUH). Assumed SMI rates were estimated using data from the 2001-2002 National Comorbidity Survey Replication (NCS-R) clinical calibration study.

The probability sample of 1,500 clinical follow-up interviews was distributed across four calendar quarters with a slightly larger sample in the first quarter (425 follow-up interviews; see [Table 3.2](#)) and the remaining sample equally divided among the remaining quarters (approximately 358 interviews in each of the quarters 2 through 4 for a combined sample of 1,075 follow-up interviews; see [Table 3.3](#)). The larger sample in quarter 1 was intended to provide some cushion should the clinical interview response rates be lower than anticipated. In addition, a slightly larger sample size in quarter 1 was needed to allow for preliminary analyses of the data. The sample sizes were determined based on an assumed 85 percent agreement rate for the clinical follow-up interview and a 90 percent participation rate among those who agreed to complete the interview.

Throughout the 2008 survey, the MHSS sample was monitored, and the sampling parameters were modified on an as-needed basis to ensure that the goal of 1,500 completions was achieved. In addition, for the last 4 weeks in quarter 4,<sup>5</sup> the probability of selection of the NSDUH interview respondents for the clinical follow-up survey was set to zero so that cases would not be sampled without adequate time for completion (by December 22, 2008) (see Section 3.6.1 for further details).

An estimated 86 percent of selected persons agreed to participate, and 76 percent of those persons completed the MHSS clinical interview. The 2008 MHSS resulted in 1,506 completed clinical interviews. However, four cases were excluded because of extreme weights and incomplete data, and another two interviews were excluded because of data errors. The final number of completed interviews in 2008 was 1,500. A summary of the 2008 MHSS respondents by quarter is included in [Table 3.4](#). Section 3.6.4 provides a further discussion of cases removed because of data errors, and Section 3.6.5 provides a further discussion of cases excluded because of extreme weights and incomplete data.

<sup>5</sup> Recruitment in 2008 ended on November 28th, and data collection ended on December 22nd.

**Table 3.2 Design Parameters for the 2008 Mental Health Surveillance Study, Quarter 1**

<b>Design Parameter</b>	<b>Total</b>	<b>Per Segment</b>
<b>Interview Respondents Aged 18 or Older, by K6 Score</b>	11,250	6.3
Score 0 to 3 (42% of Cases)	4,725	2.6
Score 4 to 5 (13% of Cases)	1,463	0.8
Score 6 to 7 (12% of Cases)	1,350	0.8
Score 8 to 9 (8% of Cases)	900	0.5
Score 10 to 11 (6% of Cases)	675	0.4
Score 12 to 15 (10% of Cases)	1,125	0.6
Score 16 or Higher (9% of Cases)	1,013	0.6
<b>Sampling Rate, by K6 Score</b>		
Score 0 to 3	0.0075	
Score 4 to 5	0.0223	
Score 6 to 7	0.0301	
Score 8 to 9	0.0823	
Score 10 to 11	0.1174	
Score 12 to 15	0.1481	
Score 16 or Higher	0.1255	
<b>Selected for Telephone Clinical Follow-Up, by K6 Score</b>		
Score 0 to 3	35	0.0
Score 4 to 5	33	0.0
Score 6 to 7	41	0.0
Score 8 to 9	74	0.0
Score 10 to 11	79	0.0
Score 12 to 15	167	0.1
Score 16 or Higher	127	0.1
<b>Total Selected for Telephone Clinical Follow-Up</b>	556	0.3
<b>Percent Agreeing to Clinical Follow-Up</b>	0.85	
<b>Percent Completing the Clinical Follow-Up Interview</b>	0.90	
<b>Completed Clinical Interview, by K6 Score</b>	425	0.2
Score 0 to 3	27	0.0
Score 4 to 5	25	0.0
Score 6 to 7	31	0.0
Score 8 to 9	57	0.0
Score 10 to 11	61	0.0
Score 12 to 15	127	0.1
Score 16 or Higher	97	0.1

K6 = Kessler-6, a 6-item psychological distress scale.

**Table 3.3 Design Parameters for the 2008 Mental Health Surveillance Study, Quarter 2 through Quarter 4**

<b>Design Parameter</b>	<b>Total</b>	<b>Per Segment</b>
<b>Interview Respondents Aged 18 or Older, by K6 Score</b>	33,750	6.3
Score 0 to 3 (42% of Cases)	14,175	2.6
Score 4 to 5 (13% of Cases)	4,388	0.8
Score 6 to 7 (12% of Cases)	4,050	0.8
Score 8 to 9 (8% of Cases)	2,700	0.5
Score 10 to 11 (6% of Cases)	2,025	0.4
Score 12 to 15 (10% of Cases)	3,375	0.6
Score 16 or Higher (9% of Cases)	3,038	0.6
<b>Sampling Rate, by K6 Score</b>		
Score 0 to 3	0.0063	
Score 4 to 5	0.0188	
Score 6 to 7	0.0254	
Score 8 to 9	0.0694	
Score 10 to 11	0.0990	
Score 12 to 15	0.1249	
Score 16 or Higher	0.1058	
<b>Selected for Telephone Clinical Follow-Up, by K6 Score</b>		
Score 0 to 3	89	0.0
Score 4 to 5	82	0.0
Score 6 to 7	103	0.0
Score 8 to 9	187	0.0
Score 10 to 11	200	0.0
Score 12 to 15	422	0.1
Score 16 or Higher	321	0.1
<b>Total Selected for Telephone Clinical Follow-Up</b>	1,405	0.3
<b>Percent Agreeing to Clinical Follow-Up</b>	0.85	
<b>Percent Completing the Clinical Follow-Up Interview</b>	0.90	
<b>Completed Clinical Interview, by K6 Score</b>	1,075	0.2
Score 0 to 3	68	0.0
Score 4 to 5	63	0.0
Score 6 to 7	79	0.0
Score 8 to 9	143	0.0
Score 10 to 11	153	0.0
Score 12 to 15	322	0.1
Score 16 or Higher	246	0.0

K6 = Kessler-6, a 6-item psychological distress scale.

**Table 3.4 2008 Mental Health Surveillance Study, Quarters 1 to 4 Summary**

Design Parameter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>Interview Respondents Aged 18 or Older</b>	10,692	12,816	11,355	10,815	45,678
<b>Unweighted K6 Distribution, by K6 Score</b>					
Score 0 to 3	0.45	0.45	0.45	0.44	0.45
Score 4 to 5	0.15	0.14	0.14	0.15	0.14
Score 6 to 7	0.10	0.10	0.10	0.10	0.10
Score 8 to 9	0.07	0.07	0.07	0.08	0.07
Score 10 to 11	0.05	0.06	0.06	0.06	0.06
Score 12 to 15	0.09	0.09	0.09	0.09	0.09
Score 16 or Higher	0.09	0.09	0.09	0.09	0.09
<b>Eligible for MHSS</b>	10,215	12,148	10,849	10,381	43,593
<i>Eligibility Rate</i>	0.9554	0.9479	0.9554	0.9599	0.9544
<b>Selected for Telephone Clinical Follow-Up<sup>1</sup></b>	696	529	485	621	2,331
<b>Zero Probability Cases</b>	0	0	0	47	47
<b>Agreed to Clinical Follow-Up</b>	586	462	416	509	1,973
<i>Percent Agreeing to Clinical Follow-Up (Including Zero Probability Cases)</i>	0.8420	0.8733	0.8577	0.8196	0.8464
<i>Percent Agreeing to Clinical Follow-Up (Excluding Zero Probability Cases)</i>	0.8420	0.8733	0.8577	0.8868	0.8638
<b>Completed Clinical Interviews</b>	467	361	317	355	1,500
<i>Clinical Interview Completion Rate</i>	0.7969	0.7814	0.7620	0.6974	0.7603

K6 = Kessler-6, a 6-item psychological distress scale.

<sup>1</sup> Includes cases assigned a zero probability of selection that would have been selected based on their K6 rates.

NOTE: The overall response rate to the MHSS clinical follow-up study should also include the nonresponse rates to the main study.

### 3.4 Sample Allocation in 2009 MHSS

The 2009 MHSS was designed to yield 500 clinical follow-up interviews during 2009. A subsample of eligible respondents was selected for clinical follow-up with probabilities based on their K6 scores. Similar to the 2008 CAI instrument, the CAI instrument in 2009 included a sampling algorithm to indicate to an FI whether a NSDUH main interview respondent had also been selected for the clinical follow-up survey.

The 2009 MHSS sample was initially 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 (AMI) rather than SMI. This decision was motivated by the desire to reduce the probability that a respondent with an extremely large weight would be selected while maintaining the efficiency of estimating SMI and AMI from the MHSS sample. A new allocation scheme was developed through Neyman's optimal allocation (Lohr, 1999) using estimated population percentages and assumed AMI estimates from the 2008 NSDUH and the 2008 MHSS. Because AMI is detected in every K6 scoring band, the new allocation put more sample in the lower K6 ranges and therefore reduced the size of the weights in those K6 groups. Table 3.5 shows the expected sample distribution for the 500 clinical follow-up interviews under the modified design (i.e., based on SMI in quarters 1 and 2 and based on



AMI in quarters 3 and 4). The table also shows the expected design effect,<sup>6</sup> effective sample size, and projected SE and RSE of the all-adult estimate of AMI prevalence under the modified design.

**Table 3.5 2009 Mental Health Surveillance Study Sample Allocation: Modified Design (*n* = 500)**

K6 Score	Percent of Population	Assumed AMI Rate (%)	Sample Size	Overall Design Effect	Effective Sample Size	Projected SE (%)	Projected RSE (%)
0 to 3	53.10	3.00	96				
4 to 5	13.98	13.42	57				
6 to 7	9.35	13.95	47				
8 to 9	6.08	33.84	59				
10 to 11	4.52	43.43	59				
12 to 15	6.77	53.78	103				
16 or Higher	6.21	76.04	79				
<b>Total</b>	<b>100.00</b>	<b>17.15</b>	<b>500</b>	<b>2.0072</b>	<b>249</b>	<b>2.39</b>	<b>13.92</b>

AMI = any mental illness; K6 = Kessler-6, a 6-item psychological distress scale; RSE = relative standard error; SE = standard error.

Source: 2008 National Survey on Drug Use and Health (NSDUH) and 2008 Mental Health Surveillance Study (MHSS).

The probability sample of 500 clinical follow-up interviews 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, a 96 percent MHSS eligibility rate, 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 were assumed in sample size determinations. [Table 3.6](#) displays the design parameters for quarters 1 and 2, and [Table 3.7](#) displays the design parameters for quarters 3 and 4.

Throughout the 2009 survey, the MHSS sample was monitored, and the sampling parameters were modified quarterly to ensure that the goal of 500 completions was achieved. In addition, for the last 5 weeks in quarter 4,<sup>7</sup> the probability of selection of the NSDUH interview respondents for the clinical follow-up survey was set to zero so that cases would not be sampled without adequate time for completion (by December 21, 2009) (see Section 3.6.1 for further details).

Among the selected persons, 87 percent agreed to participate in the MHSS, and 78 percent of those persons completed the clinical interview. The 2009 MHSS resulted in 521 completed clinical interviews. However, one case was excluded because of incomplete data. The final number of completed interviews in 2009 was 520. A summary of the 2009 MHSS respondents by quarter is included in [Table 3.8](#). Section 3.6.5 provides a further discussion of cases excluded from the 2009 MHSS analysis.

<sup>6</sup> The expected design effect for the 2009 MHSS was the product of the usual design effect for adults in the main survey (about 3.0) and the design effect for the two-phase sample stratified by K6 scores (about 0.7).

<sup>7</sup> Recruitment in 2009 ended on November 16th, and data collection ended on December 21st.

**Table 3.6 Design Parameters for the 2009 Mental Health Surveillance Study, Quarters 1 and 2**

<b>Design Parameter</b>	<b>Total</b>	<b>Per Segment</b>
<b>Interview Respondents Aged 18 or Older, by K6 Score</b>	22,500	6.250
Score 0 to 3 (45% of Cases)	10,150	2.820
Score 4 to 5 (14% of Cases)	3,205	0.890
Score 6 to 7 (10% of Cases)	2,298	0.638
Score 8 to 9 (7% of Cases)	1,573	0.437
Score 10 to 11 (6% of Cases)	1,248	0.347
Score 12 to 15 (9% of Cases)	1,977	0.549
Score 16 or Higher (9% of Cases)	1,978	0.549
<b>Sampling Rate, by K6 Score<sup>1</sup></b>		
Score 0 to 3	0.0024	
Score 4 to 5	0.0074	
Score 6 to 7	0.0130	
Score 8 to 9	0.0336	
Score 10 to 11	0.0503	
Score 12 to 15	0.0589	
Score 16 or Higher	0.0448	
<b>Selected for Telephone Clinical Follow-Up, by K6 Score</b>		
Score 0 to 3	23	0.006
Score 4 to 5	23	0.006
Score 6 to 7	29	0.008
Score 8 to 9	51	0.014
Score 10 to 11	60	0.017
Score 12 to 15	112	0.031
Score 16 or Higher	85	0.024
<b>Total Selected for Telephone Clinical Follow-Up</b>	382	0.106
<b>Percent Agreeing to Clinical Follow-Up</b>	0.86	
<b>Percent Completing the Clinical Follow-Up Interview</b>	0.76	
<b>Completed Clinical Interview, by K6 Score</b>	250	0.069
Score 0 to 3	15	0.004
Score 4 to 5	15	0.004
Score 6 to 7	19	0.005
Score 8 to 9	33	0.009
Score 10 to 11	39	0.011
Score 12 to 15	73	0.020
Score 16 or Higher	56	0.015

K6 = Kessler-6, a 6-item psychological distress scale.

<sup>1</sup> The actual sampling rates were slightly higher than those shown in this table. In quarter 1, they were increased to account for the reduced 18 or older sample. In quarter 2, they were higher to compensate for a low clinical interview yield in quarter 1.

**Table 3.7 Design Parameters for the 2009 Mental Health Surveillance Study, Quarters 3 and 4**

<b>Design Parameter</b>	<b>Total</b>	<b>Per Segment</b>
<b>Interview Respondents Aged 18 or Older, by K6 Score</b>	22,500	6.250
Score 0 to 3 (45% of Cases)	10,150	2.820
Score 4 to 5 (14% of Cases)	3,205	0.890
Score 6 to 7 (10% of Cases)	2,298	0.638
Score 8 to 9 (7% of Cases)	1,573	0.437
Score 10 to 11 (6% of Cases)	1,248	0.347
Score 12 to 15 (9% of Cases)	1,977	0.549
Score 16 or Higher (9% of Cases)	1,978	0.549
<b>Sampling Rate, by K6 Score<sup>1</sup></b>		
Score 0 to 3	0.0076	
Score 4 to 5	0.0138	
Score 6 to 7	0.0167	
Score 8 to 9	0.0300	
Score 10 to 11	0.0379	
Score 12 to 15	0.0418	
Score 16 or Higher	0.0313	
<b>Selected for Telephone Clinical Follow-Up, by K6 Score</b>		
Score 0 to 3	74	0.020
Score 4 to 5	42	0.012
Score 6 to 7	37	0.010
Score 8 to 9	45	0.013
Score 10 to 11	45	0.013
Score 12 to 15	79	0.022
Score 16 or Higher	59	0.017
<b>Total Selected for Telephone Clinical Follow-Up</b>	382	0.106
<b>Percent Agreeing to Clinical Follow-Up</b>	0.86	
<b>Percent Completing the Clinical Follow-Up Interview</b>	0.76	
<b>Completed Clinical Interview, by K6 Score</b>	250	0.069
Score 0 to 3	48	0.013
Score 4 to 5	28	0.008
Score 6 to 7	24	0.007
Score 8 to 9	30	0.008
Score 10 to 11	30	0.008
Score 12 to 15	52	0.014
Score 16 or Higher	39	0.011

K6 = Kessler-6, a 6-item psychological distress scale.

<sup>1</sup> The actual sampling rates used in quarters 3 and 4 were slightly higher than those shown in this table to account for a low clinical interview yield in quarters 1 and 2 and to compensate for the reduced quarter length in quarter 4.

**Table 3.8 2009 Mental Health Surveillance Study, Quarters 1 to 4 Summary**

<b>Design Parameter</b>	<b>Quarter 1</b>	<b>Quarter 2</b>	<b>Quarter 3</b>	<b>Quarter 4</b>	<b>Total</b>
<b>Interview Respondents Aged 18 or Older</b>	11,403	11,963	11,264	10,979	45,609
<b>Unweighted K6 Distribution</b>					
Score 0 to 3	0.45	0.45	0.45	0.45	0.45
Score 4 to 5	0.14	0.14	0.14	0.14	0.14
Score 6 to 7	0.10	0.10	0.10	0.11	0.10
Score 8 to 9	0.07	0.07	0.07	0.07	0.07
Score 10 to 11	0.06	0.05	0.05	0.06	0.06
Score 12 to 15	0.09	0.09	0.09	0.09	0.09
Score 16 or Higher	0.09	0.09	0.09	0.08	0.09
<b>Eligible for MHSS</b>	10,930	11,452	10,786	10,540	43,708
<i>Eligibility Rate</i>	<i>0.9585</i>	<i>0.9573</i>	<i>0.9576</i>	<i>0.9600</i>	<i>0.9583</i>
<b>Selected for Telephone Clinical Follow-Up<sup>1</sup></b>	182	192	211	204	789
<b>Zero Probability Cases</b>	0	0	0	21	21
<b>Agreed to Clinical Follow-Up</b>	156	167	183	159	665
<i>Percent Agreeing to Clinical Follow-Up (Including Zero Probability Cases)</i>	<i>0.8571</i>	<i>0.8698</i>	<i>0.8673</i>	<i>0.7794</i>	<i>0.8428</i>
<i>Percent Agreeing to Clinical Follow-Up (Excluding Zero Probability Cases)</i>	<i>0.8571</i>	<i>0.8698</i>	<i>0.8673</i>	<i>0.8689</i>	<i>0.8659</i>
<b>Completed Clinical Interviews</b>	123	125	142	130	520
<i>Clinical Interview Completion Rate</i>	<i>0.7885</i>	<i>0.7485</i>	<i>0.7760</i>	<i>0.8176</i>	<i>0.7820</i>

K6 = Kessler-6, a 6-item psychological distress scale.

<sup>1</sup> Includes cases assigned a zero probability of selection that would have been selected based on their K6 rates.

NOTE: The overall response rate to the MHSS clinical follow-up study should also include the nonresponse rates to the main study.

### 3.5 Sample Allocation in 2010 and 2011 MHSS

The 2010 MHSS was designed to yield 500 interviews, and the 2011 MHSS was designed to yield 1,500 interviews. Because the 2010 and 2011 sample designs were similar, they are both described in this section.

The sample selection algorithms used in 2008 and 2009 led to some respondents having much greater weights than others, which resulted in large SEs of estimates. Because young persons are oversampled in NSDUH, the sample distribution by age does not reflect the distribution of the population by age (NSDUH has a higher percentage of young persons than the actual percentage in the population). That is, a respondent aged 18 to 25 in NSDUH represents a smaller proportion of the population than a respondent aged 50 or older; therefore, the younger respondent has a much smaller weight. If MHSS respondents are selected without regard to age, as was done in 2008 and 2009, this overrepresentation of young persons is maintained in the MHSS, and thus the unequal weighting in NSDUH is maintained in the MHSS. This oversampling of young persons is not needed to meet the MHSS's analytic goals; a distribution of respondents that mirrors the population is desired.

To control the distribution of respondents selected for the MHSS by age, a new selection algorithm was developed for the 2010 and 2011 MHSS. Subsamples of eligible respondents were selected for clinical follow-up with probabilities based on their K6 scores and WHODAS scores,

and the probabilities were adjusted by age group. Specifically, an age group equalization factor was used to adjust the selection probabilities such that persons are selected for the MHSS in accordance with the age distribution in the adult population in the United States. To adjust for the oversampling of young persons in NSDUH, young persons are undersampled for the MHSS, and persons in older age groups are oversampled. This approach led to weights across age groups that were less variable.

Tables 3.9 and 3.10 show some of the age-related factors used to compute sampling rates in 2010 and 2011, respectively. For example, based on the 2008 population estimates and the 2010 planned sample, the average weighting for persons aged 50 or older was almost 10 times as large as the average weighting for persons aged 18 to 25. (Smaller differences occurred for the intermediate age groups, 26 to 34 and 35 to 49.) To compensate for this initial disparity in weights and to focus on persons aged 18 or older as a whole, sampling rates were set for persons aged 18 to 25, then adjusted for the other three age groups by applying the equalization factor, *F*, shown in Tables 3.9 and 3.10.<sup>8</sup>

**Table 3.9 Mental Health Surveillance Study Age-Related Factors for 2010**

Age	2008 Population	Planned Sample	Average Weight	Weight Equalization Factor	Eligibility Factor (%)	Response Rate Factor (%)	Overall Age-Related Factor <sup>1</sup>
18 to 25	32,938,184	22,500	1,464	1.0000	96.11	67.43	1.00000
26 to 34	35,634,108	6,300	5,656	3.8637	93.20	66.87	4.01811
35 to 49	64,198,531	9,700	6,618	3.8637	94.66	62.33	4.24452
50 or Older	92,151,942	6,500	14,177	3.8637	96.79	58.72	4.40612

<sup>1</sup> The overall age-related factor is the weight equalization factor divided by the eligibility and response rate factors and then normalized.

**Table 3.10 Mental Health Surveillance Study Age-Related Factors for 2011**

Age	2009 Population	Planned Sample	Average Weight	Weight Equalization Factor	Eligibility Factor (%)	Response Rate Factor (%)	Overall Age-Related Factor <sup>1</sup>
18 to 25	33,579,988	22,500	1,492	1.0000	96.69	69.27	1.0000
26 to 34	36,214,628	6,000	6,036	4.0442	93.66	62.18	4.6505
35 to 49	63,166,074	9,000	7,018	4.0442	94.86	67.59	4.2245
50 or Older	94,245,857	7,500	12,566	4.0442	96.73	65.48	4.2767

<sup>1</sup> The overall age-related factor is the weight equalization factor divided by the eligibility and response rate factors and then normalized.

<sup>8</sup> For each age group, the derived weight equalization factor is equal to the average weight for that age group divided by the average weight for the 18 to 25 age group. For example, the weight equalization factor in 2010 for the 26 to 34 age group equals  $5,656/1,464 = 3.8637$  (see Table 3.9). Because the average weight for persons aged 50 or older is so much higher than the other age groups, use of the derived weight equalization factors would have greatly increased the sampling rate for persons aged 50 or older. An adjusted set of factors that partially reduced the unequal weighting effects across age groups was specified instead. Rather than using a different age equalization factor for each age group, the adjusted equalization factors for the 35 to 49 and 50 or older age groups were set equal to the factor for the 26 to 34 age group.

The eligibility of NSDUH respondents for the clinical follow-up was based on the language used to complete the questionnaire; to be eligible for the MHSS, NSDUH respondents had to have completed the questionnaire in English. Response rates shown are the product of the percentage agreeing to the follow-up survey and the proportion of those who actually participated.<sup>9</sup>

The general sample allocation strategy was to find an allocation that provided a more precise estimate of all-adult SMI prevalence so that appropriate cut points (i.e., points in the SMI predicted probability continuum at which cases would be classified as SMI or not) could be established based on the MHSS sample. This involved producing a reasonably close to optimal all-adult prevalence measure. A total of 225 strata were defined based on the combination of 25 possible K6 scores (0 to 24)<sup>10</sup> and 9 possible WHODAS scores (0 to 8). Statistical models were developed to estimate the probability of SMI based on the K6 and WHODAS scores, which produced predicted probabilities of SMI for each person. In addition, the sample distribution by the K6 and WHODAS scores was computed from 2008 NSDUH data (for 2010) and from 2009 NSDUH data (for 2011) by the four sample allocation age groups represented in the 18 or older population. Predicted probabilities of SMI were used to obtain proportionality factors,  $r_{h,age}$ , for setting sampling rates by stratum (denoted  $h$ ) and age group:

$$r_{h,age} \propto \frac{\sqrt{P_h(1-P_h)}}{E_{age}RR_{age}} * F_{age},$$

where  $P_h$  refers to the predicted probability of SMI in stratum  $h$ , and  $F_{age}$ ,  $E_{age}$ , and  $RR_{age}$  refer to the age-specific weight equalization factors, eligibility factors, and response rate factors, respectively. These proportionality factors then were multiplied by the projected sample counts and scaled to achieve the desired overall respondent sample (500 persons aged 18 or older in 2010 and 1,500 persons aged 18 or older in 2011) and to obtain the stratum and age-specific sampling rates.

As an example, from the 2011 MHSS the predicted probability of SMI for a person with a K6 score of 10 and a WHODAS score of 6 was 0.1398. For the 18 to 25 age group, the proportionality factor then would be

$$r_{h,18-25} = \frac{\sqrt{0.1398(1-0.1398)}}{0.9669 * 0.6927} * 1.000 = 0.5177.$$

An adjustment factor of 0.0885 was applied to each proportionality factor in order to achieve an overall sample of 1,500 persons. Thus, the sampling rate for this stratum and age group was  $0.5177 * 0.0885 = 0.0458$ .

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<sup>9</sup> Eligibility and response rate factors were computed using 2009 MHSS data for the 2010 design and the 2010 MHSS data for the 2011 design.

<sup>10</sup> In the prediction model, a recoded form of K6 score was used: scores 0 to 7 were recoded as 0, and all other scores had 7 subtracted from them to give a recoded total ranging from 0 to 17. These scores were reverse recoded to get back to the original K6 scores that were used in the two-way matrix. This explains why the predicted probabilities of mental illness are all identical for K6 scores of 0 to 7.

Projected yields of positive cases based on the predicted probability of SMI broken out by age group are provided in [Tables 3.11](#) and [3.12](#). In addition, [Tables 3.13](#) and [3.14](#) provide the 2010 MHSS and 2011 MHSS sample allocation by K6 group, and [Tables 3.15](#) and [3.16](#) provide the 2010 MHSS and 2011 MHSS sample allocation by WHODAS score.

**Table 3.11 Projected Yields of Predicted Positive Cases, by Age Group: 2010 MHSS**

	<b>18 to 25</b>	<b>26 to 34</b>	<b>35 to 49</b>	<b>50 or Older</b>	<b>18 or Older</b>
SMI	25	23	31	10	89
AMI	67	59	80	33	239
<b>Total Sample</b>	<b>116</b>	<b>116</b>	<b>170</b>	<b>98</b>	<b>500</b>

AMI = any mental illness; SMI = serious mental illness.

**Table 3.12 Projected Yields of Predicted Positive Cases, by Age Group: 2011 MHSS**

	<b>18 to 25</b>	<b>26 to 34</b>	<b>35 to 49</b>	<b>50 or Older</b>	<b>18 or Older</b>
SMI	72	71	92	39	274
AMI	194	184	226	118	721
<b>Total Sample</b>	<b>335</b>	<b>343</b>	<b>477</b>	<b>345</b>	<b>1,500</b>

AMI = any mental illness; SMI = serious mental illness.

**Table 3.13 2010 Mental Health Surveillance Study Sample Allocation, by K6 Group**

<b>K6 Group</b>	<b>Percent of Population<sup>1</sup></b>	<b>Assumed SMI Rate (%)<sup>2,3</sup></b>	<b>Expected Sample Size</b>	<b>Expected SMI Count</b>	<b>Sampling Rate</b>
0 to 3	53.28	0.91	162	0	0.00794
4 to 5	14.22	1.20	51	0	0.00790
6 to 7	9.28	1.73	38	0	0.00841
8 to 9	6.06	2.98	34	0	0.01060
10 to 11	4.74	5.01	35	1	0.01373
12 to 15	6.55	12.65	78	18	0.01958
16 or Higher	5.87	39.03	103	69	0.02620
<b>Total</b>	<b>100.00</b>	<b>4.36</b>	<b>500</b>	<b>89</b>	

K6 = Kessler-6, a 6-item psychological distress scale; SMI = serious mental illness.

<sup>1</sup> Source: 2008 National Survey on Drug Use and Health.

<sup>2</sup> Source: 2008 Mental Health Surveillance Study.

<sup>3</sup> The assumed SMI rates are weighted averages and not the actual SMI rates that were used in the sample allocation.

**Table 3.14 2011 Mental Health Surveillance Study Sample Allocation, by K6 Group**

<b>K6 Group</b>	<b>Percent of Population<sup>1</sup></b>	<b>Assumed SMI Rate (%)<sup>2,3</sup></b>	<b>Expected Sample Size</b>	<b>Expected SMI Count</b>	<b>Overall Sampling Rate</b>
0 to 3	53.21	0.92	491	0	0.02322
4 to 5	13.78	1.21	148	0	0.02293
6 to 7	9.41	1.61	116	0	0.02418
8 to 9	5.96	2.65	96	0	0.03034
10 to 11	4.64	5.32	101	3	0.03978
12 to 15	6.99	12.49	233	50	0.05569
16 or Higher	6.02	41.07	316	221	0.07751
<b>Total</b>	<b>100.00</b>	<b>4.56</b>	<b>1,500</b>	<b>274</b>	

K6 = Kessler-6, a 6-item psychological distress scale; SMI = serious mental illness; WHODAS = World Health Organization Disability Assessment Schedule.

<sup>1</sup> Source: 2009 National Survey on Drug Use and Health.

<sup>2</sup> Source: 2009 Mental Health Surveillance Study.

<sup>3</sup> To compute assumed SMI rates, SMI estimates by K6 and WHODAS score were averaged (weighted) across K6 scores. These rates are not the actual SMI rates that were used in the sample allocation.

**Table 3.15 2010 Mental Health Surveillance Study Sample Allocation, by WHODAS Score**

<b>WHODAS Score</b>	<b>Percent of Population<sup>1</sup></b>	<b>Assumed SMI Rate (%)<sup>2,3</sup></b>	<b>Expected Sample Size</b>	<b>Expected SMI Count</b>	<b>Sampling Rate</b>
0	74.80	1.09	248	0	0.00736
1	7.11	2.71	39	1	0.01207
2	5.30	4.26	36	1	0.01498
3	3.14	8.01	32	2	0.02276
4	2.57	11.80	29	7	0.02492
5	2.04	19.04	29	11	0.03140
6	1.74	31.80	31	21	0.04003
7	1.32	41.36	25	18	0.04255
8	1.98	54.53	31	28	0.03518
<b>Total</b>	<b>100.00</b>	<b>4.36</b>	<b>500</b>	<b>89</b>	

K6 = Kessler-6, a 6-item psychological distress scale; SMI = serious mental illness; WHODAS = World Health Organization Disability Assessment Scale.

<sup>1</sup> Source: 2008 National Survey on Drug Use and Health.

<sup>2</sup> Source: 2008 Mental Health Surveillance Study.

<sup>3</sup> The assumed SMI rates are weighted averages and not the actual SMI rates that were used in the sample allocation.



**Table 3.16 2011 Mental Health Surveillance Study Sample Allocation, by WHODAS Score**

WHODAS Score	Percent of Population <sup>1</sup>	Assumed SMI Rate (%) <sup>2,3</sup>	Expected Sample Size	Expected SMI Count	Overall Sampling Rate
0	74.50	1.05	734	0	0.02188
1	7.21	2.49	115	2	0.03529
2	4.99	4.55	108	5	0.04829
3	3.32	8.51	97	9	0.06485
4	2.48	13.90	92	23	0.08205
5	2.38	20.42	95	38	0.08876
6	1.93	30.34	90	56	0.10363
7	1.28	43.47	70	55	0.12286
8	1.92	58.32	100	87	0.11535
<b>Total</b>	<b>100.00</b>	<b>4.56</b>	<b>1,500</b>	<b>274</b>	

K6 = Kessler-6, a 6-item psychological distress scale; SMI = serious mental illness; WHODAS = World Health Organization Disability Assessment Scale.

<sup>1</sup> Source: 2009 National Survey on Drug Use and Health.

<sup>2</sup> Source: 2009 Mental Health Surveillance Study.

<sup>3</sup> To compute assumed SMI rates, SMI estimates by K6 and WHODAS score were averaged (weighted) across K6 scores. These rates are not the actual SMI rates that were used in the sample allocation.

The 2010 probability sample of 500 clinical follow-up interviews was distributed across four calendar quarters with approximately 125 follow-up interviews per quarter. The 2011 sample of 1,500 clinical follow-up interviews was distributed across four calendar quarters with approximately 375 follow-up interviews per quarter. Throughout the 2010 and 2011 surveys, the MHSS sample was monitored, and the sampling parameters were modified on an as-needed basis. Sampling rates were adjusted as needed to ensure that the targeted number of completions was achieved for each year. In addition, for the last 3 weeks in quarter 4,<sup>11</sup> the probability of selection of the NSDUH interview respondents for the clinical follow-up survey was set to zero so that cases would not be sampled without adequate time for completion (by December 20, 2010, and December 20, 2011, respectively) (see Section 3.6.1 for further details).

The 2010 MHSS resulted in 516 completed clinical interviews. Approximately 84 percent of selected persons agreed to participate, and 81 percent of those persons completed the MHSS clinical interview. A summary of the 2010 MHSS respondents by quarter is included in [Table 3.17](#).

The 2011 MHSS resulted in 1,495 completed clinical interviews. An estimated 84 percent of selected persons agreed to participate, and 79 percent of those persons completed the MHSS clinical interview. A summary of the 2011 MHSS respondents by quarter is included in [Table 3.18](#).

<sup>11</sup> Recruitment in both 2010 and 2011 ended on November 29th, and data collection ended on December 20th.

**Table 3.17 2010 Mental Health Surveillance Study, Quarters 1 to 4 Summary**

Design Parameter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>Interview Respondents Aged 18 or Older</b>	10,877	12,102	11,844	11,021	45,844
<b>Unweighted K6 Distribution, by K6 Score</b>					
Score 0 to 3	0.45	0.46	0.47	0.45	0.46
Score 4 to 5	0.14	0.14	0.14	0.13	0.14
Score 6 to 7	0.10	0.10	0.10	0.11	0.10
Score 8 to 9	0.07	0.07	0.07	0.07	0.07
Score 10 to 11	0.06	0.05	0.05	0.05	0.05
Score 12 to 15	0.09	0.08	0.09	0.09	0.09
Score 16 or Higher	0.09	0.09	0.09	0.09	0.09
<b>Eligible for MHSS</b>	10,446	11,608	11,341	10,563	43,958
<i>Eligibility Rate</i>	<i>0.9604</i>	<i>0.9592</i>	<i>0.9575</i>	<i>0.9584</i>	<i>0.9589</i>
<b>Selected for Telephone Clinical Follow-Up<sup>1</sup></b>	190	246	175	157	768
<b>Zero Probability Cases</b>	0	0	0	4	4
<b>Agreed to Clinical Follow-Up</b>	163	198	146	133	640
<i>Percent Agreeing to Clinical Follow-Up (Including Zero Probability Cases)</i>	<i>0.8579</i>	<i>0.8049</i>	<i>0.8343</i>	<i>0.8471</i>	<i>0.8333</i>
<i>Percent Agreeing to Clinical Follow-Up (Excluding Zero Probability Cases)</i>	<i>0.8579</i>	<i>0.8049</i>	<i>0.8343</i>	<i>0.8693</i>	<i>0.8377</i>
<b>Completed Clinical Interviews</b>	132	157	115	112	516
<i>Clinical Interview Completion Rate</i>	<i>0.8098</i>	<i>0.7929</i>	<i>0.7877</i>	<i>0.8421</i>	<i>0.8063</i>

K6 = Kessler-6, a 6-item psychological distress scale; WHODAS = World Health Organization Disability Assessment Scale.

<sup>1</sup> Includes cases assigned a zero probability of selection that would have been selected based on their K6 and WHODAS scores.

NOTE: The overall response rate to the MHSS clinical follow-up study should also include the nonresponse rates to the main study.

### 3.6 Issues that Affected the Clinical Follow-Up Sample Design

#### 3.6.1 Zero Selection Probability

Because the MHSS is conducted by telephone follow-up after the completion of the NSDUH interview, respondents selected for the MHSS late in quarter 4 pose logistical challenges for data collection. From 2008 to 2011, MHSS recruitment was suspended early to avoid delays in data processing that would result from interviewing cases recruited at the end of quarter 4. This suspension of recruitment was accomplished by pushing a zero probability patch to quarter 4 FIs.<sup>12</sup> Any respondents who completed their NSDUH interview while the zero probability patch was in effect had no chance of being selected for the MHSS, regardless of their K6 scores, WHODAS scores, or age groups. In addition to the cases occurring at the end of quarter 4 each year, at the beginning of quarter 1 in the 2011 data collection, 15 NSDUH interview respondents who should have been selected for the MHSS were inadvertently given a zero probability of selection for the MHSS.

<sup>12</sup> The zero probability patch was released with 4 weeks remaining in data collection in 2008, with 5 weeks remaining in data collection in 2009, and with 3 weeks remaining in data collection in 2010 and 2011.

**Table 3.18 2011 Mental Health Surveillance Study, Quarters 1 to 4 Summary**

Design Parameter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total
<b>Interview Respondents Aged 18 or Older</b>	10,840	12,481	12,170	11,108	46,599
<b>Unweighted K6 Distribution, by K6 Score</b>					
Score 0 to 3	0.46	0.47	0.46	0.45	0.46
Score 4 to 5	0.14	0.13	0.13	0.14	0.14
Score 6 to 7	0.10	0.10	0.10	0.10	0.10
Score 8 to 9	0.07	0.07	0.07	0.07	0.07
Score 10 to 11	0.05	0.05	0.06	0.05	0.05
Score 12 to 15	0.09	0.08	0.09	0.09	0.09
Score 16 or Higher	0.09	0.09	0.09	0.09	0.09
<b>Eligible for MHSS</b>	10,392	11,974	11,665	10,709	44,740
<i>Eligibility Rate</i>	<i>0.9587</i>	<i>0.9594</i>	<i>0.9585</i>	<i>0.9641</i>	<i>0.9601</i>
<b>Selected for Telephone Clinical Follow-Up<sup>1</sup></b>	543	672	531	531	2,277
<b>Zero Probability Cases</b>	15	0	0	26	41
<b>Agreed to Clinical Follow-up</b>	450	561	449	421	1,881
<i>Percent Agreeing to Clinical Follow-Up (Including Zero Probability Cases)</i>	<i>0.8287</i>	<i>0.8348</i>	<i>0.8456</i>	<i>0.7928</i>	<i>0.8261</i>
<i>Percent Agreeing to Clinical Follow-Up (Excluding Zero Probability Cases)</i>	<i>0.8523</i>	<i>0.8348</i>	<i>0.8456</i>	<i>0.8337</i>	<i>0.8412</i>
<b>Completed Clinical Interviews</b>	363	436	359	337	1,495
<i>Clinical Interview Completion Rate</i>	<i>0.8067</i>	<i>0.7772</i>	<i>0.7996</i>	<i>0.8005</i>	<i>0.7948</i>

K6 = Kessler-6, a 6-item psychological distress scale; WHODAS = World Health Organization Disability Assessment Scale.

<sup>1</sup> Includes cases assigned a zero probability of selection that would have been selected based on their K6 and WHODAS scores.

NOTE: The overall response rate to the MHSS clinical follow-up study should also include the nonresponse rates to the main study.

Respondents who were given a zero probability of selection for the MHSS may have different mental health characteristics than persons who were given a chance of being selected. To avoid potential bias from the exclusion of zero probability cases, cases were identified that would have been selected for the MHSS if their selection probability reflected their mental health measures and age groups. MHSS selection was determined for all cases that received a zero probability of selection so that each case could be classified as either not selected or a nonrespondent. In 2008 and 2009, MHSS selection was determined for zero probability cases by comparing the sampling rates for the cases' K6 rates to their random numbers to determine whether or not they would have been selected. For 2010 and 2011, the probability of selection took into account their K6 rates, WHODAS scores, and age group adjustments. All zero probability cases that would have been selected if they had not been given a zero probability of selection were treated as nonrespondents (see Section 4.2.3 in Chapter 4 for more details on weighting adjustments due to nonresponse) in the calculation of the MHSS analysis weights. The numbers of cases assigned a zero probability of selection that would otherwise have been selected for the MHSS are shown in [Tables 3.4, 3.8, 3.17, and 3.18](#) for each year of MHSS data collection.

### 3.6.2 Noncoverage for Non-English Speakers

The target population for the MHSS excluded persons whose main study interview was conducted in Spanish. Approximately 4 percent of the NSDUH interviews are completed in Spanish each year.

### 3.6.3 Gulf Coast Oversample

In 2011, a special Gulf Coast Oversample (GCO) was included to measure the impact of the April 20, 2010, Deepwater Horizon oil spill on substance use, mental health, and the utilization of substance abuse and mental health services. The 2011 main study sample was expanded by 2,000 completed interviews in Alabama, Florida, Louisiana, and Mississippi.

With the additional sample in the Gulf Coast region, the main study sample shifted from approximately 1.3 percent in the affected area to 3.3 percent in this area. As a result, 56 MHSS clinical interviews (3.75 percent of the total) were completed in the affected area. The 2011 MHSS weights have been adjusted to reflect the increased sample in the Gulf Coast region.

### 3.6.4 Falsified NSDUH Interviews

At the beginning of quarter 4 of the 2011 NSDUH, it was discovered that an FI in Pennsylvania had been falsifying NSDUH main study interviews throughout 2011 and years prior. A later investigation unveiled a small number of falsified cases completed by an FI in Oregon in 2011. All NSDUH main study interviews that were determined to be falsified from 2008 through 2011 were recoded as incompletes and dropped from the file. Consequently, all clinical follow-up cases sampled from these falsified NSDUH interviews were recoded as main study incompletes. MHSS data were reprocessed such that cases selected for the MHSS that were sampled from the falsified NSDUH interviews were no longer treated as selected for the MHSS. MHSS analysis weights were recalculated for 2008 through 2010 using these revised MHSS data, such that falsified cases were excluded from the nonresponse models (i.e., they were not considered as respondents or nonrespondents). As shown in [Table 3.19](#), the removal of falsified cases resulted in two MHSS interviews being removed from the 2008 MHSS. No completed interviews were lost from the 2009 and 2010 MHSS, and the falsification was discovered prior to the processing of the 2011 MHSS, so no reweighting was required.

**Table 3.19 Falsified Cases Removed from the 2008 through 2010 MHSS**

Type of Case Removed	2008 MHSS	2009 MHSS	2010 MHSS
Selected for Clinical Follow-Up	7	3	1
Agreed to Clinical Follow-Up	4	0	0
Completed Clinical Interviews	2	0	0

### 3.6.5 Respondents Excluded from MHSS Analyses

In 2008 and 2009, data from five respondents were excluded and treated as nonrespondents. These respondents were excluded either because the respondent had an

extremely large weight or because responses on all K6 and WHODAS (or SDS) item scores were missing.

Respondents with low K6 total scores typically had relatively large weights. One case belonging to the 2008 WHODAS half sample with a large weight was designated as SMI positive by the SCID interview,<sup>13</sup> but the K6 and WHODAS total scores were zero, thus ensuring that this case would always be a false negative in the receiver operating characteristic (ROC) modeling analyses. The large weight (1.6 million for this respondent) had the effect of unduly influencing the ROC models, so this respondent was dropped from the analysis dataset. Two respondents belonging to the 2008 SDS half sample also were removed for similar reasons.

An additional 2008 respondent from the SDS half sample and a respondent from the 2009 MHSS sample were removed because all of their item scores for the K6 components were missing.

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<sup>13</sup> See Chapter 1 for details on the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP or SCID).



## 4. Sample Weighting

### 4.1 Background

The principal purpose of the subsample of clinical data collected as part of the 2011 Mental Health Surveillance Study (MHSS) is for use in estimating the prevalences of serious mental illness (SMI) among adults. This has been achieved by employing a model connecting the clinical diagnosis of SMI in the MHSS subsample with covariates collected in the National Survey on Drug Use and Health (NSDUH). Sections 6.4 and 6.5 in Chapter 6 provide the details of this estimation. Analysis weights for the 2011 MHSS subsample were created to provide nationally representative estimates of mental disorders collected with the MHSS are to be used in the modeling, thereby limiting the potential for bias in SMI prevalence estimates. This chapter describes the components of the MHSS analysis weights, including the methodology developed to prevent and manage extreme weights.

### 4.2 Components of the MHSS Analysis Weights

The MHSS analysis weights (MHWEIGHT) consist of the product of four components: (1) NSDUH's person-level analysis weights (ANALWT), (2) the inverse of probability of selection for clinical follow-up, (3) the nonresponse adjustment, and (4) the poststratification adjustment. Each of these components is described below.

#### 4.2.1 NSDUH Person-Level Analysis Weights (ANALWT)

The NSDUH person-level analysis weights, ANALWT, have 15 weight components. Each weight component represented either the selection probability at each selection stage or an adjustment on nonresponse, poststratification, or extreme weights. See Chen et al. (in press) for further details about the construction of NSDUH's person-level analysis weights.

#### 4.2.2 Inverse of Probability of Selection for Clinical Follow-Up

To compute the MHSS design weights, each NSDUH analysis weight was first multiplied by the inverse of the probability that the respondent was selected for the follow-up clinical interview (see Chapter 3 for further details about sample design and selection). Ineligible respondents (e.g., those aged 12 to 17 years, or those who completed the NSDUH interview in Spanish) were assigned a weight of zero for this weight component. For eligible respondents, selection probabilities differed according to age group, Kessler-6 (K6) score, and World Health Organization Disability Assessment Scale (WHODAS) score.

#### 4.2.3 Nonresponse Adjustment

In the 2008 and 2009 MHSS, the MHSS design weights (i.e., the product of the NSDUH analysis weights and the inverse of the probability of being selected for the MHSS) were adjusted for nonresponse using a weighting class ratio adjustment by the seven K6 group levels corresponding to those shown in [Table 3.1](#) in Chapter 3. In the 2010 and 2011 MHSS, the MHSS design weights were adjusted for nonresponse using a weighting class ratio adjustment by the

seven K6 group levels and four age group levels, as shown in [Table 3.9](#) (i.e., 18 to 25, 26 to 34, 35 to 49, and 50 or older).

As noted in Section 3.6.1, MHSS recruitment ended several weeks prior to the end of each survey year to avoid delays in processing the MHSS data. Consequently, eligible respondents who had not yet been processed for selection by this cutoff date were assigned a zero probability of selection. In addition, several respondents who should have been selected in the quarter 1 2011 MHSS sample were inadvertently given a zero probability of selection. To avoid potential bias from the exclusion of these cases, respondents who were given a zero probability of selection for the MHSS but should have been selected according to their age group, K6 score, and WHODAS score were treated as nonrespondents in the calculation of the nonresponse weight adjustment. In 2008 and 2009, five cases were excluded either due to an unusual weight or because all K6 and WHODAS (or Sheehan Disability Scale, SDS) item scores were missing (see Section 3.6.5 for more details). To account for these exclusions, these excluded cases also were treated as nonrespondents in the weight adjustment.

#### 4.2.4 Poststratification Adjustment

In the 2008 through 2010 MHSS, the nonresponse-adjusted MHSS weights (i.e., the product of ANALWT, the inverse of the probability of being selected to the MHSS, and the nonresponse adjustment) were further adjusted to match estimated totals for the civilian, noninstitutionalized population aged 18 or older, derived from the 2000 census. In the 2011 MHSS, this *poststratification* adjustment targeted estimated totals from the 2010 census. Poststratification generally reduces the variance of estimates and can also be used to reduce the potential for bias due to coverage errors in the sampling frame (see Kott, 2006).

The general exponential model (Folsom & Singh, 2000) was employed to perform the 2011 MHSS poststratification. Totals for the following demographic variables were targeted:

- Age Group (18-25, 26-49, 50+),
- Race/Ethnicity (Hispanic, Non-Hispanic White, non-Hispanic Black, and non-Hispanic Others),
- Gender (male, female),
- Age Group by Race/Ethnicity,
- Age Group by Gender, and
- Race/Ethnicity by Gender.

[Table 4.1](#) displays the weight distribution of the MHSS weights after the poststratification adjustment in 2008, 2009, and 2010. Observe that the average MHSS weight in 2011 was 155,602, but the median was much less: 80,297. Three quarters of the weights were less than 200,000, and the largest weight was slightly less than 2,000,000. The unequal weighting effect (UWE) is a measure of the variability of the weights.<sup>14</sup> When the weights are all

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<sup>14</sup>  $UWE = \text{Sample size} \times (\text{Sum of the squared weights}) / (\text{Sum of the weights})^2$ , which is approximately the relative variance of the weights plus 1.



the same, the UWE = 1. In this case, it was 2.84, which was the smallest across all years of the MHSS, although it was close to the 2010 value (a change in the way the MHSS was subsampled was implemented starting in 2010). The UWE measure for each year was much greater than 1. This was expected given that the MHSS sample is designed to oversample NSDUH respondents that have higher K6 scores.

**Table 4.1 2008 to 2011 Mental Health Surveillance Study Analysis Weight Distribution**

Statistics	2008 MHSS			2009 MHSS	2010 MHSS	2011 MHSS
	2008A	2008B	2008			
100% Max	12,774,256	11,102,251	7,418,518	16,505,869	5,210,784	1,970,745
99%	5,971,614	4,722,012	2,611,065	3,989,915	2,940,161	1,036,217
95%	1,055,662	1,441,072	614,145	2,112,483	1,416,536	545,605
90%	488,543	716,278	283,433	1,073,240	1,121,525	385,097
75% Q3	174,702	160,065	82,867	337,177	519,923	198,703
50% Median	56,848	55,823	27,955	96,550	212,109	80,297
25% Q1	20,377	19,132	10,171	28,842	83,132	32,887
10%	8,266	8,267	3,985	12,331	38,075	14,809
5%	4,785	4,402	2,146	6,418	22,436	9,083
1%	1,682	1,193	693	2,491	8,398	3,451
0% Min	327	268	75	265	2,664	306
Mean	296,341	303,539	149,949	436,936	444,327	155,602
<i>n</i>	759	741	1,500	520	516	1,495
UWE	12.83	9.30	12.11	8.73	2.98	2.84

MHSS = Mental Health Surveillance Study; 2008A = 2008 sample A; 2008B = 2008 sample B; Max = maximum; Q1 = first quartile; Q3 = third quartile; Min = minimum; *n* = sample size; UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

#### 4.2.5 Weighting Management

In the 2008 MHSS, one of the consequences of the MHSS sample allocation within the seven scoring bands in 2008 was that respondents with low K6 total scores typically had relatively large weights. One case in the WHODAS half sample with an "unusually" large weight (1.6 million in this case), and a K6 total score of 0 was subsequently diagnosed as having SMI by the Structured Clinical Interview for the DSM-IV-TR Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP or SCID) (First et al., 2002). The unusually large weight had the effect of unduly influencing the models linking SMI diagnosis on the MHSS with NSDUH variables, so this record was dropped from the 2008 dataset that was used to fit the SMI estimation model. Two cases belonging to the SDS half sample were removed for similar reasons. Including the record that was removed because all of its item scores were missing and the two falsified cases (see Chapter 3 for more details), six records were dropped from the 2008 MHSS analysis datasets used to model SMI, after which the weights were recalibrated (i.e., poststratified as discussed in Section 4.2.4). The sample size of the combined 2008 dataset was 1,500. The 2008 sample A size was 759, and the 2008 sample B size was 741.

A secondary goal of the MHSS is to generate direct estimates of various mental health prevalences. Several cases with extremely large weights appeared in the 2008 and 2009 MHSS, which unduly inflated the variances of many direct estimates of interest, such as those for any

mental illness (AMI). Because of this, sampling procedures were refined in 2010 to limit the occurrence of extreme weights. In addition, a weight trimming procedure was developed to truncate weights considered to be extreme in 2008 and 2009.

When a single respondent has a critical impact on an estimate of interest, the validity of inferences using probability-sampling principles (which assume sample sizes are "sufficiently large" to prevent such an occurrence) become problematic. With this in mind, a new weight trimming procedure allows no single weight to exceed 4 percent of the sum of all adult MHSS weights in a year (i.e., no single respondent is allowed to represent more than 4 percent of the estimates for the U.S. adult population).

For this report, outlier weights in the two half samples of the 2008 MHSS and the 2009 MHSS were trimmed so that no single weight exceeded 4 percent of the sum of all adult MHSS analysis weights in the 2008 sample A, the 2008 sample B, and again in 2009. No weights needed to be trimmed in the 2008 full sample because of its relatively large sample size (compared with the 2008 sample A, the 2008 sample B, and 2009). No weights needed to be trimmed in 2010 or 2011 because of changes implemented in the sampling design (see Section 3.5 for further details). There was no new poststratification after the weight trimming. [Table 4.2](#) displays the weight distribution of the MHSS analysis weights after weight trimming in the 2008 sample A, the 2008 sample B, and the 2009 MHSS.

**Table 4.2 2008 Sample A, 2008 Sample B, and 2009 Mental Health Surveillance Study Analysis Weight Distribution after Weight Trimming**

Statistics	2008 MHSS		2009 MHSS
	2008A	2008B	
100% Max	8,666,764	8,909,188	8,506,185
99%	5,971,614	4,722,012	3,989,915
95%	1,055,662	1,441,072	2,112,483
90%	488,543	716,278	1,073,242
75% Q3	174,702	160,065	337,177
50% Median	56,848	55,823	96,550
25% Q1	20,377	19,132	28,842
10%	8,266	8,267	12,331
5%	4,785	4,402	6,418
1%	1,682	1,193	2,491
0% Min	327	268	265
Mean	285,467	300,580	408,951
<i>n</i>	759	741	520
UWE	11.09	8.83	6.12

MHSS = Mental Health Surveillance Study; 2008A = 2008 sample A; 2008B = 2008 sample B; Max = maximum; Q1 = first quartile; Q3 = third quartile; Min = minimum; *n* = sample size; UWE = unequal weighting effect.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2009.

# 5. Description of the MHSS Sample Characteristics

## 5.1 Background

Comparisons of the distributions of key demographic and psychosocial characteristics were conducted on data from the annual Mental Health Surveillance Study (MHSS) to determine whether there were differences across the years in the sample composition and whether these differences could be accounted for when applying the sample weights. Tests were conducted comparing World Health Organization Disability Assessment Schedule (WHODAS) samples (i.e., MHSS samples collecting WHODAS components) from different time periods to assess whether the change in the sampling allocation in 2010 (see Chapter 3 for more details on sample design and selection) or the sample-size increase in 2011 may have led to statistically significant differences in demographic, mental health, and substance use estimates. The goal was to determine whether the sample collected in 2011 was consistent with the samples collected in prior years.

## 5.2 Summary of Prior Descriptive Analyses

For the 2008 MHSS sample evaluation, initial descriptive analyses and statistical tests were conducted to examine the distribution of respondent characteristics in the MHSS sample and to check for unexplainable differences between the two half samples, WHODAS and the Sheehan Disability Scale (SDS). The purpose of these analyses was to determine whether estimates from the two half samples could be directly compared (without accounting for differences between the two samples). Key demographic characteristics analyzed included gender, age, race/ethnicity, and education. Substance use characteristics included past month tobacco and marijuana use and past year alcohol abuse or dependence. The mental health characteristics included Structured Clinical Interview for DSM-IV (SCID) diagnoses, serious mental illness (SMI) status, and Kessler-6 (K6) scores. Further details about these variables can be obtained from the 2008 National Survey on Drug Use and Health (NSDUH) national findings report (Office of Applied Studies [OAS], 2009).

Analyzing both the unweighted and weighted data from the 2008 MHSS failed to uncover a demographic or mental health measure that was appreciably different across the two samples. There were, however, some large differences in the substance use measures. For details, see Aldworth et al. (2009).

For the 2009 MHSS sample evaluation, initial descriptive analyses and statistical tests were conducted comparing key demographic and psychosocial characteristics between the 2009 MHSS and the WHODAS half sample of the 2008 MHSS. The purpose of these analyses was to determine whether the new data collection in 2009 (see Section 3.4 for details) was consistent with the collection from the WHODAS half sample of 2008. Key demographic characteristics included gender, age, race/ethnicity, and education. Mental health characteristics included lifetime and past year depression, depression treatment, mental health treatment, and suicidality

measures. Substance use characteristics included past month tobacco and marijuana use and past year alcohol abuse or dependence. Additional mental health characteristics from the SCID included SMI status and diagnoses of mental health and substance use. Further details about these variables can be obtained from the 2009 NSDUH mental health findings report (Center for Behavioral Health Statistics and Quality [CBHSQ], 2010) and the 2009 NSDUH national findings report (OAS, 2010a, 2010b).

When the unweighted data were analyzed, none of the demographic characteristics were significantly different between the two samples, 2009 and WHODAS half sample of 2008, but some of the prevalence estimates of mental health and substance use measures differed significantly. After applying the weights, most of these differences were no longer statistically significant. There were, however statistically significant (i.e.,  $p < 0.05$ ) and marginally significant (i.e.,  $p < 0.10$ ) differences, respectively, for past month cigarette use and past year alcohol abuse and dependence between the two samples. Differences in the past year K6 total scores were statistically significant before weights were applied, but were no longer significantly different once the data were weighted. For details, see Aldworth et al. (2010).

For the 2010 MHSS sample evaluation, initial descriptive analyses and statistical tests were conducted to compare key demographic and psychosocial characteristics between 2008 and the first two quarters of 2009 (2009 Q1 & Q2) with the final two quarters of 2009 (2009 Q3 & Q4) and the full sample from 2010. The purpose of this particular comparison was to assess whether there was an effect of changing the sampling allocation design after the second quarter of 2009 (see Sections 3.4 and 3.5 for details). Further changes to the sampling design were made in 2010. To determine whether changes in the sampling design affected the demographic, mental health, and substance use characteristics between the samples, comparisons of these measures were made between the final two quarters of 2009 and 2010. Key demographic characteristics included gender, age, race/ethnicity, and education. Mental health characteristics included lifetime and past year depression, depression treatment, mental health treatment, and suicidality measures. Substance use characteristics included past month tobacco and marijuana use and past year alcohol abuse or dependence. Additional mental health characteristics from the SCID included SMI status and diagnoses of mental health and substance use. Details about these variables can be obtained from the 2010 NSDUH national findings report (CBHSQ, 2011) and the 2010 NSDUH mental health findings report (CBHSQ, 2012).

With unweighted data, the descriptive statistics of the demographic variables indicated that age and education were significantly different between the first two time periods and the final two time periods. Some of the prevalence estimates of the mental health and substance use measures also appeared to be significantly different between the first two time periods and the final two time periods. The same tests applied to the weighted data resulted in fewer significant differences. Specifically, only the difference of past year alcohol and illicit drug abuse or dependence was still statistically significant ( $p < 0.05$ ). The past year K6 total scores were compared between the two samples. For the unweighted scores, the two tests were statistically significant, but for the weighted scores only the test of general association was statistically significant. For details, see Aldworth et al. (2012).

## 5.3 Results of 2011 Analyses

Initial descriptive analyses and statistical tests were conducted to compare key demographic and psychosocial characteristics between the WHODAS sample of 2008-2010 with the WHODAS sample of 2011. The purpose of this particular comparison was to assess the consistency of sample collected in 2011 with the samples collected from prior years.

Two further comparisons were also made. Estimates for 2008-2009 were compared with estimates for 2010-2011 to determine whether changes in the sampling design implemented in 2010 and 2011 (see Section 3.5 for details) affected the demographic, mental health, and substance use characteristics between the samples. In addition, estimates for 2010 were compared with those for 2011 to examine the impact of random sampling variation occurring under the same sampling design with increased sample size.

Key demographic characteristics included gender, age, race/ethnicity, education, poverty threshold, core-based statistical area (CBSA), and employment status. Mental health characteristics included lifetime and past year depression, depression treatment, mental health treatment, and suicidality measures. Substance use characteristics included past month tobacco and marijuana use and past year alcohol abuse or dependence. Mental health characteristics from the SCID included SMI status and diagnoses of mental health and substance use. Details about these variables can be obtained from the 2010 NSDUH national findings report (CBHSQ, 2011) and the 2010 NSDUH mental health findings report (CBHSQ, 2012).

Unweighted descriptive statistics of the demographic, mental health, substance use, and SCID mental health variables are shown in [Tables 5.1](#), [5.2](#), and [5.3](#), and weighted versions of those descriptive statistics are shown in [Tables 5.4](#), [5.5](#), and [5.6](#).<sup>15</sup> Included in the descriptive statistics are frequencies and percentages of the subset of analyzable MHSS cases selected for the WHODAS questions across the following four sampling periods: (1) 2008, (2) 2009, (3) 2010, and (4) 2011. Three different sets of chi-square tests were conducted to compare statistics from different sampling periods: (1) compared the first three sampling periods (2008-2010) with the latter one (2011); (2) compared the first two sampling periods (2008-2009) with the final two (2010-2011); and (3) compared the final two periods (2010 and 2011).

### 5.3.1 Demographic Characteristics

[Tables 5.1](#) and [5.2](#) show that with unweighted data there was a statistically significant difference between 2008-2009 and 2010-2011 for some demographic characteristics, including age ( $p < 0.001$ ), education ( $p < 0.001$ ), poverty ( $p < 0.05$ ), and employment status ( $p < 0.001$ ). These differences appeared to be driven by both the initial change in the sampling design after the first two quarters of 2009 and the change in 2010, which allowed a greater proportion of older respondents and persons with lower K6 and WHODAS scores to be selected for the MHSS. The significant effects for age and employment status were also evident in the test comparing 2010 with 2011.

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<sup>15</sup> To facilitate the data presentation and discussion, all of the tables in this chapter have been grouped at the end of the chapter's text.

Tables 5.4 and 5.5 show that applying weights mitigated almost all of the differences among demographic characteristics that appeared in the unweighted data across different time periods. That is, corresponding  $p$  values increased and mostly became insignificant. The only significant difference remaining was for education ( $p = 0.042$ ) when comparing 2008-2010 with 2011. The weighted proportion of high school graduates in 2011 was relatively lower than the one in 2008-2010, while the weighted proportions of other categories were relatively higher.

### 5.3.2 Mental Health Characteristics

Table 5.2 shows that with unweighted data all three categories of past year depression treatment (i.e., nonmedical, prescription medication, any treatment) were significantly different when comparing 2008-2009 with 2010-2011 ( $p < 0.05$ ), suggesting that the differences were driven by the sampling design change in 2010. Although major depressive episode (MDE) and receiving outpatient mental health treatment in the past year were significantly different between 2008-2010 and 2011 ( $p < 0.05$ ), these differences were not significant between 2008-2009 and 2010-2011 ( $p = 0.101$  and  $p = 0.241$ , respectively). Further tests showed that receiving outpatient mental health treatment was significantly different between 2010 and 2011 ( $p < 0.05$ ), and MDE was marginally significantly different between 2010 and 2011 ( $p < 0.10$ ).

After the weights were applied, Table 5.5 shows that most of the significant differences in the unweighted data, including the ones for MDE and the three categories in past year depression treatment, became insignificant. Nevertheless, receiving outpatient mental health treatment in the past year was significantly different when comparing 2008-2010 with 2011, 2008-2009 with 2010-2011, and 2010 with 2011 ( $p < 0.001$ ,  $p = 0.019$ , and  $p = 0.023$ , respectively). Weighted percentages in 2011 were relatively lower than in previous years. Although these results may be due to real underlying differences in the prevalence rates being estimated, they also can be due to a combination of small yearly MHSS sample sizes and the small prevalence rates. Tests performed for differences assume asymptotic normality of estimates compared, which may not be the case for small sample sizes and prevalence rates. The difference for receiving any mental health treatment in the past year was also significant when comparing 2008-2010 with 2011 ( $p < 0.05$ ) and was marginally significant when comparing 2010 and 2011 ( $p < 0.10$ ). Similar to receiving outpatient mental health treatment, the weighted percentage of receiving any mental health treatment in 2011 was also relatively lower than the ones from prior years. This difference was not significant when comparing 2008-2009 with 2010-2011.

### 5.3.3 Suicidal Experiences, Substance Use, and SCID Survey Characteristics

Table 5.3 shows that with unweighted data the differences of past month cigarette and marijuana use ( $p = 0.001$  and  $p < 0.001$ , respectively), of past year alcohol and illicit drug abuse or dependence ( $p < 0.001$ ), of any mental illness (AMI) ( $p < 0.001$ ), and of substance use disorder ( $p < 0.001$ ) were significant between 2008-2010 and 2011, all of which were also present when a comparison was made between 2008-2009 and 2010-2011. The test of suicidal thoughts (i.e., "had thoughts of suicide") was also significant when comparing 2008-2009 with 2010 and 2011 ( $p < 0.05$ ). These differences were driven by both the initial change in the sampling design after the first two quarters of 2009 and the change in 2010.

Table 5.6 shows that applying weights mitigates most of these differences. The differences in AMI remained significant when comparing 2008-2010 with 2011 ( $p < 0.05$ ) and marginally significant when comparing 2008-2009 with 2010-2011 ( $p < 0.10$ ). The weighted percentage of AMI in 2011 was relatively lower than in 2008-2010. The difference was not significant, however, when comparing 2010 with 2011 ( $p = 0.734$ ). Similarly, the difference in the percentage of adults with a Global Assessment of Functioning (GAF) score of no more than 50 was significant when comparing 2008-2010 with 2011 ( $p < 0.05$ ) and was marginally significant when comparing 2008-2009 with 2010-2011 ( $p < 0.10$ ), but the difference was not significant in the comparison between 2010 and 2011 ( $p = 0.523$ ).

### 5.3.4 K6 and WHODAS Total Scores

Unweighted descriptive statistics of past year K6 total score (i.e., the maximum of past 30-day K6 total score and the worst month K6 total score) are given in Table 5.7, and similar weighted descriptive statistics are shown in Table 5.8. The K6 scores within the analyzable SCID cases were compared across different time periods by Cochran-Mantel-Haenszel (CMH) tests of general association (24 *df* [degrees of freedom]) and means (1 *df*). For both the weighted and unweighted scores, the two tests were statistically significant for the comparison between 2008-2010 and 2011 and for the comparison between 2008-2009 and 2010-2011 ( $p \leq 0.05$  in all the cases). For weighted scores, however, the test of means was not significant for the comparison between 2010 and 2011 ( $p > 0.10$ ). These results were likely caused by the modifications to the sampling design allowing for a greater proportion of respondents with low K6 scores to be selected for the MHSS.

Weighted descriptive statistics of past 30-day K6 total score and past year K6 total score for all sampling periods are given in Table 5.9. Their means were compared across different time periods by the *t* test. For both total scores, comparisons of 2008-2010 versus 2011 and 2008-2009 versus 2010-2011 were still statistically significant ( $p \leq 0.05$  in all the cases), but their comparisons between 2010 and 2011 were not significant ( $p > 0.10$  in both cases).

The weighted frequency distribution of past year WHODAS total scores for the analyzable SCID cases is given in Table 5.10. The WHODAS scores were compared across different time periods by CMH tests of general association (24 *df*) and means (1 *df*). For the weighted scores, only the test of general association was statistically significant for all three comparisons between 2008-2010 and 2011 ( $p < 0.001$ ), between 2008-2009 and 2010-2011 ( $p = 0.001$ ), and between 2010 and 2011 ( $p < 0.001$ ). These results may reflect real differences across time, or they could have been driven by the change in the sampling design and the nonnormality of the test statistics.

Supplementary tables corresponding to Tables 5.1 to 5.8, but using the completed rather than the analyzable dataset, are provided in Appendix A. Because the completed dataset is so similar to the analyzable dataset (i.e., three extra respondents in 2008 and one extra respondent in the first half of 2009), the results in these tables are virtually identical to those based on the analyzable dataset.

Overall, there appears to be evidence that modifications to the sampling design from 2008 to 2011 had differential effects on the unweighted distributions of several key

characteristics in each year's MHSS. The modifications to the sampling design reduced the oversampling of respondents with high K6 scores and increased the undersampling of respondents with low K6 scores. This had the effect that the sampled distributions were more similar to the population distributions, and the distribution of weights was less spread out.

As proven through the weighted descriptive analysis, taking weights into account removed most of these differential effects. But there were still some significant effects for the characteristics in the weighted data, as follows:

- education comparing 2008-2010 with 2011;
- past year receiving outpatient mental health treatment comparing 2008-2010 with 2011, comparing 2008-2009 with 2010-2011, and comparing 2010 with 2011;
- past year receiving any mental health treatment comparing 2008-2010 with 2011;
- GAF score less than or equal to 50 comparing 2008-2010 with 2011; and
- AMI comparing 2008-2010 with 2011.

Attention should be paid when making comparisons of the estimates across different time periods if the compared estimates are correlated with one or more characteristics that have imbalanced distribution across the compared time periods.



**Table 5.1 WHODAS Sample Sizes among Analyzable SCID Respondents, by Demographic Characteristics: 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		PValue <sup>1</sup>	PValue <sup>2</sup>	PValue <sup>3</sup>
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.			
<b>Total</b>	759	100.0	520	100.0	516	100.0	1,495	100.0	3,290	100.0	N/A	N/A	N/A
<b>Gender</b>													
Male	278	36.6	219	42.1	208	40.3	606	40.5	1,311	39.8	0.464	0.411	0.925
Female	481	63.4	301	57.9	308	59.7	889	59.5	1,979	60.2			
<b>Hispanic Origin and Race</b>													
Not Hispanic or Latino													
White	545	71.8	376	72.3	372	72.1	1,094	73.2	2,387	72.6	0.664	0.564	0.859
Black or African American	91	12.0	52	10.0	53	10.3	143	9.6	339	10.3			
Other or Multiple Races	53	7.0	37	7.1	42	8.1	111	7.4	243	7.4			
Hispanic or Latino	70	9.2	55	10.6	49	9.5	147	9.8	321	9.8			
<b>Age</b>													
18-25	452	59.6	293	56.3	128	24.8	313	20.9	1,186	36.0	0.000	0.000	0.004
26-49	246	32.4	172	33.1	307	59.5	832	55.7	1,557	47.3			
50+	61	8.0	55	10.6	81	15.7	350	23.4	547	16.6			
<b>Education</b>													
< High School	104	13.7	61	11.7	54	10.5	144	9.6	363	11.0	0.001	0.000	0.948
High School Graduate	219	28.9	163	31.3	139	26.9	408	27.3	929	28.2			
Some College	265	34.9	164	31.5	165	32.0	487	32.6	1,081	32.9			
College Graduate	171	22.5	132	25.4	158	30.6	456	30.5	917	27.9			
<b>Poverty<sup>4</sup></b>													
< 100% Threshold	132	18.1	89	17.7	61	11.9	225	15.2	507	15.7	0.704	0.042	0.065
100-199% Threshold	160	22.0	109	21.7	111	21.6	327	22.1	707	21.9			
≥ 200% Threshold	436	59.9	305	60.6	341	66.5	930	62.8	2,012	62.4			
<b>CBSA</b>													
CBSA = 1M ≤ CBSA	308	40.6	209	40.2	224	43.4	572	38.3	1,313	39.9	0.380	0.405	0.172
CBSA = 250K ≤ CBSA < 1M	192	25.3	135	26.0	120	23.3	388	26.0	835	25.4			
CBSA = CBSA < 250K	195	25.7	142	27.3	124	24.0	399	26.7	860	26.1			
CBSA = Not CBSA, Not Rural	26	3.4	11	2.1	14	2.7	44	2.9	95	2.9			
CBSA = Not CBSA, Rural	38	5.0	23	4.4	34	6.6	92	6.2	187	5.7			

CBSA = core-based statistical area; freq. = frequency; K = thousand; M = million; N/A = not applicable; pct. = percent; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> U.S. census poverty threshold.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.2 WHODAS Sample Sizes among Analyzable SCID Respondents, by Demographic and Mental Health Characteristics: 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		PValue <sup>1</sup>	PValue <sup>2</sup>	PValue <sup>3</sup>
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.			
<b>Total</b>	759	100.0	520	100.0	516	100.0	1,495	100.0	3,290	100.0	N/A	N/A	N/A
<b>Employment Status</b>													
Full Time	359	47.3	256	49.2	284	55.0	746	49.9	1,645	50.0	0.000	0.000	0.015
Part Time	199	26.2	110	21.2	78	15.1	249	16.7	636	19.3			
Unemployed	51	6.7	45	8.7	48	9.3	100	6.7	244	7.4			
Other <sup>4</sup>	150	19.8	109	21.0	106	20.5	400	26.8	765	23.3			
<b>Major Depressive Episode (MDE)</b>													
Lifetime/Not Past Year MDE	94	12.5	57	11.1	65	12.7	153	10.3	369	11.3	0.010	0.101	0.060
Past Year MDE													
Without Impairment	59	7.8	34	6.6	32	6.3	79	5.3	204	6.2			
With Impairment	111	14.7	62	12.0	80	15.6	180	12.1	433	13.2			
No Occurrence	491	65.0	362	70.3	335	65.4	1,076	72.3	2,264	69.2			
<b>Past Year Depression Treatment<sup>5</sup></b>													
Nonmedical	100	58.8	49	51.0	76	67.9	179	69.1	404	63.4	0.018	0.004	0.830
Prescription Medication	70	41.2	43	44.8	72	64.3	147	56.8	332	52.1	0.090	0.000	0.212
Any Treatment	107	62.9	54	56.3	83	74.1	189	73.0	433	68.0	0.043	0.002	0.836
<b>Past Year Mental Health Treatment</b>													
Outpatient	123	16.3	85	16.4	93	18.1	200	13.4	501	15.3	0.023	0.241	0.016
Inpatient	9	1.2	3	0.6	9	1.7	11	0.7	32	1.0	0.208	0.866	0.076
Prescription Medication	149	19.7	107	20.6	140	27.1	306	20.5	702	21.4	0.273	0.125	0.011
Any Treatment	191	25.2	131	25.3	166	32.2	368	24.6	856	26.1	0.093	0.384	0.002

freq. = frequency; N/A = not applicable; pct. = percent; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>5</sup> Among those with MDE.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.3 WHODAS Sample Sizes among Analyzable SCID Respondents, by Suicidal Experiences, Substance Use, and SCID Survey Characteristics: 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		PValue <sup>1</sup>	PValue <sup>2</sup>	PValue <sup>3</sup>
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.			
<b>Total</b>	759	100.0	520	100.0	516	100.0	1,495	100.0	3,290	100.0	N/A	N/A	N/A
<b>Suicidal Experiences</b>													
Had Thoughts of Suicide	102	13.5	52	10.0	54	10.5	145	9.7	353	10.7	0.071	0.045	0.642
Made Plans for Suicide	33	4.4	16	3.1	15	2.9	43	2.9	107	3.3	0.245	0.111	0.976
Attempted Suicide	12	1.6	4	0.8	5	1.0	15	1.0	36	1.1	0.668	0.569	0.944
<b>Substance Use</b>													
Past Month													
Cigarette Use	294	38.7	191	36.7	179	34.7	445	29.8	1,109	33.7	0.000	0.000	0.048
Marijuana Use	116	15.3	78	15.0	59	11.4	157	10.5	410	12.5	0.001	0.001	0.524
<b>Substance Abuse or Dependence</b>													
Past Year													
Alcohol Abuse or Dependence	142	18.7	92	17.7	62	12.0	157	10.5	453	13.8	0.000	0.000	0.385
Illicit Drug Abuse or Dependence	73	9.6	40	7.7	23	4.5	70	4.7	206	6.3	0.000	0.000	0.814
<b>SCID</b>													
Mental Illness													
GAF Score ≤ 50	95	12.5	53	10.2	64	12.4	165	11.0	377	11.5	0.454	0.870	0.401
GAF Score ≤ 59	184	24.2	106	20.4	120	23.3	326	21.8	736	22.4	0.480	0.717	0.577
Any Mental Illness	338	44.5	231	44.4	193	37.4	507	33.9	1,269	38.6	0.000	0.000	0.172
Substance Use Disorder	140	18.4	84	16.2	68	13.2	163	10.9	455	13.8	0.000	0.000	0.271

freq.= frequency; pct. = percent; GAF = Global Assessment of Functioning; N/A = not applicable; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.4 Weighted WHODAS Analyzable SCID Respondents, by Demographic Characteristics (Numbers in Thousands): 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		PValue <sup>1</sup>	PValue <sup>2</sup>	PValue <sup>3</sup>
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.			
<b>Total</b>	216,669	100.0	212,655	100.0	229,273	100.0	232,625	100.0	891,222	100.0	N/A	N/A	N/A
<b>Gender</b>													
Male	100,299	46.3	103,171	48.5	110,969	48.4	111,859	48.1	426,299	47.8	0.925	0.842	0.943
Female	116,370	53.7	109,484	51.5	118,303	51.6	120,766	51.9	464,923	52.2			
<b>Hispanic Origin and Race</b>													
Not Hispanic or Latino													
White	147,945	68.3	140,870	66.2	155,976	68.0	155,268	66.7	600,059	67.3	0.987	0.998	0.981
Black or African American	25,365	11.7	25,833	12.1	26,267	11.5	26,708	11.5	104,174	11.7			
Other or Multiple Races	14,488	6.7	14,815	7.0	15,171	6.6	16,669	7.2	61,142	6.9			
Hispanic or Latino	28,871	13.3	31,137	14.6	31,858	13.9	33,980	14.6	125,846	14.1			
<b>Age</b>													
18-25	32,938	15.2	33,580	15.8	34,072	14.9	34,302	14.7	134,892	15.1	0.695	0.645	0.975
26-49	98,368	45.4	97,045	45.6	98,566	43.0	98,033	42.1	392,012	44.0			
50+	85,363	39.4	82,030	38.6	96,634	42.1	100,290	43.1	364,317	40.9			
<b>Education</b>													
< High School	16,517	7.6	10,540	5.0	20,720	9.0	23,016	9.9	70,793	7.9	0.042	0.186	0.390
High School Graduate	67,026	30.9	76,993	36.2	71,809	31.3	59,184	25.4	275,012	30.9			
Some College	71,506	33.0	55,874	26.3	62,758	27.4	74,558	32.1	264,696	29.7			
College Graduate	61,621	28.4	69,248	32.6	73,985	32.3	75,867	32.6	280,720	31.5			
<b>Poverty<sup>4</sup></b>													
< 100% Threshold	19,639	9.1	25,225	11.9	16,915	7.4	29,290	12.7	91,069	10.3	0.203	0.753	0.103
100-199% Threshold	26,906	12.5	35,332	16.7	38,246	16.7	39,934	17.3	140,419	15.8			
≥ 200% Threshold	168,125	78.3	150,975	71.4	173,926	75.9	161,801	70.0	654,828	73.9			
<b>CBSA</b>													
CBSA = 1M ≤ CBSA	87,761	40.5	114,235	53.7	125,819	54.9	118,560	51.0	446,375	50.1	0.367	0.385	0.356
CBSA = 250K ≤ CBSA < 1M	60,268	27.8	42,655	20.1	39,689	17.3	56,413	24.3	199,025	22.3			
CBSA = CBSA < 250K	48,114	22.2	33,681	15.8	48,108	21.0	44,945	19.3	174,848	19.6			
CBSA = Not CBSA, not Rural	4,465	2.1	7,031	3.3	3,118	1.4	3,695	1.6	18,310	2.1			
CBSA = Not CBSA, Rural	16,061	7.4	15,053	7.1	12,538	5.5	9,012	3.9	52,664	5.9			

CBSA = core-based statistical area; K = thousand; M = million; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq. = weighted frequency; wt. pct. = weighted percent.

NOTE: The MHSS weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> U.S. census poverty threshold.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.5 Weighted WHODAS Analyzable SCID Respondents, by Demographic and Mental Health Characteristics (Numbers in Thousands): 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		PValue <sup>1</sup>	PValue <sup>2</sup>	PValue <sup>3</sup>
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.			
<b>Total</b>	216,669	100.0	212,655	100.0	229,273	100.0	232,625	100.0	891,222	100.0	N/A	N/A	N/A
<b>Employment Status</b>													
Full Time	143,108	66.0	117,609	55.3	126,716	55.3	115,246	49.5	502,680	56.4	0.083	0.120	0.520
Part Time	22,762	10.5	33,293	15.7	28,863	12.6	31,926	13.7	116,844	13.1			
Unemployed	5,660	2.6	11,298	5.3	16,140	7.0	16,798	7.2	49,895	5.6			
Other <sup>4</sup>	45,139	20.8	50,455	23.7	57,554	25.1	68,655	29.5	221,802	24.9			
<b>Major Depressive Episode (MDE)</b>													
Lifetime/Not Past Year MDE	14,737	6.8	15,838	7.6	17,818	7.8	17,973	7.7	66,366	7.5	0.061	0.744	0.128
Past Year MDE													
Without Impairment	6,979	3.2	7,783	3.7	6,764	3.0	5,584	2.4	27,111	3.1			
With Impairment	9,489	4.4	11,232	5.4	12,238	5.4	7,999	3.4	40,958	4.6			
No Occurrence	185,333	85.6	174,521	83.4	190,992	83.8	200,587	86.4	751,432	84.8			
<b>Past Year Depression Treatment<sup>5</sup></b>													
Nonmedical	10,506	63.8	12,507	65.8	13,014	68.5	8,942	65.8	44,970	66.1	0.966	0.724	0.789
Prescription Medication	9,542	57.9	10,579	55.6	12,378	65.1	7,088	52.2	39,587	58.2	0.351	0.667	0.173
Any Treatment	12,589	76.4	13,387	70.4	13,480	70.9	9,536	70.2	48,993	72.0	0.747	0.712	0.940
<b>Past Year Mental Health Treatment</b>													
Outpatient	18,943	8.7	25,659	12.1	18,140	7.9	11,561	5.0	74,303	8.4	0.000	0.019	0.023
Inpatient	788	0.4	320	0.2	2,734	1.2	414	0.2	4,256	0.5	0.174	0.297	0.212
Prescription Medication	31,965	14.8	29,463	13.9	30,083	13.1	23,699	10.2	115,209	12.9	0.058	0.236	0.183
Any Treatment	36,263	16.7	34,482	16.3	37,455	16.3	27,699	11.9	135,899	15.3	0.013	0.299	0.051

N/A = not applicable; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq. = weighted frequency; wt. pct. = weighted percent.

NOTE: The MHSS weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>5</sup> Among those with MDE.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.6 Weighted WHODAS Analyzable SCID Respondents, by Suicidal Experiences, Substance Use, and SCID Survey Characteristics (Numbers in Thousands): 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		PValue <sup>1</sup>	PValue <sup>2</sup>	PValue <sup>3</sup>
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.			
<b>Total</b>	216,669	100.0	212,655	100.0	229,273	100.0	232,625	100.0	891,222	100.0	N/A	N/A	N/A
<b>Suicidal Experiences</b>													
Had Thoughts of Suicide	8,873	4.1	7,711	3.6	9,090	4.0	8,164	3.5	33,838	3.8	0.463	0.880	0.607
Made Plans for Suicide	3,237	1.5	2,311	1.1	2,533	1.1	1,768	0.8	9,849	1.1	0.112	0.330	0.425
Attempted Suicide	475	0.2	362	0.2	202	0.1	594	0.3	1,633	0.2	0.471	0.840	0.181
<b>Substance Use</b>													
Past Month													
Cigarette Use	74,713	34.5	44,290	20.8	55,835	24.4	56,188	24.2	231,026	25.9	0.379	0.346	0.937
Marijuana Use	16,995	7.8	21,545	10.1	17,662	7.7	18,780	8.1	74,983	8.4	0.816	0.671	0.840
<b>Substance Abuse or Dependence</b>													
Past Year													
Alcohol Abuse or Dependence	9,200	4.2	18,251	8.6	14,996	6.5	15,805	6.8	58,252	6.5	0.796	0.843	0.886
Illicit Drug Abuse or Dependence	8,568	4.0	4,583	2.2	3,413	1.5	6,014	2.6	22,578	2.5	0.921	0.313	0.100
<b>SCID</b>													
Mental Illness													
GAF Score ≤ 50	11,103	5.1	12,206	5.7	9,068	4.0	8,054	3.5	40,430	4.5	0.037	0.077	0.523
GAF Score ≤ 59	20,453	9.4	30,581	14.4	20,402	8.9	21,674	9.3	93,110	10.4	0.397	0.302	0.790
Any Mental Illness	46,588	21.5	58,929	27.7	42,670	18.6	41,286	17.7	189,473	21.3	0.029	0.074	0.734
Substance Use Disorder	13,636	6.3	18,925	8.9	19,608	8.6	16,142	6.9	68,312	7.7	0.456	0.929	0.359

GAF = Global Assessment of Functioning; N/A = not applicable; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct. = weighted percent.

NOTE: The MHSS weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.7 WHODAS Sample Sizes among Analyzable SCID Respondents, by Past Year K6 Score Frequency Distribution: 2008-2011**

Past Year K6 Score	2008		2009		2010		2011		2008 - 2011	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	23	3.0	21	4.0	55	10.7	170	11.4	269	8.2
1	7	0.9	10	1.9	32	6.2	114	7.6	163	5.0
2	9	1.2	10	1.9	35	6.8	105	7.0	159	4.8
3	11	1.4	18	3.5	23	4.5	99	6.6	151	4.6
4	27	3.6	25	4.8	35	6.8	81	5.4	168	5.1
5	27	3.6	15	2.9	18	3.5	84	5.6	144	4.4
6	27	3.6	26	5.0	22	4.3	59	3.9	134	4.1
7	22	2.9	27	5.2	23	4.5	58	3.9	130	4.0
8	50	6.6	42	8.1	16	3.1	49	3.3	157	4.8
9	53	7.0	23	4.4	15	2.9	58	3.9	149	4.5
10	59	7.8	29	5.6	6	1.2	38	2.5	132	4.0
11	47	6.2	36	6.9	20	3.9	69	4.6	172	5.2
12	81	10.7	51	9.8	17	3.3	82	5.5	231	7.0
13	58	7.6	39	7.5	33	6.4	50	3.3	180	5.5
14	41	5.4	20	3.8	20	3.9	52	3.5	133	4.0
15	44	5.8	33	6.3	19	3.7	46	3.1	142	4.3
16	30	4.0	19	3.7	21	4.1	41	2.7	111	3.4
17	21	2.8	9	1.7	19	3.7	47	3.1	96	2.9
18	35	4.6	21	4.0	27	5.2	50	3.3	133	4.0
19	17	2.2	11	2.1	11	2.1	36	2.4	75	2.3
20	11	1.4	8	1.5	11	2.1	21	1.4	51	1.6
21	10	1.3	8	1.5	6	1.2	15	1.0	39	1.2
22	7	0.9	6	1.2	4	0.8	18	1.2	35	1.1
23	9	1.2	1	0.2	8	1.6	12	0.8	30	0.9
24	33	4.3	12	2.3	20	3.9	41	2.7	106	3.2
<b>Total</b>	759	100.0	520	100.0	516	100.0	1,495	100.0	3,290	100.0

K6 = 6-item psychological distress scale; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.8 Weighted WHODAS Analyzable SCID Respondents, by Past Year K6 Score Frequency Distribution (Numbers in Thousands): 2008-2011**

Past Year K6 Score	2008		2009		2010		2011		2008 - 2011	
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.
0	34,228	15.8	35,032	16.5	55,667	24.3	48,505	20.9	173,432	19.5
1	24,232	11.2	7,425	3.5	25,913	11.3	29,273	12.6	86,844	9.7
2	14,155	6.5	19,984	9.4	24,149	10.5	23,207	10.0	81,495	9.1
3	26,472	12.2	33,368	15.7	18,215	7.9	29,661	12.8	107,716	12.1
4	18,826	8.7	15,328	7.2	15,908	6.9	15,576	6.7	65,639	7.4
5	15,749	7.3	9,149	4.3	13,011	5.7	17,155	7.4	55,064	6.2
6	13,452	6.2	6,746	3.2	10,923	4.8	9,387	4.0	40,508	4.5
7	10,984	5.1	14,637	6.9	11,598	5.1	8,212	3.5	45,432	5.1
8	9,203	4.2	11,266	5.3	4,244	1.9	5,345	2.3	30,058	3.4
9	8,288	3.8	3,829	1.8	6,140	2.7	7,426	3.2	25,682	2.9
10	6,229	2.9	13,604	6.4	1,883	0.8	4,274	1.8	25,991	2.9
11	4,617	2.1	4,156	2.0	6,511	2.8	6,162	2.6	21,446	2.4
12	6,391	2.9	7,092	3.3	3,105	1.4	5,330	2.3	21,919	2.5
13	4,920	2.3	4,828	2.3	5,273	2.3	2,831	1.2	17,851	2.0
14	2,675	1.2	1,854	0.9	4,410	1.9	3,077	1.3	12,016	1.3
15	2,813	1.3	4,603	2.2	3,533	1.5	2,467	1.1	13,416	1.5
16	2,429	1.1	3,351	1.6	4,657	2.0	3,309	1.4	13,745	1.5
17	1,144	0.5	1,006	0.5	3,188	1.4	2,569	1.1	7,906	0.9
18	2,970	1.4	5,185	2.4	3,334	1.5	2,631	1.1	14,121	1.6
19	1,479	0.7	2,573	1.2	1,089	0.5	1,744	0.7	6,885	0.8
20	695	0.3	2,585	1.2	2,325	1.0	943	0.4	6,549	0.7
21	1,686	0.8	1,544	0.7	732	0.3	563	0.2	4,525	0.5
22	667	0.3	1,538	0.7	326	0.1	707	0.3	3,238	0.4
23	667	0.3	24	0.0	893	0.4	518	0.2	2,101	0.2
24	1,699	0.8	1,948	0.9	2,244	1.0	1,751	0.8	7,642	0.9
<b>Total</b>	<b>216,669</b>	<b>100.0</b>	<b>212,655</b>	<b>100.0</b>	<b>229,273</b>	<b>100.0</b>	<b>232,625</b>	<b>100.0</b>	<b>891,222</b>	<b>100.0</b>

K6 = 6-item psychological distress scale; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct. = weighted percent.

NOTE: The MHSS weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.



**Table 5.9 Weighted WHODAS Analyzable SCID Respondents, by K6 Scores: 2008-2011**

K6 Score	2008			2009			2010			2011			2008 - 2011			<i>P</i> Value <sup>1</sup>	<i>P</i> Value <sup>2</sup>	<i>P</i> Value <sup>3</sup>
	Range	Mean	SE	Range	Mean	SE	Range	Mean	SE	Range	Mean	SE	Range	Mean	SE			
<b>Past Month Total Score</b>	24	4.22	0.367	24	4.54	0.360	24	3.63	0.209	24	3.60	0.128	24	3.98	0.141	0.029	0.009	0.923
<b>Past Year Total Score</b>	24	5.47	0.515	24	6.23	0.529	24	5.05	0.262	24	4.75	0.167	24	5.35	0.195	0.009	0.022	0.336

SCID = Structural Clinical Interview for DSM-IV; SE = standard error; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

NOTE: The MHSS weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup> The test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The test compares 2010 versus 2011.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 5.10 Weighted WHODAS Past Year Total Score Frequency Distribution, by Sampling Period (Numbers in Thousands): 2008-2011**

WHODAS Total Score	2008		2009		2010		2011		2008-2011	
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.
0	106,811	49.3	71,664	33.7	107,453	46.9	100,852	43.4	386,780	43.4
1	12,232	5.6	9,474	4.5	18,092	7.9	18,080	7.8	57,878	6.5
2	11,119	5.1	21,060	9.9	18,405	8.0	20,562	8.8	71,147	8.0
3	20,694	9.6	24,580	11.6	13,624	5.9	14,514	6.2	73,413	8.2
4	11,198	5.2	10,209	4.8	9,587	4.2	9,626	4.1	40,621	4.6
5	7,635	3.5	17,766	8.4	9,887	4.3	9,546	4.1	44,833	5.0
6	6,946	3.2	7,066	3.3	7,518	3.3	10,466	4.5	31,996	3.6
7	7,014	3.2	6,802	3.2	3,366	1.5	8,238	3.5	25,420	2.9
8	4,048	1.9	9,718	4.6	6,640	2.9	9,476	4.1	29,882	3.4
9	3,036	1.4	3,424	1.6	5,021	2.2	4,913	2.1	16,394	1.8
10	3,278	1.5	4,641	2.2	2,416	1.1	4,338	1.9	14,673	1.6
11	1,468	0.7	4,096	1.9	3,852	1.7	3,260	1.4	12,677	1.4
12	4,195	1.9	2,468	1.2	2,731	1.2	3,588	1.5	12,982	1.5
13	1,720	0.8	2,223	1.0	3,457	1.5	2,695	1.2	10,095	1.1
14	4,797	2.2	2,439	1.1	4,569	2.0	1,889	0.8	13,694	1.5
15	1,771	0.8	3,854	1.8	1,874	0.8	2,602	1.1	10,100	1.1
16	1,815	0.8	2,529	1.2	1,516	0.7	2,553	1.1	8,413	0.9
17	613	0.3	1,099	0.5	301	0.1	994	0.4	3,007	0.3
18	1,030	0.5	1,250	0.6	1,109	0.5	1,274	0.5	4,663	0.5
19	636	0.3	1,673	0.8	1,260	0.5	710	0.3	4,280	0.5
20	1,428	0.7	218	0.1	1,851	0.8	372	0.2	3,869	0.4
21	713	0.3	3,341	1.6	938	0.4	869	0.4	5,861	0.7
22	1,472	0.7	792	0.4	702	0.3	411	0.2	3,377	0.4
23	318	0.1	243	0.1	2,032	0.9	284	0.1	2,877	0.3
24	681	0.3	24	0.0	1,072	0.5	512	0.2	2,290	0.3
<b>Total</b>	<b>216,669</b>	<b>100.0</b>	<b>212,655</b>	<b>100.0</b>	<b>229,273</b>	<b>100.0</b>	<b>232,625</b>	<b>100.0</b>	<b>891,222</b>	<b>100.0</b>

WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct. = weighted percent.

NOTE: The MHSS weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

# 6. Modeling Analyses

## 6.1 Background

In the first year of data collected for the Mental Health Surveillance Study (MHSS) (2008), a random half of the adult main sample from the National Survey on Drug Use and Health (NSDUH) received the World Health Organization Disability Assessment Schedule (WHODAS) and the other half received the Sheehan Disability Scale (SDS). The randomization of the impairment scales was maintained within the MHSS sample so that about half of the approximately 1,500 MHSS sample participants were administered the WHODAS and half were administered the SDS. Modeling analyses were conducted to develop algorithms based on the Kessler-6 (K6) scale and each of the impairment scales in turn, and receiver operating characteristic (ROC) analyses were conducted to compare the two impairment scales and to select the optimal cut point for determining serious mental illness (SMI) status. In the 2009 MHSS, the decision to use the 2008 WHODAS model, parameter estimates, and appropriate cut points to produce 2009 estimates of SMI and other levels of mental illness were evaluated by a series of sensitivity analyses (see Section 6.3 for details).

In accordance with the primary objective, the final WHODAS prediction model developed in the 2008 analysis (see Section 6.4) was used to produce national estimates of SMI prevalence and other mental health categories (e.g., any mental illness [AMI], serious or moderate mental illness [SMMI]) annually for the 2008 to 2011 NSDUHs. In the remainder of this chapter, Sections 6.2 and 6.3 summarize the modeling and sensitivity analyses conducted in prior years. Section 6.4 describes the 2008 WHODAS model in more detail. Sections 6.5 and 6.6 provide and compare national estimates of SMI prevalence and other mental health categories for the 2008 to 2011 NSDUHs.

## 6.2 Summary of Prior Modeling Analyses

In the 2008 MHSS, the process of selecting an impairment scale began by developing separate weighted logistic regression prediction models for the K6 and for both impairment scales (i.e., WHODAS and SDS). Some models included "total score" variables that combined items from a scale into one value, while other models included individual "item score" variables. Each model was fitted using SUDAAN<sup>®</sup> software (RTI International, 2008), with weights and design variables similar to those for the 2011 analysis described in Section 6.4. The terms in the models were tested, and ROC statistics were estimated. The weighted number of false positives and false negatives was used to identify the optimal cut point of each model. That is, the optimal cut point was determined to be the one that resulted in the approximate equalization of the weighted number of false positives and false negatives. Section 6.4 provides a more detailed discussion of this process.

The process of selecting the best model for each half sample followed several steps. First, a basic set of models was run to find out whether single or multiple individual item scores were required for each scale. Then a subset of models was selected from the basic set in the first step and further refined (e.g., models containing all the items of a scale may have had some of those

items dropped from the model due to collinearity). These models were then estimated within specific demographic subgroups (i.e., age group, race, gender) to ensure stability within subgroups. The final prediction models for SMI were selected by three criteria: (1) *model robustness* (e.g., preference was 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 area under the curve [AUC], like the area under the ROC curve based on the optimal cut point  $[(\text{sensitivity} + \text{specificity})/2]$ ); and (3) *reasonable SMI estimates* (i.e., across demographic subgroups and the WHODAS and the SDS half samples). For further details, see Aldworth et al. (2009).

For 2009 estimates, the Substance Abuse and Mental Health Services Administration (SAMHSA) made the decision to use the final WHODAS prediction model developed for 2008 data to produce national estimates of the SMI prevalence and other levels of mental illness. The reason for this decision was to control for differences in model parameter estimates and cut points that could have occurred because of sampling error if a new model had been estimated for each year. Another reason is that the parsimonious 2 degrees of freedom (*df*) model in question contains only two 1 *df* terms: 1 *df* assigned to a version of the K6 total score and 1 *df* assigned to a version of the WHODAS total score. Not only are parsimonious models more robust and hence more widely representative and applicable to other datasets, but there also does not appear to be any reason for the relationship between the K6 and WHODAS terms in the model and the SMI measure to change across different years. Thus, this prediction model was used in combination with data collected from the brief scales of psychological distress and functional impairment that were administered to the full NSDUH samples in 2009, 2010, and 2011 to estimate SMI. For further details, see Aldworth et al. (2010).

### **6.3 Summary of Prior Sensitivity Analyses**

Sensitivity analyses were performed with the 2008 6-month data but were not conducted using the 2008 12-month data to gauge the effect of the analysis weights on the models for two reasons: (a) the weights in the 6-month data did not require any special poststratification adjustments that were included in the 12-month data to balance the two half samples, and (b) the earlier sensitivity analyses applied to the 2008 6-month data indicated that the ROC statistics and SMI estimates were robust to the different sets of weights used (see Aldworth et al., 2008).

An analysis was carried out to assess the sensitivity of the selected models to the inclusion of any statistically significant demographic covariates. Various modeling and ROC analyses indicated that the WHODAS models were fairly robust to the model selected and to the inclusion or exclusion of such covariates, but that the SDS models were not.

In addition, an analysis was conducted to assess the sensitivity of the cut points determined from the final WHODAS and SDS prediction models. Results of this analysis showed that for the WHODAS model, the cut point was robust to incremental changes with respect to the number of false negatives (which governs sensitivity), but it was less robust to incremental changes with respect to the number of false positives (which governs specificity). This vulnerability had little effect on specificity because the SMI negative rate was very high. Results showed that for the SDS model, the cut point was fairly robust to incremental changes with respect to the number of false negatives, although not to the same extent as that of the

WHODAS model. However, the SDS model appeared to be more robust to incremental changes with respect to the number of false positives.

After the 2009 MHSS, sensitivity analyses were conducted to assess the decision to use the 2008 WHODAS model, parameter estimates, and appropriate cut points to produce 2009 estimates of SMI and other levels of mental illness. First, an analysis was conducted to assess the sensitivity or robustness of the 2008 cut point for producing 2009 estimates of SMI while maintaining the 2008 model terms and parameter estimates. Results of this analysis indicated that it was reasonable to use the 2008 WHODAS cut point to provide 2009 national estimates of SMI (Aldworth et al., 2010). Second, further analyses were conducted to assess different models and cut points derived from these models for various levels of mental illness (i.e., SMI, AMI, and SMMI). Results of the analyses indicated that it was reasonable to use the 2008 WHODAS model and appropriate cut points to provide 2009 national estimates of SMI and AMI, but the cut point for SMMI (i.e., SMI or moderate mental illness [MMI] positive) estimation may need to be more finely tuned when more data become available (Aldworth et al., 2010).

#### 6.4 Final 2008 WHODAS SMI Prediction Model

As discussed earlier, the final WHODAS prediction model developed using the 2008 NSDUH data (described in detail below) was employed to produce national estimates of SMI prevalence in the 2011 NSDUH. More details on the final 2008 WHODAS SMI model are provided below. SMI status was based on having a Structured Clinical Interview for DSM-IV (SCID) diagnosis plus a Global Assessment of Functioning (GAF) score of  $\leq 50$ . The response variable  $Y$  is defined so that  $Y = 1$  when an SMI diagnosis is positive; otherwise,  $Y = 0$ . If  $\mathbf{x}$  is a vector of realized explanatory variables, then the response probability  $\pi = \Pr(Y = 1 | \mathbf{x})$  can be estimated using a weighted logistic regression model. The final 2008 WHODAS prediction model was

$$\text{logit}(\hat{\pi}) \equiv \log\left[\frac{\hat{\pi}}{1 - \hat{\pi}}\right] = -4.74999920 + 0.20977232x_k + 0.38388395x_w,$$

where  $\hat{\pi}$  refers to an estimate of the SMI response probability  $\pi$ ,

$$x_k = \begin{cases} 0, & \text{if past year K6 total score} < 8 \\ \text{past year K6 total score minus 7,} & \text{otherwise,} \end{cases}$$

past year K6 total score is the maximum of past month and past year total scores, and  $x_w$  = sum of recoded WHODAS item scores, where item scores of 0 or 1 were recoded as 0, and item scores of 2 or 3 were recoded as 1. Rearranging terms provided a direct calculation of the *predicted probability* of SMI:

$$\hat{\pi} = \frac{1}{1 + \exp[-(-4.74999920 + 0.20977232x_k + 0.38388395x_w)]}.$$

Next, a cut point probability  $\pi_0$  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. That is, a dichotomy of *SMI status* was computed. 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 point was determined to be  $\pi_0 = 0.26971946$ ; see Aldworth et al. (2009) for further details.

In 2008, 1,500 NSDUH respondents participated in the MHSS clinical follow-up, approximately 750 of whom were given the WHODAS and were used to develop the SMI prediction model. In 2009 and 2010, approximately 500 adult respondents participated in the MHSS clinical interview. In 2011, a further subsample of approximately 1,500 adult NSDUH respondents participated in the MHSS clinical interview.

Because the annual samples were relatively small and subject to sampling errors, the 2008 WHODAS prediction model terms and cut points were used to produce estimates for 2009, 2010, and 2011 under the assumption that the model stayed the same across the 4 years. Fixing the model parameter estimates across years removed a source of error when comparing the results between individual years. This does not mean that SMI prevalences were assumed to remain unchanged from 2008 to 2011, only that the relationships between SMI (or AMI) and K6 and WHODAS scores were unchanged. Changes in estimated K6 and/or WHODAS scores across years could produce changes in estimated SMI prevalences.

## 6.5 SMI Estimation for 2011 MHSS

The 2008 WHODAS model for SMI was applied to the 2011 data, from which five different methods of producing national estimates of SMI were investigated for comparison purposes:

1. direct estimate based on the SCID sample in the MHSS;
2. direct estimate based on the predicted probability of SMI applied to the MHSS sample;
3. direct estimate based on predicted SMI status (i.e., positive if predicted probability is greater than or equal to cut point; negative otherwise) applied to the MHSS sample;
4. direct estimate based on the predicted probability of SMI applied to the adult NSDUH sample; and
5. direct estimate based on predicted SMI status applied to the adult NSDUH sample.

The third and fifth methods may be referred to as *cut point methods* because SMI prevalence is determined by the weighted average of predicted SMI positive cases, and the second and fourth methods may be referred to as *probability methods* because SMI prevalence is determined by the weighted average of SMI predicted probabilities.

Prevalence estimates of SMI for the five methods were determined as follows. Suppose that for respondent  $j$ ,  $Y_j$  refers to SCID diagnosis of SMI (i.e., 1 = positive, 0 = negative);  $\hat{\pi}_j$  is the predicted probability of SMI based on the model described above;  $\hat{Y}_j$  is the predicted SMI status (i.e., equal to 1 if  $\hat{\pi}_j \geq \pi_0$ , otherwise equal to 0);  $w_{1j}$  is the analysis weight associated with

the full NSDUH sample  $S_1$ ; and  $w_{2j}$  is the analysis weight associated with the MHSS subsample  $S_2$ . Then,

$$\hat{p}_1 = \frac{\sum_{S_2} w_{2j} Y_j}{\sum_{S_2} w_{2j}}, \quad \hat{p}_2 = \frac{\sum_{S_2} w_{2j} \hat{\pi}_j}{\sum_{S_2} w_{2j}}, \quad \hat{p}_3 = \frac{\sum_{S_2} w_{2j} \hat{Y}_j}{\sum_{S_2} w_{2j}}, \quad \hat{p}_4 = \frac{\sum_{S_1} w_{1j} \hat{\pi}_j}{\sum_{S_1} w_{1j}}, \quad \hat{p}_5 = \frac{\sum_{S_1} w_{1j} \hat{Y}_j}{\sum_{S_1} w_{1j}},$$

where  $\hat{p}_i$ ,  $i=1, \dots, 5$  refer to the SMI prevalence estimates based on the five methods, respectively. Note that although  $Y_j$  and  $\hat{Y}_j$  can only take the values of 0 or 1,  $\hat{\pi}_j$  can theoretically take any value in the open interval between 0 and 1. However, because of the finite nature of the predictor variables in the final model,  $\hat{\pi}_j$  can take at most  $18 * 9 = 162$  distinct values.

Because the optimal cut point is determined by (approximately) equalizing the weighted number of false-positive and false-negative counts, the first three methods, based on the MHSS data, should produce similar estimates. Although the MHSS weights allow national estimates of SMI prevalence to be produced (using any of the first three methods), these estimates may be more subject to sampling fluctuations given the small sample size ( $n = 1,495$ ) of the MHSS subsample in 2011. This is particularly true at the demographic subgroup level.

Therefore, the latter two methods provide estimates by *extrapolating* the candidate model and cut point determined from the MHSS data to the full adult NSDUH data (with a sample size of 46,599) to obtain a predicted probability of SMI and predicted SMI status for each adult NSDUH respondent. If both the model and cut point are representative of the full NSDUH data, then these two estimation methods would be expected to produce similar results.

Actual national estimates of SMI prevalence in 2008 were produced from the cut point method extrapolated to the full adult NSDUH data (i.e., fifth method). The same method was used to produce national estimates in 2011. Estimates of SMI for 2011 using each of the five methods described above are shown in [Table 6.1](#). For the all-adult population in 2011, the overall SMI estimates based on the adult NSDUH sample were higher than the estimates based on the MHSS sample. In the same sample (either the adult NSDUH sample or MHSS sample), the direct estimate based on the cut point method was higher than the direct estimate based on the probability method. In the MHSS sample, the direct estimates based on both cut point and probability methods were higher than the one derived directly from the SCID sample.

For most of the domains (i.e., subgroups) in the MHSS sample, direct estimates based on the probability or cut point methods were higher than the ones derived directly from the SCID sample; however, when comparing domain estimates between the probability and cut point methods, there was no clear trend. For some domains, one was higher than another, while for other domains one was lower than another. In the NSDUH sample, the cut point method tended to produce higher estimates than the probability method for most domains. When comparing estimates derived from the MHSS sample and the adult NSDUH sample, both the probability and cut point methods tended to produce higher estimates based on the adult NSDUH sample than the ones based on the MHSS sample for most domains.

**Table 6.1 Weighted SMI Estimates for 2011, by Different Methods**

Demographic Domain	2011 MHSS Analyzable Cases (N = 1,495 )			2011 Adult NSDUH (N = 46,599 )	
	SCID-Based	Probability	Cut Point	Probability	Cut Point
<b>Total</b>	3.46	4.34	4.49	4.64	4.96
Gender = Male	2.83	3.40	3.33	3.62	3.43
Gender = Female	4.04	5.22	5.57	5.59	6.37
Age = 18-25	2.38	5.18	4.89	6.64	7.63
Age = 26-49	5.04	5.25	6.01	5.39	5.99
Age = 50+	2.29	3.17	2.87	3.22	3.03
Race/Ethnicity = White	3.61	4.38	4.61	4.92	5.48
Race/Ethnicity = Black	2.64	3.46	2.40	3.93	3.46
Race/Ethnicity = Other or Multiple Races	3.61	4.36	3.04	4.90	5.12
Race/Ethnicity = Hispanic	3.36	4.84	6.32	3.79	3.67
Education = < High School	6.83	6.12	6.38	5.42	5.71
Education = High School	4.13	4.97	5.30	4.56	4.79
Education = Some College	2.68	4.25	4.10	5.44	6.22
Education = College Graduate	2.69	3.41	3.67	3.62	3.62
Poverty < 100% Threshold <sup>1</sup>	7.68	6.75	6.86	7.92	9.57
Poverty =100-199% Threshold <sup>1</sup>	5.82	5.71	6.25	5.43	6.00
Poverty ≥ 200% Threshold <sup>1</sup>	2.14	3.56	3.64	3.67	3.62
CBSA = 1M ≤ CBSA	3.48	3.93	3.73	4.29	4.63
CBSA = 250K ≤ CBSA < 1M	3.63	5.00	6.08	4.88	5.25
CBSA = CBSA < 250K	3.71	4.34	4.26	5.17	5.53
CBSA = Not CBSA, Not Rural	1.40	5.82	8.10	6.45	7.04
CBSA = Not CBSA, Rural	1.79	5.01	4.31	4.44	4.04
Employment = Full Time	2.29	3.73	4.07	3.71	3.68
Employment = Part Time	4.69	4.84	4.06	5.37	5.85
Employment = Unemployed	2.94	4.48	3.77	6.43	7.60
Employment = Other <sup>2</sup>	4.99	5.10	5.58	5.47	6.13

CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SCID = Structured Clinical Interview for DSM-IV; SMI = serious mental illness.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

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

As noted earlier, parameter estimates from the 2008 WHODAS sample were used to estimate SMI in 2011. Treating those parameter estimates as the true parameter values, the standard errors (SEs) of the estimates displayed in [Table 6.1](#) are presented in [Table 6.2](#). The estimates based on the adult NSDUH sample had much lower SEs than the ones based on the MHSS sample, which indicates that the approach of calibrating the MHSS sample to the full NSDUH adult sample can effectively improve the efficiency of estimating SMI. In the MHSS sample, the estimates based on the probability method had lower SEs than the ones based on the SCID sample for the overall adult population and most of the domains, except for the 18 to 25 age group. The estimates based on the cut point method, however, had higher SEs than the ones based on the SCID sample for the all-adult population and most of the domains. Comparing estimates from the adult NSDUH sample, the estimates based on the cut point method had much higher SEs than the ones based on the probability method. These results indicate that the cut point method is less efficient than the probability method in both the MHSS sample and adult NSDUH sample.



**Table 6.2 Standard Errors of Weighted SMI Estimates for 2011, by Different Methods**

Demographic Domain	2011 MHSS Analyzable Cases (N = 1,495 )			2011 Adult NSDUH (N = 46,599 )	
	SCID-Based	Probability	Cut Point	Probability	Cut Point
<b>Total</b>	0.426	0.256	0.493	0.087	0.154
Gender = Male	0.549	0.333	0.739	0.101	0.190
Gender = Female	0.539	0.413	0.675	0.132	0.232
Age = 18-25	0.596	0.622	1.053	0.136	0.239
Age = 26-49	0.724	0.374	0.834	0.143	0.248
Age = 50+	0.574	0.367	0.601	0.126	0.234
Race/Ethnicity = White	0.493	0.275	0.492	0.108	0.191
Race/Ethnicity = Black	0.879	0.544	0.781	0.193	0.349
Race/Ethnicity = Other or Multiple Races	2.531	1.155	1.406	0.384	0.693
Race/Ethnicity = Hispanic	1.479	0.849	2.299	0.198	0.359
Education = < High School	2.219	0.932	1.427	0.245	0.404
Education = High School	0.782	0.583	1.035	0.148	0.263
Education = Some College	0.548	0.410	0.650	0.193	0.340
Education = College Graduate	0.799	0.340	0.860	0.127	0.252
Poverty < 100% Threshold <sup>1</sup>	2.334	1.019	1.524	0.315	0.541
Poverty =100-199% Threshold <sup>1</sup>	1.314	0.628	1.120	0.201	0.344
Poverty ≥ 200% Threshold <sup>1</sup>	0.404	0.287	0.601	0.088	0.171
CBSA = 1M ≤ CBSA	0.637	0.321	0.575	0.118	0.219
CBSA = 250K ≤ CBSA < 1M	0.843	0.589	1.370	0.187	0.331
CBSA = CBSA < 250K	0.781	0.467	0.783	0.181	0.325
CBSA = Not CBSA, Not Rural	0.857	2.038	3.885	0.820	1.299
CBSA = Not CBSA, Rural	0.957	0.860	1.366	0.354	0.541
Employment = Full Time	0.438	0.323	0.712	0.104	0.197
Employment = Part Time	1.190	0.532	0.808	0.218	0.405
Employment = Unemployed	1.261	0.976	1.354	0.343	0.642
Employment = Other <sup>2</sup>	0.931	0.501	0.939	0.182	0.325

CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SCID = Structured Clinical Interview for DSM-IV; SMI = serious mental illness.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

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

Note that the SEs of the estimates derived from cut point method assume that the model chosen for estimation is correct and that the parameter estimates and/or cut point of the model are true (where applicable) and hence do not account for the variability in the model and/or cut point. Ongoing studies are investigating these issues.

## 6.6 Estimation of Other Categories of Mental Illness

Although the primary objective of the MHSS is to produce national estimates of SMI prevalence, its secondary objectives are to produce national estimates of the prevalence of other levels of mental illness. The discrete categories of moderate mental illness (MMI), low (mild) mental illness (LMI), and no mental illness, based on SCID disorder diagnoses and GAF scores, are defined in [Table 1.1](#) in Chapter 1. Any mental illness (AMI) is the cumulative category obtained by collapsing SMI, MMI, and LMI into a single category (i.e., it covers mild, moderate, and serious mental illness), and serious or moderate mental illness (SMMI) is defined as the cumulative category obtained by collapsing SMI and MMI into a single category (i.e., it covers moderate and serious mental illness). Estimates of MMI and LMI were obtained by subtraction.

The 2011 national estimates of SMMI and AMI were based on the same SMI model. Different cut points were used, however, for the estimation of both SMMI and AMI. As in the case of SMI estimation, the same model was used in 2008 to 2011 for producing estimates of SMMI and AMI in order to control for differences in model parameter estimates and cut points that could have occurred because of sampling error if a new model had been estimated each year.

Estimates of SMI, SMMI, and AMI for 2011 based on the SCID sample of the MHSS are given in [Tables 6.3](#), [6.5](#), and [6.7](#), respectively. The estimates based on the cut point method in the full adult NSDUH are given in [Tables 6.4](#), [6.6](#), and [6.8](#). For comparison purposes, estimates based on the 2008, 2009, and 2010 adult NSDUHs are also shown.

The estimates based on the cut point method in the full adult NSDUH across different time periods (SMI ranging from 4.37 to 5.02 percent, SMMI ranging from 8.02 to 9.00 percent, and AMI ranging from 16.88 to 20.08 percent) were more stable than the ones based on the SCID sample (SMI ranging from 3.46 to 5.74 percent, SMMI ranging from 8.18 to 14.38 percent, and AMI ranging from 17.75 to 27.71 percent), which indicates that calibrating the SCID sample to the full adult NSDUH sample can produce more reliable estimates than using the SCID sample alone. When comparing SCID-based estimates in 2011 with their corresponding estimates in previous years, only a few significant differences were found among the estimates for the overall population and domains in 2011. These differences may be due to the change of sampling design and small sample sizes involved in each year.

Note that the SEs for estimates based on the cut point method do not account for the variability in the model and/or cut point and can be inaccurate. Therefore, the statistical tests between two estimates based on the cut point method in the full adult NSDUH (shown in [Tables 6.4](#), [6.6](#), and [6.8](#)) can be unreliable because the test statistic is a function of estimates and their SEs. Ongoing studies are investigating a method for estimating the SEs of the estimates based on the cut point method that accurately captures variability from selected models and cut points.

**Table 6.3 Weighted SMI SCID-Based Estimates in the Analyzable MHSS Sample: 2008-2011**

Demographic Domain	2008 Sample A	2008 Sample B	2008	2009	2010	2011	2008A-2011	2008-2011
	Adult MHSS (N= 759)	Adult MHSS (N= 741)	Adult MHSS (N= 1,500)	Adult MHSS (N= 520)	Adult MHSS (N= 516)	Adult MHSS (N= 1,495 )	Adult MHSS (N=3,290)	Adult MHSS (N=4,031)
<b>Total</b>	5.12	5.37	4.26	5.74	3.95	3.46	4.54	4.32
Gender = Male	3.46	7.73	3.97	4.21	1.81	2.83	3.05	3.18
Gender = Female	6.56	3.21	4.53	7.18	5.97	4.04	5.90	5.39
Age = 18-25	5.36 <sup>a</sup>	4.99 <sup>a</sup>	5.05 <sup>a</sup>	4.04	2.51	2.38	3.55	3.48
Age = 26-49	5.52	4.96	4.08	9.75	5.18	5.04	6.36	5.99
Age = 50+	4.57	5.96	4.16	1.69	3.22	2.29	2.94	2.86
Race/Ethnicity = White	6.88	3.30	4.65	6.33	4.07	3.61	5.17	4.62
Race/Ethnicity = Black	2.22	15.29	6.18	1.45	4.95	2.64	2.83	3.79
Race/Ethnicity = Other or Multiple Races	0.39	19.86	4.14	16.28	0.43	3.61	5.13	6.02
Race/Ethnicity = Hispanic	1.04	0.55	0.70	1.60	4.27	3.36	2.62	2.53
Education = < High School	9.85	17.48	11.27	13.01	0.52 <sup>a</sup>	6.83	6.61	7.16
Education = High School	6.91	1.93	3.47	5.81	2.14	4.13	4.76	3.91
Education = Some College	3.77	4.31	4.27	4.05	7.18 <sup>a</sup>	2.68	4.33	4.47
Education = College Graduate	3.50	5.50	3.00	5.92	3.94	2.69	3.99	3.87
Poverty < 100% Threshold <sup>1</sup>	7.94	26.17	14.27	13.66	6.46	7.68	9.16	10.63
Poverty =100-199% Threshold <sup>1</sup>	14.28	4.68	7.72	5.73	6.66	5.82	7.65	6.45
Poverty ≥ 200% Threshold <sup>1</sup>	3.37	1.77	2.29	4.46	3.06	2.14	3.24	2.96
CBSA = 1M ≤ CBSA	4.43	4.04	3.29	4.61	5.34	3.48	4.48	4.25
CBSA = 250K ≤ CBSA < 1M	6.62	4.87	5.05	10.82	1.33 <sup>a</sup>	3.63	5.62	5.14
CBSA = CBSA < 250K	4.77	10.98	5.94	6.13	2.84	3.71	4.23	4.56
CBSA = Not CBSA, Not Rural	18.15	1.52	5.21	1.22	4.30	1.40	5.91	3.10
CBSA = Not CBSA, Rural	0.73	0.65	0.72	1.17	2.57	1.79	1.48	1.49
Employment = Full Time	1.64	3.88	1.84	3.40	1.71	2.29	2.22	2.28
Employment = Part Time	9.34	3.37	6.03	4.15	3.53	4.69	5.16	4.53
Employment = Unemployed	17.60	4.07	10.32	22.14	15.60	2.94	13.04	12.20
Employment = Other <sup>2</sup>	12.49	8.86	8.94	8.57	5.84	4.99	7.55	6.92

CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SCID = Structured Clinical Interview for DSM-IV; SMI = serious mental illness.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>a</sup> Difference between this estimate and corresponding estimate from 2011 is statistically significant ( $p < 0.05$ ).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 6.4 Weighted SMI Estimates Based on Cut Point Method in Adult NSDUH Sample: 2008-2011**

Demographic Domain	2008 Sample A	2008 Sample B	2008	2009	2010	2011	2008A-2011	2008-2011
	Adult NSDUH (N= 22,622)	Adult NSDUH (N= 23,046)	Adult NSDUH (N= 45,678)	Adult NSDUH (N= 45,609)	Adult NSDUH (N= 45,844)	Adult NSDUH (N= 46,599 )	Adult NSDUH (N= 160,674)	Adult NSDUH (N=183,730)
<b>Total</b>	4.37 <sup>a</sup>	4.44 <sup>a</sup>	4.40 <sup>a</sup>	4.84	5.02	4.96	4.80	4.81
Gender = Male	3.01	3.05	3.03	3.19	3.37	3.43	3.25	3.26
Gender = Female	5.64	5.74	5.67 <sup>a</sup>	6.39	6.55	6.37	6.24	6.25
Age = 18-25	7.64	7.55	7.52	7.35	7.75	7.63	7.59	7.56
Age = 26-49	5.18 <sup>a</sup>	5.37	5.27 <sup>a</sup>	5.93	5.87	5.99	5.74	5.76
Age = 50+	2.33	2.33	2.34 <sup>a</sup>	2.81	3.18	3.03	2.85	2.85
Race/Ethnicity = White	4.91	4.46 <sup>a</sup>	4.68 <sup>a</sup>	5.31	5.27	5.48	5.24	5.19
Race/Ethnicity = Black	2.96	3.80	3.46	3.71	4.43	3.46	3.65	3.77
Race/Ethnicity = Other or Multiple Races	3.25	4.58	3.70	3.75	4.20	5.12	4.12	4.23
Race/Ethnicity = Hispanic	3.32	4.85	4.04	3.98	4.65	3.67	3.91	4.08
Education = < High School	4.58	5.38	4.93	5.66	4.61 <sup>a</sup>	5.71	5.13	5.22
Education = High School	4.92	4.02 <sup>a</sup>	4.44	4.98	5.74 <sup>a</sup>	4.79	5.10	4.98
Education = Some College	5.08 <sup>a</sup>	5.99	5.53	5.94	5.93	6.22	5.80	5.91
Education = College Graduate	3.00	2.98	3.02	3.29	3.65	3.62	3.40	3.40
Poverty < 100% Threshold <sup>1</sup>	7.36 <sup>a</sup>	7.72 <sup>a</sup>	7.45 <sup>a</sup>	9.14	9.11	9.57	8.87	8.88
Poverty =100-199% Threshold <sup>1</sup>	5.96	6.28	6.09	6.14	5.97	6.00	6.01	6.04
Poverty ≥ 200% Threshold <sup>1</sup>	3.45	3.42	3.44	3.69	3.90	3.62	3.66	3.66
CBSA = 1M ≤ CBSA	4.06	4.48	4.27	4.36	4.65	4.63	4.42	4.48
CBSA = 250K ≤ CBSA < 1M	4.52	4.48	4.49	4.96	5.39	5.25	5.04	5.03
CBSA = CBSA < 250K	5.04	4.46 <sup>a</sup>	4.70	5.62	5.43	5.53	5.41	5.32
CBSA = Not CBSA, Not Rural	5.04	4.93	4.93	6.01	5.21	7.04	5.78	5.76
CBSA = Not CBSA, Rural	3.93	3.51	3.72	5.84 <sup>c</sup>	5.58	4.04	4.82	4.77
Employment = Full Time	3.20	3.92	3.55	3.60	3.54	3.68	3.50	3.59
Employment = Part Time	5.42	4.32 <sup>a</sup>	4.83	5.60	5.72	5.85	5.65	5.51
Employment = Unemployed	9.07	7.32	8.08	7.12	7.84	7.60	7.76	7.62
Employment = Other <sup>2</sup>	5.52	5.07 <sup>a</sup>	5.29	6.14	6.55	6.13	6.10	6.04

CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SMI = serious mental illness.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>a</sup> Difference between this estimate and corresponding estimate from 2011 is statistically significant ( $p < 0.05$ ).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 6.5 Weighted SMMI SCID-Based Estimates in the Analyzable MHSS Sample: 2008-2011**

Demographic Domains	2008 Sample A	2008 Sample B	2008	2009	2010	2011	2008A-2011	2008-2011
	Adult MHSS (N= 759)	Adult MHSS (N= 741)	Adult MHSS (N= 1,500)	Adult MHSS (N= 520)	Adult MHSS (N= 516)	Adult MHSS (N= 1,495 )	Adult MHSS (N=3,290)	Adult MHSS (N=4,031)
<b>Total</b>	9.44	9.42	8.18	14.38	8.90	9.32	10.45	10.12
Gender = Male	5.67	10.63	6.26	6.04	5.11	7.05	5.98	6.12
Gender = Female	12.69	8.32	9.96	22.24	12.45	11.42	14.55	13.86
Age = 18-25	11.59	8.87	10.33	6.46	7.28	7.87	8.28	7.97
Age = 26-49	9.22	10.06	8.55	18.69	11.31	12.36	12.87	12.69
Age = 50+	8.86	8.93	7.00	12.53	7.01	6.84	8.64	8.18
Race/Ethnicity = White	12.38	7.68	9.31	18.82	10.16	9.57	12.59	11.80
Race/Ethnicity = Black	5.64	23.54	11.30	2.62	7.12	7.01	5.61	6.99
Race/Ethnicity = Other or Multiple Races	0.51 <sup>a</sup>	20.52	4.55	17.45	1.78 <sup>a</sup>	11.23	7.85	8.81
Race/Ethnicity = Hispanic	2.18 <sup>a</sup>	1.10 <sup>a</sup>	1.50 <sup>a</sup>	2.59 <sup>a</sup>	7.59	9.02	5.49	5.29
Education = < High School	25.43	23.77	19.33	15.67	6.52	15.74	15.29	14.15
Education = High School	11.24	3.46 <sup>a</sup>	5.87 <sup>a</sup>	19.47	5.67	10.71	11.97	10.53
Education = Some College	7.70	10.62	9.60	6.83	12.17	7.11	8.41	8.90
Education = College Graduate	5.22	9.50	6.03	14.62	9.93	8.46	9.65	9.76
Poverty < 100% Threshold <sup>1</sup>	16.42	28.49	18.95	15.04	10.37	18.62	15.62	16.24
Poverty =100-199% Threshold <sup>1</sup>	22.48	9.78	13.40	8.42	10.05	12.56	12.74	11.09
Poverty ≥ 200% Threshold <sup>1</sup>	6.61	5.85	5.78	15.77	8.45	6.91	9.29	9.07
CBSA = 1M ≤ CBSA	9.08	8.25	7.90	13.79	9.02	9.84	10.47	10.22
CBSA = 250K ≤ CBSA < 1M	9.64	9.49	8.61	25.56	10.19	10.01	13.26	12.90
CBSA = CBSA < 250K	10.93	15.24	9.95	10.84	8.66	8.24	9.59	9.33
CBSA = Not CBSA, Not Rural	27.99	1.54	7.77	1.22	6.65	5.36	9.51	5.03
CBSA = Not CBSA, Rural	1.03	3.36	2.29	1.26	5.07	5.13	2.76	3.17
Employment = Full Time	3.73 <sup>a</sup>	7.69	4.64 <sup>a</sup>	14.04	5.89	7.85	7.63	7.91
Employment = Part Time	16.36	8.75	12.61	19.37	7.02	10.54	13.32	12.59
Employment = Unemployed	30.63	7.61	17.99	24.78	18.01	10.68	18.50	17.08
Employment = Other <sup>2</sup>	21.39	12.85	14.11	9.56	13.92	10.88	13.51	12.11

CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SCID = Structured Clinical Interview for DSM-IV; SMMI = serious or moderate mental illness.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>a</sup> Difference between this estimate and corresponding estimate from 2011 is statistically significant ( $p < 0.05$ ).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 6.6 Weighted SMMI Estimates Based on Cut Point Method in Adult NSDUH Sample: 2008-2011**

Demographic Domains	2008 Sample A	2008 Sample B	2008	2009	2010	2011	2008A-2011	2008-2011
	Adult NSDUH (N= 22,622)	Adult NSDUH (N= 23,046)	Adult NSDUH (N= 45,678)	Adult NSDUH (N= 45,609)	Adult NSDUH (N= 45,844)	Adult NSDUH (N= 46,599 )	Adult NSDUH (N=160,674)	Adult NSDUH (N=183,730)
<b>Total</b>	8.38	8.02 <sup>a</sup>	8.19 <sup>a</sup>	8.82	9.00	8.84	8.76	8.71
Gender = Male	5.95	5.76 <sup>a</sup>	5.86 <sup>a</sup>	6.46	6.83	6.67	6.48	6.46
Gender = Female	10.65	10.13	10.36	11.02	11.03	10.86	10.89	10.82
Age = 18-25	14.14	13.52	13.75	13.89	13.78	13.65	13.86	13.76
Age = 26-49	9.70	9.15 <sup>a</sup>	9.41 <sup>a</sup>	10.24	10.33	10.48	10.18	10.11
Age = 50+	4.89	4.83	4.87	5.50	5.95	5.61	5.50	5.49
Race/Ethnicity = White	8.66	8.22 <sup>a</sup>	8.45 <sup>a</sup>	9.32	9.28	9.42	9.17	9.12
Race/Ethnicity = Black	7.87	7.41	7.68	7.46	8.66	7.37	7.84	7.79
Race/Ethnicity = Other or Multiple Races	7.93	6.99	7.19 <sup>a</sup>	7.89	7.34	9.59	8.23	8.06
Race/Ethnicity = Hispanic	7.56	8.01	7.74	7.88	8.68 <sup>a</sup>	7.00	7.77	7.81
Education = < High School	9.71	9.79	9.68	9.82	9.68	10.60	9.94	9.93
Education = High School	8.71	7.29 <sup>a</sup>	7.97	8.96	9.53	8.67	8.97	8.78
Education = Some College	9.14	10.11	9.61	10.31	10.51	10.35	10.09	10.20
Education = College Graduate	6.58	5.93	6.29	6.79	6.72	6.81	6.72	6.65
Poverty < 100% Threshold <sup>1</sup>	14.33	13.86	13.98	15.53	15.61	15.47	15.27	15.19
Poverty =100-199% Threshold <sup>1</sup>	10.90	10.53	10.70	10.88	10.87	10.78	10.85	10.81
Poverty ≥ 200% Threshold <sup>1</sup>	6.72	6.37	6.55	6.98	7.08	6.77	6.89	6.85
CBSA = 1M ≤ CBSA	8.13	7.88	8.00	8.27	8.43	7.95	8.19	8.16
CBSA = 250K ≤ CBSA < 1M	8.75	7.64 <sup>a</sup>	8.18 <sup>a</sup>	8.95	9.59	9.63	9.24	9.10
CBSA = CBSA < 250K	8.72	8.90	8.79	9.73	9.74	9.94	9.54	9.55
CBSA = Not CBSA, Not Rural	9.46	9.92	9.75	10.70	9.32 <sup>a</sup>	13.39	10.63	10.71
CBSA = Not CBSA, Rural	7.36	6.45	6.86	9.52	9.27	8.67	8.70	8.57
Employment = Full Time	6.59	7.07	6.84	7.24	6.80	6.93	6.88	6.95
Employment = Part Time	11.09	7.88 <sup>a</sup>	9.43	10.12	10.11	10.71	10.50	10.10
Employment = Unemployed	16.79 <sup>a</sup>	13.19	14.73	12.88	14.02	12.23	13.66	13.35
Employment = Other <sup>2</sup>	9.43	9.10	9.25 <sup>a</sup>	10.02	11.08	10.47	10.27	10.22

CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SMMI = serious or moderate mental illness.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>a</sup> Difference between this estimate and corresponding estimate from 2011 is statistically significant ( $p < 0.05$ ).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 6.7 Weighted AMI SCID-Based Estimates in the Analyzable MHSS Sample: 2008-2011**

Demographic Domains	2008 Sample A	2008 Sample B	2008	2009	2010	2011	2008A-2011	2008-2011
	Adult MHSS (N= 759)	Adult MHSS (N= 741)	Adult MHSS (N= 1,500)	Adult MHSS (N= 520)	Adult MHSS (N= 516)	Adult MHSS (N= 1,495 )	Adult MHSS (N=3,290)	Adult MHSS (N=4,031)
<b>Total</b>	21.50	22.15	18.18	27.71 <sup>a</sup>	18.61	17.75	21.26	20.43
Gender = Male	17.57	17.27	14.40	16.11	17.84	13.04	16.10	15.34
Gender = Female	24.89	26.62	21.69	38.65 <sup>a</sup>	19.33	22.10	25.99	25.19
Age = 18-25	24.11	20.41	22.02	23.07	17.21	15.49	19.92	19.40
Age = 26-49	27.22	19.79	21.63	35.76	21.86	22.67	26.85	25.43
Age = 50+	13.91	25.42	13.07	20.09	15.79	13.71	15.75	15.50
Race/Ethnicity = White	27.41 <sup>a</sup>	15.95	19.75	28.92	19.82	17.27	23.17	21.26
Race/Ethnicity = Black	9.91	38.00	18.47	11.50	12.51	13.62	11.91	13.99
Race/Ethnicity = Other or Multiple Races	2.57 <sup>a</sup>	55.06 <sup>a</sup>	8.28	37.31	26.87	15.84	20.63	21.99
Race/Ethnicity = Hispanic	10.92	24.40	14.65	31.14	13.78	24.12	20.21	20.99
Education = < High School	35.29	38.57	30.17	34.51	9.20 <sup>a</sup>	24.94	24.17	23.35
Education = High School	22.78	11.59 <sup>a</sup>	14.10	29.65	16.81	19.65	22.47	20.18
Education = Some College	19.47	34.46 <sup>a</sup>	22.42	20.78	20.03	13.66	18.24	18.93
Education = College Graduate	18.77	16.42	15.10	30.11	21.78	18.10	22.18	21.26
Poverty < 100% Threshold <sup>a</sup>	48.40 <sup>a</sup>	40.87	37.43	42.38	22.38	25.92	34.67	32.44
Poverty =100-199% Threshold <sup>a</sup>	32.03	38.89	28.41	27.34	29.58	23.74	27.82	27.18
Poverty ≥ 200% Threshold <sup>a</sup>	16.76	14.01	13.67	25.51	15.75	14.90	18.05	17.25
CBSA = 1M ≤ CBSA	24.28	27.80	21.97	24.92	17.78	18.98	21.20	20.76
CBSA = 250K ≤ CBSA < 1M	18.16	15.57	14.60	37.57	26.21	19.15	24.21	23.02
CBSA = CBSA < 250K	25.96	24.45	19.70	37.21 <sup>a</sup>	16.97	13.51	22.45	20.73
CBSA = Not CBSA, Not Rural	28.37	3.70	9.27	4.41	11.87	12.83	13.22	8.66
CBSA = Not CBSA, Rural	3.60 <sup>a</sup>	14.34	9.37	10.55	10.89	15.97	9.44	11.25
Employment = Full Time	15.65	19.29	13.52	25.05	17.86	15.40	18.35	17.77
Employment = Part Time	29.43	39.11	33.38	38.77	15.80	19.19	25.93	26.76
Employment = Unemployed	63.05 <sup>a</sup>	25.27	42.53 <sup>a</sup>	61.53 <sup>a</sup>	27.04	16.16	35.27	33.06
Employment = Other <sup>b</sup>	30.85	19.87	20.65	19.03	19.31	21.41	22.25	20.19

AMI = any mental illness; CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency; SCID = Structured Clinical Interview for DSM-IV.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>a</sup> Difference between this estimate and corresponding estimate from 2011 is statistically significant ( $p < 0.05$ ).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table 6.8 Weighted AMI Estimates Based on Cut Point Method in Adult NSDUH Sample: 2008-2011**

Demographic Domains	2008 Sample A	2008 Sample B	2008	2009	2010	2011	2008A-2011	2008-2011
	Adult NSDUH (N= 22,622)	Adult NSDUH (N= 23,046)	Adult NSDUH (N= 45,678)	Adult NSDUH (N= 45,609)	Adult NSDUH (N= 45,844)	Adult NSDUH (N= 46,599)	Adult NSDUH (N=160,674)	Adult NSDUH (N=183,730)
<b>Total</b>	19.57	16.88 <sup>a</sup>	18.20 <sup>a</sup>	19.97	20.08	19.59	19.80	19.47
Gender = Male	15.22	13.31 <sup>a</sup>	14.25 <sup>a</sup>	15.70	16.84	15.87	15.91	15.67
Gender = Female	23.62	20.20 <sup>a</sup>	21.89	23.96	23.12	23.03	23.43	23.00
Age = 18-25	31.18	26.83 <sup>a</sup>	28.85	30.24	30.14	29.77	30.32	29.76
Age = 26-49	20.97	19.01 <sup>a</sup>	20.00 <sup>a</sup>	22.35	22.22	21.44	21.75	21.50
Age = 50+	13.90	11.01 <sup>a</sup>	12.45 <sup>a</sup>	13.79	14.36	14.30	14.09	13.74
Race/Ethnicity = White	19.96	16.91 <sup>a</sup>	18.43 <sup>a</sup>	20.82	20.68	20.46	20.48	20.10
Race/Ethnicity = Black	18.75	17.06	17.96	17.98	19.78	18.81	18.84	18.64
Race/Ethnicity = Other or Multiple Races	20.21	17.14	18.69	19.09	18.18	20.19	19.44	19.08
Race/Ethnicity = Hispanic	17.93	16.43	17.02	17.80	18.28 <sup>a</sup>	15.92	17.45	17.24
Education = < High School	21.79	21.10	21.33	21.85	22.15	22.49	22.07	21.95
Education = High School	19.41	15.75 <sup>a</sup>	17.52 <sup>a</sup>	19.53	20.32	18.91	19.54	19.07
Education = Some College	21.05	19.73 <sup>a</sup>	20.33	22.55	21.95	21.83	21.84	21.67
Education = College Graduate	17.16	13.14 <sup>a</sup>	15.25 <sup>a</sup>	17.13	17.05	16.85	17.04	16.59
Poverty < 100% Threshold <sup>1</sup>	29.36	25.01 <sup>a</sup>	26.95 <sup>a</sup>	30.03	29.56	29.64	29.65	29.12
Poverty =100-199% Threshold <sup>1</sup>	25.23	20.94	22.92	22.55	23.49	23.12	23.56	23.03
Poverty ≥ 200% Threshold <sup>1</sup>	16.40	14.40 <sup>a</sup>	15.45	17.31 <sup>a</sup>	17.08	16.24	16.76	16.51
CBSA = 1M ≤ CBSA	18.44	16.85 <sup>a</sup>	17.64	19.62	19.37	18.57	19.00	18.81
CBSA = 250K ≤ CBSA < 1M	20.46	16.62 <sup>a</sup>	18.57	20.60	20.94	20.18	20.54	20.08
CBSA = CBSA < 250K	20.37	17.62 <sup>a</sup>	18.96 <sup>a</sup>	19.88	20.93	21.32	20.62	20.27
CBSA = Not CBSA, Not Rural	27.04	17.49 <sup>a</sup>	21.65	23.80	19.69	23.37	23.44	22.03
CBSA = Not CBSA, Rural	21.28	14.64 <sup>a</sup>	17.88	19.81	20.61	19.35	20.24	19.40
Employment = Full Time	16.43	14.97	15.73	17.18 <sup>a</sup>	16.80	16.08	16.62	16.44
Employment = Part Time	25.43	17.99 <sup>a</sup>	21.59	23.59	22.90	23.23	23.76	22.84
Employment = Unemployed	29.64	25.84	27.54	27.65	27.90	27.97	28.12	27.79
Employment = Other <sup>2</sup>	21.49	18.62 <sup>a</sup>	19.99 <sup>a</sup>	21.35	22.56	22.04	21.87	21.51

AMI = any mental illness; CBSA = core-based statistical area; K = thousand; M = million; MHSS = Mental Health Surveillance Study; N = frequency.

<sup>1</sup> U.S. census poverty threshold.

<sup>2</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>a</sup> Difference between this estimate and corresponding estimate from 2011 is statistically significant ( $p < 0.05$ ).

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.



## 7. Conclusions

The primary objective of the Mental Health Surveillance Study (MHSS) analysis is to produce annual national estimates of serious mental illness (SMI) prevalence using National Survey on Drug Use and Health (NSDUH) data that have sound psychometric properties, that are accurate, and so that it is possible to examine trends over time. Secondary objectives include the prediction of other categories of mental illness, such as low (mild) mental illness (LMI), moderate mental illness (MMI), and any mental illness (AMI).

The MHSS was initiated to provide annual estimates of SMI, AMI, and other categories of mental illness among adults aged 18 years or older in the United States. Because of the space limitations on the NSDUH questionnaire and because data collection is carried out by interviewers with no clinical training, it is not possible to complete a structured diagnostic interview on each of approximately 45,000 adult respondents each year to assess mental illness. Therefore, the questionnaire included short scales that measure psychological distress and functional impairment and that can be used to predict whether a respondent has AMI or SMI. Models that used these short scales to predict mental illness status were developed using a subsample of NSDUH respondents who had completed the NSDUH interview and were administered the Structured Clinical Interview for DSM-IV (SCID) via a clinical follow-up study.

In 2008, the first year of the MHSS, approximately 1,500 NSDUH respondents participated in the clinical follow-up. This sample was used to develop prediction models that have been developed to produce estimates of AMI and SMI from the main NSDUH samples for 2008, 2009, 2010, and 2011. NSDUH has continued to conduct the MHSS clinical interviews, with nationally representative samples of 500 in 2009 and 2010, 1,500 in 2011, and 1,500 planned in 2012.

This report is a compendium of documentation for the analyses of the 2011 MHSS, including both the descriptive analyses (see Chapter 5) comparing key characteristics among the World Health Organization Disability Assessment Schedule (WHODAS) samples from different time periods and the modeling analyses (see Chapter 6) comparing SMI, SMMI, and AMI estimates based on different estimation methods and from different time periods. To provide more background information, this report also includes information on design and methodological changes for the entire length of MHSS collection from 2008 to 2011 (see Chapters 3 and 4).

Initial descriptive analyses and statistical tests were conducted with 2011 MHSS data to compare key demographic, mental health, and substance use variables among the WHODAS samples from different time periods. These analyses examined whether estimates across years could be directly compared despite changes in sampling allocations and sizes. Overall, modifications to the sampling design from 2008 to 2010-2011 had significant impacts on the unweighted distributions of several key characteristics in each year's MHSS. Applying weights removed most of these. A few characteristics, however, remained significantly different across different time periods even after weighting the data. This should be kept in mind when making

comparisons across years in mental illness prevalences that are correlated with variables that changed significantly even after weighting across those same years.

As noted previously, the 2011 national estimates (i.e., based on the cut point method of the full adult NSDUH) of SMI prevalence were produced from the 2008 WHODAS model, parameter estimates, and cut point to control for potential effects due to differences in model parameter estimates and cut points. In addition, the 2011 national estimates of serious or moderate mental illness (SMMI, i.e., SMI or MMI) and AMI were based on the same SMI model and cut points for SMMI and AMI that were used for the WHODAS half sample of 2008. National estimates of MMI and LMI were obtained by subtraction.

National estimates of SMI showed no statistically significant change (5.02 percent in 2010 and 4.96 percent in 2011). There was a significant increase among respondents with less than a high school education (4.61 percent in 2010 and 5.71 percent in 2011), while there was a significant decrease among respondents with a high school education (5.74 percent in 2010 and 4.79 percent in 2011). In contrast, between 2008 and 2011, the overall difference and several subgroup differences were statistically significant (mostly higher in 2011).

National estimates of AMI showed no change (20.08 percent in 2010 and 19.59 percent in 2011). The only significant change was among Hispanics (18.28 percent in 2010 and 15.92 percent in 2011). In contrast, between 2008 and 2011, the overall difference and several subgroup differences were statistically significant (higher in 2011).

Given the unique model-based methodology used to estimate AMI and SMI, it is important to continually evaluate the quality of these estimates and incorporate refinements to the methods, if appropriate. Even though the clinical interview data were collected through the follow-up studies from 2009 to 2011, they have not been used in developing models that produce national estimates of SMI and AMI. The Substance Abuse and Mental Health Services Administration (SAMHSA) is currently reviewing the recent clinical interview data, developing plans for updating the 2008-based model with these data, and deciding on a long-term plan for producing the estimates. A key concern is considering priorities in how the estimates will be used, such as for tracking trends, describing demographic and geographic variations, or performing multivariate analysis. Long-term plans are being developed that use data collected over several years to update the model based on the 2008 MHSS. These modeling exercises will continue, and it is expected that SAMHSA will be able to identify an improved prediction model after more MHSS data are accumulated in 2012.

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## **Appendix A: Supplementary Tables**

**Table A.1 WHODAS Sample Sizes among Completed SCID Respondents, by Demographic Characteristics: 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		P Value <sup>1</sup>	P Value <sup>2</sup>	P Value <sup>3</sup>
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.			
<b>Total</b>	760	100.0	521	100.0	516	100.0	1,495	100.0	3,292	100.0	N/A	N/A	N/A
<b>Gender</b>													
Male	279	36.7	220	42.2	208	40.3	606	40.5	1,313	39.9	0.490	0.438	0.925
Female	481	63.3	301	57.8	308	59.7	889	59.5	1,979	60.1			
<b>Hispanic Origin and Race</b>													
Not Hispanic or Latino													
White	546	71.8	376	72.2	372	72.1	1,094	73.2	2,388	72.5	0.668	0.568	0.859
Black or African American	91	12.0	52	10.0	53	10.3	143	9.6	339	10.3			
Other or Multiple Races	53	7.0	37	7.1	42	8.1	111	7.4	243	7.4			
Hispanic or Latino	70	9.2	56	10.7	49	9.5	147	9.8	322	9.8			
<b>Age</b>													
18-25	452	59.5	294	56.4	128	24.8	313	20.9	1,187	36.1	0.000	0.000	0.004
26-49	247	32.5	172	33.0	307	59.5	832	55.7	1,558	47.3			
50+	61	8.0	55	10.6	81	15.7	350	23.4	547	16.6			
<b>Education</b>													
< High School	104	13.7	62	11.9	54	10.5	144	9.6	364	11.1	0.001	0.000	0.948
High School Graduate	220	28.9	163	31.3	139	26.9	408	27.3	930	28.3			
Some College	265	34.9	164	31.5	165	32.0	487	32.6	1,081	32.8			
College Graduate	171	22.5	132	25.3	158	30.6	456	30.5	917	27.9			
<b>Poverty<sup>4</sup></b>													
< 100% Threshold	133	18.2	90	17.9	61	11.9	225	15.2	509	15.8	0.647	0.030	0.065
100-199% Threshold	160	21.9	109	21.6	111	21.6	327	22.1	707	21.9			
≥ 200% Threshold	436	59.8	305	60.5	341	66.5	930	62.8	2,012	62.3			
<b>CBSA</b>													
CBSA = 1M ≤ CBSA	308	40.5	210	40.3	224	43.4	572	38.3	1,314	39.9	0.380	0.397	0.172
CBSA = 250K ≤ CBSA < 1M	193	25.4	135	25.9	120	23.3	388	26.0	836	25.4			
CBSA = CBSA < 250K	195	25.7	142	27.3	124	24.0	399	26.7	860	26.1			
CBSA = Not CBSA, Not Rural	26	3.4	11	2.1	14	2.7	44	2.9	95	2.9			
CBSA = Not CBSA, Rural	38	5.0	23	4.4	34	6.6	92	6.2	187	5.7			

CBSA = core-based statistical area; freq. = frequency; K = thousand; M = million; N/A = not applicable; pct. = percent; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> U.S. census poverty threshold.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.



**Table A.2 WHODAS Sample Sizes among Completed SCID Respondents, by Demographic and Mental Health Characteristics: 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		P Value <sup>1</sup>	P Value <sup>2</sup>	P Value <sup>3</sup>
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.			
<b>Total</b>	760	100.0	521	100.0	516	100.0	1,495	100.0	3,292	100.0	N/A	N/A	N/A
<b>Employment Status</b>													
Full Time	359	47.2	256	49.1	284	55.0	746	49.9	1,645	50.0	0.000	0.000	0.015
Part Time	199	26.2	110	21.1	78	15.1	249	16.7	636	19.3			
Unemployed	52	6.8	45	8.6	48	9.3	100	6.7	245	7.4			
Other <sup>4</sup>	150	19.7	110	21.1	106	20.5	400	26.8	766	23.3			
<b>Major Depressive Episode (MDE)</b>													
Lifetime/Not Past Year MDE	94	12.4	57	11.1	65	12.7	153	10.3	369	11.3	0.010	0.104	0.060
Past Year MDE													
Without Impairment	59	7.8	34	6.6	32	6.3	79	5.3	204	6.2			
With Impairment	111	14.7	62	12.0	80	15.6	180	12.1	433	13.2			
No Occurrence	492	65.1	362	70.3	335	65.4	1,076	72.3	2,265	69.2			
<b>Past Year Depression Treatment<sup>5</sup></b>													
Nonmedical	100	58.8	49	51.0	76	67.9	179	69.1	404	63.4	0.018	0.004	0.830
Prescription Medication	70	41.2	43	44.8	72	64.3	147	56.8	332	52.1	0.090	0.000	0.212
Any Treatment	107	62.9	54	56.3	83	74.1	189	73.0	433	68.0	0.043	0.002	0.836
<b>Past Year Mental Health Treatment</b>													
Outpatient	123	16.2	85	16.4	93	18.1	200	13.4	501	15.3	0.023	0.244	0.016
Inpatient	9	1.2	3	0.6	9	1.7	11	0.7	32	1.0	0.208	0.864	0.076
Prescription Medication	149	19.6	107	20.6	140	27.1	306	20.5	702	21.3	0.278	0.123	0.011
Any Treatment	191	25.2	131	25.3	166	32.2	368	24.6	856	26.1	0.096	0.378	0.002

Freq. = frequency; N/A = not applicable; pct. = percent; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>5</sup> Among those with MDE.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table A.3 WHODAS Sample Sizes among Completed SCID Respondents, by Suicidal, Substance Use, and SCID Survey Characteristics: 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		P Value <sup>1</sup>	P Value <sup>2</sup>	P Value <sup>3</sup>
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.			
<b>Total</b>	760	100.0	521	100.0	516	100.0	1,495	100.0	3,292	100.0	N/A	N/A	N/A
<b>Suicidal Experiences</b>													
Had Thoughts of Suicide	102	13.4	52	10.0	54	10.5	145	9.7	353	10.7	0.072	0.046	0.642
Made Plans for Suicide	33	4.3	16	3.1	15	2.9	43	2.9	107	3.3	0.246	0.112	0.976
Attempted Suicide	12	1.6	4	0.8	5	1.0	15	1.0	36	1.1	0.669	0.570	0.944
<b>Substance Use</b>													
Past Month Cigarette Use	295	38.8	192	36.9	179	34.7	445	29.8	1,111	33.7	0.000	0.000	0.048
Past Month Marijuana Use	116	15.3	79	15.2	59	11.4	157	10.5	411	12.5	0.001	0.001	0.524
<b>Substance Abuse or Dependence</b>													
Past Year Alcohol Abuse or Dependence	142	18.7	92	17.7	62	12.0	157	10.5	453	13.8	0.000	0.000	0.385
Past Year Illicit Drug Abuse or Dependence	73	9.6	40	7.7	23	4.5	70	4.7	206	6.3	0.000	0.000	0.814
<b>SCID</b>													
Mental Illness													
GAF Score ≤ 50	95	12.5	54	10.4	64	12.4	165	11.0	378	11.5	0.426	0.819	0.401
GAF Score ≤ 59	184	24.2	107	20.5	120	23.3	326	21.8	737	22.4	0.463	0.681	0.577
Any Mental Illness	338	44.5	232	44.5	193	37.4	507	33.9	1,270	38.6	0.000	0.000	0.172
Substance Use Disorder	140	18.4	85	16.3	68	13.2	163	10.9	456	13.9	0.000	0.000	0.271

Freq. = frequency; GAF = Global Assessment of Functioning; N/A = not applicable; pct. = percent; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table A.4 Weighted Completed SCID Respondents, by Demographic Characteristics (Numbers in Thousands): 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		P Value <sup>1</sup>	P Value <sup>2</sup>	P Value <sup>3</sup>
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.			
<b>Total</b>	224,923	100.0	227,207	100.0	229,273	100.0	232,625	100.0	914,027	100.0	N/A	N/A	N/A
<b>Gender</b>													
Male	108,553	48.3	109,723	48.3	110,969	48.4	111,859	48.1	441,105	48.3	0.952	0.994	0.943
Female	116,370	51.7	117,483	51.7	118,303	51.6	120,766	51.9	472,923	51.7			
<b>Hispanic Origin and Race</b>													
Not Hispanic or Latino													
White	154,734	68.8	155,422	68.4	155,976	68.0	155,268	66.7	621,400	68.0	0.963	0.995	0.981
Black or African American	25,365	11.3	25,833	11.4	26,267	11.5	26,708	11.5	104,174	11.4			
Other or Multiple Races	14,488	6.4	14,815	6.5	15,171	6.6	16,669	7.2	61,142	6.7			
Hispanic or Latino	30,336	13.5	31,137	13.7	31,858	13.9	33,980	14.6	127,311	13.9			
<b>Age</b>													
18-25	32,938	14.6	33,580	14.8	34,072	14.9	34,302	14.7	134,892	14.8	0.907	0.941	0.975
26-49	99,833	44.4	99,381	43.7	98,566	43.0	98,033	42.1	395,813	43.3			
50+	92,152	41.0	94,246	41.5	96,634	42.1	100,290	43.1	383,322	41.9			
<b>Education</b>													
< High School	16,507	7.3	10,609	4.7	20,720	9.0	23,016	9.9	70,853	7.8	0.038	0.102	0.390
High School Graduate	71,831	31.9	91,524	40.3	71,809	31.3	59,184	25.4	294,348	32.2			
Some College	72,065	32.0	55,823	24.6	62,758	27.4	74,558	32.1	265,205	29.0			
College Graduate	64,519	28.7	69,251	30.5	73,985	32.3	75,867	32.6	283,621	31.0			
<b>Poverty<sup>4</sup></b>													
< 100% Threshold	23,061	10.3	27,624	12.2	16,915	7.4	29,290	12.7	96,890	10.7	0.214	0.595	0.103
100-199% Threshold	26,971	12.1	35,302	15.6	38,246	16.7	39,934	17.3	140,453	15.4			
≥ 200% Threshold	172,904	77.6	163,158	72.2	173,926	75.9	161,801	70.0	671,789	73.9			
<b>CBSA</b>													
CBSA = 1M ≤ CBSA	87,637	39.0	126,480	55.7	125,819	54.9	118,560	51.0	458,496	50.2	0.491	0.505	0.356
CBSA = 250K ≤ CBSA < 1M	66,881	29.7	42,630	18.8	39,689	17.3	56,413	24.3	205,613	22.5			
CBSA = CBSA < 250K	50,209	22.3	33,678	14.8	48,108	21.0	44,945	19.3	176,940	19.4			
CBSA = Not CBSA, Not Rural	4,114	1.8	7,030	3.1	3,118	1.4	3,695	1.6	17,958	2.0			
CBSA = Not CBSA, Rural	16,083	7.2	17,389	7.7	12,538	5.5	9,012	3.9	55,021	6.0			

CBSA = core-based statistical area; K = thousand; M = million; N/A = not applicable; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct. = weighted percent.

NOTE: The Mental Health Surveillance Study (MHSS) weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup>The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup>U.S. census poverty threshold.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table A.5 Weighted Completed SCID Respondents, by Demographic and Mental Health Characteristics (Numbers in Thousands): 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		P Value <sup>1</sup>	P Value <sup>2</sup>	P Value <sup>3</sup>
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.			
<b>Total</b>	224,923	100.0	227,207	100.0	229,273	100.0	232,625	100.0	914,027	100.0	N/A	N/A	N/A
<b>Employment Status</b>													
Full Time	148,003	65.8	127,902	56.3	126,716	55.3	115,246	49.5	517,868	56.7	0.106	0.192	0.520
Part Time	22,737	10.1	33,267	14.6	28,863	12.6	31,926	13.7	116,794	12.8			
Unemployed	9,013	4.0	11,278	5.0	16,140	7.0	16,798	7.2	53,228	5.8			
Other <sup>4</sup>	45,170	20.1	54,759	24.1	57,554	25.1	68,655	29.5	226,137	24.7			
<b>Major Depressive Episode (MDE)</b>													
Lifetime/Not Past Year MDE	14,431	6.4	15,840	7.1	17,818	7.8	17,973	7.7	66,062	7.3	0.099	0.815	0.128
Past Year MDE													
Without Impairment	6,993	3.1	7,770	3.5	6,764	3.0	5,584	2.4	27,111	3.0			
With Impairment	9,444	4.2	11,213	5.0	12,238	5.4	7,999	3.4	40,894	4.5			
No Occurrence	193,921	86.3	189,015	84.4	190,992	83.8	200,587	86.4	774,514	85.2			
<b>Past Year Depression Treatment<sup>5</sup></b>													
Nonmedical	10,517	64.0	12,501	65.9	13,014	68.5	8,942	65.8	44,974	66.1	0.956	0.738	0.789
Prescription Medication	9,556	58.1	10,573	55.7	12,378	65.1	7,088	52.2	39,595	58.2	0.346	0.680	0.173
Any Treatment	12,613	76.7	13,379	70.5	13,480	70.9	9,536	70.2	49,008	72.1	0.735	0.694	0.940
<b>Past Year Mental Health Treatment</b>													
Outpatient	18,822	8.4	25,657	11.4	18,140	7.9	11,561	5.0	74,180	8.1	0.000	0.034	0.023
Inpatient	779	0.3	320	0.1	2,734	1.2	414	0.2	4,246	0.5	0.182	0.279	0.212
Prescription Medication	31,550	14.0	29,458	13.0	30,083	13.1	23,699	10.2	114,790	12.6	0.095	0.387	0.183
Any Treatment	35,792	15.9	34,477	15.2	37,455	16.3	27,699	11.9	135,424	14.8	0.028	0.510	0.051

N/A = not applicable; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct.= weighted percent.

NOTE: The Mental Health Surveillance Study (MHSS) weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

<sup>4</sup> The Other Employment category includes students, persons keeping house or caring for children full time, retired or disabled persons, or other persons not in the labor force.

<sup>5</sup> Among those with MDE.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table A.6 Weighted Completed SCID Respondents, by Suicidal, Substance Use, and SCID Survey Characteristics (Numbers in Thousands): 2008-2011**

Characteristic	2008		2009		2010		2011		2008-2011		P Value <sup>1</sup>	P Value <sup>2</sup>	P Value <sup>3</sup>
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.			
<b>Total</b>	224,923	100.0	227,207	100.0	229,273	100.0	232,625	100.0	914,027	100.0	N/A	N/A	N/A
<b>Suicidal Experiences</b>													
Had Thoughts of Suicide	8,893	4.0	7,700	3.4	9,090	4.0	8,164	3.5	33,847	3.7	0.616	0.939	0.607
Made Plans for Suicide	3,249	1.4	2,303	1.0	2,533	1.1	1,768	0.8	9,853	1.1	0.133	0.410	0.425
Attempted Suicide	472	0.2	362	0.2	202	0.1	594	0.3	1,629	0.2	0.442	0.910	0.181
<b>Substance Use</b>													
Past Month Cigarette Use	80,029	35.6	44,336	19.5	55,835	24.4	56,188	24.2	236,388	25.9	0.424	0.411	0.937
Past Month Marijuana Use	16,799	7.5	29,598	13.0	17,662	7.7	18,780	8.1	82,840	9.1	0.633	0.531	0.840
<b>Substance Abuse or Dependence</b>													
Past Year Alcohol Abuse or Dependence	9,066	4.0	18,220	8.0	14,996	6.5	15,805	6.8	58,087	6.4	0.657	0.635	0.886
Past Year Illicit Drug Abuse or Dependence	8,492	3.8	4,564	2.0	3,413	1.5	6,014	2.6	22,482	2.5	0.805	0.373	0.100
<b>SCID</b>													
Mental Illness													
GAF Score ≤ 50	11,038	5.0	12,286	5.4	9,068	4.0	8,054	3.5	40,445	4.4	0.051	0.114	0.523
GAF Score ≤ 59	20,228	9.1	38,652	17.0	20,402	8.9	21,674	9.3	100,956	11.1	0.376	0.315	0.790
Any Mental Illness	45,487	20.5	66,968	29.5	42,670	18.6	41,286	17.7	196,411	21.6	0.052	0.129	0.734
Substance Use Disorder	13,432	6.1	18,989	8.4	19,608	8.6	16,142	6.9	68,171	7.5	0.581	0.769	0.359

GAF = Global Assessment of Functioning; N/A = not applicable; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct.= weighted percent.

NOTE: The Mental Health Surveillance Study (MHSS) weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age. Completed respondents excluded from the analyzable dataset were treated as nonrespondents, and their associated MHSS weights were set to zero; the remaining MHSS weights were appropriately recalibrated.

<sup>1</sup> The chi-square test compares 2008, 2009, and 2010 versus 2011.

<sup>2</sup> The chi-square test compares 2008 and 2009 versus 2010 and 2011.

<sup>3</sup> The chi-square test compares 2010 versus 2011.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table A.7 WHODAS Sample Sizes among Completed SCID Respondents, by Past Year K6 Score Frequency Distribution: 2008-2011**

Past Year K6 Score	2008		2009		2010		2011		2008 - 2011	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
0	24	3.2	22	4.2	55	10.7	170	11.4	271	8.2
1	7	0.9	10	1.9	32	6.2	114	7.6	163	5.0
2	9	1.2	10	1.9	35	6.8	105	7.0	159	4.8
3	11	1.4	18	3.5	23	4.5	99	6.6	151	4.6
4	27	3.6	25	4.8	35	6.8	81	5.4	168	5.1
5	27	3.6	15	2.9	18	3.5	84	5.6	144	4.4
6	27	3.6	26	5.0	22	4.3	59	3.9	134	4.1
7	22	2.9	27	5.2	23	4.5	58	3.9	130	3.9
8	50	6.6	42	8.1	16	3.1	49	3.3	157	4.8
9	53	7.0	23	4.4	15	2.9	58	3.9	149	4.5
10	59	7.8	29	5.6	6	1.2	38	2.5	132	4.0
11	47	6.2	36	6.9	20	3.9	69	4.6	172	5.2
12	81	10.7	51	9.8	17	3.3	82	5.5	231	7.0
13	58	7.6	39	7.5	33	6.4	50	3.3	180	5.5
14	41	5.4	20	3.8	20	3.9	52	3.5	133	4.0
15	44	5.8	33	6.3	19	3.7	46	3.1	142	4.3
16	30	3.9	19	3.6	21	4.1	41	2.7	111	3.4
17	21	2.8	9	1.7	19	3.7	47	3.1	96	2.9
18	35	4.6	21	4.0	27	5.2	50	3.3	133	4.0
19	17	2.2	11	2.1	11	2.1	36	2.4	75	2.3
20	11	1.4	8	1.5	11	2.1	21	1.4	51	1.5
21	10	1.3	8	1.5	6	1.2	15	1.0	39	1.2
22	7	0.9	6	1.2	4	0.8	18	1.2	35	1.1
23	9	1.2	1	0.2	8	1.6	12	0.8	30	0.9
24	33	4.3	12	2.3	20	3.9	41	2.7	106	3.2
<b>Total</b>	760	100.0	521	100.0	516	100.0	1,495	100.0	3,292	100.0

K6 = 6-item psychological distress scale; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.

**Table A.8 Weighted Completed SCID Respondents, by Past Year K6 Score Frequency Distribution (Numbers in Thousands): 2008-2011**

Past Year K6 Score	2008		2009		2010		2011		2008 - 2011	
	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.	Wt. Freq.	Wt. Pct.
0	36,795	16.4	37,461	16.5	55,667	24.3	48,505	20.9	178,428	19.5
1	29,460	13.1	7,411	3.3	25,913	11.3	29,273	12.6	92,057	10.1
2	13,885	6.2	24,185	10.6	24,149	10.5	23,207	10.0	85,426	9.3
3	28,471	12.7	41,371	18.2	18,215	7.9	29,661	12.8	117,718	12.9
4	18,329	8.1	15,330	6.7	15,908	6.9	15,576	6.7	65,144	7.1
5	15,280	6.8	9,154	4.0	13,011	5.7	17,155	7.4	54,600	6.0
6	13,477	6.0	6,744	3.0	10,923	4.8	9,387	4.0	40,531	4.4
7	11,000	4.9	14,622	6.4	11,598	5.1	8,212	3.5	45,432	5.0
8	9,020	4.0	11,265	5.0	4,244	1.9	5,345	2.3	29,875	3.3
9	8,353	3.7	3,830	1.7	6,140	2.7	7,426	3.2	25,748	2.8
10	6,131	2.7	13,596	6.0	1,883	0.8	4,274	1.8	25,885	2.8
11	4,626	2.1	4,157	1.8	6,511	2.8	6,162	2.6	21,456	2.3
12	6,345	2.8	7,095	3.1	3,105	1.4	5,330	2.3	21,875	2.4
13	4,900	2.2	4,829	2.1	5,273	2.3	2,831	1.2	17,832	2.0
14	2,631	1.2	1,855	0.8	4,410	1.9	3,077	1.3	11,973	1.3
15	2,793	1.2	4,605	2.0	3,533	1.5	2,467	1.1	13,399	1.5
16	2,456	1.1	3,345	1.5	4,657	2.0	3,309	1.4	13,768	1.5
17	1,152	0.5	998	0.4	3,188	1.4	2,569	1.1	7,907	0.9
18	2,947	1.3	5,167	2.3	3,334	1.5	2,631	1.1	14,079	1.5
19	1,500	0.7	2,565	1.1	1,089	0.5	1,744	0.7	6,898	0.8
20	665	0.3	2,583	1.1	2,325	1.0	943	0.4	6,516	0.7
21	1,652	0.7	1,543	0.7	732	0.3	563	0.2	4,490	0.5
22	673	0.3	1,530	0.7	326	0.1	707	0.3	3,235	0.4
23	677	0.3	24	0.0	893	0.4	518	0.2	2,111	0.2
24	1,703	0.8	1,944	0.9	2,244	1.0	1,751	0.8	7,642	0.8
<b>Total</b>	<b>224,923</b>	<b>100.0</b>	<b>227,207</b>	<b>100.0</b>	<b>229,273</b>	<b>100.0</b>	<b>232,625</b>	<b>100.0</b>	<b>914,027</b>	<b>100.0</b>

K6 = 6-item psychological distress scale; SCID = Structural Clinical Interview for DSM-IV; WHODAS = 8-item World Health Organization Disability Assessment Schedule; wt. freq.= weighted frequency; wt. pct.= weighted percent.

NOTE: The Mental Health Surveillance Study (MHSS) weight included the following weights: overall NSDUH analysis weight; inverse of the SCID selection probability; nonresponse adjustment for clinical interview; and poststratification adjustments by gender, race/ethnicity, and age.

Source: SAMHSA, Center for Behavioral Health Statistics and Quality, National Survey on Drug Use and Health, 2008-2011.





## Appendix B: K6 Module

[SPLIT RANDOM SAMPLE: SAMPLE A WILL RECEIVE THE WHODAS, SAMPLE B WILL RECEIVE THE SHEEHAN DISABILITY SCALE, ALL ADULTS WILL RECEIVE THE SUICIDALITY QUESTIONS]

(Questions administered only to respondents 18 or older.)

*K6 scale (Administered to Sample A and Sample B in the Random Split sample design) the K6 has been expanded to include both 30 day and past 12 month reference periods per recommendation from the Expert Consultant group)*

**DIINTRO** [IF CURNTAGE = 18 OR OLDER] These questions ask how you have been feeling during the past 30 days

**NERVE30** [IF CURNTAGE = 18 OR OLDER] 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

DK/REF

**HOPE30** [IF CURNTAGE = 18 OR OLDER] During the past 30 days, how often did you feel hopeless?

- 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

DK/REF

**FIDG30** [IF CURNTAGE = 18 OR OLDER] During the past 30 days, how often did you feel restless or fidgety?

- 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

DK/REF

**NOCHR30** [IF CURNTAGE = 18 OR OLDER] During the past 30 days, how often did you feel so sad or depressed that nothing could cheer you up?

- 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

DK/REF

**EFFORT30** [IF CURNTAGE = 18 OR OLDER] During the past 30 days, how often did you feel that everything was an effort?

- 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
- DK/REF

**DOWN30** [IF CURNTAGE = 18 OR OLDER] During the past 30 days, how often did you feel down on yourself, no good or worthless?

- 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
- DK/REF

**WORST30** The last questions asked about how you have been feeling during the past 30 days. Now think about **the past 12 months**. Was there a month in the past 12 months when you felt more depressed, anxious, or emotionally stressed than you felt during the past 30 days?

- 1 Yes
- 2 No

**DSNERV1** [IF CURNTAGE = 18 OR OLDER AND WORST30 = 1] Think of one month in the past 12 months when you were the most depressed, anxious, or emotionally stressed.

During that month, 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
- DK/REF

**DSHOPE** [IF CURNTAGE = 18 OR OLDER AND WORST30 = 1] During that same month when you were at your worst emotionally . . .

how often did you feel hopeless?

- 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
- DK/REF

**DSFIDG** [IF CURNTAGE = 18 OR OLDER AND WORST30 = 1] During that same month when you were at your worst emotionally . . .

how often did you feel restless or fidgety?

- 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

DK/REF

**DSNOCHR** [IF CURNTAGE = 18 OR OLDER AND WORST30 = 1] During that same month when you were at your worst emotionally . . .

how often did you feel so sad or depressed that nothing could cheer you up?

- 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

DK/REF

**DSEFFORT** [IF CURNTAGE = 18 OR OLDER AND WORST30 = 1] During that same month when you were at your worst emotionally . . .

how often did you feel that everything was an effort?

- 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

DK/REF

**DSDOWN** [IF CURNTAGE = 18 OR OLDER AND WORST30 = 1] During that same month when you were at your worst emotionally . . .

how often did you feel down on yourself, no good, or worthless?

- 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

DK/REF

DEFINE DISTRESS:

IF NERVE30 = 1-4 OR HOPE30 = 1-4 OR FIDG30 = 1-4, OR NOCHR30 = 1-4 OR EFFORT30 = 1-4 OR DOWN30 = 1-4, OR DSNERV1 = 1-4 OR DSHOPE = 1-4 OR DSFIDG = 1-4 OR DSNOCHR = 1-4 OR DSEFFORT = 1-4 OR DSDOWN = 1-4, THEN DISTRESS = 1  
ELSE, DISTRESS = 2



## Appendix C: WHODAS Module

**LIKERT** [IF SAMPLE A AND DISTRESS = 1] The next questions are about how much your emotions, nerves, or mental health caused you to have **difficulties in daily activities** over the past 12 months.

Press [ENTER] to continue.

**LIREMEM** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have remembering to do things you needed to do?

- 1 No difficulty
- 2 Mild difficulty
- 3 Moderate difficulty
- 4 Severe difficulty

DK/REF

**LICONCEN** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **concentrating on doing something important when other things were going on around you?**

- 1 No difficulty
- 2 Mild difficulty
- 3 Moderate difficulty
- 4 Severe difficulty

DK/REF

**LIGOOUT1** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **going out of the house and getting around on your own?**

- 1 No difficulty
- 2 Mild difficulty
- 3 Moderate difficulty
- 4 Severe difficulty
- 5 You didn't leave the house on your own

DK/REF

**LIGOOUT2** [IF LIGOOUT1 = 5] Did problems with your emotions, nerves, or mental health keep you from leaving the house on your own?

- 1 Yes
- 2 No

DK/REF

**LISTRAN1** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **dealing with people you did not know well?**

- 1 No difficulty
  - 2 Mild difficulty
  - 3 Moderate difficulty
  - 4 Severe difficulty
  - 5 You didn't deal with people you did not know well
- DK/REF

**LISTRAN2** [IF LISTRAN1 = 5] Did problems with your emotions, nerves, or mental health keep you from dealing with people you did not know well?

- 1 Yes
  - 2 No
- DK/REF

**LISOC1** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **participating in social activities, like visiting friends or going to parties?**

- 1 No difficulty
  - 2 Mild difficulty
  - 3 Moderate difficulty
  - 4 Severe difficulty
  - 5 You didn't participate in social activities
- DK/REF

**LISOC2** [IF LISOC1=5] Did problems with your emotions, nerves, or mental health keep you from participating in social activities?

- 1 Yes
  - 2 No
- DK/REF

**LIHHRES1** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **taking care of household responsibilities?**

- 1 No difficulty
  - 2 Mild difficulty
  - 3 Moderate difficulty
  - 4 Severe difficulty
  - 5 You didn't take care of household responsibilities
- DK/REF

**LIHHRES2** [IF LIHHRES1 = 5] Did problems with your emotions, nerves, or mental health keep you from taking care of household responsibilities?

- 1 Yes
- 2 No
- DK/REF

**LIWKRES1** [IF SAMPLE A AND DISTRESS = 1] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **taking care of your daily responsibilities at work or school?**

- 1 No difficulty
- 2 Mild difficulty
- 3 Moderate difficulty
- 4 Severe difficulty
- 5 You didn't work or go to school
- DK/REF

**LIWKRES2** [IF LIKWKRES1 = 5] Did problems with your emotions, nerves, or mental health keep you from taking care of your daily responsibilities at work or school?

- 1 Yes
- 2 No
- DK/REF

**LIWKQUIC** [IF SAMPLE A AND DISTRESS = 1 AND LIWKRES1 ≠ 5] During that one month when your emotions, nerves or mental health interfered **most** with your daily activities . . .

how much difficulty did you have **getting your daily work done as quickly as needed?**

- 1 No difficulty
- 2 Mild difficulty
- 3 Moderate difficulty
- 4 Severe difficulty
- DK/REF



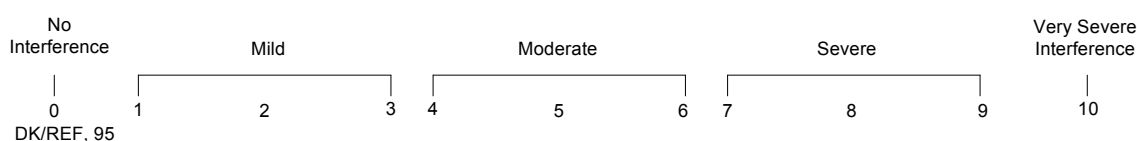


## Appendix D: Sheehan Disability Scale

**MHAD66a** [IF SAMPLE B AND DISTRESS = 1] The next questions are about how much your emotions, nerves, or mental health **interfered with your daily activities** over the past 12 months. In answering, think of **one month** in the past 12 months when your emotions, nerves, or mental health interfered **most** with your daily activities.

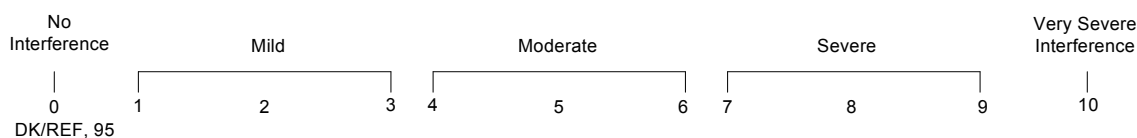
Using the 0 to 10 scale shown below, where 0 means **no** interference and 10 means very **severe** interference, select the number that describes how much **your emotions, nerves or mental health** interfered with each of the following activities during that period. You can use any number between 0 and 10 to answer. If this activity doesn't apply to you, type in 95.

**During that month when you were at your worst emotionally**, how much did your emotions interfere with your home management, like cleaning, shopping, and working around the house, apartment, or yard?



**MHAD66b** [IF SAMPLE B AND DISTRESS = 1] During that **month** in the past 12 months when you were at your worst emotionally how much did this interfere with your ability to work?

You can use any number between 0 and 10 to answer. If this activity doesn't apply to you, type in 95.



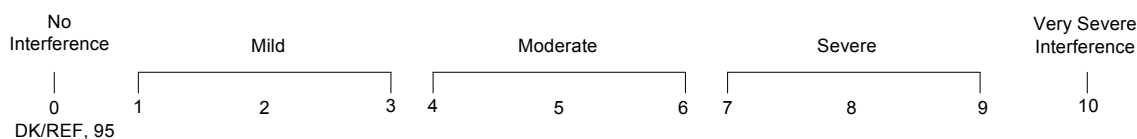
**MHAD66c** [IF SAMPLE B AND DISTRESS = 1] During that month when you were at your worst emotionally, how much did this interfere with your ability to form and maintain **close** relationships with other people?

You can use any number between 0 and 10 to answer. If this activity doesn't apply to you, type in 95.



**MHAD66d** [IF SAMPLE B AND DISTRESS = 1] How much did your emotions interfere with your social life during that period of time?

You can use any number between 0 and 10 to answer. If this activity doesn't apply to you, type in 95.



**MHAD68** [IF ANY RESPONSES TO AD66a – AD66d = 1-10 OR DK/REF] About how many days out of 365 in the past 12 months were you **totally unable** to work or carry out your normal activities because of your emotions, nerves or mental health?

You can use any number between 0 and 365 to answer.

# OF DAYS: \_\_\_\_\_ [RANGE: 0-365]  
DK/REF, 95

## **Appendix E: Structured Clinical Interview for DSM-IV Axis I Disorders**

This 143-page questionnaire is available upon written request. Please contact the following:

Substance Abuse and Mental Health Services Administration  
Center for Behavioral Health Statistics and Quality  
1 Choke Cherry Road, Room 2-1042  
Rockville, MD 20857

