

# CBHSQ DATA REVIEW

CENTER FOR BEHAVIORAL HEALTH STATISTICS AND QUALITY

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This report compares adult mental health prevalence estimates generated from the 2009 National Survey on Drug Use and Health (NSDUH) with estimates of similar measures generated from other national data sources. It also describes the methodologies of the different data sources and discusses the differences in survey design and estimation that may contribute to differences among these estimates. The other data systems discussed include the 2001 to 2003 National Comorbidity Survey Replication (NCS-R), 2001 to 2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), 2007 Behavioral Risk Factor Surveillance System (BRFSS), 2008 National Health Interview Survey (NHIS), 2008 Medical Expenditure Panel Survey (MEPS), and 2008 Uniform Reporting System (URS). Mental health indicators compared include past year serious mental illness (SMI), past year any mental illness (AMI), past month serious psychological distress (SPD), past year major depressive episode (MDE), and past year suicidality. Although methodological differences between surveys make interpretation difficult, there were multiple differences in estimates of mental health indicators between the data sources. Estimates of past year SMI and AMI from NSDUH were significantly lower than estimates of these indicators from NCS-R. The prevalence rates of past month SPD from NSDUH were significantly higher than the estimate from BRFSS or NHIS and similar to the estimate from MEPS. Estimates of past year MDE were lower in NSDUH than in NCS-R or NESARC. The NSDUH estimate of past year suicide ideation was higher than the estimate from NCS-R, but there were no differences between these data sources in respondents having suicide plans or making suicide attempts in the past year. Conclusions regarding which estimates of these mental health indicators are “correct” are difficult due to substantial methodological differences across the surveys (e.g., year of data collection, sampling design, mode of data collection, specific measures used, and operational definitions). However, precise agreement among the surveys is not expected, and this lack of agreement does not reduce the importance of these studies in providing a comprehensive picture of mental health in the United States.

## Comparison of NSDUH Mental Health Data and Methods with Other Data Sources

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### 1. Introduction

The National Survey on Drug Use and Health (NSDUH) is one of the primary sources of data for population-based prevalence estimates of mental health indicators in the United States. When discussing mental health estimates generated by NSDUH, it is important to consider how these estimates differ from those produced by other data sources. Cross-data source comparisons of prevalence estimates can be challenging because national surveys and other data sources vary considerably in factors that may affect the estimates, such as year(s) of data collection, sampling design, mode of data collection, instrumentation, operational definitions, and estimation methodology.

The main objective of this report is to provide a comparison of adult mental health prevalence estimates generated from the 2009 NSDUH with similar, previously published estimates from other national data sources. The report will (1) briefly describe NSDUH and other selected surveys and data systems in terms of their survey design and instrumentation, (2) describe the methodology used to produce estimates for each data source, and (3) discuss the differences in survey design and

estimation methods between NSDUH and other data sources that may contribute to differences among these estimates.

This review focuses on prevalence estimates generated from the 2009 NSDUH that also are available from other data sources. Mental health indicators discussed in this report are past year (12 months preceding survey interview) serious mental illness (SMI), past year any mental illness (AMI), past month (30 days preceding survey interview) serious psychological distress (SPD), past year major depressive episode (MDE), and past year suicidality (suicidal thoughts and behaviors). The comparison data sources include

- National Comorbidity Survey Replication (NCS-R),
- National Epidemiologic Survey on Alcohol and Related Conditions (NESARC),
- Behavioral Risk Factor Surveillance System (BRFSS) (state surveys with mental health content from 35 states, the District of Columbia, and Puerto Rico),
- National Health Interview Survey (NHIS),
- Medical Expenditure Panel Survey (MEPS), and
- Center for Mental Health Services, Uniform Reporting System (URS).

## 2. Methodological Characteristics and Instruments by Data Source

This section briefly presents key methodological characteristics of the relevant data sources, including survey year, sponsor, sampling design, sample size, mode of administration, and national and/or state representation. This section also includes an overview of the instruments used to develop specific mental health prevalence estimates from NSDUH and other national data sources. Table 2-1 lists the methodological characteristics and instruments used, by data source.

### 2.1. NSDUH Methodological Characteristics

#### 2.1.1. Overview

NSDUH, an annual survey sponsored by the Substance Abuse and Mental Health Services Administration (SAMHSA), is the primary source of statistical information on the use of illegal drugs by the U.S. population aged 12 or older and also includes assessments of mental health problems, mental

health treatment, and other health-related behaviors. NSDUH is a nationally representative survey that uses a state-based design with an independent, multistage area probability sample within each state and the District of Columbia to produce national, state, and substate estimates. In 2009, 68,700 completed interviews were obtained, including 46,056 from adults aged 18 or older. Because it asks potentially sensitive questions, NSDUH uses an audio computer-assisted self-interviewing (ACASI) administration mode. Mental health prevalence estimates produced using the 2009 NSDUH include: past year SMI, past year AMI, past month SPD, past year MDE, and past year suicidality.

#### 2.1.2. NSDUH Instruments That Measure Serious Mental Illness, Any Mental Illness, Serious Psychological Distress, Major Depressive Episode, and Suicidality

**Kessler 6 (K6).** NSDUH uses the K6 scale to capture nonspecific psychological distress (Kessler et al., 2003a). The six domains covered by the questions on the K6 correspond to how nervous, hopeless, restless or fidgety, sad or depressed, or worthless the respondent felt and to what extent everything felt like an effort to the respondent. From 2004 to 2007, adult NSDUH respondents were administered K6 items to measure how often they experienced symptoms of psychological distress during the 1 month in the past 12 months that they were the most depressed, anxious, or stressed. Beginning with the 2008 NSDUH, the K6 scale was expanded to two sets of six questions that asked respondents how frequently they experienced symptoms of psychological distress during two different time periods: (1) during the past 30 days and (2) the 1 month in the past 12 months when they were at their worst emotionally. Respondents were asked about the second time period only if they reported 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 K6 in the 2009 NSDUH was used to produce past month and past year SPD estimates (a K6 score of 13 or greater is considered SPD). It should be noted that, in this report, the past month estimate of SPD for NSDUH is compared with the past month estimates of SPD from other data sources given that the other data sources do not report past year SPD. The K6 also was used in conjunction with the World Health Organization

**Table 2-1. Comparison of Methodology across National Data Sources**

Survey	Main Sponsor	Sampling Design	Adult Sample	Mode	Representation	Mental Health Instruments	Mental Health Prevalence Estimates	Year of Mental Health Prevalence Estimates
NSDUH	SAMHSA	National probability sample of the U.S. civilian, noninstitutionalized population aged 12 or older (18 years or older reported here)	46,056	ACASI	National, state	<ul style="list-style-type: none"> <li>• K6</li> <li>• WHODAS</li> <li>• Modified WMH-CIDI for MDE adapted from NCS-R</li> </ul>	<ul style="list-style-type: none"> <li>• Past year SMI</li> <li>• Past year AMI</li> <li>• Past month SPD</li> <li>• Past year MDE</li> <li>• Past year suicidality</li> </ul>	2009
NCS-R	NIMH	Multistage, clustered-area probability sample of U.S. adults (18 years or older)	9,282	CAPI	National	<ul style="list-style-type: none"> <li>• WMH-CIDI</li> <li>• SDS</li> </ul>	<ul style="list-style-type: none"> <li>• Past year SMI</li> <li>• Past year MDE</li> <li>• Past year suicidality</li> <li>• Past year any mental disorder*</li> </ul>	2001-2003
NESARC	NIAAA	National sample of the noninstitutionalized population of U.S. adults (18 years or older)	43,093	CAPI	National	<ul style="list-style-type: none"> <li>• AUDADIS-IV</li> </ul>	<ul style="list-style-type: none"> <li>• Past year MDE</li> </ul>	2001-2002
BRFSS	CDC	Random-digit dialing survey of noninstitutionalized adults	202,114**	CATI	State	<ul style="list-style-type: none"> <li>• PHQ-8</li> <li>• K6</li> </ul>	<ul style="list-style-type: none"> <li>• Current depression</li> <li>• Past month SPD</li> </ul>	2007
NHIS	NCHS	Household, multistage probability sample of civilian, noninstitutionalized U.S. population (18 years or older)	21,781	CAPI	National	<ul style="list-style-type: none"> <li>• K6</li> </ul>	<ul style="list-style-type: none"> <li>• Past month SPD</li> </ul>	2008
MEPS	AHRQ	Panel survey with a household component drawn from a nationally representative subsample of households that participated in the prior year's NHIS	23,793***	CAPI, SAQ for K6 items	National	<ul style="list-style-type: none"> <li>• K6</li> </ul>	<ul style="list-style-type: none"> <li>• Past month SPD</li> </ul>	2008
URS	SAMHSA	States report of all persons served by the state mental health authority in the past year	N/A	N/A	State	N/A	<ul style="list-style-type: none"> <li>• Past year SMI</li> </ul>	2008

NOTES: NSDUH = National Survey on Drug Use and Health; SAMHSA = Substance Abuse and Mental Health Services Administration; ACASI = audio computer-assisted self-interviewing; K6 = Kessler 6; WHODAS=World Health Organization Disability Assessment Schedule; WMH-CIDI = World Mental Health Survey Initiative version of the Composite International Diagnostic Interview; MDE = major depressive episode; NCS-R = National Comorbidity Survey Replication; SMI = serious mental illness; AMI = any mental illness; SPD = serious psychological distress; NIMH = National Institute of Mental Health; CAPI = computer-assisted personal interviewing; SDS= Sheehan Disability Scale; NESARC = National Epidemiologic Survey on Alcohol and Related Conditions; NIAAA = National Institute on Alcohol Abuse and Alcoholism; AUDADIS-IV = Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV; BRFSS = Behavioral Risk Factor Surveillance System; CDC = Centers for Disease Control and Prevention; CATI = computer-assisted telephone interviewing; NHIS = National Health Interview Survey; NCHS = National Center for Health Statistics; MEPS = Medical Expenditure Panel Survey; AHRQ = Agency for Health Care Research and Quality; SAQ = Self-Administered Questionnaire; URS = Uniform Reporting System; CMHS = Center for Mental Health Services; N/A= not applicable.

\* This estimate is comparable with NSDUH's estimate of any mental illness.

\*\* Based only on the 35 states, District of Columbia, and Puerto Rico that administered the optional mental health module.

\*\*\* Sample size includes respondents from the Household Component eligible to receive the SAQ, which contains K6.

Disability Assessment Schedule (WHODAS) and a clinical interview to estimate SMI and AMI.

**WHODAS.** WHODAS consists of a series of questions that are used for assessing disturbances in social adjustment and behavior. A short eight-item version of the WHODAS (Novak, Colpe, Barker, & Gfroerer, 2010) was used in the 2009 NSDUH. Respondents were asked about how much difficulty they had with any of the following activities during the 1 month when their psychological difficulties interfered most with their daily activities: (1) remembering to do things they needed to do, (2) concentrating on doing something important when other things were going on around them, (3) going out of the house and getting around on their own, (4) dealing with people whom 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.

**Depression Module.** Beginning in 2004, depression modules derived from the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) (American Psychiatric Association [APA], 1994) criteria for lifetime and past year MDE were included in NSDUH. Separate modules were administered to adults aged 18 or older and to youths aged 12 to 17. The adult questions were adapted from the depression section of NCS-R (Harvard School of Medicine, 2005), which used the depression and other modules from the World Health Organization (WHO) World Mental Health Survey Initiative version of the Composite International Diagnostic Interview (WMH-CIDI) (Kessler & Üstün, 2004). Minor revisions were made to the NCS-R questions, primarily to reduce its length and modify the questions for the ACASI format used in NSDUH.

Lifetime major depressive episode is defined as endorsing at least five or more of the following nine symptoms as occurring nearly every day in the same 2-week period and when at least one of the symptoms is a depressed mood or loss of interest or pleasure in daily activities: (1) depressed mood most of the day; (2) markedly diminished interest or pleasure in all or almost all activities most of the day; (3) significant weight loss when not sick or dieting, weight gain when not pregnant or growing, or decrease or increase in appetite; (4) insomnia or hypersomnia; (5) psychomotor agitation or retardation; (6) fatigue or loss of energy; (7) feelings of worthlessness;

(8) diminished ability to think or concentrate or indecisiveness; and (9) recurrent thoughts of death or suicidal ideation (APA, 1994). Impairment caused by depression is measured using the Sheehan Disability Scale (SDS). To generate NSDUH past year MDE data, respondents who endorse lifetime MDE are asked whether in the past 12 months they experienced MDE symptoms for a period lasting 2 weeks or longer. Severe impairment is defined by the level of role interference reported to be caused by MDE in the past 12 months. It should be noted that no exclusions were made in NSDUH for MDE caused by medical illness, bereavement, or substance use disorders. Based on these criteria, estimates of past year MDE from NSDUH are calculated annually.

**Suicidality.** NSDUH includes a series of questions as to whether, in the 12 months preceding interview, the respondent (1) seriously thought about trying to kill themselves, (2) made any plans to kill themselves, or (3) attempted to kill themselves. These items were asked of all adults aged 18 or older. Additional questions on suicide were asked as part of the depression module. However, because those questions were asked only of persons who screened into the depression module, they were not used to estimate suicidality.

## 2.2. NCS-R Methodological Characteristics

### 2.2.1. Overview

NCS-R was a replication of the National Comorbidity Survey (NCS) (Kessler et al., 1994) with a newly recruited, nationally representative, multistage, clustered-area probability sample of adults aged 18 or older. Funded by the National Institute of Mental Health (NIMH), National Institute of Drug Abuse (NIDA), and the William T. Grant Foundation, the study was designed to measure the prevalence of mental illnesses and substance abuse or dependence. Conducted between 2001 and 2003, NCS-R obtained 9,282 completed interviews using a computer-assisted personal interviewing (CAPI) methodology. Published NCS-R mental health estimates that are comparable with estimates available in the 2009 NSDUH include past year SMI, MDE, and suicidality, as well as the percentage of respondents with one or more past year disorders (comparable with NSDUH's AMI).

### 2.2.2. *NCS-R Instruments That Measure Serious Mental Illness, Any Disorder, Major Depressive Episode, and Suicidality*

**World Health Organization Composite International Diagnostic Interview (WHO-CIDI).** DSM-IV diagnoses in NCS-R were based on the WHO-CIDI, a comprehensive, fully structured interview administered by trained lay interviewers (WHO, 1990). Using the WHO-CIDI, the NCS-R included diagnoses of past year anxiety disorders (i.e., panic disorder, generalized anxiety disorder, agoraphobia without panic disorder, specific phobia, social phobia, posttraumatic stress disorder, obsessive-compulsive disorder), mood disorders (i.e., MDE and major depressive disorder, dysthymia, bipolar disorder I or II), impulse control disorders (i.e., intermittent explosive disorder), and substance use disorders (i.e., alcohol or drug abuse or dependence). The diagnoses included in this interview have been used in the estimation of past year SMI, past year any disorder (analogous to AMI), and past year MDE.

**SDS.** NCS-R included the SDS, a measure of global functional impairment, which has been used in conjunction with disorder diagnoses to measure past year SMI.

**Kessler 10 (K10).** The K10 is a longer version of the K6 that includes the same questions and response options as the K6 but has an additional four questions. NCS-R included K10 questions regarding symptoms of psychological distress during the past 30 days as well as the 1 month in the past 12 months when respondents were at their worst emotionally. Estimates of SPD have not been published using the past month reference period.

**Suicidality.** Suicidal behavior for NCS-R was assessed using questions about lifetime occurrence, age of onset, and recency of suicide ideation, plans, and attempts. Based on evidence that sensitive behaviors were more likely to be reported in self-administered rather than interviewer-administered surveys (Turner et al., 1998), the suicide questions were printed in a booklet and were referred to by letter (A. suicide ideation “Have you ever seriously thought about committing suicide?”; B. suicide plans “Have you ever made a plan for committing suicide?”; and C. suicide attempts “Have you ever attempted suicide?”). Interviewers asked respondents to report whether experiences A, B, or C had ever happened to them and, if so, to report the age of onset and recency of the experiences.

## 2.3. NESARC Methodological Characteristics

### 2.3.1. Overview

NESARC was conducted by the U.S. Bureau of the Census for the National Institute on Alcohol Abuse and Alcoholism (NIAAA) using CAPI. The NESARC sample was designed to longitudinally survey persons aged 18 or older in the civilian, noninstitutionalized population of the United States, including persons living in noninstitutional group quarters. The first wave of the survey was conducted in 2001 and 2002, with a final sample size of 43,093 respondents. The second wave was conducted in 2004 and 2005 and included a final sample size of 34,653 (Grant & Dawson, 2006). The primary purpose of NESARC was to measure alcohol use disorders and their associated disabilities in the national population. Other topics covered in NESARC included alcohol use, drug use, drug use disorders, and mental disorders. Estimates of past year MDE have been published using NESARC data (Compton, Conway, Stinson, & Grant, 2006).

### 2.3.2. *NESARC Instruments That Measure Major Depressive Episode: Alcohol Use Disorder and Associated Disabilities Interview Schedule–IV*

NESARC used Alcohol Use Disorder and Associated Disabilities Interview Schedule–IV (AUDADIS-IV) (Grant, Dawson, & Hasin, 2001), a structured diagnostic interview designed to be used by lay interviewers, to produce DSM-IV diagnoses for some mental health disorders. NESARC included numerous DSM-IV Axis II disorders (personality disorders) in addition to Axis I disorders. Diagnostic modules include questions that assess severity and impairment caused by the specific disorder. Within the mood disorders section, AUDADIS-IV has a module that assesses past year MDE using DSM-IV criteria. The instrument measures whether or not MDE were substance induced, caused by a medical condition, or caused by bereavement. Compton and colleagues (2006) have published an estimate of MDE that excludes participants whose MDE was caused by a medical condition or caused by bereavement and includes participants whose MDE was substance induced. For comparability with NSDUH, this report also includes a previously unpublished estimate of past year MDE without any of these exclusions.

## 2.4. BRFSS Methodological Characteristics

BRFSS is a state-based system of health surveys that collect information on health-risk behaviors, clinical preventive practices, and health care access and use primarily related to chronic diseases and injury. BRFSS has technical and methodological assistance from the Centers for Disease Control and Prevention (CDC). States conduct monthly telephone surveys of noninstitutionalized adults aged 18 or older using random-digit dialing (RDD) methods. BRFSS started in 1984 and has, since 1994, collected data from all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam using a computer-assisted telephone interviewing (CATI) design.

The BRFSS design allows states to add optional modules. An optional module, incorporated in the 2007 BRFSS, was the Mental Illness and Stigma Module. In 2007, the optional module was administered by 35 states, the District of Columbia, and Puerto Rico, in which data from 202,114 respondents was obtained. This module consists of a 30-day scale of psychological distress (the K6) and questions on attitudes toward persons with mental illness. An estimate of past month SPD has been published using 2007 BRFSS data from the 35 states, the District of Columbia, and Puerto Rico (Strine et al., 2009).

## 2.5. NHIS and MEPS Methodological Characteristics

### 2.5.1. Overview

NHIS, sponsored by the National Center for Health Statistics (NCHS), is a continuous nationally representative sample survey that collects data using personal household interviews through an interviewer-administered CAPI system. NHIS data have been collected since 1957, and in 2008, there were 21,781 respondents aged 18 or older (NCHS, Division of Health Interview Statistics, 2009). The survey provides national estimates of a broad range of health measures, including health status and health care access. Since 1997, NHIS has included the past month K6 scale to produce estimates of past month SPD. The 2008 estimate of SPD is presented in this report (Barnes, Ward, & Freeman, 2010).

MEPS, which began in 1996, is sponsored by the Agency for Healthcare Research and Quality. MEPS is a set of large-scale surveys of families and individuals, their medical providers (e.g., doctors, hospitals,

pharmacies), and employers across the United States. MEPS collects data on the specific health services that Americans use, how frequently the services are used, the cost of these services, and how they are paid for, as well as data on the cost, scope, and breadth of health insurance held by and available to U.S. workers. MEPS currently contains a Household Component, which uses a CAPI system to survey individuals in households; this information is supplemented by data from their medical providers. The MEPS sample is drawn from NHIS respondents; thus, NHIS and MEPS panel data can be linked for analysis.

NHIS and MEPS use different methodologies to gather information about SPD. Whereas NHIS uses CAPI, MEPS uses mail-back self-administered paper-and-pencil questionnaires (the Self-Administered Questionnaire [SAQ]) for questions that may be unreliable if answered by a proxy during the MEPS core household interview. The SAQ includes the K6 and is administered to all household respondents aged 18 or older.

MEPS data have been used to produce estimates of past month SPD (Fleishman & Zuvekas, 2007; Wun, 2011). The analytic sample used to estimate SPD was drawn from respondents eligible to receive the SAQ and who completed *all* items on the SAQ. In the 2008 MEPS sample, 23,793 individuals were eligible to receive the SAQ, of which 86.3 percent (20,526 individuals) responded. Removal of respondents who served as proxy respondents reduced the sample to 18,467 individuals; removal of respondents who had any missing items on the K6 further reduced the sample to 17,877.

### 2.5.2. NHIS and MEPS Instruments That Measure SPD: K6

Each of these surveys includes the K6 as a past month measure of SPD comparable with that used in the 2009 NSDUH.

## 2.6. Uniform Reporting System Methodological Characteristics

The URS is sponsored by SAMHSA's Center for Mental Health Services (CMHS). This project facilitates the uniform reporting of state-level data to describe the public mental health system and the outcomes of its programs. URS produces standardized tables that the State Mental Health Authorities (SMHAs) submit each December in their Community Mental Health Services Block Grant Implementation

Report to CMHS. URS data submitted by the states are used to create 14 different output tables that show performance on issues of access, appropriateness, outcomes, and system management. The intent of the URS tables is to allow both (1) the tracking of individual state performance over time and (2) the aggregation of state information to develop a national picture of the public mental health systems for states. CMHS annual reports provide general population prevalence estimates of past year SMI by state.

### 3. Estimation Methodology by Mental Health Measure

Estimation methods of mental health indicators have used either direct or modeled methods. Direct methods are generated based on the responses of all participants completing an instrument used to gather this information (e.g., a specific survey or structured clinical interview). For studies such as NSDUH that generate mental health estimates each year with large sample sizes, direct methods of estimation for certain mental health indicators like SMI are not feasible because of the time and cost considerations of administering a comprehensive structured clinical interview for each respondent. Modeled estimation methodology attends to these challenges by generating estimates from brief screening instruments calibrated using gold-standard clinical assessment (Kessler et al., 2003a). The majority of mental health indicators included in this report (e.g., SPD, MDE, suicidality) were generated using direct methods. However, estimates of SMI and AMI from NSDUH, as well as estimates of SMI from URS, were generated using statistical modeling. The estimation methods used by each data source for each mental health indicator are presented in the following sections.

#### 3.1. Estimation Methodology for Serious Mental Illness

##### 3.1.1. Overview

The Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) Reorganization Act of 1992 (Pub. L. No. 102-321) established a block grant for states to fund community mental health services for adults with SMI. The law required states to include prevalence estimates of SMI in their annual applications for block grant funds. This law established that the Federal definition of SMI includes

persons aged 18 or older who currently have or at any time in the past year have had a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) that is or was of sufficient duration to meet diagnostic criteria specified by the DSM-IV (APA, 1994) and that has resulted in functional impairment substantially interfering with or limiting one or more major life activities.

##### 3.1.2. NSDUH

From 2001 to 2003, SAMHSA used the K6 scale (Kessler et al., 2003a), a measure of psychological distress, to produce estimates of past year SMI from NSDUH. However, in 2004, it was determined that the K6 scale alone was not sufficient for estimating SMI, as defined previously. That is, the K6 does not provide disorder diagnoses, and it does not measure functional impairment. See Appendix B in the 2004 NSDUH national findings report (Office of Applied Studies [OAS], 2005) for a discussion. These concerns led SAMHSA to launch the Mental Health Surveillance Study (MHSS) in 2008. The goal was to use the NSDUH K6 and impairment data in combination with gold-standard interviews for diagnosing mental disorders to produce accurate estimates of SMI. Because of the limitations on interview time in NSDUH, a structured diagnostic interview in its entirety could not be used to assess SMI on approximately 45,000 adult respondents each year. Therefore, the approach adopted by SAMHSA was to use short scales in NSDUH that measure psychological distress and functional impairment and to select a subsample of NSDUH respondents who were administered a gold-standard diagnostic interview, the *Structured Clinical Interview for the DSM-IV-TR [DSM-IV Text Revision] Axis I Disorders, Research Version, Non-patient Edition (SCID-I/NP)* (First, Spitzer, Gibbon, & Williams, 2002), and a gold-standard measure of functional impairment, the Global Assessment of Functioning (GAF). Table 3-1 presents the specific disorders that were assessed via the SCID-I/NP by trained mental health clinicians over the telephone. A respondent in the MHSS subsample was coded positive for SMI if he or she was determined to have any of the mental disorders or symptoms assessed in the SCID-I/NP and a GAF score of 50 or less.

In 2008, statistical models were developed to produce predicted probabilities of SMI by using

**Table 3-1. Diagnostic Modules in the Mental Health Surveillance Study Structured Clinical Interview for the *Diagnostic and Statistical Manual of Mental Disorders: 2008***

<b><i>Mood Disorders</i></b>	
Past year major depressive episode*	
Lifetime major depressive episode	
Past year manic episode*	
Lifetime manic episode	
Dysthymic disorder*	
<b><i>Past Year Psychotic Disorders</i></b>	
Psychotic screen*	
<b><i>Past Year Anxiety Disorders</i></b>	
Posttraumatic stress disorder*	
Panic disorder with and without agoraphobia*	
Agoraphobia without history of panic disorder*	
Social phobia*	
Specific phobia*	
Obsessive compulsive disorder*	
Generalized anxiety disorder*	
<b><i>Past Year Eating Disorders</i></b>	
Anorexia nervosa*	
Bulimia nervosa*	
<b><i>Past Year Impulse Control Disorders</i></b>	
Intermittent explosive disorder*	
<b><i>Past Year Substance Use Disorders</i></b>	
Alcohol abuse	
Alcohol dependence	
Nonalcohol substance abuse	
Nonalcohol substance dependence	
<b><i>Past Year Adjustment Disorders</i></b>	
Adjustment disorder*	

\*Disorder was included in the estimation of serious mental illness and any mental illness for the 2008 NSDUH MHSS's SCID sample.

Source: 2008 SAMHSA National Survey on Drug Use and Health (NSDUH).

the K6 and WHODAS scales as predictors of SMI determined using the SCID-I/NP and GAF data collected from the MHSS subsample. In 2009, the K6 scale and an abbreviated version of the WHODAS were administered to all adult NSDUH respondents (Novak et al., 2010; Rehm et al., 1999). The prediction model developed in 2008 was then used in combination with the data collected from the K6 and WHODAS in 2009 to produce predicted probabilities of SMI for each adult in the 2009 NSDUH. The predicted probabilities were then dichotomized to produce prevalence estimates of SMI in the full NSDUH sample. For a further discussion on the modeling methods for estimating SMI in the 2009 NSDUH, see Appendix B of the mental health findings report (OAS, 2010). Using this methodology, the modeled estimate of SMI among adults aged 18 or older was 4.8 percent in 2009.

### 3.1.3. NCS-R

In response to the ADAMHA Reorganization Act of 1992, several estimates of SMI have been produced using data from NCS-R (Kessler et al., 2003a). A measure of SMI was operationalized in the NCS-R based on SAMHSA's definition. However, there exist variations in the operationalization of the definition of SMI for each published estimate. For example, Kessler and colleagues (2005b) classified respondents who had one or more past year disorders as having SMI if they had any of the following characteristics: a past year suicide attempt with serious lethality intent; work disability because of mental or substance use disorder; diagnosis of nonaffective psychosis, bipolar I, or bipolar II disorder; substance dependence with serious role impairment; impulse control disorder with serious violence; or any disorder that resulted in 30 or more days of role impairment at work, home, or in social relationships during the past year. Of the 26.2 percent of respondents who had any of the past



year psychiatric disorders (i.e., anxiety, mood, impulse control, or substance use disorders), approximately 22.3 percent, or about 5.84 percent total, exhibited symptomatology that could be considered severe based on the previously listed criteria.

Another study by Kessler and colleagues (2006) produced an estimate of SMI using NCS-R data. Respondents with one or more past year mental disorders (excluding respondents with exclusive substance use disorders) were defined as having SMI if they had at least one of the following: 12-month bipolar I disorder or nonaffective psychosis; a 12-month suicide attempt; at least two areas of role functioning with self-described “severe” role impairment on the SDS; or a pattern of functional impairment at a level consistent with a GAF score of 50 or less. Using this definition, SMI was estimated to occur in 5.8 percent of U.S. adults aged 18 or older (Kessler et al., 2006).

#### **3.1.4. URS**

URS produces state estimates of SMI, using methodology selected by CMHS. CMHS selected this methodology, described in *Mental Health, United States, 1996* (Manderscheid & Sonnenschein, 1996), and *Mental Health, United States, 1998* (Manderscheid & Sonnenschein, 1998), to provide annual state estimates of SMI. This method of SMI estimation uses data from NCS and the Baltimore site of the Epidemiologic Catchments Area (ECA) (Kessler et al., 1996, 1998a, 2001), which were not necessarily designed to measure SMI in adults. The methodology selected used the following definition to operationalize SMI in the NCS and ECA: (1) the presence of a “severe” and persistent mental illness as defined by the National Advisory Mental Health Council of NIMH (National Advisory Mental Health Council, 1993) or (2) any past 12-month DSM-III-R (*Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition, revised; APA, 1987) mental disorder (excepting DSM-IV codes, substance use disorder, and developmental disorders) and either a planned suicide or attempted suicide or lack of a productive role or serious role impairment or serious interpersonal impairment (Kessler et al., 1996, 2001). A formal assessment of functional impairment was not available in the ECA or NCS; therefore, impairment was assessed using questions that were included in the NCS and ECA for other purposes (Kessler et al., 2001; Narrow, Rae, Robins, &

Regier, 2002). Methods for SMI estimation used data from the NCS on adults aged 18 to 54 and data from the Baltimore site of the ECA, which collected data on adults aged 18 or older. Although not nationally representative, the Baltimore ECA site was retained for estimation of SMI because it was the only site of the ECA study to collect data on role impairment and it provided data for persons aged 55 or older (Kessler et al., 1998b).

Estimates of the 12-month prevalence of SMI among persons aged 18 to 54 for NCS and the Baltimore ECA study were 6.2 and 7.5 percent, respectively (Kessler et al., 1996, 1998b, 2001). Given the similarity of the SMI estimates for adults aged 18 to 54 for the two studies, data were further extrapolated for estimates of SMI in adults aged 55 or older. Specifically, an adjustment rule was developed, assuming that the ratio of the NCS to Baltimore ECA prevalence estimates for those aged 18 to 54 was the same as it was for older age groups. This assumption was used to generate a national prevalence estimate for persons aged 55 or older (3.9 percent). The SMI prevalence estimate for the total population aged 18 or older then was inferred to be 5.4 percent, based on age distributions from the 1990 census; that is, 71.7 percent of the adult population were aged 18 to 54, and 28.3 percent were aged 55 or older in 1990 (Kessler et al., 1996).

Methods for estimating the number of adults with SMI by state using the SMI prevalence estimate of 5.4 percent also were developed by applying statistical models that controlled for demographic and geographic characteristics and corresponding census data. Through its URS, CMHS has continued to provide state and national estimates of SMI totals among the civilian population aged 18 or older. Estimates of SMI totals by state are updated annually by applying updated population characteristics when new data become available through the U.S. Census Bureau. Specifically, SMI estimates are derived from prediction equations using NCS and (for persons aged 55 or older) ECA, as well as yearly individual and county census variables. Individual-level variables (e.g., age, sex, race, marital status), census tract-level socioeconomic status (SES), and county-level variables (related to housing and education) are used to study aggregate predictors of SMI. Statistically significant variables are incorporated into the final models used to estimate SMI (Kessler et al., 1998a, pp. 89-103). Thus, the NCS, ECA, and the individual,

census tract–level SES, and county-level variables are used as independent variables for URS SMI prediction models.

## 3.2. Estimation Methodology for Any Mental Illness

### 3.2.1. NSDUH

For the 2009 NSDUH, AMI was defined and modeled similarly to SMI, with the principal difference being that functional impairment was not required for a respondent in the MHSS to be classified with AMI. As with SMI, the 2009 past year AMI estimate contained in this report is based on statistical models using data from the subsample that completed the clinical interview used to develop AMI estimates for the NSDUH adult sample. Based on the 2009 NSDUH, an estimated 19.9 percent of adults aged 18 or older had AMI in the past year.

### 3.2.2. NCS-R

Direct estimates of any disorder have been published using data collected from the WHO-CIDI of NCS-R. Kessler and colleagues (2005b) defined any disorder as the prevalence of at least one of several disorders, including anxiety, mood, impulse-control, and substance use disorders. Among adults, any disorder was estimated as 26.2 percent. Another published estimate produced using the NCS-R data of any disorder of 10 mental disorders that excluded substance use disorders was 24.8 percent (Druss et al., 2009; Kessler et al., 2006).

## 3.3. Estimation Methodology for Serious Psychological Distress

### 3.3.1. NSDUH

In 2009, NSDUH included two versions of the K6 scale: one that collected information about psychological distress in the past 30 days and a second that collected information about psychological distress during the respondents' worst month in the past year. Both the past month and the "worst month in the past year" questions were used to determine direct estimates of past month and past year SPD in 2009, which was defined as a score of 13 or higher on the past month K6 items (Kessler et al., 2005b). Based on the 2009 NSDUH, an estimated 4.6 percent of adults aged 18 or older had past month SPD, and 10.2 percent of adults had past year SPD (SAMHSA, OAS, 2009).

### 3.3.2. BRFSS

Using a K6 cut point identical to that used in the 2009 NSDUH (K6 score  $\geq 13$ ), a publication using BRFSS data estimated that 4.0 percent of persons in the 35 states, the District of Columbia, and Puerto Rico met the criteria for past month SPD in 2007 (Strine et al., 2009). It should be noted that 11 of the 35 states, the District of Columbia, and Puerto Rico for this estimate collected K6 data on a subset of the state sample rather than the entire state sample (Strine et al., 2009). Also, some states did not administer the mental illness and stigma module, which included the K6. Therefore, this SPD estimate is not nationally representative, especially because it excludes states such as New York, Florida, and Pennsylvania, which have large populations.<sup>1</sup>

### 3.3.3. NHIS

Using the same SPD definition as NSDUH (K6 score  $\geq 13$ ), (Heyman, Barnes, & Schiller, 2009; Barnes et al., 2010) reported a past month prevalence of 3.1 percent using the 2008 NHIS.

### 3.3.4. MEPS

Using the same SPD definition as NSDUH (K6 score  $\geq 13$ ), the latest available estimate of past month SPD from the MEPS indicates that 4.8 percent of adults were classified with past month SPD in 2008 (Wun, 2011).

## 3.4. Estimation Methodology for Major Depressive Episode

A direct estimate of MDE was produced using data collected from the depression module in the 2009 NSDUH. According to the 2009 NSDUH, 6.5 percent of adults experienced at least one MDE in the past year (OAS, 2010). As indicated previously, no exclusions were made in NSDUH for MDE caused by medical illness, bereavement, or substance use disorders.

Published, direct estimates of MDE also are available for NCS-R and NESARC. Using NCS-R data, Kessler and colleagues (2003b) reported that 7.6 percent of adults had at least one MDE in the past year. A published, direct estimate of past year

<sup>1</sup> The following states did not administer the mental illness and stigma module in 2007: Alabama, Arizona, Delaware, Florida, Idaho, Maryland, New Jersey, New York, North Carolina, North Dakota, Pennsylvania, South Dakota, Tennessee, Utah, and West Virginia.

MDE using NESARC data that excluded participants whose MDE was caused by a medical condition or bereavement but included those whose MDE was substance induced was 7.1 percent among adults (Compton et al., 2006). For comparability with NSDUH, an estimate of past year MDE without any of these exclusions was calculated using NESARC, resulting in a prevalence of 7.9 percent among adults.

### 3.5. Estimation Methodology for Suicidality

Direct estimates generated from the 2009 NSDUH indicate that 3.7 percent of adults aged 18 or older had serious thoughts about suicide in the past year, 1.0 percent made suicide plans in the past year, and 0.5 percent attempted suicide in the past year (OAS, 2010). Borges and colleagues (2006) used NCS-R data to report that 2.6 percent of adults aged 18 or older had seriously thought about committing suicide in the past year, 0.7 percent had made a suicide plan in the past year, and 0.4 percent had attempted suicide in the past year.

## 4. Differences in Survey Methods That May Affect Estimates of Mental Health Indicators

This section discusses methodological differences among the surveys that may affect estimates of mental health indicators and cross-survey comparability. It should be noted that each data source uses a variety of different methods; therefore, no single difference in methodology can fully explain the differential estimates of mental health between data sources. Table 4-1 lists the prevalence estimates that are available in the 2009 NSDUH and other data sources. As demonstrated in the table, the estimates differ. For example, estimates of past year SMI were 4.8 percent for the 2009 NSDUH and 5.8 percent for NCS-R (Kessler et al., 2006). The estimate of past year AMI for the 2009 NSDUH was 19.9 percent, whereas 24.8 percent of NCS-R respondents were classified as having one or more mental disorders (excluding substance use disorder) in the past year (Druss et al.,

**Table 4-1. Mental Health Prevalence Estimates and 95% Confidence Intervals (CI), by Data Source**

Mental Health Estimate	NSDUH (2009)		NCS-R (2001-2003)		NESARC (2001-2002)		BRFSS (2007)		NHIS (2008)		MEPS (2008)		URS (2008)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Past Year SMI	4.8	(4.5, 5.1)	5.8 <sup>a*</sup>	(5.4, 6.2)	--	--	--	--	--	--	--	--	5.4 <sup>**</sup>	--
Past Year AMI	19.9	(19.3, 20.5)	24.8 <sup>b</sup>	(23.2, 26.4)	--	--	--	--	--	--	--	--	--	--
Past Month SPD	4.6	(4.3, 4.9)	--	--	--	--	4.0 <sup>b</sup>	(3.8, 4.1)	3.1 <sup>b</sup>	(2.8, 3.4)	4.8	(4.4, 5.1)	--	--
Past Year MDE	6.5	(6.1, 6.9)	7.6 <sup>b</sup>	(7.0, 8.2)	7.9 <sup>b</sup>	(7.5, 8.3)	--	--	--	--	--	--	--	--
Past Year Suicide Ideation	3.7	(3.4, 4.0)	2.6 <sup>b</sup>	(2.2, 3.0)	--	--	--	--	--	--	--	--	--	--
Past Year Suicide Plans	1.0	(0.75, 1.3)	0.7	(0.5, 0.9)	--	--	--	--	--	--	--	--	--	--
Past Year Suicide Attempts	0.5	(0.42, 0.58)	0.4	(0.2, 0.6)	--	--	--	--	--	--	--	--	--	--

NOTES: Because of variations in survey methods, caution should be taken in interpreting differences between the estimates from NSDUH and other surveys.

NSDUH = National Survey on Drug Use and Health; NCS-R = National Comorbidity Survey–Replication; NESARC = National Epidemiologic Survey on Alcohol and Related Conditions; BRFSS = Behavioral Risk Factor Surveillance System; NHIS = National Health Interview Survey; MEPS = Medical Expenditure Panel Survey; URS = Uniform Reporting System; SMI = serious mental illness; -- = indicator not included in data system; AMI = any mental illness; SPD = serious psychological distress; MDE = major depressive episode

<sup>a</sup> The difference between this estimate and the NSDUH estimate is statistically significant at the .05 level.

<sup>b</sup> The difference between this estimate and the NSDUH estimate is statistically significant at the .01 level.

\* Design-based variance estimation for past year SMI is unavailable from publicly accessible NCS-R data. Standard error estimates for SMI were derived by assuming that the design effect of past year AMI and past year SMI were equivalent. Derived standard errors were used to calculate confidence intervals for past year SMI.

\*\*The standard error for the estimate of past year serious mental illness was not available. Therefore, the difference between the NSDUH estimate and URS estimates could not be tested.

Sources: NSDUH estimates of past year SMI, past year AMI, past month SPD, past year MDE, and past year suicidality are from OAS, 2010. NCS-R estimate of past year serious mental illness is from Kessler et al. (2006). NCS-R estimate of past year any mental illness is from Druss et al. (2009). NCS-R estimate of past year MDE is from Kessler et al. (2003b). NCS-R estimates of past year suicidality are from Borges et al. (2006). NESARC estimate of past year MDE was calculated for this paper and is previously unpublished. BRFSS estimate of past month SPD is from Strine et al. (2009). NHIS estimate of past month SPD is from Barnes et al. (2010). MEPS estimate of past month SPD is from Wun (2011). URS estimate of past year SMI is from Kessler et al. (2006).

2009). SPD ranged from 3.1 percent in NHIS to 4.8 percent in MEPS, with the NSDUH estimate at 4.6 percent (Barnes et al., 2010; OAS, 2010; Wun, 2011). Past year MDE estimates ranged from 6.5 to 7.6 percent (Kessler et al., 2003b; OAS, 2010). Compared with the 2008 NSDUH, the prevalence of past year suicidal ideation was notably low in NCS-R (2.6 vs. 3.7 percent); however, the prevalence of past year suicide plan (0.7 vs. 1.0 percent) and the prevalence of suicide attempts (0.4 vs. 0.5 percent) was similar (Kessler et al., 2005a).

Differences in estimates may be because methodology differs between surveys. That is, the surveys discussed here vary considerably in methodological factors that may affect the estimates, such as year of data collection, sampling design, mode, instruments used, operational definitions, and estimation methodology, and in survey nonresponse rates. Interview context effects may also result in different estimates for different surveys, even when using the same instruments. Context effects are changes in the responses to a “target” question because of its placement in the questionnaire. A context effect may be said to take place when the response to a question is affected by information that is not part of the question itself. For example, the content of a preceding question may affect the interpretation of a subsequent question. Alternately, a respondent may answer a subsequent question in a manner that is consistent with responses to a preceding question if the two questions are closely related to each other. As an example, it was found, in the 2008 NSDUH, that the inclusion of new items to assess global impairment and suicidality before the questions on depression altered the estimates of adult MDE relative to previous years, even though the depression questions themselves did not change (OAS, 2009, Appendix B). Differing methodology between surveys also can influence nonresponse rates. For example, mail-back questionnaires potentially result in higher nonresponse rates compared with telephone surveys. As nonresponse increases, the probability samples may not be representative of the larger population, decreasing the generalizability of the findings. The following subsections describe differences in survey methodology between NSDUH and other selected data sources that could have an impact on estimates of mental health indicators.

#### 4.1. Survey Methods and Serious Mental Illness Estimates

Several data sources—including NSDUH, NCS-R, and URS—have produced estimates of SMI. A number of methodological differences between NSDUH and NCS-R may account for differences in SMI estimates between the two surveys, including year of data collection, sampling design, mode, instruments used, operational definitions, and estimation methodology. NCS-R data were gathered between 2001 and 2003, whereas the NSDUH estimate is based on data from 2009. Differences in SMI estimates between the two surveys could partially reflect real population-level change over the different time frames. Also, estimates produced from NCS-R were obtained from information gathered from 9,282 respondents, whereas NSDUH estimates included data from 46,056 respondents. The mode of data collection also differed; NCS-R used CAPI methods, whereas NSDUH uses ACASI. ACASI is considered to be a more anonymous data collection technique, which is thought to increase the accuracy in reporting of sensitive behaviors. The higher estimates of SMI and AMI from NCS-R than from NSDUH, despite the more anonymous data collection technique used in NSDUH, suggest that factors other than mode of data collection affected these estimates. One key factor is differences between the surveys in the operational definition of mental health indicators. For example, several studies that published estimates of SMI using NCS-R data define SMI to include respondents with at least one past year mental disorder and conditions classified as “serious,” including any past year suicide attempt; in NSDUH, however, those with a past year suicide attempt are not necessarily classified as having SMI.

Estimation methods for obtaining SMI also differed between the two studies. Specifically, the 2009 NSDUH estimate is based on responses to brief screeners (the K6 in combination with the WHODAS) that have been used in combination with the MHSS SCID-I/NP and GAF to estimate SMI via statistical modeling, whereas the NCS-R estimate is directly estimated using a structured diagnostic interview. Furthermore, the NSDUH SMI estimate was based on a gold-standard measure of disorder diagnoses (MHSS SCID-I/NP) and functional impairment (GAF), which was administered by trained clinical interviewers, whereas the NCS-R measure (the WMH-CIDI) used to estimate SMI was administered by trained lay interviewers.

Several important differences between NSDUH and URS also warrant discussion. Most importantly, URS assumes a national prevalence of SMI of 5.4 percent that is based on research conducted in the mid-1990s. Although current annual estimates of SMI are produced by the CMHS URS using the combined ECA and NCS data, it should be noted that neither of these studies was designed with the intent of estimating SMI as defined by SAMHSA (Kessler, 2002). Also, this national estimate of past year SMI of 5.4 percent is applied to annually updated estimates of the total state civilian population from the U.S. Census Bureau to generate state estimates of SMI. The 2009 NSDUH national estimate is based on more recent data. Although state-level SMI estimates from NSDUH are not included in this report, future NSDUH reports will provide estimates of SMI that use information gathered from respondents within each state to allow variation in prevalence between states and across time.

#### **4.2. Survey Methods and Estimates of Any Mental Illness**

As mentioned earlier in the discussion of SMI, numerous methodological differences between NSDUH and NCS-R may explain the lower estimate of AMI in the 2009 NSDUH than in NCS-R (19.9 vs. 24.8 percent). Among these factors are variations in the year of data collection, sampling design, mode, instruments used, operational definitions, and estimation methodology.

#### **4.3. Survey Methods and Serious Psychological Distress Estimates**

NSDUH, BRFSS, NHIS, and MEPS all include the K6, and all allow for the estimation of SPD. The 2009 NSDUH estimate of past month SPD was somewhat higher than the 2007 BRFSS estimate (4.6 vs. 4.0 percent). Several methodological differences between the two studies may affect estimates of SPD, including sampling design, sample, and mode. Across all reported data sources, there is some consistency in how past month SPD is defined; a score of 13 or higher on the past month K6 items is used to identify SPD in the adult population (Kessler et al., 2005b). However, as indicated previously, the BRFSS mental illness and stigma module was administered in only 35 states, the District of Columbia, and Puerto Rico in 2007 and thus was not nationally representative. To determine how much the BRFSS estimate might differ if BRFSS had national representation, an estimate of

SPD was calculated from NSDUH using the same 35 states that were available in BRFSS plus the District of Columbia. The estimate of past month SPD from the 2009 NSDUH for just those states and the District of Columbia was 4.7 percent, which was very similar to the estimate for the Nation as a whole (4.6 percent).

The mode of data collection also differs between the two surveys. BRFSS uses CATI, which may yield lower reports of sensitive behaviors or emotions than the ACASI method used by NSDUH. ACASI is considered to be an anonymous data collection technique that yields higher reporting of sensitive behaviors (Epstein, Barker, & Kroutil, 2001; Kalfs & Saris, 1998; Moskowitz, 2004). Although survey response rates were similar between NSDUH (74.6 percent for persons aged 18 or older in 2009) and the 2007 BRFSS (overall median state cooperation rate of 72.1 percent), there was considerable variation in the BRFSS rate by state (range: 51.6 to 95.5 percent). This could have resulted in a differential nonresponse bias pattern in the surveys.

The prevalence of SPD in NHIS (3.1 percent for 2008 data) was lower than the prevalence of SPD estimated from the 2009 NSDUH (4.6 percent). One possible reason for this difference is the different mode of data collection. NHIS uses CAPI, in which questions on sensitive behaviors are asked face to face by an interviewer. As mentioned earlier, this mode of interviewing allows less privacy when answering sensitive questions and can result in underreporting of sensitive behaviors and emotions. Another possible reason for this difference is that NSDUH includes a larger number of mental health questions than does NHIS, which is limited to the K6, possibly resulting in NSDUH respondents becoming more comfortable answering mental health questions relative to NHIS respondents. This increased level of comfort by NSDUH respondents may result in them being more willing to disclose psychological distress.

Although prevalence estimates of SPD were similar for NSDUH and MEPS, various differences in survey methodology should be mentioned. For example, the mode of administration differs between data sources: MEPS uses a mail-back SAQ and NSDUH uses ACASI. Furthermore, as discussed in the section on NHIS and MEPS methodological characteristics, the analytic sample used to estimate SPD from the 2008 MEPS was drawn from respondents eligible to receive the SAQ who had completed all items on the SAQ. In the 2008 MEPS sample, 23,793 individuals were eligible

to receive the SAQ, of which 86.3 percent (20,526 individuals) responded. Removal of respondents who served as proxy respondents reduced the sample to 18,467 individuals; removal of respondents who had any missing items on the K6 further reduced the sample to 17,877. In contrast, the K6 is incorporated into the main NSDUH interview, and is thus completed by all adult participants. Note, however, that the response rate for SPD in the 2008 MEPS (75.1 percent) was similar to the overall response rate for the 2009 NSDUH (74.6 percent).

In addition to the previously mentioned methodological differences between surveys, there were also some slight variations in the wording and order of the individual K6 questions between surveys that may help to explain these differences in the prevalence of SPD. NHIS and MEPS asked respondents, “How often did you feel so *sad* that nothing could cheer you up?”; BRFSS asked, “How often did you feel so *depressed* that nothing could cheer you up?”; NSDUH asked, “How often did you feel so *sad or depressed* that nothing could cheer you up?” In another question, NHIS, BRFSS, and MEPS asked respondents, “How often did you feel *worthless?*”, whereas NSDUH asked respondents, “How often did you feel *down on yourself, no good, or worthless?*” The broader language of these two questions in NSDUH compared with the other surveys may partially explain the higher prevalence of SPD in NSDUH than in NHIS or BRFSS. In addition, NHIS and NSDUH started each question by asking, “*How often* did you feel. . .,” whereas BRFSS and MEPS asked, “*About how often* did you feel. . .” Finally, the order of questions was different in the NHIS than in the other surveys.

#### 4.4. Survey Methods and Major Depressive Episode Estimates

Several data sources have produced estimates of MDE, including NSDUH, NCS-R, and NESARC. The estimated prevalence of past year MDE was 6.5 percent in the 2009 NSDUH and 7.6 percent in NCS-R. Differences between the two surveys that could have an impact on estimates of MDE include year of data collection, sampling design, mode, instruments used, operational definitions, and estimation methodology. The differences between NCS-R and NSDUH in terms of year of data collection, sampling design, and mode have been discussed previously. Further differences that may impact MDE prevalence specifically include the instruments used to collect MDE estimates for

each study. Although the questions used to develop the MDE estimate from NSDUH are based on the questions used in NCS-R, there were slight revisions to the questions that were required to maintain the logical processes of the ACASI environment.

Comparisons between the past year MDE estimates in NSDUH (6.5 percent) and those in NESARC (7.1 percent) also require consideration of methodological differences. Specifically, differences in survey methods between NSDUH and NESARC include year of data collection, mode, instruments used, and operational definitions of MDE. Methodological factors that may affect estimates of MDE include the different years of data collection used to derive the MDE estimates (2009 for NSDUH vs. 2001 to 2002 for NESARC), which could be a reflection of true changes in population estimates over time. Differences between the two studies also include the mode of data collection (questions about sensitive topics in NSDUH are self-administered, whereas similar questions in NESARC are interviewer administered). Also, the diagnosis of MDE in NESARC was generated using AUDADIS-IV, whereas the diagnosis of MDE in NSDUH was generated using adapted questions from WHO-CIDI that were used for NCS-R. Finally, the MDE estimate from NESARC presented by Compton and colleagues (2006) and that from NCS-R use DSM-IV hierarchy rules, which exclude depressive symptoms induced by substance use, a medical illness, or bereavement. These exclusions were not made for the NSDUH estimate.

#### 4.5. Survey Methods and Suicidality Estimates

Two data sources have produced estimates of suicidality: NSDUH and NCS-R. The greater prevalence of suicide ideation and planning in NSDUH than in NCS-R could reflect the previously discussed differences in survey methodology. Furthermore, the variation in the questions could have an impact on the estimates. Specifically, the NCS-R measures of past year suicidality is based on two responses (questions about the recency of suicidal thoughts and behaviors required to determine a past year prevalence were asked only of those who reported lifetime suicidality), whereas NSDUH requires a single response (the full sample was asked about past year suicidal thoughts and behaviors).

## 5. Current Depression

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In addition to the measures described previously, two national surveys, BRFSS and the National Health and Nutrition Examination Survey (NHANES) include an indicator of current depression (i.e., past 2 weeks). Specifically, BRFSS uses the eight-item Patient Health Questionnaire (PHQ-8) and NHANES uses the nine-item PHQ-9 to produce various estimates of depression (Pratt & Brody, 2008; CDC, 2010). The following text briefly describes the estimates of current depression that are produced from these data sources. Because of the differences in time frame, estimates of current depression from these data sources are not compared with past year estimates of MDE from NSDUH or other data sources.

### 5.1. NHANES

NHANES is a cross-sectional survey of the civilian, noninstitutionalized U.S. population designed to assess health and nutrition. Survey participants are asked to complete a household interview and an examination in a mobile examination center (MEC) that included a private interview. The depression screener was conducted as part of the MEC interview questionnaire among participants aged 12 or older, using CAPI.

Depression was measured using the PHQ-9, a nine-item screening instrument that asks questions about the frequency of the nine symptoms of depression during the past 2 weeks. Specifically, respondents are asked how often they have been bothered by any of the nine symptoms of depression, as specified in the DSM-IV, during the past 2 weeks. These nine items are assessed on a 0 to 3 scale, with responses of “not at all” coded as 0; “several days” coded as 1; “more than half the days” coded as 2; and “nearly every day” coded as 3. Summing across the nine items results in a score in which depression is defined at a score of 10 or higher. The 2005 and 2006 NHANES data indicated that 5.4 percent of Americans aged 12 or older had current depression. Furthermore, 4.3 percent of youths aged 12 to 17 had current depression.

### 5.2. BRFSS

In 2006 and 2008, BRFSS (described previously) included an optional module for states that assessed anxiety and depression. The module included a standardized version of the PHQ-8. The PHQ-8 is a clinical instrument that was not originally designed

for survey administration but has been shown to be a valid measure of major depression in a study of medical clinic populations (Kroenke, Spitzer, & Williams, 2001), although it has not been validated against clinical diagnoses or other sources of data in the general population. The PHQ-8 omits one of the criteria for MDE (suicidal and self-injurious thoughts) specified in the DSM-IV; this omission has been shown to have minimal effect on the reliability and validity of the scale in a medical clinic population (Kroenke & Spitzer, 2002). The BRFSS PHQ-8 data have been used to approximate current MDE.

A recent report assessed current major depression using combined data from the 29 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands that administered the PHQ-8 in 2006 and 16 states that administered the PHQ-8 in 2008 (Gonzalez et al., 2010). Current major depression was defined as meeting five of eight of the criteria listed in the DSM-IV for major depressive episode for more than half the days in the 2 weeks prior to survey administration (corrected data for Gonzalez et al., 2010, supplied by T. Strine, personal communication, February 15, 2011). The ninth criterion listed in the DSM-IV on suicidal ideation was omitted from the instrument because interviewers were not able to provide adequate intervention by telephone. The average estimate of current major depression generated from this data was 4.1 percent using data from the PHQ-8 among the 45 states, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands that participated in 2006 and 2008.

## 6. Discussion

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The main objective of this report is to compare prevalence estimates of mental health indicators generated from the NSDUH with estimates from other national data sources. The goal of this effort is to aid policymakers, researchers, and other users of mental health statistics to better understand and interpret the data produced by national studies. Substantial methodological differences across the data sources with unmeasured effects on estimation make it difficult to determine which of the various estimates is “best.” However, precise agreement between the data sources is not expected, and this lack of agreement does not reduce the importance of these studies in providing a comprehensive picture of mental health in the United States.

Each study reviewed in this report was designed for a different purpose and therefore has different strengths, which taken together allow for a more thorough understanding of the nature of mental health problems in the United States. For example, NSDUH not only collects information on mental health but also is the primary source of data collected on substance use and substance use disorders. NSDUH also includes extensive data on demographics, physical health, receipt of mental health and substance use treatment, and various other topics relevant to mental health. Therefore, NSDUH data has been used to examine the association between mental health issues and a variety of correlates. Furthermore, the large sample size and the annual nature of NSDUH allow for precise and up-to-date estimates of mental health indicators for various subpopulations (e.g., specific racial/ethnic groups) and the capability of tracking trends over time. BRFSS, NHIS, and MEPS also are designed so that trends in estimates can be produced. In addition, NSDUH and BRFSS allow for state-specific estimates of mental health problems.

The other surveys included in this study also provide unique information on mental health in the Nation. The primary purpose of NESARC was to measure alcohol use disorders and their associated disabilities in the national population, including questions that allowed for the diagnosis of substance use and mental health disorders according to DSM-IV criteria. Therefore, symptoms and criteria of specific substance use and mental disorders may be examined in detail. The primary purpose of the NCS-R was to examine the prevalence and correlates of specific disorders in the Nation. Therefore, the NCS-R data has been used to produce national estimates of disorders including, anxiety, mood, impulse-control, and substance use disorders. Because of the longitudinal nature of NESARC and the inclusion of items on the age of onset and lifetime history of disorders in the NCS-R, both data sources can provide information about the etiology and course of mental and substance use disorders. A key strength of the NHIS is the inclusion of a broad range of physical health measures, including health status and health care access, and a key strength of MEPS is the inclusion of data on health service use and insurance status. As a result, both NHIS and MEPS permit an examination of the association of serious psychological distress and a variety of health characteristics and service use. In summary, each of these data sources uniquely

contributes to the knowledge of the distribution and determinants of a variety of mental health indicators.

Finally, as discussed throughout this report, one should consider the methodological differences when comparing survey estimates of mental health indicators across data sources, including but not limited to the timing of data collection, sample design, mode of data collection, instruments used, operational definitions, and estimation methods. Understanding the differences in methodology, survey mode, and specific measures used to assess different mental health indicators across these surveys can help to provide context for understanding and interpreting the various prevalence estimates that have been published from these surveys.

Continued monitoring of mental health indicators is vital to improving the ability to provide treatment and prevention services to reduce the impact of mental illness, and a more thorough understanding of how the methodological differences between surveys can impact the measurement of these indicators. This can, in turn, lead to improvements in survey design that will allow for better understanding of mental health in the United States.

## 7. References

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