The Descriptive Epidemiology of Commonly Occurring Mental Disorders in the United States

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mental illness, prevalence, comorbidity, age of onset, illness burden

Abstract
Data are reviewed on the descriptive epidemiology of commonly occurring DSM-IV mental disorders in the United States. These disorders are highly prevalent: Roughly half the population meets criteria for one or more such disorders in their lifetimes, and roughly one fourth of the population meets criteria in any given year. Most people with a history of mental disorder had first onsets in childhood or adolescence. Later onsets typically involve comorbid disorders. Some anxiety disorders (phobias, separation anxiety disorder) and impulse-control disorders have the earliest age of onset distributions. Other anxiety disorders (panic disorder, generalized anxiety disorder, post-traumatic stress disorder), mood disorders, and substance disorders typically have later ages of onset. Given that most seriously impairing and persistent adult mental disorders are associated with child-adolescent onsets and high comorbidity, increased efforts are needed to study the public health implications of early detection and treatment of initially mild and currently largely untreated child-adolescent disorders.
INTRODUCTION

Data on the epidemiology of commonly occurring mental disorders in the United States have proliferated over the past two decades owing to the development of diagnostic criteria in the DSM system that are amenable to operationalization and to the subsequent creation of fully structured research diagnostic interviews based on these criteria, which were used to carry out large-scale community epidemiological surveys. We begin by presenting a brief historical overview of these recent developments, and then we turn to a more detailed review of the results from the National Comorbidity Survey Replication (NCS-R) (30), the most recent nationally representative epidemiological survey of mental disorders.

A BRIEF HISTORICAL OVERVIEW

The first survey to employ a fully structured research diagnostic interview to assess the prevalence and correlates of DSM disorders was the Epidemiologic Catchment Area (ECA) study. The ECA was administered in the early 1980s in population samples selected from mental health catchment areas in five U.S. communities (47) using a diagnostic interview developed specifically for the study, which was called the Diagnostic Interview Schedule (DIS) (45). The DIS was designed to be used by trained lay interviewers and to generate diagnoses that approximated those made blindly by experienced clinicians. Methodological studies showed that concordance of DIS diagnoses with clinical diagnoses was statistically significant, but far from perfect (4, 46).

The DIS was subsequently adopted and used in similar surveys in other parts of the world (16). Both the ECA and these later ECA-influenced surveys in other countries documented high prevalence of mental disorders and widespread unmet need for treatment. However, because the ECA study was not nationally representative, questions were raised about whether the striking results regarding prevalence and treatment held throughout the United States. These questions were especially acute with regard to treatment because the ECA sites were all in urban areas in which the survey catchment areas were quite close to major medical schools with strong psychiatry departments. This sampling feature raised concerns that unmet need for treatment due to low access might be considerably greater in other areas of the country than demonstrated by the ECA sample.

These concerns were answered a decade later in the National Comorbidity Survey (NCS) (29), the first nationally representative survey to assess the prevalence and correlates of DSM disorders. The NCS, like the ECA, carried out face-to-face interviews with a fully-structured diagnostic interview to assess the prevalence and correlates of DSM disorders. However, whereas the ECA studied DSM-III disorders, the NCS studied DSM-III-R disorders. The NCS, like the ECA, documented high prevalence of mental disorders and substantial unmet need for treatment. The NCS also documented that much of the treatment provided for mental disorders in the United States at the time of the survey, in the early 1990s, failed to meet even the most minimal published criteria for treatment adequacy (51, 52).

As with the ECA, the NCS was followed by a number of replications in other parts of the world. These replications were greater in number than after the ECA, however, because the interview schedule used in the NCS was developed by the World Health Organization (WHO) to include not only DSM criteria but also ICD-10 criteria. In addition, in an effort to foster cross-national comparative studies, WHO carried out developmental work for the survey in many different countries and made the instrument available in many different languages (48). WHO created a cross-national research consortium that brought together the investigators who carried out the many replications of the NCS to collaborate in systematic cross-national comparisons (21).
High prevalence, early age of onset, substantial persistence, and high comorbidity were all documented consistently in these comparative analyses (17).

Perhaps the most concerning issue raised by the ECA, NCS, and the other surveys that followed them was that the number of people estimated to meet criteria for a mental disorder in any given year was much higher than the number that could realistically be treated. Commentators suggested that this observation might represent less of a problem than it might at first seem because some untreated cases almost certainly have mild or self-limiting disorders that do not need treatment (42). However, in the absence of information about disorder severity there was no way to know how many cases were in question. The ECA and NCS were unable to provide definitive data on this issue because the main concern of these surveys was to make categorical assessments of specific DSM disorders. Clinical severity of these disorders was not a major focus. Nonetheless, post hoc analysis provided some indirect information about severity. These analyses strongly suggested that a substantial proportion of DSM cases in the general U.S. population are mild (42). Comparable results were obtained in secondary analyses of surveys carried out in other developed countries (6, 11).

Because the results regarding disorder severity based on the ECA and NCS methodology were post hoc, the next generation of epidemiological surveys invested much more heavily in assessing severity. The U.S. survey involved in this effort was the NCS Replication (NCS-R) (30), which was carried out a decade after the NCS (2001–2003) using a substantially expanded interview that included a wider range of disorders and much more detailed information about disorder severity (32). This expanded interview was also used in a series of community epidemiological surveys coordinated by the WHO in its World Mental Health (WMH) Survey Initiative (27). In the United States, a ten-year follow-up of the original baseline NCS sample was carried out in parallel with the NCS-R to study patterns and predictors of onset and progression of mental disorders (31).

The NCS-R and the other WMH surveys documented, consistent with the results of the post-hoc ECA and NCS analyses, that many mental disorders are mild (11, 25). However, the NCS follow-up study documented something else that was quite important: A substantial proportion of initially mild mental disorders progress to become serious disorders within a decade (31). This progression was common especially for seldom-treated child-adolescent onset anxiety disorders, raising the question of whether expanded early detection and treatment of mild disorders during the school years might have an important public health effect in preventing the subsequent development of more serious disorders.

The NCS-R, as a replication of the NCS, was also used to study time trends in the prevalence and treatment of mental disorders during the 1990s. This was an important exercise because substantial changes occurred in mental health care delivery in the United States during the decade between the NCS and the NCS-R. The Substance Abuse and Mental Health Services Administration (SAMSHA) found that annual encounters in specialty mental health treatment centers increased by nearly 50% between 1992 and 2000 (38). The National Ambulatory Medical Care Survey documented that people receiving health care treatment for depression more than tripled between 1987 and 1997 (44). The Robert Wood Johnson Foundation Community Tracking Survey documented that the proportion of people with serious mental illness who received specialty care increased by nearly 20% between 1997–1998 and 2000–2001 (39). To the extent that these increases in treatment were effective, we might expect that the prevalence of mental disorders would be lower in the NCS-R than in the NCS.

However, this was not the case. Comparison of the NCS-R with the NCS found that the prevalence of DSM disorders among people in the age range 18–54 (the age range
included in both surveys in the U.S. household population) did not change during the decade between the two surveys (26). The prevalence estimate was 29.4% in the NCS and 30.5% in the NCS-R. However, treatment was found to increase dramatically, from 20.3% of people with a disorder receiving treatment in the NCS to 32.9% in the NCS-R. Significant treatment increases were limited, though, were much more pronounced in the general medical sector than in other parts of the treatment system (159% increase) compared with a lower increase among psychiatrists, and showed an even lower increase among psychologists and other mental health professionals (a 59% increase). Despite these increases, most people with mental disorders remain untreated, and those in treatment often received suboptimal treatment (53).

THE NATIONAL COMORBIDITY SURVEY REPLICATION

As implied above, the most recent estimates of the prevalence and correlates of DSM-IV mental disorders in the United States come from the NCS-R. Because the remainder of this review presents an overview of NCS-R findings, we now discuss the NCS-R design. The NCS-R is a nationally representative household survey of 9282 respondents ages 18 and older in the coterminous United States who were interviewed face to face in their homes between February 2001 and April 2003. The survey included a diagnostic assessment in a wide range of DSM-IV disorders in addition to measures of many risk factors and correlates. The response rate was 70.9%. More details on the NCS-R design and field procedures are presented elsewhere (23).

DSM-IV diagnoses were made in the NCS-R using Version 3.0 of the WHO's Composite International Diagnostic Interview (CIDI) (32), a fully structured lay-administered diagnostic interview that generates diagnoses according to the definitions and criteria of both the ICD-10 (54) and DSM-IV (2) diagnostic systems (32). DSM-IV criteria are used in all results reported here. The core CIDI disorders assessed in the NCS-R include mood disorders (major depressive disorder, dysthymic disorder, and bipolar disorder), anxiety disorders (panic disorder, agoraphobia, specific phobia, social phobia, generalized anxiety disorder, post-traumatic stress disorder, obsessive-compulsive disorder, and separation anxiety disorder), substance disorders (alcohol and drug abuse and dependence), and impulse control disorders (intermittent explosive disorder, oppositional defiant disorder, conduct disorder, and attention-deficit/hyperactivity disorder). Lifetime prevalence, age of onset, and 12-month prevalence were assessed separately for each disorder (24). A blinded clinical reappraisal study using the Structured Clinical Interview for DSM-IV (SCID) (13) as the clinical gold standard found generally good concordance between DSM-IV diagnoses based on the CIDI and the SCID for anxiety, mood, and substance disorders, with area under the receiver operator characteristic curve in the range .65–.88 for individual diagnoses (15). The CIDI diagnoses of impulse-control disorders were not validated.

ESTIMATES OF LIFETIME PREVALENCE

Table 1 shows the lifetime prevalence estimates of the mental disorders assessed in the NCS-R. Some 46.4% of respondents had an estimated lifetime history of at least one of the DSM-IV disorders assessed in the survey, whereas 27.7% of respondents had a lifetime history of two or more disorders and 17.3% had three or more disorders. The most prevalent class of disorders was anxiety disorders (28.8%), followed by impulse-control disorders (24.8%), mood disorders (20.8%), and substance use disorders (14.6%). The most prevalent individual lifetime disorders were major depressive disorder (16.6%), alcohol abuse (13.2%), specific phobia (12.5%), and social phobia (12.1%).

Investigators sound significant differences in prevalence estimates with age for almost
Table 1  Lifetime prevalence of DSM-IV/WMH-CIDI disorders in the total NCS-R sample and by age.  
Reproduced with permission from Kessler et al. (24)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>18–29</th>
<th>30–44</th>
<th>45–59</th>
<th>60+</th>
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<td>%</td>
<td>(se)</td>
<td>%</td>
<td>(se)</td>
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<td>(se)</td>
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<td><strong>I. Anxiety disorders</strong></td>
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<td>Panic disorder</td>
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<td>4.4</td>
<td>(0.4)</td>
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<td>Agoraphobia without panic</td>
<td>1.4</td>
<td>(0.1)</td>
<td>1.1</td>
<td>(0.2)</td>
<td>1.7</td>
<td>(0.3)</td>
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<td>Specific phobia</td>
<td>12.5</td>
<td>(0.4)</td>
<td>13.3</td>
<td>(0.8)</td>
<td>13.9</td>
<td>(0.8)</td>
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<td>Social phobia</td>
<td>12.1</td>
<td>(0.4)</td>
<td>13.6</td>
<td>(0.7)</td>
<td>14.3</td>
<td>(0.8)</td>
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<td>Generalized anxiety disorder</td>
<td>5.7</td>
<td>(0.3)</td>
<td>4.1</td>
<td>(0.4)</td>
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<td>(0.5)</td>
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<td>PTSD</td>
<td>6.8</td>
<td>(0.4)</td>
<td>6.3</td>
<td>(0.5)</td>
<td>8.2</td>
<td>(0.8)</td>
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<td>OCD</td>
<td>1.6</td>
<td>(0.3)</td>
<td>2.0</td>
<td>(0.5)</td>
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<td>(0.9)</td>
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<td>SAD</td>
<td>5.2</td>
<td>(0.4)</td>
<td>5.2</td>
<td>(0.6)</td>
<td>5.1</td>
<td>(0.6)</td>
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<td>Any anxiety disorder</td>
<td>28.8</td>
<td>(0.9)</td>
<td>30.2</td>
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<td>35.1</td>
<td>(1.4)</td>
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<td>Major depressive disorder</td>
<td>16.6</td>
<td>(0.5)</td>
<td>15.4</td>
<td>(0.7)</td>
<td>19.8</td>
<td>(0.9)</td>
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<td>Dysthymia</td>
<td>2.5</td>
<td>(0.2)</td>
<td>1.7</td>
<td>(0.3)</td>
<td>2.9</td>
<td>(0.4)</td>
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<td>Bipolar I–II disorders</td>
<td>3.9</td>
<td>(0.2)</td>
<td>5.9</td>
<td>(0.6)</td>
<td>4.5</td>
<td>(0.3)</td>
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<tr>
<td>Any mood disorder</td>
<td>20.8</td>
<td>(0.6)</td>
<td>21.4</td>
<td>(0.9)</td>
<td>24.6</td>
<td>(0.9)</td>
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<td><strong>III. Impulse-control disorders</strong></td>
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<td>ODD</td>
<td>8.5</td>
<td>(0.7)</td>
<td>9.5</td>
<td>(0.9)</td>
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<td>OD</td>
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<td>10.9</td>
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<td>(0.8)</td>
<td>8.3</td>
<td>(0.9)</td>
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<td>Intermittent explosive disorder</td>
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<td>7.4</td>
<td>(0.7)</td>
<td>5.7</td>
<td>(0.6)</td>
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<tr>
<td>Any impulse—control disorder</td>
<td>24.8</td>
<td>(1.1)</td>
<td>26.8</td>
<td>(1.7)</td>
<td>23.0</td>
<td>(1.3)</td>
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<td><strong>IV. Substance disorders</strong></td>
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<tr>
<td>Alcohol abuse</td>
<td>13.2</td>
<td>(0.6)</td>
<td>14.3</td>
<td>(1.0)</td>
<td>16.3</td>
<td>(1.1)</td>
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<td>Alcohol dependence</td>
<td>5.4</td>
<td>(0.3)</td>
<td>6.3</td>
<td>(0.7)</td>
<td>6.4</td>
<td>(0.6)</td>
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<tr>
<td>Drug abuse</td>
<td>7.9</td>
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<td>10.9</td>
<td>(0.9)</td>
<td>11.9</td>
<td>(1.0)</td>
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<td>Drug dependence</td>
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<td>(0.2)</td>
<td>3.9</td>
<td>(0.5)</td>
<td>4.9</td>
<td>(0.6)</td>
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<tr>
<td>Any substance disorder</td>
<td>14.6</td>
<td>(0.6)</td>
<td>16.7</td>
<td>(1.1)</td>
<td>18.0</td>
<td>(1.1)</td>
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<td><strong>V. Any disorder</strong></td>
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<td></td>
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<tr>
<td>Any</td>
<td>46.4</td>
<td>(1.1)</td>
<td>52.4</td>
<td>(1.7)</td>
<td>55.0</td>
<td>(1.6)</td>
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<tr>
<td>Two or more disorders</td>
<td>27.7</td>
<td>(0.9)</td>
<td>33.9</td>
<td>(1.3)</td>
<td>34.0</td>
<td>(1.5)</td>
</tr>
<tr>
<td>Three or more disorders</td>
<td>17.3</td>
<td>(0.7)</td>
<td>22.3</td>
<td>(1.2)</td>
<td>22.5</td>
<td>(1.1)</td>
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<td><strong>VI. Sample sizes</strong></td>
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<tr>
<td>Part I</td>
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<td></td>
<td>(2338)</td>
<td></td>
<td>(2886)</td>
<td></td>
</tr>
<tr>
<td>Part II</td>
<td>(5692)</td>
<td></td>
<td>(1518)</td>
<td></td>
<td>(1805)</td>
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<tr>
<td>Part II OCD subsample</td>
<td>(1808)</td>
<td></td>
<td>(493)</td>
<td></td>
<td>(566)</td>
<td></td>
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</tbody>
</table>

Abbreviations: ADHD: attention-deficit/hyperactivity disorder; CD: conduct disorder; OCD: obsessive-compulsive disorder; ODD: oppositional-defiant disorder; PTSD: post-traumatic stress disorder; SAD: separation anxiety disorder.

bSignificant age difference at the 0.05 level.

cPTSD was assessed only in the Part II sample (\(n = 5692\)).

dOCD was assessed only in a random one third of the Part II sample (\(n = 1808\)).

eSAD, ODD, CD, and ADHD were assessed only among Part II respondents in the age range 18–44 (\(n = 3199\)).

fThese summary measures were analyzed in the full Part II sample (\(n = 5692\)). OCD, SAD, ODD, CD, and ADHD were coded as absent among respondents who were not assessed for these disorders.

gThe \(\chi^2\) test evaluates statistical significance of age-related differences in estimated prevalence. \(\chi^2\) is evaluated with one degree of freedom for SAD, ODD, CD, ADHD, and any impulse-control disorder.
all the disorders assessed in the NCS-R, with generally monotonic increases found starting with the youngest (ages 18–29) to the next oldest (for the most part, ages 30–44) age groups, followed by a decline in the oldest age group(s). The lifetime prevalence estimates of the disorders considered in the survey were always lowest in the oldest age group (60+), with the most extreme examples of this pattern of differences occurring for drug abuse, drug dependence, post-traumatic stress disorder, and bipolar disorder.

The NCS-R is not alone in finding these age patterns in estimated lifetime prevalence. Most community epidemiological surveys find very similar patterns (17). A number of methodological factors could account for this pattern. For instance, people living in institutions (including nursing homes and other assisted-living facilities) are usually excluded from general population surveys, and people who die early are always excluded, which incorrectly implied that elderly survey participants were especially healthy. It is noteworthy in this regard that mental disorders have significant risk factors for early mortality (8). The lower reported lifetime prevalence of mental disorders among older respondents may also be due to a genuine cohort effect, that is, the risk could actually be increasing in people born in the younger generations. Regardless of the interpretation of the pattern, though, the implication is that lifetime prevalence estimates in community surveys should be considered lower bounds on the estimates in recent cohorts.

AGE OF ONSET

Although age of onset (AOO) is one of the least commonly studied aspects of descriptive epidemiology, it has important implications for clinical practice and research. The dearth of information on AOO of mental disorders is presumably due to reluctance on the part of epidemiologists to rely on the retrospective reports obtained in general-population surveys. However, analysis of these data shows that the patterns are substantively plausible and generally consistent with those found in prospective studies. An examination of AOO distributions is important for at least two reasons. The first reason is that information on AOO allows us to distinguish between lifetime prevalence (the proportion of the population who had a disorder at some time in their lives up to their age at interview) and projected lifetime risk (the estimated proportion of the population who will have the disorder by the end of their lives). Lifetime risk cannot be estimated directly from community surveys because respondents differ in age and, therefore, number of years at risk. However, projections of estimated future risk can be made from AOO distributions.

Second, an understanding of AOO is important for targeting research on prevention of mental disorders (3), early intervention with prodromal or incipient mental disorders (33), and primary prevention of secondary disorders (19). In the absence of AOO information, we would have no way to know the appropriate age range to target preventive interventions. A related issue is that early AOO is often associated with greater disorder severity (28), persistence (10), and lack of treatment response (43). On the basis of these associations, AOO information can be useful in making projections of aggregate illness course associated with primary and secondary disorders.

The disorder-specific estimates of AOO in the NCS-R, which are shown elsewhere (24), are very similar to those in the other WMH surveys (22) in all major respects. In all these surveys, the impulse-control disorders have the earliest AOO distributions of any disorders studied, with median AOO in middle childhood for attention-deficit/hyperactivity disorder (ADHD), middle-late childhood for oppositional-defiant disorder (ODD) and conduct disorder (CD), and late childhood to late adolescence for intermittent explosive disorder (IED). Impulse-control disorders also have an extremely narrow age range of onset risk. For example, 80% of all
lifetime ADHD cases begins in the age range 4–11, whereas the vast majority of ODD and CD cases begins between ages 5 and 15. Fully half of all lifetime IED begins in childhood or adolescence.

Some anxiety disorders—the phobias and separation anxiety disorder (SAD)—also have very early AOO distributions in the NCS-R, with median AOO in the range of early-middle childhood and interquartile range (IQR; 25th–75th percentiles of the AOO distributions) of 4–20 years of age. The other anxiety disorders, in comparison, have considerably later AOO distributions than the phobias and SAD do, although the cross-national variation in both median AOO (age range 25–53) and IQR AOO (age range 15–75) is considerably wider than for the impulse-control disorders or the phobias or SAD. The mood disorder AOO distributions are quite similar to those for the later-onset anxiety disorders, with consistently low prevalence until the early teens followed by a roughly linear increase through late middle age and a declining increase thereafter. The median AOO of mood disorders has a very wide range across countries (ages 25–45) and an even wider IQR (ages 17–65).

Finally, the AOO distributions of substance use disorders in the NCS-R are quite tightly grouped in that few onsets occur prior to the mid-teens and cumulative increase in onset is rapid in adolescence and early adulthood. Considerable variation exists, however, in the sharpness of the change in the slope as well as in the age range of this change, leading to wider variation in both the median (ages 18–29) and the interquartile range (ages 16–43) of the AOO distributions than for impulse-control disorders or early-onset anxiety disorders but lower variation than for mood disorders or other anxiety disorders.

PROJECTED LIFETIME RISK

As noted in the previous section, one important reason for estimating AOO distributions is to obtain data on projected lifetime risk. It is noteworthy that the projected lifetime risk of a given DSM-IV disorder in the NCS was, on average, one third higher than estimated lifetime prevalence. This means that for every 10 people who already have a history of any given mental disorder, 3–4 people in the population are likely to develop the disorder at some point in the future. Not surprising, the highest class-specific proportional increase in projected lifetime risk vs. prevalence was associated with mood disorders, and the lowest was associated with impulse-control disorders. This demonstrates the fact that many mood disorders begin in middle age or older, whereas most impulse-control disorders begin in childhood or adolescence.

The high comorbidity known to exist among impulse-control disorders (18, 20, 35) is expected to result in many respondents who developed child or adolescent impulse-control disorders or early-onset anxiety disorders and experienced subsequent onsets of co-morbid disorders that typically have later ages of onset, such as substance, mood, or later-onset anxiety disorders. This possibility was investigated in the NCS-R by comparing the risk-to-prevalence ratios of any disorder vs. individual disorders. Most projected new onsets of individual disorders were found to be secondary disorders, as indicated by the fact that the risk-to-prevalence ratio for any disorder was close to 1.0. Very similar patterns were found in other WMH surveys (22).

TWELVE-MONTH PREVALENCE AND SEVERITY

Mental disorders that were active within the 12 months of the NCS-R interview were classified by severity using a complex classification scheme. Cases were classified serious if they had any of the following: a 12-month suicide attempt with serious lethality intent; work disability or substantial work limitation due to a mental or substance disorder; a positive screen for nonaffective psychosis, bipolar I or II disorder; substance dependence with serious role impairment (as defined by

Comorbidity: the joint occurrence of two or more disorders in the same person.
Twelve-month prevalence: proportion of a population that reports having a particular experience (e.g., meeting criteria for a mental disorder) at any time in the 12 months prior to the interview.

Of 12-month cases, 22.3% were classified serious, 37.3% moderate, and 40.4% mild. Having a serious disorder was strongly related to comorbidity, with 9.6% of those with one diagnosis, 25.5% with two, and 49.9% with three or more diagnoses classified as serious cases. Among disorder classes, mood disorders had the highest percentage of serious cases (45.0%) and anxiety disorders the lowest (22.8%). The anxiety disorder with the highest proportion of serious cases was obsessive-compulsive disorder (50.6%), whereas bipolar disorder had the highest proportion of serious cases (82.9%) among mood disorders, ODD had the highest (49.6%) among impulse-control disorders, and drug dependence had the highest (56.5%) among substance disorders.

Tetrachoric correlations between all logically possible pairs of these disorders were estimated and found to be nearly all positive and statistically significant (25). The highest correlations involved well-known syndromes: bipolar disorder (major depressive episode with mania-hypomania), double-depression (major depressive episode with dysthymia), anxious-depression (major depressive episode with generalized anxiety disorder), comorbid mania-hypomania and ADHD, panic disorder with agoraphobia, comorbid social phobia with agoraphobia, and comorbid substance disorders (both alcohol abuse and dependence with drug abuse and dependence).

The correlation matrix was explored with factor analysis, and a two-factor solution was the best fit (25). Rotation to a varimax solution showed that the first factor had high factor loadings for internalizing disorders (anxiety disorders, major depressive episode) and the second factor had high factor loadings for externalizing disorders (CD, substance disorders). This pattern is very similar to the one found in previous factor analyses of comorbidity matrices using community epidemiological studies (20, 34, 49).

Among the 219 or 524,288 logically possible multivariate disorder profiles that can be made from the 19 NCS-R disorders...
Table 2  Twelve-month prevalence and severity of DSM-IV/WMH-CIDI disorders ($n = 9282$). Originally published in Kessler et al. (25), used with permission

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Severity&lt;sup&gt;a&lt;/sup&gt;</th>
<th></th>
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<tr>
<td></td>
<td></td>
<td>% (se)</td>
<td>Serious (se)</td>
<td>Moderate (se)</td>
<td>Mild (se)</td>
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<tr>
<td>I. Anxiety disorders</td>
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<tr>
<td>Panic disorder</td>
<td>2.7 (0.2)</td>
<td>44.8 (3.2)</td>
<td>29.5 (2.7)</td>
<td>25.7 (2.5)</td>
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<tr>
<td>Agoraphobia without panic</td>
<td>0.8 (0.1)</td>
<td>40.6 (7.2)</td>
<td>30.7 (6.4)</td>
<td>28.7 (8.4)</td>
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<tr>
<td>Specific phobia</td>
<td>8.7 (0.4)</td>
<td>21.9 (2.0)</td>
<td>30.0 (2.0)</td>
<td>48.1 (2.1)</td>
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<tr>
<td>Social phobia</td>
<td>6.8 (0.3)</td>
<td>29.9 (2.0)</td>
<td>38.8 (2.5)</td>
<td>31.3 (2.4)</td>
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<tr>
<td>Generalized anxiety disorder</td>
<td>3.1 (0.2)</td>
<td>32.3 (2.9)</td>
<td>44.6 (4.0)</td>
<td>23.1 (2.9)</td>
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<tr>
<td>Post-traumatic stress disorder&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.5 (0.3)</td>
<td>36.6 (3.5)</td>
<td>33.1 (2.2)</td>
<td>30.2 (3.4)</td>
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<tr>
<td>Obsessive-compulsive disorder&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.0 (0.3)</td>
<td>50.6 (12.4)</td>
<td>34.8 (14.1)</td>
<td>14.6 (5.7)</td>
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<tr>
<td>Separation anxiety disorder&lt;sup&gt;d&lt;/sup&gt;</td>
<td>0.9 (0.2)</td>
<td>43.3 (9.2)</td>
<td>24.8 (7.5)</td>
<td>31.9 (12.2)</td>
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<tr>
<td>Any anxiety disorder&lt;sup&gt;e&lt;/sup&gt;</td>
<td>18.1 (0.7)</td>
<td>22.8 (1.5)</td>
<td>33.7 (1.4)</td>
<td>43.5 (2.1)</td>
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<td>II. Mood disorders</td>
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<tr>
<td>Major depressive disorder</td>
<td>6.7 (0.3)</td>
<td>30.4 (1.7)</td>
<td>50.1 (2.1)</td>
<td>19.5 (2.1)</td>
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<tr>
<td>Dysthymia</td>
<td>1.5 (0.1)</td>
<td>49.7 (3.9)</td>
<td>32.1 (4.0)</td>
<td>18.2 (3.4)</td>
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<tr>
<td>Bipolar I–II disorders</td>
<td>2.6 (0.2)</td>
<td>82.9 (3.2)</td>
<td>17.1 (3.2)</td>
<td>0.0 (0.0)</td>
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<tr>
<td>Any mood disorder</td>
<td>9.5 (0.4)</td>
<td>45.0 (1.9)</td>
<td>40.0 (1.7)</td>
<td>15.0 (1.6)</td>
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<tr>
<td>III. Impulse-control disorders</td>
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<tr>
<td>Oppositional-defiant disorder&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.0 (0.2)</td>
<td>49.6 (8.0)</td>
<td>40.3 (8.7)</td>
<td>10.1 (4.8)</td>
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<tr>
<td>Conduct disorder&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.0 (0.2)</td>
<td>40.5 (11.1)</td>
<td>31.6 (7.5)</td>
<td>28.0 (9.1)</td>
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<tr>
<td>Attention-deficit/hyperactivity disorder&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.1 (0.3)</td>
<td>41.3 (4.3)</td>
<td>35.2 (3.5)</td>
<td>23.5 (4.5)</td>
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<tr>
<td>Intermittent explosive disorder</td>
<td>2.6 (0.2)</td>
<td>23.8 (3.3)</td>
<td>74.4 (3.5)</td>
<td>1.7 (0.9)</td>
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<tr>
<td>Any impulse-control disorder&lt;sup&gt;d&lt;/sup,&lt;sup&gt;f&lt;/sup&gt;</td>
<td>8.9 (0.5)</td>
<td>32.9 (2.9)</td>
<td>52.4 (3.0)</td>
<td>14.7 (2.3)</td>
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<tr>
<td>IV. Substance disorders</td>
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<tr>
<td>Alcohol abuse&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.1 (0.3)</td>
<td>28.9 (2.6)</td>
<td>39.7 (3.7)</td>
<td>31.5 (3.3)</td>
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<tr>
<td>Alcohol dependence&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.3 (0.2)</td>
<td>34.3 (4.5)</td>
<td>65.7 (4.5)</td>
<td>0.0 (0.0)</td>
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<tr>
<td>Drug abuse&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.4 (0.1)</td>
<td>36.6 (5.0)</td>
<td>30.4 (5.8)</td>
<td>33.0 (6.8)</td>
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<tr>
<td>Drug dependence&lt;sup&gt;b&lt;/sup&gt;</td>
<td>0.4 (0.1)</td>
<td>56.5 (8.2)</td>
<td>43.5 (8.2)</td>
<td>0.0 (0.0)</td>
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<tr>
<td>Any substance disorder&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.8 (0.3)</td>
<td>29.6 (2.8)</td>
<td>37.1 (3.5)</td>
<td>33.4 (3.2)</td>
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<tr>
<td>V. Any disorder</td>
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<tr>
<td>Any&lt;sup&gt;e&lt;/sup&gt;</td>
<td>26.2 (0.8)</td>
<td>22.3 (1.3)</td>
<td>37.3 (1.3)</td>
<td>40.4 (1.6)</td>
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<tr>
<td>One disorder&lt;sup&gt;e&lt;/sup&gt;</td>
<td>14.4 (0.6)</td>
<td>9.6 (1.3)</td>
<td>31.2 (1.9)</td>
<td>59.2 (2.3)</td>
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<tr>
<td>Two disorders&lt;sup&gt;e&lt;/sup&gt;</td>
<td>5.8 (0.3)</td>
<td>25.5 (2.1)</td>
<td>46.4 (2.6)</td>
<td>28.2 (2.0)</td>
<td></td>
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<tr>
<td>Three or more disorders&lt;sup&gt;e&lt;/sup&gt;</td>
<td>6.0 (0.3)</td>
<td>49.9 (2.3)</td>
<td>43.1 (2.1)</td>
<td>7.0 (1.3)</td>
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</table>

<sup>a</sup>Percentages in the three severity columns are repeated as proportions of all cases and sum to 100% across each row.

<sup>b</sup>Assessed in the Part II sample ($n = 5692$).

<sup>c</sup>Assessed in a random one third of the Part II sample ($n = 1808$).

<sup>d</sup>Assessed in the Part II sample among respondents in the age range 18–44 ($n = 3199$).

<sup>e</sup>Estimated in the Part II sample. No adjustment is made for the fact that one or more disorders in the category were not assessed for all Part II respondents.

<sup>f</sup>The estimated prevalence of any impulse-control disorder is larger than the sum of the individual disorders because the prevalence of intermittent explosive disorder, the only impulse-control disorder that was assessed in the total sample, is reported here for the total sample rather than for the subsample of respondents among whom the other impulse-control disorders were assessed (Part II respondents in the age range 18–44). The estimated prevalence of any impulse-control disorder, in comparison, is estimated in the latter subsample. Intermittent explosive disorder has a considerably higher estimated prevalence in this subsample than in the total sample.
assessed, 433 were observed (25). Nearly 80% of these patterns involved highly comorbid cases (three or more disorders), which accounted for 27.0% of all respondents with a disorder and 55.9% of all instances of these disorders. The distribution of comorbidity in these profiles was significantly different ($\chi^2 = 110.2, p < 0.001$) from the distribution we would expect to find if the multivariate structure among the disorders was due entirely to the two-way associations that are the focus of factor analysis. The full set of implications of this finding is not yet clear, but one important implication is that the structure of comorbidity is too complex to study merely with the kinds of factor-analytic models that have been used up to now.

**DISCUSSION**

The results of the NCS-R and other community epidemiological surveys are limited by the fact that they focus on the household population and exclude population segments likely to have high proportions of the severely mentally ill (e.g., the homeless and people living in institutions). Furthermore, systematic survey nonresponse (i.e., people with mental disorders having a higher survey refusal rate than those without disorders) and systematic nonreporting (i.e., recall failure, conscious nonreporting, or error in the diagnostic evaluation) could lead to bias in the estimates of disorder prevalence or unmet need for treatment in these surveys, particularly for lifetime events. Given what we know about the associations between true prevalence and these errors (1, 9, 12, 23, 50), it is likely that disorder prevalence is underestimated. This makes the high prevalence estimates found in these surveys all the more striking.

An additional limitation is that surveys like the NCS-R use fully structured diagnostic interviews administered by trained lay interviewers rather than clinician-administered interviews. This practice could introduce imprecision into prevalence estimates. However, as noted above, clinical reappraisal interviews generally support these lay diagnoses in the aggregate, arguing against an overestimation of prevalence based on invalidity of diagnoses from lay interviews. Indeed, the more general pattern is for clinical interviews to diagnose more cases than lay interviews. Furthermore, the fact that the diagnoses in these interviews do not include all those in DSM-IV adds another layer of conservative bias to the overall prevalence estimates. It seems safe to conclude, on the basis of these considerations, that a very high proportion of people in the general U.S. population meet criteria for a DSM-IV disorder.

Along with their high prevalence, perhaps the most striking finding is the generally early AOO of mental disorders, with first onsets concentrated in the first two decades of life and later-onset disorders occurring largely as temporally secondary comorbid conditions. These findings are, of course, limited by the fact that they are based on retrospective recall, but the results based on these retrospective reports are consistent with the results of epidemiological surveys of children and adolescents. These early AOO distributions suggest that mental disorders are uniquely burdensome to the young. This contrasts sharply with almost all chronic physical disorders, which have conditional risks that increase with age rather than having their highest risk in childhood or adolescence, typically peaking in late middle or old age (41).

The cohort effect in the NCS-R, with increasing prevalence of many types of disorders in more recent cohorts, deserves further consideration. This pattern varied in plausible ways (e.g., largest with substance disorders, which are independently known to have increased among cohorts that went through adolescence beginning in the 1970s) and had plausible sociodemographic correlates (e.g., increasing similarity of women and men in substance use disorders in recent cohorts). These patterns argue for the cohort effect in the survey data being caused at least in part by substantive rather than entirely methodological factors. Nonetheless, methodological
effects are likely based on the fact that longitudinal studies demonstrate that mental disorders are associated with early mortality (7) and that resolved mental disorders reported in baseline interviews often are not reported in follow-up interviews (5). To the extent that these biases are at work, the high prevalence found in the younger NCS-R cohorts might also apply to older cohorts. The only way to resolve this uncertainty is to carry out parallel longitudinal surveys of mental disorders in successive cohorts, possibly along the lines of the surveys of drug use that the National Institute of Drug Abuse and, more recently, the Substance Abuse and Mental Health Services Administration have carried out since the 1970s to monitor trends in drug use. Despite these uncertainties, the NCS-R findings of high lifetime prevalence, early AOO, high comorbidity, and substantial persistence, when coupled with independent data documenting adverse effects of mental disorders on role functioning (14, 37, 40), suggest that greater attention should be paid to public health interventions that target the childhood and adolescent years when mental disorders so often begin. With appropriately balanced considerations of potential risks and benefits, focus is also needed on early interventions aimed at preventing the progression of primary disorders and the onset of comorbid disorders to supplement the current focus on treatment of more serious disorders beginning in adulthood.

**SUMMARY POINTS**

1. The prevalence of mental disorders in the United States is very high, with roughly half the population meeting criteria for one or more DSM-IV disorders at some time in their lives and more than one fourth of the population meeting criteria for a disorder in any given year.

2. Most people with a lifetime mental disorder had their first onset in childhood or adolescence.

3. Later-onset disorders typically are temporally secondary comorbid conditions.

4. Disorder severity is strongly associated with high comorbidity, even though the temporally primary disorder is often relatively mild.

5. Little is known about the public health effects of early detection and intervention to treat child-adolescent disorders on the subsequent progression of primary disorders or the onset of temporally secondary comorbid disorders, but this is an obvious area for future investigation.

**FUTURE ISSUES**

1. Little is known about the epidemiology of child mental disorders. Controversy exists, in fact, about how best to assess mental illness in children. Reports obtained from parents, teachers, and children themselves often differ greatly. Resolution of uncertainties about measurement and expansion of available data about prevalence, correlates, and changes over the course of childhood and adolescence are needed.

2. Long-term longitudinal studies are needed of the associations between childhood mental disorders and adult mental disorders and about risk factors for persistence-progression in the transition to adulthood as well as throughout the adult years.
3. Although categorical models of mental disorder are dominant in the existing DSM system, considerable evidence shows that dimension models might make more sense for many mental disorders. Future epidemiological research is needed to help shed light on this issue.

4. Advances in our understanding of the genetics of mental disorders will make it increasingly important to integrate the collection of genetic information into population epidemiological studies.

5. Expansion of our understanding of risk and protective factors for the onset and persistence of mental disorders requires more serious efforts than researchers have made up to now to search for and analyze the effects of natural experiments and natural quasi-experiments that manipulate either exposure to stress or access to one or more resilience or vulnerability factors.

DISCLOSURE STATEMENT

R.K. has been a consultant for Astra Zeneca, BristolMyersSquibb, Eli Lilly and Co, GlaxoSmithKline, Pfizer, and Wyeth and has had research support for his epidemiological studies from Bristol-Myers Squibb, Eli Lilly and Company, Ortho-McNeil, Pfizer, and the Pfizer Foundation.

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