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# Comorbid Psychiatric Disorders in Youth in Juvenile Detention

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**Objective:** To estimate 6-month prevalence of comorbid psychiatric disorders among juvenile detainees by demographic subgroups (sex, race/ethnicity, and age).

**Design:** Epidemiologic study of juvenile detainees. Master's level clinical research interviewers administered the Diagnostic Interview Schedule for Children Version 2.3 to randomly selected detainees.

**Setting:** A large temporary detention center for juveniles in Cook County, Illinois (which includes Chicago and surrounding suburbs).

**Participants:** Randomly selected, stratified sample of 1829 African American, non-Hispanic white, and Hispanic youth (1172 males, 657 females, aged 10-18 years) arrested and newly detained.

**Main Outcome Measure:** Diagnostic Interview Schedule for Children.

**Results:** Significantly more females (56.5%) than males (45.9%) met criteria for 2 or more of the following disorders: major depressive, dysthymic, manic, psychotic, panic, separation anxiety, overanxious, generalized anxiety, obsessive-compulsive, attention-deficit/hyperactivity, con-

duct, oppositional defiant, alcohol, marijuana, and other substance; 17.3% of females and 20.4% of males had only one disorder. We also examined types of disorder: affective, anxiety, substance use, and attention-deficit/hyperactivity or behavioral. The odds of having comorbid disorders were higher than expected by chance for most demographic subgroups, except when base rates of disorders were already high or when cell sizes were small. Nearly 14% of females and 11% of males had both a major mental disorder (psychosis, manic episode, or major depressive episode) and a substance use disorder. Compared with participants with no major mental disorder (the residual category), those with a major mental disorder had significantly greater odds (1.8-4.1) of having substance use disorders. Nearly 30% of females and more than 20% of males with substance use disorders had major mental disorders. Rates of some types of comorbidity were higher among non-Hispanic whites and older adolescents.

**Conclusions:** Comorbid psychiatric disorders are a major health problem among detained youth. We recommend directions for research and discuss how to improve treatment and reduce health disparities in the juvenile justice and mental health systems.

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**M**ANY OF our nation's youth are involved in the juvenile justice system. The US Department of Justice estimates that each year there are 2.5 million juvenile arrests.<sup>1</sup> Moreover, nearly 1.8 million cases are referred to juvenile courts.<sup>2</sup> On an average day in the United States, approximately 109 000 youth younger than 18 years are incarcerated<sup>3</sup>; nearly 15% of these are youth housed in adult facilities that may lack mental health services for youth.<sup>4</sup> African American and Hispanic youth are overrepresented in the juvenile justice system, accounting for more than 60% of young offenders in juvenile justice facilities.<sup>5</sup> The number of females in the juvenile justice system is in-

creasing at an even faster rate than the number of males.<sup>5</sup>

Many detained youth have psychiatric disorders.<sup>6-9</sup> Teplin et al<sup>8</sup> found that even after excluding conduct disorder (symptoms of which include delinquent behaviors), approximately 60% of males and 70% of females had a psychiatric disorder. These rates of disorder far exceed those of youth in the community.<sup>8,10</sup>

Advocacy groups and public policy experts believe that many youth in the juvenile justice system have comorbidity: more than 1 alcohol, other drug, or mental (ADM) disorder.<sup>11</sup> The Surgeon General's report<sup>12</sup> on children's mental health notes that youth with comorbidity may be arrested because our fragmented mental health system has little to offer them. Re-

lated research suggests that ADM comorbidity among juvenile detainees is common. Comorbidity is prevalent among youth in the community,<sup>13-16</sup> adolescent treatment samples,<sup>17,18</sup> and adult jail detainees.<sup>19,20</sup> Rates of comorbidity among detained adolescents may be even higher than rates among detained adults.<sup>15,21,22</sup>

Despite its importance, there have been few empirical studies of ADM comorbidity among juvenile detainees and no large-scale investigations, to our knowledge.<sup>23</sup> Three studies found high rates of comorbidity<sup>24-26</sup>; however, their samples were too small to estimate its true prevalence or how patterns of comorbidity vary by sex, race/ethnicity and age.

Data on ADM comorbidity among juvenile detainees are needed for 2 reasons:

1. **To improve treatment of detained youth.** Detention centers are legally mandated to treat detainees with major mental disorders.<sup>27</sup> However, treating detainees who have ADM comorbidity is far more complex than treating youth who have only one disorder.<sup>28,29</sup> Sound epidemiologic data on comorbidity will help us target youth with the most common diagnostic profiles.

2. **To improve treatment for high-risk youth in the community.** Although committed (sentenced) juveniles stay an average of 5 months,<sup>5</sup> juveniles in detention have an average stay of 2 weeks.<sup>5</sup> Moreover, many high-risk youth (eg, substance abusers, abused and neglected youth) eventually cycle through the juvenile justice system. Without treatment, disorders are likely to persist and worsen, contributing to negative social outcomes and recidivism.<sup>30</sup> Data on ADM comorbidity among detainees are needed to develop more effective interventions for high-risk youth in the community and to tailor services for special populations, such as females and minorities.

We present findings on the prevalence and patterns of ADM comorbidity from the Northwestern Juvenile Project, a large-scale study of psychiatric disorders in detained youth.

## METHODS

### PARTICIPANTS AND SAMPLING PROCEDURES

Participants were 1829 male and female youth, 10 to 18 years old, randomly sampled at intake into the Cook County Juvenile Temporary Detention Center (CCJTDC) from November 20, 1995, through June 14, 1998. The sample was stratified by sex, race/ethnicity (African American, non-Hispanic white, Hispanic), age (10-13 years or  $\geq 14$  years), and legal status (processed as a juvenile or as an adult) to obtain enough participants to compare key subgroups (eg, females, Hispanics, and younger children).

The CCJTDC receives approximately 8500 admissions each year (John Howard Association, Chicago, unpublished data, 1992) and is used solely for pretrial detention and for offenders sentenced for fewer than 30 days. All detainees younger than 17 years are held at the CCJTDC, including youth processed as adults (automatic transfers to adult court). Youth up to 21 years may be detained in the CCJTDC if they are being prosecuted for an arrest that occurred when they were younger than 17 years. Like juvenile detainees nationwide, approximately 90% of the CCJTDC detainees are male, and most are racial/ethnic

minorities.<sup>5</sup> The CCJTDC's population is 77.9% African American, 5.6% non-Hispanic white, 16.0% Hispanic, and 0.5% other racial or ethnic groups. The age and offense distributions of the CCJTDC detainees are also similar to detained juveniles nationwide.<sup>5</sup>

We chose the detention center in Cook County (which includes Chicago and surrounding suburbs) for 3 reasons. First, nationwide, most juvenile detainees live in and are detained in urban areas.<sup>31</sup> Second, Cook County is ethnically diverse and has the third largest Hispanic population in the United States.<sup>32</sup> Studying Hispanics is important because they are the largest minority group in the United States<sup>33</sup> and they are overrepresented in the justice systems.<sup>5</sup> Third, the detention center's size (daily census of approximately 650 youth and intake of 20 youth per day) ensured that enough participants would be available.

No single site can represent the entire country because different jurisdictions have different options for diversion.<sup>34,35</sup> Nevertheless, Illinois' criteria for detaining juveniles are similar to those of other states.<sup>34</sup> All states allow pretrial detention if the youth needs protection, is likely to flee, or is considered a danger to the community.<sup>34,35</sup>

Detainees were eligible to participate, regardless of their psychiatric morbidity, state of alcohol or other drug intoxication, or fitness to stand trial. Within each stratum of sex, race/ethnicity, age, and legal status, we used a random-numbers table to select names from the CCJTDC's intake log. Throughout the study, we tracked how many participants were needed to fill each cell. Project staff sampled the rarest categories first. When more than one participant was available for a cell, a random-numbers table was used. The final sampling fractions ranged from 0.018 to 0.689. (Additional information on the sample is available from the authors.)

Studying detained youth requires special procedures because they are minors, they are detained, and many do not have a parent or guardian who can provide appropriate consent.<sup>36</sup> Project staff approached participants in their units, explained the project, and assured them that anything they told us (except acute suicidal or homicidal risk) would be confidential. Participants signed an assent form (if they were younger than 18 years) or consent form (if they were 18 years or older). Federal regulations allow parental consent to be waived if the research involves minimal risk (45 CFR §46.116(c), 45 CFR §46.116(d), and 45 CFR §46.408(c)).<sup>36,37</sup> The Northwestern University Institutional Review Board, the Centers for Disease Control and Prevention Institutional Review Board, and the US Office of Protection from Research Risks waived parental consent. However, as ethicists recommend, we nevertheless tried to contact parents to provide them an opportunity to decline participation and to offer them additional information (45 CFR §46.116(d)[4]).<sup>38,39</sup> Despite repeated attempts to contact the parent or guardian, none could be found for 43.8% of participants. In lieu of parental consent, youth assent was overseen by a participant advocate who represented the interests of the participants. Federal regulations allow for a participant advocate when parental consent is not feasible (45 CFR §46.116(d)).<sup>38</sup>

Of the 2275 names selected, 4.2% (34 youth and 62 parents or guardians) refused to participate. There were no significant differences in refusal rates by sex, race/ethnicity, or age. Some youth processed as adults (automatic transfers) were counseled by their lawyers to refuse participation; in this stratum, the refusal rate was 7.1% (26 of 368 youth). Twenty-seven youth left the detention center before we could schedule an interview; 312 were not interviewed because they left while we were attempting to locate their caretakers for consent. Eleven others were excluded: 9 became physically ill during the interview and could not finish it, 1 was too cognitively impaired to be interviewed, and 1 appeared to be lying. The final sample size was 1829. This sample size allows us to reliably detect (ie,

distinguish from zero) disorders that have a base rate in the general population of 1.0% or greater with a power of 0.80.<sup>40</sup>

The final sample comprised 1172 males (64.1%) and 657 females (35.9%), 1005 African Americans (54.9%), 296 non-Hispanic whites (16.2%), 524 Hispanics (28.7%), and 4 others (0.2%). The mean age of participants was 14.9 years, and the median age was 15 years.

Participants were interviewed in a private area, almost always within 2 days of intake. Most interviews lasted 2 to 3 hours, depending on how many symptoms were reported. We used both male and female interviewers. Female participants were always interviewed by female interviewers. Interviewers were trained for at least a month; most had a master's degree in psychology or an associated field and experience interviewing high-risk youth. One third of our interviewers were fluent in Spanish. We maintained consistency throughout the study by monitoring scripted interviews with mock participants.

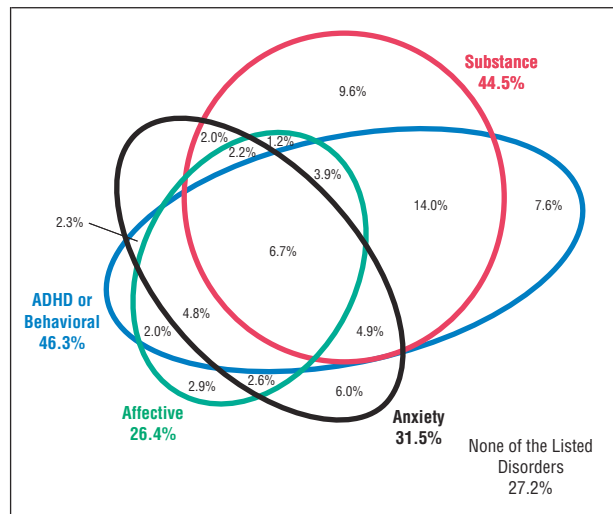
## PSYCHIATRIC DIAGNOSES

We used the Diagnostic Interview Schedule for Children (DISC) Version 2.3,<sup>41,42</sup> the most recent English and Spanish versions then available. The DISC 2.3 assesses the presence of DSM-III-R disorders in the past 6 months. The DISC is highly structured, contains detailed symptom probes, has acceptable reliability and validity,<sup>41,43-46</sup> and requires relatively brief training.

As in our previous work,<sup>8</sup> 2 of the diagnoses required special management. The DISC psychosis module, a broad symptom screen, does not generate a specific diagnosis. Instead, this module flags participants if they endorse any "possible" or "probable" pathognomonic symptoms or at least 3 nonpathognomonic symptoms of psychosis. More than one quarter of our participants scored positive on this screen. To be conservative, we counted these participants as psychotic only if (1) their symptoms persisted for at least 1 week; (2) they had not used alcohol, other drugs, or medication during this time; and (3) a project clinician (a child and adolescent psychiatrist or clinical psychologist) judged that the symptoms were "probably indicative of psychosis" after reviewing the protocol and discussing the case with the interviewer. Twelve participants met these criteria. Project clinicians classified another 8 participants as psychotic who, although they denied symptoms, were judged by the research interviewer to have auditory hallucinations, delusions, or thought disorder during the interview.

Attention-deficit/hyperactivity disorder (ADHD) is difficult to assess via self-report<sup>47</sup> and is even more challenging to diagnose among delinquent youth.<sup>48</sup> In addition, the DSM-III-R requires that symptoms of ADHD be present before the age of 7 years. In many studies, age of onset is reported by the caretaker. Most of our participants who reported symptoms of ADHD could not remember when these symptoms began. To avoid underreporting, we calculated rates of ADHD in 2 ways: in the conventional manner (requiring that symptoms be present before the age of 7 years) and counting the disorder as present regardless of the reported age of onset. (We present only the latter; the former rates are available from the authors.)

We determined rates of disorders in 2 ways. As most investigators have done, we report rates using the standard DISC computer algorithms to calculate rates using DSM-III-R criteria. We also calculated more conservative (less inclusive) rates for diagnoses that met both DSM-III-R criteria and diagnosis-specific impairment criteria, reported by participants.<sup>41</sup> Although youth are poor reporters of their own impairment,<sup>41,49</sup> we calculated these latter rates because psychiatric diagnoses are best determined by the presence of both symptoms and functional impairment.<sup>41,50-52</sup> These more conservative estimates, substantially similar to those reported herein, are available from the authors.



**Figure 1.** Comorbid types of disorder among females. ADHD indicates attention-deficit/hyperactivity disorder.

## STATISTICAL ANALYSIS

Because we stratified our sample by sex, race/ethnicity, age, and legal status, we weighted all prevalence estimates to reflect the distributions of these variables in the detention center's population. All reported SEs and tests of significance have been corrected for design characteristics with Taylor series linearization.<sup>53,54</sup> We used 2-tailed tests; our level of significance for all tests was .05. We report disorders for males and females separately, because combining them masks important differences.

## RESULTS

### COMORBIDITY OF PSYCHIATRIC DISORDERS

#### Specific Disorders

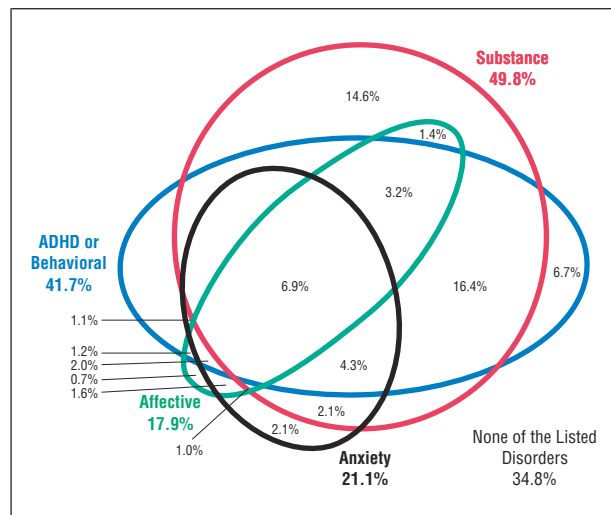
Significantly more females (56.5%) than males (45.9%) met criteria for 2 or more of the following disorders: major depressive, dysthymic, manic, psychotic, panic, separation anxiety, overanxious, generalized anxiety, obsessive-compulsive, ADHD, conduct, oppositional defiant, alcohol, marijuana, and other substance ( $t_{1812}=3.13$ ,  $P=.002$ ); 17.3% of females and 20.4% of males had only 1 disorder. (The DISC 2.3 did not include posttraumatic stress disorder; posttraumatic stress disorder diagnoses, available on a subsample, will be presented in future articles.) These analyses are available from the authors; analyses of single disorders are available elsewhere.<sup>8</sup> Even after excluding conduct and substance use disorders, which are common among delinquent youth, significantly more females (33.6%) than males (24.2%) had 2 or more disorders ( $t_{1813}=2.81$ ,  $P=.005$ ).

#### Types of Disorders

**Figure 1** and **Figure 2** show substantial comorbidity for females and males. (We omitted psychoses from this analysis because there were so few cases.) Patterns of overlap differ somewhat by sex. Nearly one third of females (29.5%) and males (30.8%) had both substance use disorders and

ADHD or behavioral disorders; approximately half of these also had anxiety disorders, affective disorders, or both.

Significantly more females (47.8%) than males (41.6%) had 2 or more of the following types of disorders:



**Figure 2.** Comorbid types of disorder among males. ADHD indicates attention-deficit/hyperactivity disorder.

ders: affective, anxiety, substance use, and ADHD or behavioral ( $t_{1813}=2.56, P=.02$ ). Again, even when excluding conduct and substance use disorders, significantly more females (25.1%) than males (18.0%) had 2 or more types of disorders ( $t_{1812}=2.64, P=.01$ ). Significantly more females (22.5%) than males (17.2%) had 3 or more types of disorders ( $t_{1813}=2.09, P=.04$ ). These analyses are available from the authors.

**Racial/Ethnic Differences.** Among females, significantly more non-Hispanic whites (63.1%) had 2 or more types of disorders than African Americans (42.6%;  $t_{639}=3.21, P=.002$ ). Among males, significantly more non-Hispanic whites (53.1%) had 2 or more types of disorders than African Americans (40.7%;  $t_{1142}=3.92, P<.001$ ). These analyses are available from the authors.

**Table 1** and **Table 2** give the prevalence of comorbidity by race/ethnicity among females and males with affective, substance use, anxiety, and ADHD or behavioral disorders. The odds of having comorbid disorders are higher than expected by chance for most racial/ethnic subgroups, except when base rates of disorders were already high or when cell sizes were small.

**Table 1. Prevalence and Odds Ratios (ORs) of Comorbidity Among Female Juvenile Detainees With Affective, Substance Use, Anxiety, and ADHD or Behavioral Disorders by Race/Ethnicity\***

Disorder	Total (n = 656)		African American (n = 430)		Non-Hispanic White (n = 89)		Hispanic (n = 136)	
	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)
Affective disorders (n = 144)								
Substance use disorders	56.4 (47.8-64.7)	1.8† (1.2-2.6)	51.0 (40.6-61.2)	1.6 (1.0-2.5)	60.9 (37.5-80.2)	1.0 (0.3-3.2)	75.9 (57.8-87.8)	4.5† (1.7-12.2)
Anxiety disorders	64.2 (55.7-71.9)	6.3‡ (4.1-9.6)	63.4 (52.9-72.8)	5.7‡ (3.5-9.5)	60.9 (37.5-80.2)	6.2‡ (2.0-19.3)	69.4 (50.9-83.2)	9.2‡ (3.4-25.1)
ADHD or behavioral disorders	71.2 (62.4-78.6)	3.9‡ (2.5-6.1)	70.9 (60.7-79.4)	5.0‡ (3.0-8.4)	70.8 (46.2-87.3)	1.7 (0.5-5.6)	72.3 (44.7-89.4)	2.8 (0.8-10.3)
Substance use disorders (n = 303)								
Affective disorders	25.7 (20.8-31.3)	1.8† (1.2-2.6)	25.8 (19.8-32.8)	1.6 (1.0-2.5)	18.8 (10.3-31.8)	1.0 (0.3-3.2)	30.9 (19.0-46.0)	4.5† (1.7-12.2)
Anxiety disorders	34.1 (28.5-40.1)	1.3 (0.9-1.9)	36.6 (29.8-44.1)	1.5 (1.0-2.3)	22.6 (12.9-36.4)	0.5 (0.2-1.4)	35.2 (22.5-50.3)	1.6 (0.6-4.4)
ADHD or behavioral disorders	65.2 (59.0-70.9)	4.4‡ (3.1-6.4)	60.3 (52.9-67.3)	4.2‡ (2.8-6.3)	79.6 (66.3-88.5)	7.7‡ (2.7-22.2)	69.0 (50.5-82.9)	3.2§ (1.1-9.2)
Anxiety disorders (n = 206)								
Affective disorders	42.8 (35.8-50.1)	6.3‡ (4.1-9.6)	42.4 (34.2-50.9)	5.7‡ (3.5-9.5)	41.1 (24.4-60.2)	6.2‡ (2.0-19.3)	45.4 (27.8-64.3)	9.2‡ (3.4-25.1)
Substance use disorders	49.8 (42.5-57.1)	1.3 (0.9-1.9)	48.5 (40.1-57.1)	1.5 (1.0-2.3)	47.8 (30.0-66.2)	0.5 (0.2-1.4)	56.0 (35.9-74.3)	1.6 (0.6-4.4)
ADHD or behavioral disorders	58.9 (51.6-66.0)	2.2‡ (1.5-3.2)	57.9 (49.4-66.0)	2.8‡ (1.8-4.3)	62.5 (43.2-78.6)	1.1 (0.4-3.2)	60.8 (39.8-78.4)	1.6 (0.6-4.5)
ADHD or behavioral disorders (n = 317)								
Affective disorders	32.1 (26.9-37.7)	3.9‡ (2.5-6.1)	36.9 (30.0-44.3)	5.0‡ (3.0-8.4)	21.2 (12.2-34.2)	1.7 (0.5-5.6)	26.4 (17.6-37.6)	2.8 (0.8-10.3)
Substance use disorders	64.7 (58.6-70.4)	4.4‡ (3.1-6.4)	62.3 (54.9-69.3)	4.2‡ (2.8-6.3)	78.5 (65.3-87.6)	7.7‡ (2.7-22.2)	60.8 (45.6-74.2)	3.2§ (1.1-9.2)
Anxiety disorders	39.9 (34.2-45.9)	2.2‡ (1.5-3.2)	44.9 (37.6-52.4)	2.8‡ (1.8-4.3)	28.6 (17.6-42.9)	1.1 (0.4-3.2)	33.9 (22.5-47.5)	1.6 (0.6-4.5)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; CI, confidence interval.

\*Participants may have more than one disorder. Each cell is weighted to reflect the population of the detention center. Statistically significant ORs indicate that comorbidity exceeds the level expected by chance, given the prevalence of that disorder in the sample. Affective, substance use, anxiety, and ADHD or behavioral disorders are missing for 1 participant. This participant is excluded from all analyses in this table. All available data from the 656 remaining participants are used for each cell. Of these, 3 participants are missing for affective disorders, 13 are missing for substance use disorders, and 8 are missing for anxiety disorders. Because 1 participant of "other" race/ethnicity is included only in the Total column, racial/ethnic subcategories sum to 655, not 656.

† $P<.01$ .  
‡ $P<.001$ .  
§ $P<.05$ .

**Table 2. Prevalence and Odds Ratios (ORs) of Comorbidity Among Male Juvenile Detainees With Affective, Substance Use, Anxiety, and ADHD or Behavioral Disorders by Race/Ethnicity\***

Disorder	Total (n = 1170)		African American (n = 574)		Non-Hispanic White (n = 207)		Hispanic (n = 386)	
	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)
Affective disorders (n = 150)								
Substance use disorders	72.9 (59.7-83.0)	3.1† (1.7-5.8)	74.8 (58.7-86.1)	3.7‡ (1.7-8.0)	58.2 (20.4-88.4)	0.9 (0.2-5.2)	68.9 (43.8-86.3)	2.1 (0.7-6.2)
Anxiety disorders	71.2 (58.1-81.6)	16.4† (8.5-31.8)	69.3 (52.9-82.0)	15.1† (6.8-33.3)	68.2 (38.5-88.0)	19.3† (5.1-73.4)	81.0 (66.1-90.4)	25.8† (10.2-64.8)
ADHD or behavioral disorders	81.5 (70.0-89.3)	7.8† (4.0-15.3)	83.1 (68.8-91.7)	9.6‡ (4.1-22.3)	81.1 (55.3-93.7)	2.9 (0.8-10.5)	74.1 (48.4-89.7)	4.7‡ (1.5-14.8)
Substance use disorders (n = 571)								
Affective disorders	21.0 (15.8-27.3)	3.1† (1.7-5.8)	21.7 (15.4-29.6)	3.7‡ (1.7-8.0)	13.6 (8.4-21.2)	0.9 (0.2-5.2)	21.0 (12.6-32.8)	2.1 (0.7-6.2)
Anxiety disorders	28.9 (23.0-35.6)	2.5† (1.5-4.1)	29.1 (22.0-37.4)	2.7‡ (1.4-4.9)	16.6 (10.8-24.6)	0.8 (0.2-2.7)	31.5 (21.5-43.5)	2.2 (0.9-5.0)
ADHD or behavioral disorders	62.0 (55.0-68.5)	5.7† (3.7-8.8)	61.0 (52.3-69.0)	5.9† (3.5-10.1)	72.2 (63.3-79.6)	2.6§ (1.2-5.4)	61.7 (50.4-71.9)	5.6† (2.7-11.5)
Anxiety disorders (n = 230)								
Affective disorders	47.8 (37.4-58.3)	16.4† (8.5-31.8)	46.5 (34.1-59.4)	15.1† (6.8-33.3)	52.6 (26.1-77.7)	19.3† (5.1-73.4)	54.6 (37.1-71.1)	25.8† (10.2-64.8)
Substance use disorders	67.4 (56.8-76.5)	2.5† (1.5-4.1)	67.8 (54.8-78.5)	2.7‡ (1.4-4.9)	53.7 (25.1-80.1)	0.8 (0.2-2.7)	68.0 (49.7-82.1)	2.2 (0.9-5.0)
ADHD or behavioral disorders	68.4 (57.9-77.3)	4.0† (2.4-6.6)	67.3 (54.3-78.1)	4.1† (2.2-7.5)	78.4 (56.8-90.9)	2.5 (0.9-7.2)	69.0 (51.0-82.6)	4.1† (1.8-9.3)
ADHD or behavioral disorders (n = 524)								
Affective disorders	27.6 (21.3-34.9)	7.8† (4.0-15.3)	28.7 (20.9-37.9)	9.6† (4.1-22.3)	17.9 (8.1-35.1)	2.9 (0.8-10.5)	28.4 (18.5-41.0)	4.7‡ (1.5-14.8)
Substance use disorders	73.8 (66.8-79.8)	5.7† (3.7-8.8)	73.8 (64.8-81.1)	5.9† (3.5-10.1)	68.4 (55.0-79.2)	2.6§ (1.2-5.4)	76.6 (65.4-85.0)	5.6† (2.7-11.5)
Anxiety disorders	34.7 (27.9-42.1)	4.0† (2.4-6.6)	34.6 (26.3-44.0)	4.1† (2.2-7.5)	22.7 (12.1-38.4)	2.5 (0.9-7.2)	39.9 (28.9-52.0)	4.1† (1.8-9.3)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; CI, confidence interval.

\*Participants may have more than one disorder. Each cell is weighted to reflect the population of the detention center. Statistically significant ORs indicate that comorbidity exceeds the level expected by chance, given the prevalence of that disorder in the sample. Affective, substance use, anxiety, and ADHD or behavioral disorders are missing for 2 participants. These 2 participants are excluded from all analyses in this table. All available data from the 1170 remaining participants are used for each cell. Of these, 13 participants are missing for affective disorders, 16 are missing for substance use disorders, 9 are missing for anxiety disorders, and 1 is missing for ADHD or behavioral disorders. Because 3 participants of "other" race/ethnicity are included only in the Total column, racial/ethnic subcategories sum to 1167, not 1170.

† $P < .001$ .

‡ $P < .01$ .

§ $P < .05$ .

**Age Differences.** Significantly more males aged 16 years and older had 2 or more types of disorders (41.2%) than males aged 13 years and younger (27.0%;  $t_{1158} = 3.57$ ,  $P < .001$ ). Similarly, significantly more males aged 14 and 15 years had 2 or more types of disorders (45.3%) than males aged 13 years and younger ( $t_{1158} = 3.75$ ,  $P < .001$ ). Among females, there were no significant age differences in the overall prevalence of types of disorder. These analyses are available from the authors.

**Table 3** and **Table 4** give the prevalence of comorbidity by age among females and males with affective, substance use, anxiety, and ADHD or behavioral disorders. These tables show that the odds of having comorbid disorders are higher than expected by chance for most age groups.

#### SUBSTANCE USE DISORDERS AND MAJOR MENTAL DISORDERS

More than one tenth of males (10.8%) and 13.7% of females had both a major mental disorder (psychosis, manic

episode, or major depressive episode) and a substance use disorder. We examined these disorders in depth because detention centers are mandated to treat major mental disorders and because comorbidity complicates treatment.

#### Rates of Substance Use Disorders Among Youth With Major Mental Disorders

What are the odds that participants with major mental disorders had co-occurring substance use disorders? **Table 5** shows that compared with participants with no major mental disorder (the residual category), both females and males with any major mental disorder had significantly greater odds (1.8-4.1) of having substance use disorders. We also examined 2 subcategories of major mental disorder: psychosis or manic episode (combined because there were too few cases to analyze separately and because these disorders present similarly) and major depressive episode. Most odds ratios for these subcategories were statistically significant, except when cell sizes were small.

**Table 3. Prevalence and Odds Ratios (ORs) of Comorbidity Among Female Juvenile Detainees With Affective, Substance Use, Anxiety, and ADHD or Behavioral Disorders by Age\***

Disorder	Total (n = 656)		Age 10-13 y (n = 56)		Age 14-15 y (n = 353)		Age ≥16 y (n = 247)	
	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)
Affective disorders (n = 144)								
Substance use disorders	56.4 (47.8-64.7)	1.8† (1.2-2.6)	45.4 (18.9-74.9)	2.8 (0.6-12.7)	60.4 (48.6-71.0)	2.2† (1.3-3.8)	52.4 (38.7-65.7)	1.1 (0.6-2.2)
Anxiety disorders	64.2 (55.7-71.9)	6.3‡ (4.1-9.6)	61.4 (30.1-85.4)	4.6 (0.9-23.5)	69.4 (58.1-78.7)	7.8‡ (4.4-13.9)	56.5 (42.5-69.5)	4.5‡ (2.3-8.7)
ADHD or behavioral disorders	71.2 (62.4-78.6)	3.9‡ (2.5-6.1)	88.1 (48.1-98.3)	12.9§ (1.4-119.4)	75.1 (62.6-84.5)	4.2‡ (2.2-8.0)	61.8 (47.7-74.2)	3.0† (1.5-5.8)
Substance use disorders (n = 303)								
Affective disorders	25.7 (20.8-31.3)	1.8† (1.2-2.6)	25.3 (10.4-49.7)	2.8 (0.6-12.7)	29.3 (22.3-37.4)	2.2† (1.3-3.8)	21.1 (14.6-29.5)	1.1 (0.6-2.2)
Anxiety disorders	34.1 (28.5-40.1)	1.3 (0.9-1.9)	20.9 (7.7-45.5)	0.6 (0.1-2.4)	41.4 (33.4-49.8)	2.0† (1.2-3.3)	26.3 (18.9-35.2)	0.8 (0.4-1.4)
ADHD or behavioral disorders	65.2 (59.0-70.9)	4.4‡ (3.1-6.4)	72.4 (47.6-88.4)	6.4† (1.8-22.9)	71.9 (63.3-79.1)	5.9‡ (3.5-9.9)	55.4 (45.4-65.1)	3.3‡ (1.8-5.9)
Anxiety disorders (n = 206)								
Affective disorders	42.8 (35.8-50.1)	6.3‡ (4.1-9.6)	33.4 (13.9-60.8)	4.6 (0.9-23.5)	46.3 (36.8-56.1)	7.8‡ (4.4-13.9)	39.2 (28.7-50.8)	4.5‡ (2.3-8.7)
Substance use disorders	49.8 (42.5-57.1)	1.3 (0.9-1.9)	21.8 (7.4-49.4)	0.6 (0.1-2.4)	57.0 (47.0-66.5)	2.0† (1.2-3.3)	44.3 (33.4-55.8)	0.8 (0.4-1.4)
ADHD or behavioral disorders	58.9 (51.6-66.0)	2.2‡ (1.5-3.2)	67.5 (39.6-86.8)	3.7 (1.0-13.4)	61.8 (51.6-71.1)	2.2† (1.3-3.6)	52.1 (40.7-63.3)	2.0§ (1.1-3.6)
ADHD or behavioral disorders (n = 317)								
Affective disorders	32.1 (26.9-37.7)	3.9‡ (2.5-6.1)	29.9 (15.2-50.3)	12.9§ (1.4-119.4)	33.7 (27.0-41.1)	4.2‡ (2.2-8.0)	29.9 (21.4-40.0)	3.0† (1.5-5.8)
Substance use disorders	64.7 (58.6-70.4)	4.4‡ (3.1-6.4)	45.9 (26.3-66.8)	6.4† (1.8-22.9)	66.3 (58.5-73.2)	5.9‡ (3.5-9.9)	66.9 (55.9-76.4)	3.3‡ (1.8-5.9)
Anxiety disorders	39.9 (34.2-45.9)	2.2‡ (1.5-3.2)	42.1 (22.8-64.2)	3.7 (1.0-13.4)	41.6 (34.4-49.2)	2.2† (1.3-3.6)	36.4 (26.9-47.1)	2.0§ (1.1-3.6)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; CI, confidence interval.

\*Participants may have more than one disorder. Each cell is weighted to reflect the population of the detention center. Statistically significant ORs indicate that comorbidity exceeds the level expected by chance, given the prevalence of that disorder in the sample. Affective, substance use, anxiety, and ADHD or behavioral disorders are missing for 1 participant. This participant is excluded from all analyses in this table. All available data from the 656 remaining participants are used for each cell. Of these, 3 participants are missing for affective disorders, 13 are missing for substance use disorders, and 8 are missing for anxiety disorders.

† $P < .01$ .

‡ $P < .001$ .

§ $P < .05$ .

**Sex Differences.** Table 5 shows that among youth with major mental disorders (n=305), more than half of females and nearly three quarters of males had any substance use disorder. Differences between females and males (and the corresponding odds ratios) were not statistically significant ( $t_{1784} = 1.92, P = .055$ ; this analysis is available from the authors).

**Racial/Ethnic Differences.** Among females with major mental disorders, significantly more non-Hispanic whites and Hispanics had both drug and alcohol use disorders than did African Americans (50.0% and 43.4%, respectively, vs 21.3%); significantly more Hispanic females had alcohol use disorders than did African Americans (52.5% vs 26.6%). Among males with major mental disorders, there were no significant differences by race/ethnicity. These analyses are available from the authors.

**Age Differences.** Among females with major mental disorders, there were no significant differences by age. Among males, nearly 90% aged 16 years and older who had a major mental disorder also had a substance use disorder,

significantly more than males 10 to 13 years and 14 to 15 years of age (55.2% and 60.6%, respectively). These analyses are available from the authors.

#### Rates of Major Mental Disorder Among Youth With Substance Use Disorders

What are the odds that participants with substance use disorders had co-occurring major mental disorders? **Table 6** shows that compared with participants with no substance use disorder (the residual category), both females and males with any substance use disorder had significantly greater odds of having any major mental disorder and its subcategory, major depressive episode. Among males, odds ratios for psychosis or a manic episode were significant for some subcategories of substance use disorders.

Table 6 also shows that nearly 30% of females and more than 20% of males with any substance use disorder also had a major mental disorder. Among youth with both drug and alcohol use disorders, more than one third of females and more than one quarter of males had a ma-

**Table 4. Prevalence and Odds Ratios (ORs) of Comorbidity Among Male Juvenile Detainees With Affective, Substance Use, Anxiety, and ADHD or Behavioral Disorders by Age\***

Disorder	Total (n = 1170)		Age 10-13 y (n = 315)		Age 14-15 y (n = 361)		Age ≥16 y (n = 494)	
	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)	Prevalence of Comorbidity, % (95% CI)	OR (95% CI)
<b>Affective disorders (n = 150)</b>								
Substance use disorders	72.9 (59.7-83.0)	3.1† (1.7-5.8)	42.6 (20.0-68.8)	2.3 (0.7-7.0)	60.8 (39.7-78.5)	1.6 (0.7-4.0)	89.3 (74.1-96.0)	9.0† (2.8-29.1)
Anxiety disorders	71.2 (58.1-81.6)	16.4† (8.5-31.8)	84.7 (64.7-94.3)	43.8† (13.6-141.2)	73.7 (52.7-87.6)	18.2† (6.5-51.1)	66.8 (47.2-82.0)	13.0† (5.0-34.0)
ADHD or behavioral disorders	81.5 (70.0-89.3)	7.8† (4.0-15.3)	67.4 (42.2-85.3)	4.9‡ (1.7-14.4)	90.2 (74.0-96.8)	14.6† (4.6-46.6)	75.3 (55.5-88.2)	5.4† (2.0-14.3)
<b>Substance use disorders (n = 571)</b>								
Affective disorders	21.0 (15.8-27.3)	3.1† (1.7-5.8)	17.4 (10.5-27.5)	2.3 (0.7-7.0)	18.8 (11.6-29.1)	1.6 (0.7-4.0)	23.0 (15.8-32.3)	9.0† (2.8-29.1)
Anxiety disorders	28.9 (23.0-35.6)	2.5† (1.5-4.1)	29.9 (20.6-41.4)	2.4§ (1.1-5.2)	29.4 (20.3-40.5)	2.2§ (1.0-5.0)	28.4 (20.5-37.9)	3.0‡ (1.4-6.7)
ADHD or behavioral disorders	62.0 (55.0-68.5)	5.7† (3.7-8.8)	62.4 (50.9-72.7)	5.5† (2.9-10.5)	63.2 (51.9-73.1)	4.8† (2.4-9.3)	61.0 (51.3-69.9)	7.2† (3.6-14.5)
<b>Anxiety disorders (n = 230)</b>								
Affective disorders	47.8 (37.4-58.3)	16.4† (8.5-31.8)	48.0 (29.8-66.7)	43.8† (13.6-141.2)	50.2 (33.8-66.6)	18.2† (6.5-51.1)	45.4 (30.8-60.7)	13.0† (5.0-34.0)
Substance use disorders	67.4 (56.8-76.5)	2.5† (1.5-4.1)	41.1 (25.6-58.7)	2.4§ (1.1-5.2)	65.7 (47.9-80.0)	2.2§ (1.0-5.0)	73.9 (58.5-85.0)	3.0‡ (1.4-6.7)
ADHD or behavioral disorders	68.4 (57.9-77.3)	4.0† (2.4-6.6)	57.9 (40.3-73.7)	3.6† (1.7-7.8)	74.2 (56.9-86.2)	5.1† (2.2-11.7)	64.8 (48.9-77.9)	3.4‡ (1.6-7.3)
<b>ADHD or behavioral disorders (n = 524)</b>								
Affective disorders	27.6 (21.3-34.9)	7.8† (4.0-15.3)	21.7 (10.5-39.3)	4.9‡ (1.7-14.4)	31.1 (21.2-43.1)	14.6† (4.6-46.6)	25.3 (17.0-35.9)	5.4† (2.0-14.3)
Substance use disorders	73.8 (66.8-79.8)	5.7† (3.7-8.8)	49.1 (37.1-61.2)	5.5† (2.9-10.5)	71.5 (59.7-80.9)	4.8† (2.4-9.3)	80.1 (70.0-87.4)	7.2† (3.6-14.5)
Anxiety disorders	34.7 (27.9-42.1)	4.0† (2.4-6.6)	33.1 (20.8-48.2)	3.6† (1.7-7.8)	37.6 (27.0-49.6)	5.1† (2.2-11.7)	32.2 (23.0-43.0)	3.4‡ (1.6-7.3)

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; CI, confidence interval.

\*Participants may have more than one disorder. Each cell is weighted to reflect the population of the detention center. Statistically significant ORs indicate that comorbidity exceeds the level expected by chance, given the prevalence of that disorder in the sample. Affective, substance use, anxiety, and ADHD or behavioral disorders are missing for 2 participants. These 2 participants are excluded from all analyses in this table. All available data from the 1170 remaining participants are used for each cell. Of these, 13 participants are missing for affective disorders, 16 are missing for substance use disorders, 9 are missing for anxiety disorders, and 1 is missing for ADHD or behavioral disorders.

† $P < .001$ .

‡ $P < .01$ .

§ $P < .05$ .

major mental disorder. There were no significant differences by sex, race/ethnicity, or age (analyses are available from the authors).

#### RELATIVE ONSET OF MAJOR MENTAL DISORDERS AND SUBSTANCE USE DISORDERS

One quarter of both females (27.2%) and males (25.0%) reported that their major mental disorder preceded their substance use disorder by more than 1 year. One tenth of females (9.8%) and 20.7% of males reported that their substance use disorder preceded their major mental disorder by more than 1 year. Nearly two thirds of females (63.0%) and 54.3% of males developed their disorders within the same year. Findings were similar for subcategories of disorders. (Analyses are available from the authors.)

#### COMMENT

Psychiatric disorders are a major health problem among detained youth, exacerbated by high rates of comorbidity. Can we estimate how many youth with comorbidity are processed through detention nationwide? Precise estimates are difficult because our data reflect only one county and because the Department of Justice tabulates only numbers of admissions to detention annually, not

individuals.<sup>5,55</sup> To the extent that Cook County is typical, our findings suggest that on an average day, there may be as many as 47 000 detained youth who have 2 or more types of psychiatric disorder; more than 12 000 have both a major mental disorder and a substance use disorder. The juvenile courts, which the Department of Justice estimates manage 1 100 000 individuals per year<sup>5,55</sup> (Melissa Sickmund, PhD, Office of Juvenile Justice and Delinquency Prevention, e-mail communication, December 18, 2002), may process as many as 550 000 youth with comorbidity per year.

Not surprisingly, among the disorders assessed, detainees are more likely to have substance use plus ADHD or behavioral disorders than any other combination. Half of these detainees also have an affective or anxiety disorder. Among adolescent substance users, these internalizing disorders are associated with more severe substance use<sup>56,57</sup> but better treatment outcomes.<sup>58</sup> Our findings suggest that we must reexamine how we manage substance use and behavioral problems in our children. Early onset of these disorders predicts worse outcomes; hence, early intervention is critical.<sup>48,59,60</sup> Psychiatric care has a chance to succeed where criminalization never can.

It is difficult to compare our findings with community studies because few are comparable.<sup>61</sup> Also, rates vary



**Table 5. Prevalence and Odds Ratios (ORs) of Substance Use Disorders Among Juvenile Detainees With Major Mental Disorders\***

Variable	No Major Mental Disorder (n = 1501), % (95% CI)	Major Mental Disorder (n = 305)					
		Any Major Mental Disorder (n = 305)		Psychosis or Manic Episode (n = 54)		Major Depressive Episode (n = 271)	
		Prevalence, % (95% CI)	OR (95% CI)	Prevalence, % (95% CI)	OR (95% CI)	Prevalence, % (95% CI)	OR (95% CI)
<b>Females (n = 655)†</b>							
No substance use disorder (n = 340)	56.9 (52.4-61.2)	41.6 (32.2-51.7)		52.1 (29.9-73.5)		40.3 (30.6-50.9)	
Any substance use disorder (n = 303)	43.1 (38.8-47.6)	58.4 (48.3-67.8)	1.8§ (1.2-2.9)	47.9 (26.5-70.1)	1.2 (0.5-3.2)	59.7 (49.1-69.4)	1.9§ (1.2-3.1)
Drug use disorder (n = 272)	38.8 (34.6-43.2)	52.9 (42.4-63.2)	1.8   (1.1-2.8)	43.5 (23.1-66.4)	1.2 (0.5-3.2)	54.4 (43.4-64.9)	1.9   (1.9-3.0)
Alcohol use disorder (n = 171)	22.7 (19.2-26.5)	38.8 (28.0-51.0)	2.2§ (1.3-3.7)	29.4 (13.4-52.9)	1.4 (0.5-3.9)	39.4 (27.9-52.2)	2.2§ (2.2-3.9)
Both drug and alcohol use disorders (n = 140)	18.7 (15.5-22.4)	33.7 (22.7-46.9)	2.2§ (1.2-4.0)	25.0 (10.5-48.7)	1.4 (0.5-4.2)	34.5 (22.8-48.3)	2.3§ (2.3-4.2)
<b>Males (n = 1167)‡</b>							
No substance use disorder (n = 583)	53.4 (48.2-58.6)	26.2 (16.5-39.0)		28.2 (10.3-57.4)		28.2 (17.5-42.1)	
Any substance use disorder (n = 571)	46.6 (41.4-51.8)	73.8 (61.0-83.5)	3.2¶ (1.7-6.0)	71.8 (42.6-89.7)	2.9 (0.8-10.2)	71.8 (57.9-82.5)	2.9§ (2.9-5.6)
Drug use disorder (n = 514)	42.9 (37.8-48.1)	59.6 (46.4-71.6)	2.0   (1.1-3.5)	71.4 (42.4-89.4)	3.3 (1.0-11.5)	56.0 (42.0-69.1)	1.7 (1.7-3.1)
Alcohol use disorder (n = 295)	21.0 (17.1-25.5)	52.4 (39.7-64.8)	4.1¶ (2.3-7.4)	55.7 (29.6-78.9)	4.7§ (1.5-14.5)	51.8 (38.2-65.1)	4.0¶ (4.0-7.4)
Both drug and alcohol use disorders (n = 238)	17.4 (13.8-21.8)	38.4 (26.8-51.5)	2.9¶ (1.6-5.4)	56.2 (29.7-79.6)	6.1§ (1.9-19.2)	35.9 (24.0-49.8)	2.6§ (1.4-5.0)

Abbreviation: CI, confidence interval.

\*Major mental disorder includes psychosis, manic episode, and major depressive episode. Participants may have more than one substance use disorder and more than one major mental disorder. Each cell is weighted to reflect the population of the detention center. Statistically significant ORs indicate that comorbidity exceeds the level expected by chance, given the prevalence of that disorder in the sample. Psychosis, manic episode, major depressive episode, drug use disorder, and alcohol use disorder are missing for 3 of the 1829 participants; in addition, drug use disorder and alcohol use disorder are missing for 4 other participants. These 7 participants are excluded from all analyses in this table. All available data from the 1822 remaining participants are used for each cell. Because 16 participants are missing the diagnosis of any major mental disorder, this column and the "No Major Mental Disorder" column sum to 1806, not 1822.

†Substance use disorder is missing for 12 females.

‡Substance use disorder is missing for 13 males.

§P < .01.

||P < .05.

¶P < .001.

widely, depending on the sample, method, source of data (subject or collaterals), and whether functional impairment was required.<sup>50</sup> However, even after excluding conduct and substance use disorders (expected to be high in detained populations), our rates are substantially higher than those reported in community samples.<sup>28,62-65</sup>

Mental health professionals who screen incoming detainees should anticipate that at least 1 in 10 youth will have a major mental disorder (psychosis, manic episode, or major depressive episode) and a substance use disorder, rates as high as adult detainees.<sup>19,20</sup> Psychiatrists who treat detained youth with major mental disorders should expect that as many as three quarters of males and half of females will also have substance use disorders. These clients are a challenge to psychiatry; they are more recalcitrant to traditional treatments, they are more likely to be treatment failures, and they are more difficult to place because their needs cross traditional boundaries between service sectors.<sup>22,63,66-68</sup> Conversely, addiction psychiatrists should anticipate that more than one fifth of detainees who abuse or are dependent on drugs will also have a major mental disorder, rates comparable to clinical<sup>17,69,70</sup> and correctional<sup>71,72</sup> samples.

Females had higher rates of comorbidity than males. These sex differences, similar to our analyses of specific

disorders,<sup>8</sup> parallel prior studies of adult<sup>73,74</sup> and juvenile detainees<sup>75</sup> and may reflect the different ways that delinquent acts by females and males are managed. Criminologists suggest that females are treated more leniently than males for similar offenses, especially at the earliest stages of processing: arrests, station adjustments, and initial court hearings.<sup>76</sup> Thus, those females who are detained may be more dysfunctional and have more problem behaviors and more disorders than their male counterparts.<sup>75</sup>

Non-Hispanic whites had the highest rate of comorbidity; African Americans had the lowest. Again, these racial/ethnic differences, similar to our analyses of specific disorders,<sup>8</sup> parallel prior studies of adult detainees.<sup>19,20</sup> Although minorities have lower rates of comorbidity than other youth, they make up two thirds of youth in the juvenile justice system.<sup>5</sup> Thus, more minority adolescents will require services for comorbidity than nonminorities.

Although comorbidity of major mental and substance use disorders is more prevalent among older detainees, we found no dominant sequence of onset. This suggests that there are multiple pathways to disorders. Thus, we cannot target interventions to a single point of vulnerability. Detainees with the same combination of disorders may require different treatments, depending on

**Table 6. Prevalence and Odds Ratios (ORs) of Major Mental Disorders Among Juvenile Detainees With Substance Use Disorders\***

Variable	Substance Use Disorder (n = 874)								
	No Substance Use Disorder (n = 923), % (95% CI)	Any Substance Use Disorder (n = 874)		Drug Use Disorder (n = 786)		Alcohol Use Disorder (n = 466)		Both Drug and Alcohol Use Disorders (n = 378)	
		Prevalence, % (95% CI)	OR (95% CI)	Prevalence, % (95% CI)	OR (95% CI)	Prevalence, % (95% CI)	OR (95% CI)	Prevalence, % (95% CI)	OR (95% CI)
<b>Females (n = 655)†</b>									
No major mental disorder (n = 506)	81.7 (77.1-85.4)	70.6 (62.9-77.4)		70.6 (62.2-77.8)		65.6 (54.0-75.6)		64.4 (51.0-75.9)	
Any major mental disorder (n = 146)	18.3 (14.6-22.9)	29.4 (22.6-37.1)	1.8§ (1.2-2.9)	29.4 (22.2-37.8)	1.9¶ (1.2-3.0)	34.4 (24.4-46.0)	2.3§ (1.3-4.1)	35.6 (24.1-49.0)	2.5§ (1.3-4.6)
Psychosis or manic episode (n = 18)	2.7 (1.4-5.1)	2.8 (1.5-5.4)	1.1 (0.4-2.7)	2.9 (1.4-5.7)	1.1 (0.4-2.8)	3.1 (1.4-6.8)	1.1 (0.4-3.3)	3.2 (1.3-7.6)	1.2 (0.4-3.7)
Major depressive episode (n = 135)	16.5 (12.9-20.8)	27.7 (21.0-35.4)	1.9§ (1.2-3.1)	27.8 (20.7-36.3)	2.0§ (1.2-3.2)	32.2 (22.3-44.1)	2.4§ (1.3-4.3)	33.5 (22.1-47.2)	2.6§ (1.3-4.9)
<b>Males (n = 1167)‡</b>									
No major mental disorder (n = 995)	92.3 (87.6-95.3)	78.6 (72.4-83.8)		81.0 (74.7-86.0)		70.0 (60.3-78.1)		72.9 (62.4-81.4)	
Any major mental disorder (n = 159)	7.7 (4.7-12.4)	21.4 (16.2-27.6)	3.2   (1.7-6.0)	19.0 (14.0-25.3)	2.8§ (1.5-5.3)	30.0 (21.9-39.7)	5.1   (2.6-10.1)	27.1 (18.6-37.6)	4.4   (2.2-9.0)
Psychosis or manic episode (n = 36)	1.9 (0.7-5.1)	4.6 (2.4-8.6)	2.5 (0.7-8.8)	5.1 (2.7-9.5)	2.8 (0.8-9.9)	7.1 (3.4-14.1)	4.0¶ (1.1-14.8)	8.9 (4.3-17.5)	5.1¶ (1.4-19.0)
Major depressive episode (n = 136)	7.4 (4.4-12.1)	18.5 (13.7-24.5)	2.8§ (1.5-5.5)	15.8 (11.3-21.8)	2.4¶ (1.2-4.6)	26.3 (18.6-35.8)	4.5   (2.2-9.0)	22.4 (14.7-32.6)	3.6   (1.7-7.7)

Abbreviation: CI, confidence interval.

\*Major mental disorder includes psychosis, manic episode, and major depressive episode. Participants may have more than one substance use disorder and more than one major mental disorder. Each cell is weighted to reflect the population of the detention center. Statistically significant ORs indicate that comorbidity exceeds the level expected by chance, given the prevalence of that disorder in the sample. Psychosis, manic episode, major depressive episode, drug use disorder, and alcohol use disorder are missing for 3 of the 1829 participants; in addition, drug use disorder and alcohol use disorder are missing for 4 other participants. These 7 participants are excluded from all analyses in this table. All available data from the 1822 remaining participants are used for each cell. Because 25 participants are missing the diagnosis of any substance use disorder, this column and the "No Substance Use Disorder" column sum to 1797, not 1822.

†Major mental disorder is missing for 3 females.

‡Major mental disorder is missing for 13 males.

§P < .01.

||P < .001.

¶P < .05.

their etiology.<sup>14</sup> Psychiatrists should assess the sequence and interplay of symptoms to determine the best treatments for youth with comorbidity.

### LIMITATIONS

This study has several limitations. Because our findings are drawn from a single site, they may pertain only to youth in detention centers with similar demographic composition. Rates of comorbidity might differ if diagnoses were based on *DSM-IV* instead of *DSM-III-R*. Finally, our rates may underestimate the true prevalence of comorbidity among youth in the entire juvenile justice system for 3 reasons. First, our sample included only detainees; it excluded youth who were not detained because their charges were less serious, because they were immediately released at the police station or detention center, or because they were referred immediately into the mental health system. Second, because it was not feasible to

interview caretakers (few would have been available), our data are subject to the reliability and validity of the youth's self-report. Underreporting of symptoms by youth is endemic, especially for disruptive behavior disorder.<sup>47</sup> Third, estimates of comorbidity would have been higher had we included additional disorders, such as posttraumatic stress, eating, dissociative, and somatoform disorders. Despite these limitations, our findings have implications for mental health treatment and research.

### IMPLICATIONS FOR TREATMENT

Our findings may reflect our nation's increasingly punitive approaches to delinquency and substance abuse.<sup>4,23,77</sup> Our findings may also reflect failures of the social service systems.<sup>78</sup> A recent report to Congress<sup>79</sup> and the Surgeon General's report<sup>12</sup> on children's mental health have highlighted the paucity of mental health services available to youth with comorbidity. Because the fragmented

public mental health system has little to offer,<sup>80</sup> youth with comorbidity may “fall between the cracks” into the juvenile justice net. Unfortunately, recent innovations to treat comorbidity rarely reach into the juvenile justice system.<sup>23</sup> Mental health professionals must collaborate with the juvenile justice system to:

**1. Improve screening.** Many detention centers do not screen detainees for psychiatric problems.<sup>81</sup> Comorbidity is particularly difficult to detect because intoxication and withdrawal can mask or exacerbate psychiatric symptoms (and vice versa).<sup>66,70,82</sup> Although there are promising screening tools,<sup>83,84</sup> additional studies are needed to document their validity.

**2. Increase diversion and linkage.** Youth with major mental disorders who are not a threat to the community should be diverted to treatment facilities on arrest. Most detained youth are charged with nonviolent offenses<sup>85</sup> and could be placed in community-based programs. Youth who are detained should be linked to services in the community after release. Ensuring that a first appointment is made and kept maximizes the chance of successful linkage to services.<sup>86</sup> Only 20% of all delinquency cases result in detention.<sup>87</sup> With collaboration from mental health professionals, juvenile courts and detention centers can help detect and refer many youth who are vulnerable to arrest. Although detained youth stay an average of only 2 weeks, many troubled youth at risk for comorbidity will be arrested during adolescence.<sup>88-90</sup>

**3. Reduce barriers to service in the community.** Most delinquent youth experience substantial barriers to services. Youth in the juvenile justice system are disproportionately minority, poor, and poorly educated and have few social networks—all characteristics known to limit the type and scope of ADM services that are provided.<sup>91,92</sup> The Surgeon General reports that, compared with non-Hispanic whites, racial and ethnic minorities have less access to mental health services, are less likely to receive needed care, and are more likely to receive poor quality care.<sup>93</sup> Poor minority youth rarely have private insurance.<sup>94-99</sup> Many are ineligible for Medicaid.<sup>95,97</sup> Moreover, youth of color may be more likely than whites to be arrested, even for the same offenses.<sup>100</sup> Reynolds et al<sup>101</sup> found that more than one quarter of low-income, African American urban youth were arrested before the age of 18 years. The stigma of an arrest history may add to already formidable barriers to services.

Success, however, is limited by the availability and quality of services. Children in general are underserved; minority children even more so.<sup>92</sup> Courts cannot mandate services where none are available.

## FUTURE RESEARCH

Studies are needed in 4 areas:

**1. Pathways to comorbidity.** We need to determine the most common pathways to comorbidity, critical periods of vulnerability, and how these differ by sex, race/ethnicity, and age. Longitudinal studies that identify the most common developmental sequences will demonstrate when primary and secondary preventive interventions may be most beneficial.<sup>67</sup>

**2. Health disparities.** Although juvenile crime is relatively similar across race/ethnicity,<sup>102</sup> racial/ethnic minorities compose 29% of arrests,<sup>5</sup> 63% of detainees,<sup>85</sup> and 62% of juveniles who are committed (serving sentences).<sup>85</sup> Studies are needed to understand (and rectify) racial/ethnic disparities in the decision to arrest, divert, detain, and provide mental health services to juveniles. Such studies will document whether the racial/ethnic differences found in our study indicate systematic disparities in identification and management of comorbidity or reflect true differences in need.

**3. Evaluations of interventions.** We must develop more effective treatments for comorbid disorders and identify which treatments work best for special populations (eg, females, minorities, and younger adolescents).<sup>67</sup> Despite the escalating numbers of females in the justice system,<sup>5,103</sup> few sex-specific services are available.<sup>104</sup>

**4. Prevalence, patterns, and outcomes of comorbid mental and physical disorders.** There is growing evidence that psychiatric disorders often co-occur with physical disorders in children.<sup>105-109</sup> Comorbidity may worsen the prognosis of a physical illness; for example, depression worsens the outcome of children with asthma.<sup>110</sup> Health care costs are also much higher for those with both mental and physical disorders than for persons with either one alone.<sup>111</sup>

Most juveniles do not remain in detention for long. The responsibility for their care typically falls to the public mental health system on their release. Only a sustained partnership between the mental health and juvenile justice systems offers hope for a rational response to comorbidity in delinquent youth.

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