Detection of Co-Occurring Mental Illness Among Adult Patients in the New Jersey Substance Abuse Treatment System

| Hsou Mei Hu, PhD, MHS, Anna Kline, PhD, Frederick Y. Huang, MD, and Douglas M. Ziedonis, MD, MPH

Individuals who have co-occurring mental illness and addiction disorders make up a significant, understudied population in mental health and substance abuse treatment systems. Several studies report a high prevalence of co-occurring disorders among mentally ill or substance abuse patients in the general US population.[1–2] In 1996, the National Comorbidity Survey reported that 42.7% of individuals who had a 12-month addictive disorder had at least one 12-month mental health disorder.[1] The more recent National Epidemiological Survey on Alcohol and Related Conditions found that 60.3% of respondents who had drug use disorders and who sought treatment had at least 1 independent mood disorder, and 42.6% had at least 1 independent anxiety disorder.[3] Although substantial evidence shows that patients who have co-occurring mental illness and addiction disorders have more functional impairment, more behavioral problems, and a high risk of HIV or hepatitis infection,[4–13] it is a challenge to detect the co-occurrence of these disorders.

Low rates of detecting co-occurring disorders in patients are supported by previous research. In a recent study, the New Jersey Division of Addiction Services (DAS) found the detection rates for patients who had co-occurring disorders to be 57% in the mental health treatment system and 23% in the addiction treatment system.[14] Other studies report equally low rates. As cited by Drake et al.,[15] Ananth et al. reported a 25% detection rate for patients in an acute care psychiatric setting.[16] Among adolescents who receive mental health treatment, detection rates ranged from 57% in a continuum-of-care system, a mental health care network designed to be a highly integrated and well-coordinated community network that provides a full range of care to 4% in a traditional fee-for-service system.[17]

Objectives. We assessed the detection of mental illness in an adult population of substance abuse patients and the rate of referral for mental health treatment.

Methods. We obtained combined administrative records from 1994 to 1997 provided by the New Jersey substance abuse and mental health systems and estimated detection and referral rates of patients with co-occurring disorders (n = 47 379). Mental illness was considered detected if a diagnosis was in the record and considered undetected if a diagnosis was not in the record but the patient was seen in both treatment systems within the same 12-month period. Predictors of detection and referral were identified.

Results. The detection rate of co-occurring mental illness was 21.9% (n = 10 364); 57.9% (n = 6 001) of these individuals were referred for mental health treatment. Methadone maintenance clinics had the lowest detection rate but the highest referral rate. Male, Hispanic, and African American patients, as well as those who used heroin or were in the criminal justice system, had a higher risk of mental illness not being detected. Once detected, African American patients, heroin users, and patients in the criminal justice system were less likely to be referred for treatment.

Conclusions. There is a need to improve the detection of mental illness among substance abuse patients and to provide integrated treatment. (*Am J Public Health.* 2006;96:1785–1793. doi:10.2105/AJPH.2005.072736)

The underdiagnosis of co-occurring disorders in mental health and substance abuse populations has not received sufficient attention, given the importance of accurate diagnosis to effective treatment. In its report to Congress, the Substance Abuse and Mental Health Services Administration (SAMHSA) defined the elements of effective treatment for individuals who have co-occurring disorders: time-sensitive screening, comprehensive assessment, and program-oriented clinical interventions for medications and integrated psychosocial treatments.[18] Recent studies have shown integrated treatment programs to be effective.[19–21] However, when either substance abuse or mental health disorders are undiagnosed, patients lack access to integrated programs and tend to respond poorly to treatment interventions that emphasize only 1 behavioral disorder.

Although several studies have examined the factors that affect the detection of mental health problems in primary care or inpatient settings,[22–25] few studies have systematically examined diagnostic accuracy across addiction treatment settings. Nor have many studies assessed both treatment system and patient factors that contribute to accurate diagnosis. This paper addresses the detection of co-occurring disorders within the New Jersey addiction treatment system. Specifically, the authors examine (1) the extent to which patients who have co-occurring mental illness and addiction disorders are diagnosed in an adult addiction treatment population, (2) the extent to which accurately diagnosed patients are referred for mental health treatment, and (3) patient and treatment characteristics associated with detection and referral for mental health treatment.

METHODS

Data

Our data are from the combined 1994–1997 administrative records of the Alcohol

and Drug Abuse Data System (ADADS) and the Uniform Services Transaction Form (USTF), which was originally prepared by DAS for a study of treatment access and use of available services. These 2 data systems collect patient admission and discharge information from all publicly funded and most privately funded substance abuse and mental health treatment agencies in New Jersey. Although the data collection process differs among agencies, typically an intake worker or clinician collects information on the day of the patient's admission and completes a discharge form within days of the patient's discharge. The DAS maintains internal quality control procedures to ensure the accuracy and completeness of the records.

At the time these data were collected, New Jersey addiction agencies did not use a standardized mental health screening tool, and few agencies conducted systematic mental health screening. There was also substantial variability across agencies in levels of staff experience and training. For example, a recent study of New Jersey addiction treatment outcomes found that among the 20 participating inpatient, outpatient, and methadone agencies, there was a range of 0%–80% in the proportion of staff certified as addiction counselors.[26]

Both ADADS and USTF records contain patient demographic and treatment-related information. A detailed description of the data set, the process of compiling the data, and the identification of patients who had co-occurring disorders can be found in a previous report.[14] Briefly, the DAS created the data set by randomly selecting 1 record per person (an index admission) from the total of each individual's admissions to the addiction or mental health treatment systems between 1994 and 1997. Among index admissions to the addiction system, 130 604 unique individuals were adults aged 18 years and older. A match was then sought for the index admission within the mental health data set in order to identify patients who had been treated in both systems. On the basis of this data-matching process, substance abuse patients were grouped into 2 categories: those with addiction problems only and those with co-occurring disorders. A patient was identified as having a co-occurring disorder if at least 1 of 2 criteria

was met: (1) the patient had both an addiction and mental health diagnosis or a need for mental health treatment indicated in the index admission or discharge record or (2) the patient had an admission to the New Jersey mental health treatment system during the 12 months before or after the index addiction admission. By these criteria, 47 379 adult substance abuse patients were identified as having a co-occurring mental illness. This was 36.3% of the adult patients who were treated in the New Jersey addiction treatment system between 1994 and 1997. Among the 47 379 patients who had co-occurring disorders, only 8.6% met both criteria, and 13.3% met criterion (1) but not (2). Most of the patients who had co-occurring disorders (78.1%) met only criterion (2).

Dependent Variables

The addiction treatment provider was considered to have detected co-occurring mental illness only if criterion (1) was met. If only criterion (2) was met, the co-occurring disorder was considered to be undetected. The treatment referral was determined by whether or not a referral for mental health services was indicated on the discharge record.

Independent Variables

Because detection and referral are pathways to treatment for patients who have co-occurring disorders, our analysis included patient-centered variables that were associated with the use of mental health services or addiction treatment in several national studies. These variables include gender, age, race/ethnicity, education, family income, and reimbursement source.[27–31] Age, race, and gender were associated with undetected mental illness among primary care patients,[22] although homelessness and employment status were found to be predictive of a co-occurring disorder.[32]

We selected treatment characteristics for our analysis that were shown by previous research to have an impact on access to care. These included referral source, polydrug or monodrug use, and number of past drug treatment episodes.[27,32] In addition, primary drug used, treatment setting at admission, and length (days) of treatment were included because of their significant association with

detection and referral rates in preliminary bivariate analyses.

Treatment settings were grouped into five categories: (1) outpatient, including traditional or intensive outpatient care; (2) methadone, including outpatient methadone maintenance or detoxification; (3) short-term residential, typically 28 days; (4) long-term residential or halfway house, typically 180 days or longer; and (5) detoxification, including hospital or residential detoxification. The index admission year was included in the preliminary analysis to test time trends in detection and referral, but to promote a parsimonious model, it was dropped in the final analysis because it was statistically insignificant.

Data Analyses

We described the characteristics of patients who had co-occurring disorders and compared them to the characteristics of patients who had only substance use disorders. We then estimated the rates at which co-occurring disorders were detected by health care providers. Detection rates were compared among different patient and treatment characteristics, and the differences were tested using χ^2 statistic and t tests. The associations between patient and treatment characteristics (independent variables) and detection (dependent variable) were further examined using a logistic regression model. Similar bivariate and logistic regression analyses were conducted for patients in whom mental illness had been detected to identify factors associated with referral to mental health treatment. We identified significant characteristics (at the .05 level) and reported the estimated odds ratios (ORs) and 95% confidence intervals. All statistical analyses were conducted using SAS version 8.0 (SAS Institute Inc.,Cary, NC).

RESULTS

Substance Abuse Patients With Co-Occurring Mental Illness

Patients who had co-occurring disorders were more likely to be female than patients who had only addiction disorders (33.2% vs 24.7%), but there was no difference between the groups with respect to age or race/ethnicity (Table 1). Patients who had co-occurring disorders were more likely than addiction-only

TABLE 1—Demographic Characteristics of Patients Treated for Substance Abuse Problems: New Jersey Substance Abuse Treatment Systems, 1994–1997

	Co-Occurring Disorder, No. (%)	Substance Abuse Only, No. (%)
All	47 379 (100.0)	83 225 (100.0)
Race/ethnicity		
White	24 547 (52.0)	41 965 (50.6)
African American	16 228 (34.4)	28 773 (34.7)
Hispanic or Latino	5 871 (12.4)	10.961 (13.2)
Others	577 (1.2)	1 262 (1.5)
Gender		
Female	15 722 (33.2)	20 531 (24.7)
Male	31 657 (66.8)	62 694 (75.3)
Age, y[a]		
18–34	27 057 (57.2)	44 964 (54.0)
35–44	14 790 (31.2)	25 916 (31.1)
45–54	4 258 (9.0)	8 790 (10.6)
≥55	1 274 (2.7)	3 555 (4.3)
Homeless status		
Yes	383 (0.9)	394 (0.5)
No	44 074 (99.1)	82 831 (99.5)
Employment status		
Unemployed	18 846 (39.9)	27 820 (33.6)
Employed/not in force	28 376 (60.1)	55 081 (66.4)
Education		
Less than high school	16 142 (34.1)	27 243 (32.7)
High school or GED	21 993 (46.4)	39 045 (46.9)
More than high school	9 244 (19.5)	16 937 (20.4)
Annual household income[b]		
Poor	41 768 (88.2)	69 065 (83.0)
Low income	2 768 (5.8)	6 662 (8.0)
Middle income	2 210 (4.7)	5 767 (6.9)
High income	633 (1.3)	1 731 (2.1)
Reimbursement source		
Medicaid/Medicare	7 423 (18.0)	7 724 (10.4)
Private	6 574 (15.9)	13 216 (17.8)
Self-pay	7 818 (19.0)	18 292 (24.7)
None[c]	19 424 (47.1)	34 910 (47.1)
Referred source		
Self/family/friend	23 694 (50.2)	32 586 (39.3)
Other addiction providers	5 689 (12.1)	8 451 (10.2)
Mental health/medical providers	8 488 (18.0)	5 930 (7.2)
Legal	5 896 (12.5)	29 476 (35.6)
Others	3 420 (7.3)	6 443 (7.8)
Primary drug used		
Alcohol	16 874 (35.7)	39 254 (47.3)
Heroin	18 938 (40.1)	23 414 (28.2)
Crack/cocaine	7 885 (16.7)	12 682 (15.3)
Marijuana	2 200 (4.7)	5 628 (6.8)
Others	1 329 (2.8)	1 934 (2.3)

Continued

patients to have Medicaid or Medicare coverage (18.0% vs 10.4%), to be self-referred for treatment or to be referred by a friend or family member (50.2% vs 39.3%), and to use heroin (40% vs 28.2%). Patients who had co-occurring disorders were less likely than addiction-only patients to be treated in outpatient treatment settings (34.9% vs 52.3%) and to have had previous addiction treatment (31.1% vs 51.0%). The length of an index admission stay was shorter for patients who had co-occurring disorders than for addiction-only patients (88.3 vs 109.7 days). Index admissions for both groups were evenly distributed across the 4 years (1994–1997).

Detection Rates

The overall rate of detection for co-occurring disorders was low. Co-occurring disorders were detected in only 21.9% of patients by their addiction treatment provider (Table 2). Providers detected disorders in more White patients (28.5%) than African Americans (13.9%) and Hispanics (16.2%) and in more women (26.0%) than men (19.8%). Disorders were more likely to be detected in older patients. By contrast, low rates of detection were found among patients who were unemployed, not homeless, less educated, or low income; who lacked a reimbursement source; or who had 1–3 previous treatment episodes. Most noticeably, patients who used heroin had the lowest detection rate (9.2%) compared with patients who used other substances (32.0% for alcohol, 23.9% for crack cocaine, and 33.8% for marijuana). Across all treatment settings, co-occurring disorders were detected in the lowest proportion of patients at methadone maintenance clinics (7.3%); disorders were detected in the highest proportion of patients at short-term residential programs (42.3%). The mean number of treatment days also was longer for patients who had disorders detected (mean=119.2 days) compared with patients for whom disorders were not detected (mean=78.2 days) (result not shown).

Characteristics Associated With Detection

Co-occurring disorders were less likely to be detected in African American (OR=0.52) and Hispanic individuals (OR=0.83) than in Whites (Table 2). Disorders in women were 1.503 times as likely to be detected as in

TABLE 1—Continued

Treatment settings at admission[d]		
Outpatient	16 142 (34.9)	42 793 (52.3)
Methadone	8 596 (18.6)	10 605 (13.0)
Short-term residential	6 126 (13.2)	5 879 (7.2)
Long-term residential	2 598 (5.6)	3 662 (4.5)
Detoxification	12 855 (27.8)	18 856 (23.1)
Polydrug use		
Yes	18 252 (59.8)	42 565 (51.3)
No	18 974 (40.2)	40 347 (48.7)
Past addiction treatment episode		
None	14 747 (31.1)	42 422 (51.0)
One	12 375 (26.1)	19 171 (23.0)
Two	7 615 (16.1)	8 523 (10.2)
Three	4 240 (9.0)	4 114 (4.9)
Four or more	8 402 (17.7)	8 995 (10.8)
Year		
1994	12 816 (27.1)	21 477 (25.8)
1995	11 564 (24.4)	21 187 (25.5)
1996	11 022 (23.3)	20 910 (25.1)
1997	11 977 (25.3)	19 651 (23.6)
Length of treatment in days		
Mean (SD)	88.3 (178.3)	109.7 (180.3)
Median	27	52

Note. GED = general equivalency diploma.
[a]Mean age of patients with co-occurring disorders = 33.8 years (9.2); mean age of patients with substance abuse only = 34.7 years (10.1).
[b]Poor < 125% federal poverty level (FPL); low income = 125%–199% FPL; middle income = 200%–399% FPL; high income ≥ 400% FPL.
[c]No expected reimbursement source and did not self-pay for the treatment.
[d]Outpatient, including traditional outpatient or intensive outpatient care; methadone, including outpatient methadone maintenance and outpatient methadone detoxification; short-term residential care, typically 28 days; long-term residential care, typically 180 days or longer or halfway house; and detoxification, hospital detoxification, or residential detoxification.

men. Co-occurring disorders were about 10% less likely to be detected in patients younger than 35 years and were 19% more likely to be detected in older patients (45 to 54 years), than in patients between 35 and 44 years.

The probability of detection also was influenced by socioeconomic factors. Disorders were 0.67 times as likely to be detected in unemployed patients as in patients who were employed. Disorders in high-school graduates were less likely to be detected (OR=0.94) than in patients who had some college education or better. Patients in the poor income group were approximately 8% more likely to have disorders detected than were high-income patients. Compared with privately insured patients, Medicaid and Medicare (OR= 1.45) and self-pay (OR=1.11) patients were

more likely to have disorders detected, but those who had no source of reimbursement were only 0.70 times as likely to have disorders detected.

Compared with primary alcohol users, primary heroin or crack and cocaine users were significantly less likely to have disorders detected (OR=0.47 for heroin; OR=0.91 for crack and cocaine); primary marijuana or other drug users were more likely to have disorders detected. Disorders in polydrug users were 1.13 times more likely to be detected than in monodrug users.

With respect to treatment-related characteristics, patients who were referred from the criminal justice system were significantly less likely to have disorders detected (OR=0.63), and those patients referred from medical or

mental health settings were significantly more likely to have disorders detected (OR=1.99) than patients who were referred for treatment from other addiction agencies. By treatment setting, patients in methadone maintenance clinics or hospital/residential detoxification programs had the lowest (OR=0.35 and OR=0.58, respectively), and patients in short-term residential programs had the highest (OR=2.70), odds of disorders being detected compared with outpatients. The odds that disorders would be detected were higher for patients who had 4 or more previous addiction treatment episodes (OR=1.48) than for first-time admissions; however, patients who had 1–3 previous episodes were significantly less likely to have disorders detected. Also, the odds of detection increased by 2% for every 10 days the patient spent in treatment.

Referral Rates

Among the 10 364 patients in whom co-occurring disorders were detected, 57.9% were referred for mental health treatment (Table 3). Referral rates differed by age, income, reimbursement source, referral source, primary drug used, and treatment setting at admission. Also, patients who were referred had shorter addiction treatment stays than patients who were not referred (mean=105.3 vs 135.7 days) (result not shown).

Characteristics Associated With Referral Rates

Overall, treatment and insurance-related characteristics appear to have played a more significant role in the referral for mental health treatment than other patient characteristics (Table 3). Patients who were referred for addiction treatment from the legal system had lower odds of being referred (OR=0.89) for mental health treatment than those referred from other addiction providers. By treatment setting, methadone maintenance clinics were substantially more likely (OR=2.60) to refer patients for mental health treatment than were outpatient programs. By contrast, long-term residential programs had a low referral rate (OR= 0.70). Unlike the positive effect of longer treatment programs on detection of disorders, longer stays were negatively associated with referral for mental health treatment. With respect to patient characteristics,

TABLE 2—Odd Ratios (ORs) and 95% Confidence Intervals (CIs) for Substance Abuse Patients With Co-Occurring Mental Disorder Detected During Treatment: New Jersey Substance Abuse System, 1994–1997

	Logistic Regression: Co-Occurring Disorder Positively Detected[a]		
	No.	Detected, %[b]	OR (95% CI)
All	47 379	21.9	
Race/ethnicity			
White	24 547	28.5	Referent
African American	16 228	13.9	0.52* (0.48, 0.55)
Hispanic or Latino	5 871	16.2	0.83* (0.76, 0.91)
Others	577	24.1	0.97 (0.77, 0.24)
Gender			
Female	15 722	26.0	1.50* (1.41, 1.60)
Male	31 657	19.8	Referent
Age, y			
Mean (SD)	35.0 (10.3)		
18–34	27 057	20.1	0.90* (0.85, 0.95)
35–44	14 790	22.4	Referent
45–54	4 258	27.7	1.19* (1.10, 1.28)
≥55	1 274	34.5	0.93 (0.83, 1.04)
Homeless status			
Homeless	383	25.1	1.23 (0.89, 1.72)
Not homeless	44 074	22.0	Referent
Employment status			
Unemployed	18 846	15.8	0.67* (0.63, 0.72)
Employed/not-in-force	28 376	25.9	Referent
Education			
Less than high school	16 142	19.4	0.98 (0.94, 1.03)
High school or GED	21 993	21.8	0.94* (0.90, 0.97)
More than high school	9 244	26.4	Referent
Annual household income[c]			
Poor	41 768	21.8	1.08* (1.00, 1.16)
Low income	2 768	21.5	0.97 (0.88, 1.08)
Middle income	2 210	23.3	0.96 (0.87, 1.07)
High income	633	26.1	Referent
Reimbursement source			
Private	6 574	32.3	Referent
Medicaid/Medicare	7 423	26.8	1.45* (1.37, 1.54)
Self-pay	7 818	24.8	1.11* (1.05, 1.18)
None[d]	19 424	17.6	0.70* (0.67, 0.73)
Referred source			
Other addiction providers	5 689	19.5	Referent
Self/family/friend	23 694	17.1	1.15* (1.09, 1.21)
Mental health/medical providers	8 488	43.9	1.99* (1.86, 2.11)
Legal	5 896	21.3	0.63* (0.59, 0.67)
Others	3 420	22.3	0.90* (0.83, 0.99)
Primary drug used			
Alcohol	16 874	32.0	Referent
Heroin	18 938	9.2	0.47* (0.43, 0.50)
Crack/cocaine	7 885	23.9	0.91* (0.85, 0.96)

Continued

African American patients were less likely to be referred for treatment (OR=0.85) than White patients. The odds of referral for younger patients (age between 18 and 34) were 0.87 times those of patients between 35 and 44. Compared with high-income patients, individuals in the poor income group had higher odds of being referred for mental health treatment (OR=1.36). Self-pay patients or those with no reimbursement source were less likely to be referred for treatment (OR=0.87 and OR=0.92, respectively). In terms of drug use, patients who used heroin had lower odds of being referred for mental health treatment (OR= 0.83) than alcohol users; polydrug users were 12% more likely to be referred.

DISCUSSION

Our findings are reflective of practices in a single state and, as such, are not nationally representative. In addition, these data reflect treatment practices that were in place in New Jersey until 2003, before system-wide implementation of a standardized mental health screening tool. Therefore, the findings are only suggestive of practices in states that do not have standardized mental health screening.

As with many studies that use administrative data, this study is subject to the accuracy and completeness of the records. Because DAS had a quality control system that systematically checked for and corrected missing data, it was expected that errors in the data set would be random and, given the size of the data set, that overall trends would be reliable. Because the identification of patients who had co-occurring disorders is based solely on treatment records, the findings are likely to underrepresent the true prevalence of co-occurring disorders. Many patients may not have sought mental health treatment or accessed treatment from nonreporting health care providers (such as the Veterans Administration, family doctors, or out-of-state providers). Finally, the method by which the original data set was compiled placed primary emphasis on treatment and patient characteristics identified in the patient's index admission setting. Because all patients in this study had their index admission in the addiction system, the data exclude key mental

TABLE 2—Continued

Marijuana	2 200	33.8	1.36* (1.24, 1.50)
Others	1 329	41.8	1.54* (1.37, 1.73)
Treatment setting at admission[e]			
Outpatient	16 142	30.3	Referent
Methadone	8 596	7.3	0.35* (0.36, 0.39)
Short-term residential	6 126	42.3	2.70* (2.53, 2.88)
Long-term residential	2 598	16.0	1.14* (1.03, 1.27)
Detoxification	12 855	11.2	0.58* (0.54, 0.62)
Polydrug use			
Monodrug	18 974	22.1	Referent
Polydrug	18 252	21.7	1.13* (1.06, 1.20)
Past addiction treatment episode			
None	14 747	25.2	Referent
One	12 375	18.3	0.82* (0.78, 0.87)
Two	7 615	17.4	0.80* (0.753, 0.86)
Three	4 240	17.7	0.92 (0.85, 1.00)
Four or more	8 402	27.4	1.48* (1.40, 1.57)
Length of treatment in days			1.00* (1.00, 1.00)
Mean (SD)[f]		119.2 (219.4)	OR = 1.015 for every 10 days
Median		36.0	

Note. GED = general equivalency diploma.
[a]Likelihood-ratio test statistic = 7671.04, df = 35, P < .0001.
[b]P values for all categories were <.001 except household income, where P = .020, and polydrug user status, where P = 0.244. P values were based on χ^2 tests for the association between percentage identified and patient characteristics.
[c]Poor < 125% federal poverty level (FPL); low income = 125%–199% FPL; middle income = 200%–399% FPL; high income ≥ 400% FPL.
[d]No expected reimbursement source and did not self-pay for the treatment.
[e]Outpatient, including traditional outpatient or intensive outpatient care; methadone, including outpatient methadone maintenance and outpatient methadone detoxification; short-term residential care, typically 28 days; long-term residential care, typically 180 days or longer or halfway house; and detoxification, hospital detoxification, or residential detoxification.
[f]Significantly more days of treatment for patients whose mental illness was detected than those not detected, P < .001.
*Statistically significant at α = 0.05.

health system variables, such as psychiatric diagnosis, that would have been desirable to include in the analysis.

Our findings revealed low detection rates for disorders and low referral rates for addiction treatment in patients who had co-occurring mental illness. The study also identified specific treatment settings and patient populations that should be targeted for systemic improvements. These findings are indicative of a larger national problem, which has prompted researchers and clinicians to identify the assessment and diagnosis of co-occurring disorders as an important area for new funding to provide training and services.[33]

A number of sociodemographic characteristics were significantly associated with detection of disorders and referral for treatment. Males, young adults,[18–34] minorities (African Americans and Hispanics), and unemployed patients were at higher risk than other patients that their disorders would go undetected. African American patients, in particular, were about half as likely as White patients to be diagnosed and were less likely to be referred for treatment.

These differences among gender, age, and race/ethnicity are consistent with findings of studies that examined detection and treatment access in primary care and other populations.[22,29–31] The greater risk of nondetection for minorities may relate, in part, to cultural differences in the presentation of symptoms,[34,35] and lower detection rates may partially explain lower minority treatment

access. In our study, however, even when disorders were diagnosed in African Americans, they were less likely than Whites to be referred for treatment.

Reimbursement source was also an important factor in this study. Patients who had no reimbursement source were at a significant disadvantage compared with those who had private insurance, Medicaid, or Medicare. Medicaid and Medicare patients were somewhat more likely than privately insured patients to be identified as having co-occurring disorders, possibly because they presented with more severe symptoms at admission, which made them more readily identifiable. Because public funding covers mental health treatment, however, we would expect the referral rates to be comparable.

The importance of drug-use characteristics was evidenced by the lower detection and referral rates for patients who were primary heroin and polydrug users. Patients who are polydrug users often present with more complex withdrawal symptoms than patients who are monodrug users. This increases the clinical challenge of differentiating symptoms of mental illness from symptoms of drug use. Similarly, patients who use heroin have high rates of antisocial personality disorder,[36,37] which could cause clinicians to misinterpret complaints about mental health symptoms as manipulative behavior.

Across all treatment settings, methadone maintenance clinics had the lowest rate of detecting disorders but the highest rate of referrals for treatment. However, co-morbidity rates for patients who were receiving methadone maintenance treatment (46%) were similar to patients being treated in long-term residential (42%) and detoxification settings (41%). Because many New Jersey methadone clinics have large patient populations, excessive staff workloads might lead to low detection rates where only the sickest patients are identified. As a result, referral rates might be expected to be higher if the identified populations are more severely impaired. Detoxification settings also had low rates of identifying disorders. This was a predictable finding because such settings manage patients in acute withdrawal for limited time periods, which makes it difficult to differentiate mental health symptoms from withdrawal symptoms.

TABLE 3—Odd Ratios (ORs) and 95% Confidence Intervals (CIs) for Substance Abuse Patients With Co-Occurring Mental Disorder Detected During Treatment: New Jersey Substance Abuse System, 1994–1997

	No.	Referred to Mental Health Treatment, %	P^a	Logistic Regression: Referred to Mental Health Treatment, OR (95% CI)^b
All	10 364	57.9		
Race/ethnicity			.129	
White	6 991	58.5		Referent
African American	2 249	55.8		0.85* (0.76, 0.96)
Hispanic or Latino	949	58.9		1.09 (0.93, 1.28)
Others	139	55.4		0.98 (0.67, 1.43)
Gender			.420	
Female	4 090	58.4		1.03 (0.94, 1.13)
Male	6 274	57.6		Referent
Age, y			<.001	
Mean (SD)	35.3 (10.6)			
18–34	5 429	56.1		0.87* (0.80, 0.95)
35–44	3 316	59.2		Referent
45–54	1 180	59.8		1.02 (0.91, 1.14)
≥55	439	65.2		1.17 (0.98, 1.39)
Homeless status			.616	
Homeless	96	60.4		0.86 (0.50, 1.47)
Not homeless	9 674	57.7		Referent
Employment status			.887	
Unemployed	2 976	58.0		0.99 (0.89, 1.09)
Employed/not-in-force	7 349	57.8		Referent
Education			.092	
Less than high school	3 137	56.3		0.95 (0.88, 1.01)
High school or GED	4 783	58.6		1.03 (0.97, 1.10)
Some college or more	2 444	58.6		Referent
Annual household income^c			<.001	
Poor	9 088	59.7		1.36* (1.21, 1.52)
Low income	595	46.1		0.96 (0.82, 1.13)
Middle income	516	44.4		0.85 (0.72, 1.01)
High income	165	46.7		Referent
Reimbursement source			<.001	
Private	2 121	65.5		Referent
Medicaid/Medicare	1 990	62.0		0.99 (0.91, 1.08)
Self-pay	1 936	49.6		0.87* (0.80, 0.95)
None^d	3 409	56.8		0.92* (0.85, 0.99)
Referred source			<.001	
Other addiction providers	1 110	53.5		Referent
Self/family/friend	4 046	59.3		0.93 (0.86, 1.01)
Mental health/medical providers	2 591	66.3		1.28* (1.17, 1.41)
Legal	1 804	46.5		0.89* (0.80, 0.98)
Others	763	54.7		1.01 (0.88, 1.16)

Continued

By contrast, short-term residential programs were approximately 2.7 times as likely as outpatient programs to detect co-occurring disorders. This possibly reflects the fact that short-term residential programs adhere to a medical treatment model and have highly professional staff.[26]

As might be expected, disorders were identified more often in patients who were referred from mental health and medical sources, probably because those patients entered into addiction treatment with a preexisting mental health diagnosis. Similarly, self- or family-referred patients also experienced higher rates of diagnosis, which suggests that those patients may enter treatment with greater acknowledgment of their problems than patients who enter through other pathways. Patients who were referred for treatment by the legal system had significantly low detection rates, an alarming finding in light of US Department of Justice estimates that 72% of mentally ill prisoners have an addiction disorder.[13,38] New Jersey has both drug and mental health courts, which divert individuals who have behavioral problems to treatment; however, these 2 court systems have separate discharge and re-entry planning processes, which could result in fragmented care for people who have dual problems. Also, many individuals who are referred for treatment by drug court have antisocial and other personality disorders,[37,39] which can lead to the same risk experienced by heroin users; reports of depression and anxiety may be dismissed as unfounded.

Because of the large sample size of this study, many variables were found to be statistically significant even though the coefficients were small. However, several relationships that showed substantial effects have important implications for public policy. The low rates of disorder detection for African Americans, for example, point to racial disparities in health care access that require a greater public investment in creative and effective solutions. Similarly, the greater detection of mental illness in patients covered by Medicaid rather than privately insured patients points to a potentially greater public, as opposed to private, funding burden for treating co-occurring disorders, at least among patients in public addiction treatment programs.

TABLE 3—Continued

Primary drug used			.001
Alcohol	5 401	57.6	Referent
Heroin	1 734	61.1	0.83* (0.73, 0.94)
Cocaine/crack	1 887	55.6	0.94 (0.85, 1.05)
Marijuana	743	55.3	1.09 (0.94, 1.25)
Others	556	63.3	1.18 (1.00, 1.39)
Treatment setting at admission[e]			<.001
Outpatient	2 310	47.3	Referent
Methadone	624	75.0	2.60* (2.13, 3.18)
Short-term residential	2 591	68.3	1.13* (1.01, 1.25)
Long-term residential	415	50.0	0.70* (0.58, 0.84)
Detoxification	1 445	62.7	0.91 (0.80, 1.02)
Polydrug use			.090
Monodrug	4 198	57.0	Referent
Polydrug	6 123	58.6	1.12* (1.01, 1.23)
Past addiction treatment episode			.212
None	3 723	56.4	Referent
One	2 264	58.8	1.08 (0.98, 1.18)
Two	1 329	58.8	1.01 (0.909, 1.128)
Three	749	59.6	0.97 (0.844, 1.112)
Four or more	2 299	58.4	1.00 (0.91, 1.09)
Length of treatment in days			1.00* (1.00, 1.00)
Mean (SD)[f]		105.3 (228.6)	OR = 0.966 for every 10 days
Median		28.0	

Note. GED = general equivalency diploma.
[a]Based on χ^2 tests for the association between percentage who were referred and the patient's characteristics.
[b]Likelihood-ratio test statistic = 643.18, df = 35, P < .0001.
[c]Poor < 125% federal poverty level (FPL); low income = 125%–199% FPL; middle income = 200%–399% FPL; high income ≥ 400% FPL.
[d]No expected reimbursement source and did not self-pay for the treatment.
[e]Outpatient, including traditional outpatient or intensive outpatient care; methadone, including outpatient methadone maintenance and outpatient methadone detoxification; short-term residential care, typically 28 days; long-term residential care, typically 180 days or longer, or halfway house; and detoxification, hospital detoxification, or residential detoxification.
[f]Significantly fewer days of treatment for patients with identified co-occurring disorder who were referred than those not referred, P < .001.
*Statistically significant at α = 0.05.

Finally, the low probability of detecting mental illness in people who use heroin, affects both heroin users and methadone clinics, the most common treatment setting, and suggests the need for further research into the factors unique to heroin use and the clinical processes of methadone clinics that might discourage accurate diagnoses.

Although structured psychiatric interviews significantly improve psychiatric diagnosis,[40] at the time this data set was collected, standardized instruments were not commonly used by states to evaluate a patient's mental status. However, New Jersey subsequently instituted a modified Addiction Severity Index (ASI)[41] as a standardized intake instrument for all publicly funded treatment agencies. The ASI will help alert clinicians to possible mental health problems; however, other instruments, such as the Beck Depression Inventory-II[42] or Mental Health Screening Form-III,[43] would be useful enhancements for patients who present with possible psychiatric involvement. Improving the detection of co-occurring disorders, however, should be one component of a broader national goal to promote truly integrated treatment through large-scale systems change. As SAMHSA has indicated, this will require (1) cross-training of addiction and mental health professionals in screening, assessment, and specialized integrated treatment techniques; (2) complementary licensing and certification for addiction and mental health programs and staff; and (3) more flexible reimbursement mechanisms for financing the treatment of co-occurring disorders. ∎

About the Authors

At the time of the study, Hsou Mei Hu and Frederick Y. Huang were with the Institute for Health, Health Care Policy, and Aging Research at Rutgers, The State University of New Jersey, New Brunswick. Anna Kline and Douglas M. Ziedonis are with the Department of Psychiatry, Division of Addiction Psychiatry, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, Piscataway.

Requests for reprints should be sent to Hsou Mei Hu, Division of General Medicine, University of Michigan Medical School, 300 North Ingalls, Suite 7C27, Ann Arbor, MI 48109–0429 (e-mail: hsoumei@gmail.com).

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Contributors

All authors helped to conceptualize ideas, interpret findings, review drafts of the article, and approve the final version. Hsou Mei Hu synthesized the analyses and led the writing. Anna Kline supervised the design and analysis of the study and interpretation of the findings. Fredrick Huang assisted with the analyses and interpretation of the findings. Douglas Ziedonis provided clinical expertise and supervised all aspects of the study.

Human Participant Protection

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