

UC Davis

UC Davis Previously Published Works

Title

Psychiatric diagnoses of 901 inpatients seen by consultation-liaison psychiatrists at an academic medical center in a managed care environment

Permalink

<https://escholarship.org/uc/item/68f1p9ds>

Journal

Psychosomatics, 46(1)

ISSN

0033-3182

Authors

Bourgeois, James A., O.D., M.D.
Wegelin, J A
Servis, M E
[et al.](#)

Publication Date

2005

Peer reviewed

Psychiatric Diagnoses of 901 Inpatients Seen by Consultation-Liaison Psychiatrists at an Academic Medical Center in a Managed Care Environment

JAMES A. BOURGEOIS, O.D., M.D., JACOB A. WEGELIN, PH.D.
MARK E. SERVIS, M.D., ROBERT E. HALES, M.D., M.B.A.

The authors reviewed the diagnoses from all inpatient psychiatric consultations conducted by faculty psychiatrists during calendar year 2001 (N=901) at an academic medical center. In about 25% of the consultations, multiple psychiatric diagnoses were made. The most frequent diagnosis groups were mood (40.7%), cognitive (32.0%), and substance use disorders (18.6%). Among 671 consultations in which only one diagnosis was made, the rates of these diagnosis groups were 35.4%, 20.1%, and 10.2%, respectively. The findings were compared with the findings of 19 previous studies published over the past 27 years. Mood, cognitive, and substance use disorders remain major foci of consultation-liaison practice in the managed care era, although the rate of cognitive disorder diagnoses has increased. No evidence was found of a change over time in referral rates.

(Psychosomatics 2005; 46:47–57)

The consultation-liaison psychiatrist is called upon to evaluate and treat a wide variety of psychiatric disorders in patients with general medical disorders. In the last 27 years, several studies have examined the rates of psychiatric diagnoses in inpatient populations seen by consultation-liaison services.^{1–20} These studies were completed both in the United States and internationally, used various psychiatric diagnostic systems, and examined psychiatric diagnoses in general hospitals and teaching hospitals that have private, public, and federal funding models.

Funding and billing incentives may affect the likelihood of ordering of a psychiatric consultation. For example, a hospital with an extremely short length of stay and/or a cost barrier to access to psychiatric consultation might have a lower rate of consultation (as a percentage of all medical/surgical admissions) than a federally funded hospital or an international hospital that operates in a less cost-sensitive manner.^{9,12,14} These local and systemic factors must be considered when interpreting the results of prior studies.

Despite methodological differences and a wide dis-

parity in the number of cases reviewed in each study, the rate of psychiatric consultation remained in the range 0.9% to 6% for studies in which this rate was mentioned.^{1,3–12,14,17,19} The data contain no evidence that this rate has changed systematically with time. The rates of referred cases in which a psychiatric diagnosis (V codes excluded) was made ranged from 51% to 98% for studies in which this rate was specified.^{1,2,4–16,19} The studies that report on a broad range of psychiatric diagnoses are summarized in forward chronological order by date of publication to highlight the evolution of psychiatric diagnostic systems (Table 1).

The psychiatric diagnostic groups and frequencies of psychiatric diagnoses (when specified in the original stud-

Received Oct. 29, 2003; revision received March 22, 2004; accepted April 29, 2004. From the Department of Psychiatry and Behavioral Sciences, University of California, Davis Medical Center. Address correspondence and reprint requests to Dr. Bourgeois, Department of Psychiatry and Behavioral Sciences, University of California, Davis Medical Center, 2230 Stockton Blvd., Sacramento, CA 95817; james.bourgeois@ucdmc.ucdavis.edu (e-mail).

Copyright © 2005 The Academy of Psychosomatic Medicine.

Diagnoses in Inpatient Psychiatric Consultations

ies) for each study are shown in Table 2.¹⁻¹⁹ The findings of the prior studies in which only one or the "primary" psychiatric diagnosis was included in the analysis are displayed in the top part of Table 2 in forward chronological order.^{1-3,6-10,12,16,18} The final row of the top part of Table 2 shows data from the present study for the 671 consultations in which only one psychiatric diagnosis was given,

for comparison to the prior studies in which only diagnosis per consultation was included in the analysis. The findings from studies in which multiple psychiatric diagnoses per consultation were considered (including all 901 consultations in the present study) are displayed in the bottom part of Table 2.^{4,5,11,13-15,17,19}

In the majority of these studies, the most common di-

TABLE 1. Studies Reporting Rates of Psychiatric Consultation and of Psychiatric Diagnoses Made in Psychiatric Consultations in Inpatient Populations (1977-2004)

Study	Date	Diagnostic System	Type of Hospital	Country	N	Rate of Psychiatric Consultation ^a	Psychiatric Consultations in Which Psychiatric Diagnoses Were Made ^b
Karasu et al. ¹	1977	None	University teaching hospital	United States	151	3%	91%
Lipowski and Wolston ²	1981	None	University medical center	United States			
Cohort A					1,000	Not specified	90%
Cohort B					1,000	Not specified	95%
Craig ³	1982	DSM-II	University teaching hospital	United States	308	1.9%	Not specified
Loewenstein and Sharfstein ⁴	1983	None	National Institutes of Health (federal research facility)	United States	103	2%	87%
McKegney et al. ⁵	1983	DSM-III	University medical center	United States	756	3.3%	82% (axis I); 30% (axis II)
Perez and Silverman ⁶	1983	DSM-II	General hospital	Canada	255	2%	96%
Hengeveld et al. ⁷	1984	ICD-9	University hospital	Netherlands	1,814	2.1%	89%
Malhotra and Malhotra ⁸	1984	ICD-9	University hospital	India	336	1.5%	70%
Hales et al. ⁹	1986	DSM-III	Military medical center	United States	1,065	5.8%	71%
Kuhn et al. ¹⁰	1986	DSM-III	Public and private hospitals	United States			
Private hospital cohort					100	2%	92%
Public hospital cohort					100	2%	85%
Schofield et al. ¹¹	1986	ICD-9	Regional hospital	Ireland	370	1.6%	90%
Wallen et al. ¹²	1987	H-ICDA ^c (1965 version)	General hospitals	United States	2,374	0.9%	51%
Sobel et al. ¹³	1988	None	General hospital	Israel	479	Not specified	93%
Clarke and Smith ¹⁴	1995	DSM-III-R	University-affiliated hospital	Australia	165	4.2%	83%
Ormont et al. ¹⁵	1997	DSM-III-R	University-affiliated hospital	United States	145	Not specified	96%
Ramchandani et al. ¹⁶	1997	DSM-III-R	Urban teaching hospitals	United States	50	Not specified	98%
Grant et al. ¹⁷	2001		University medical center	United States			
Cohort A		DSM-III-R			75	2.9%	Not specified
Cohort B		DSM-IV			90	2.6%	Not specified
De Jonge et al. ¹⁸	2001	ICD-10	33 European hospitals		9,542 ^d	1.8%	86%
Diefenbacher and Strain ¹⁹	2002	DSM-III-R	University medical center	United States	4,429	1.3%	93.6%
Bourgeois et al.	Current study	DSM-IV	University medical center	United States	901	4.2%	99%

^aPercentage of total medical/surgical admissions for which consultations were requested.

^bCases with V codes and deferred diagnosis were excluded.

^cHospital Adaptation of the ICD Adapted for Use in the United States.

^dTable 2 of paper included N = 837 from neurological wards, N = 8,705 from other wards; median consult rate of 1.8%.

agnostic group was mood disorders. Three studies included “neurosis” or “neurotic disorders” as diagnostic groups and did not include data for mood disorders as a discrete group.^{8,11,12} The diagnoses of neurosis or neurotic disorders in these studies are included in Table 2 as mood disorder diagnoses, although there is a high likelihood that some of these cases would be diagnosed as anxiety disorders in current practice. This interpretation of these prior studies may overestimate the prevalence of mood disorders and underestimate the prevalence of anxiety disorders. Although found less consistently across these studies, organic mental disorders/cognitive disorders were generally the second most common group.

Since the publication of the majority of these studies, there have been significant changes in both the nosology of psychiatric disorders and in fiscal models for health care systems. DSM-IV and DSM-IV-TR abandoned the DSM-III and DSM-III-R category of “organic mental disorders” and replaced it with a more restrictive category of “delirium, dementia, and amnesic and other cognitive disorders.”^{21–24} The term “neurosis” has been eliminated in favor of more explicitly defined mood, anxiety, adjustment, and personality disorders.^{23,24}

In recent years, managed care pressures have led to shorter lengths of stay in the general hospital, which reduce the amount of time the patient is available for an inpatient psychiatric consultation.^{19,25–31} Shorter lengths of stay might thus result in less frequent use of any inpatient consultations, including psychiatric consultations. Managed care reimbursement systems (e.g., capitation-based models) are funded on a “per member per month” cost system and often employ inpatient hospitalists and use other methodological incentives to minimize the utilization of inpatient care (the most cost-intensive care), resulting in shorter lengths of stay.^{28,32–33}

We sought to examine whether the rate of psychiatric consultations, as a fraction of total admissions, was affected by these contemporary incentives. We also undertook this study to examine if referral rates and overall diagnostic trends in psychiatric consultation patients seen in prior studies still held true in the era of DSM-IV/DSM-IV-TR and managed care, or if a new pattern of referral and diagnosis may be emerging.

In addition to changes in diagnosis associated with DSM-IV/DSM-IV-TR and the overarching changes in contemporary psychiatric practice resulting from managed care influences, other factors may be relevant. With the aging of the population and the resulting increased prevalence of cognitive disorders in the population, the con-

temporary consultation-liaison psychiatrist may be diagnosing more cases of delirium and dementia.^{34–37} Greater awareness of the diagnosis and treatment of depression might mean that nonpsychiatric physicians would exhibit greater vigilance for cases of depression, although uncomplicated cases of depression might be managed without formal psychiatric consultation.^{38–41} Finally, we hypothesized that the continued high rate of substance abuse in the general population (particularly in urban populations) combined with a greater awareness of substance abuse by other physicians might result in more psychiatric consultations for evaluation and management of substance-related illness.⁴²

METHOD

The University of California, Davis Medical Center (UCDMC), located in Sacramento, Calif., is a 528-bed, level I trauma center that serves a large region of northern California. UCDMC maintains an active adult psychiatric consultation-liaison service, with services provided by three faculty psychiatrists (one full time and two part time), postgraduate-year-1 and postgraduate-year-4 psychiatry residents, a clinical nurse specialist, and up to five third-year and fourth-year medical students. After the medical student or resident evaluates a new patient, a board-certified faculty psychiatrist conducts a clinical evaluation with the trainee to confirm the diagnosis and to review the treatment plan.

Billing data for the 901 consultations conducted by faculty psychiatrists in calendar year 2001 were gathered and examined. Data on diagnoses were abstracted from billing data without using patient-specific identifiers. The results presented are thus pooled data only. Diagnoses were classified according to DSM-IV-TR diagnosis groups. Multiple psychiatric diagnoses in an individual patient were counted as a “case” of each diagnosed illness. In addition, the UCDMC medical records format allows for the coding of a primary diagnosis for a given hospitalization and up to 14 secondary diagnoses. For the group of patients seen and billed by the consultation-liaison service, the coded primary discharge diagnosis was examined as an estimate of the type of medical/surgical patients for whom consultation-liaison services are requested.

RESULTS

In 2001, there were 21,164 adult admissions to UCDMC. The 901 consultations completed during that period thus represent a consultation rate of 4.2%. The group of patients

Author	Year	DSM-III-R	DSM-IV	Current study	Not specified	29.8% ^{b,1}	40.1% ^b	8.5% ^b	4.7%	Not specified ¹	10.8%	Not specified	9.0%	Not specified	7.5%
Diefenbacher and Strain ¹⁹	2002				1.3	40.7%	40.1% ^b	8.5% ^b	4.7%	Not specified ¹	10.8%	Not specified	9.0%	Not specified	7.5%
Bourgeois et al. ^m				Current study		40.7%	32.0%	18.6%	11.1%						

^aDiagnostic groups calculated from consolidation of data presented in the original papers.
^bStatistically significant difference in diagnosis rate compared to present study (analysis included mood, cognitive, and substance use disorders only).
^cRates reported in the original paper for "neurosis/personality disorder/situational reaction" (25%) and for "unstated and other" (4.9%) were combined and reported as the rate of "other" psychiatric diagnoses here.
^dThe original paper reported the percentage of neurotic disorders or neurosis and did not separate mood and anxiety disorders; the percentage shown here for mood disorders may include cases of anxiety disorders.
^eHospital Adaptation of the ICD Adapted for Use in the United States.
^fPercentage may also include anxiety disorders, which were not listed separately in the original paper.
^gOriginal paper did not specify adjustment disorder as a discrete category.
^hData for 671 consultations in which only one diagnosis was made.
ⁱPercentage includes a 24.7% rate of a diagnosis of "suicide attempt," also described as "other psychiatric illness."
^jRate of organic mental disorders included rates of delirium (16.0%) and dementia (5.6%).
^kOriginal paper specified only the rate of dementia; delirium was not discussed.
^lMood disorders category included adjustment disorders with depressed mood.
^mData for 901 consultations in which either one diagnosis or multiple diagnoses were made.

seen by the consultation-liaison service was 52% male and had a mean age of 48.59 years (SD = 17, range = 18–96). The overall rate of psychiatric diagnoses was 1.3 per patient (SD = 0.6, range = 0–4). Table 3 shows the frequency of psychiatric diagnoses, broken down by major DSM-IV-TR categories. The top part of Table 3 lists results for the 671 consultations in which only one psychiatric diagnosis was given, and the bottom part shows the data for all 901 consultations, including those in which more than one psychiatric diagnosis was made. In 99% of consultations, at least one DSM-IV-TR diagnosis was made; V codes were excluded. The diagnosis rates for mood disorders, for cognitive or organic disorders, and for substance use disorders were lower in the 671-consultation subsample than in the larger group of 901 consultations ($p < 0.05$).

In an additional analysis, the medical complexity of the conditions of the patients seen by the consultation-liaison service in calendar year 2001 was compared with that

TABLE 3. Psychiatric Diagnoses Made in Psychiatric Consultations at an Academic Medical Center in Calendar Year 2001

Type of Consultation and DSM-IV-TR Diagnostic Category	N	%
Single-diagnosis consultations (N = 671) ^a		
Mood disorders	238	35.4
Cognitive disorders	135	20.1
Delirium	85*	12.7*
Dementia	40*	6.0*
Cognitive disorder not otherwise specified	10*	1.5*
Substance use disorders	69	10.2
Psychotic disorders	68	10.1
Adjustment disorders	79	11.7
Anxiety disorders	47	7.0
Other psychiatric disorders	35	5.2
Single-diagnosis and multiple-diagnosis consultations (N = 901) ^b		
Mood disorders	367	40.7
Cognitive disorders	288	32.0
Delirium	190*	21.1*
Dementia	69*	7.7*
Cognitive disorder not otherwise specified	29*	3.2*
Substance use disorders	168	18.6
Psychotic disorders	100	11.1
Adjustment disorders	97	10.8
Anxiety disorders	81	9.0
Other psychiatric disorders	68	7.5
V code/no diagnosis/diagnosis deferred	12	1.3

^aIncludes consultations in which only one diagnosis was made.

^bIncludes consultations in which one diagnosis or multiple diagnoses were made (mean = 1.3 diagnoses/consultation).

*Included in totals for cognitive disorders.

Diagnoses in Inpatient Psychiatric Consultations

of all admissions to UCDMC in fiscal year 2001. The measures of medical complexity considered were length of stay and average diagnosis-related group weight. Diagnosis-related group weight is an index of medical complexity based on the resource implications of the patient's final diagnosis or diagnoses, as recorded in the patient's chart. The higher the average diagnosis-related group weight, the more medically complex is the patient's case. Since length of stay and diagnosis-related group weight are always positive and are skewed toward high values, the geometric mean is a more appropriate summary than the arithmetic (usual) mean and interquartile range is a better measure of spread than the standard deviation. The geometric mean length of stay for the consultation-liaison service patients was 8.1 days (range = 1–508, interquartile range = 14), which was 5.1 days greater than the geometric mean for all admissions ($p < 0.0001$). The geometric mean diagnosis-related group weight for the consultation-liaison service patients was 1.48 (range = 0.38–17.00, interquartile range = 1.71), 0.38 greater than the geometric mean for all admissions ($p < 0.0001$).

Table 4 lists, in descending order of frequency, the primary discharge diagnoses of the patients seen in the 901 consultations included in this study. Infectious diseases (90 cases) and orthopedic problems (86 cases) were the two most frequent primary diagnoses, followed by cardiovascular disease, gastrointestinal disease, poisonings (includes overdoses) and psychiatric illness as primary illness.

Statistical Analysis

Table 5 displays significance levels for analyses contrasting diagnosis rates for mood disorders, substance use

disorders, and cognitive or organic disorders in the current study with the rates in previous studies. The top part of Table 5 reports results for contrasts involving studies that reported a single diagnosis for each case, and the bottom part of Table 5 reports results for contrasts involving studies in which multiple diagnoses were reported. Significance levels have been adjusted for multiple comparisons, that is, for the fact that the analyses reported in Table 5 contains 66 separate significance levels, by means of the Bonferroni method.⁴³ The significance levels reported in Table 5 are therefore conservative.

DISCUSSION

Our study's relatively large sample size (901 consultations) exceeds the sample size of most prior similar studies. We found a rate of psychiatric consultation of 4.2% among all admissions for calendar year 2001. Despite managed care pressures, this is the second-highest consultation rate among similar studies, exceeded only by the rate reported by Hales et al. in 1986.⁹ The 1995 study by Clarke and Smith¹⁴ reported the same consultation rate as our study. The unusually high rates in these three studies, spread over 15 years, do not indicate a trend. Rather, for each study, local factors may explain the high consultation rates. The study by Hales et al. took place at a federally funded medical center where there was no cost barrier to consultations. The study by Clarke and Smith took place in Australia, under a distinct billing model. Finally, UCDMC, the site of the current study, is subject to the constraints of a U.S. university medical center operating in a managed care system, but it has made specific administrative arrangements to facilitate the availability of consultation services, including direct financial support for consultation-liaison service operations.⁴⁴ It is likely that such support translates into more requests for consultation.

In our study, the overall rate of consultations in which at least one psychiatric diagnosis was made was 99%; this rate is consistent with the results of prior studies. Our inclusion in the analysis of consultations in which multiple psychiatric diagnoses were made provides more clinical information but means that the rates of individual psychiatric diagnoses we reported do not measure the same entity as the rates reported in previous studies that considered only a "major" or "single" psychiatric diagnosis for each consultation. Consequently, in Table 5, we reported results of separate comparisons for the two classes of studies.

In our study, more than one psychiatric diagnosis was given in about 25% of consultations. In the study by

TABLE 4. Primary Discharge Diagnoses Among Inpatients Seen in 901 Psychiatric Consultations at an Academic Medical Center in Calendar Year 2001

Illness Category	Number of Patients
Infectious disease	90
Orthopedic conditions	86
Cardiovascular disease	82
Gastrointestinal disease	81
Poisonings/overdoses	69
Psychiatric illness	51
Obstetric/gynecological illnesses	49
Malignant disease	43
Neurological illnesses	35
Thoracic/abdominal surgical conditions	31
Burns	27
Renal/genitourinary conditions	23
Neurosurgical conditions/head trauma	22
Other	212

McKegney *et al.*,⁵ 20% of referral patients had more than one axis I diagnosis. Other studies addressing multiplicity of psychiatric diagnoses have described this phenomenon in terms of the number of psychiatric diagnoses (axis I and axis II) per referral patient. This rate has been reported to range from a low of 1.1 diagnoses per patient to a high of 1.8.^{4,5,13–15,17} The number of diagnoses per referral patient in our study was 1.3, within the range reported by prior studies. The observation of multiple psychiatric diagnoses leads to consideration of an as yet little-defined phenomenon: *multiple* psychiatric comorbidity that complicates the management of medical/surgical illness. In studies that considered only single or major psychiatric diagnoses, the detail offered by consideration of multiple diagnoses is not provided.

We sought to maximize the useful comparisons of our data to those of prior studies by splitting our database into two cohorts. We compared the group of 671 consultations

with only a single psychiatric diagnosis to previous study samples with only one diagnosis per consultation and compared the total group of 901 consultations with previous samples with more than one psychiatric diagnosis per consultation. There is an additional risk of distortion in this method, however, because a consultation that results in two diagnoses in the same DSM-IV-TR group (e.g., a case of preexisting dementia with acute delirium) would be excluded from the single-diagnosis group, despite clearly representing a single DSM-IV-TR category. In addition, the more psychiatrically complex cases are *a priori* excluded from the smaller group.

Several inferences can be drawn from our data on the larger group of consultations (N=901), which included consultations in which multiple diagnoses were made. The mood disorders category was the most common group of psychiatric diagnoses encountered. Comparing our results to those of previous studies in which multiple psychiatric

TABLE 5. Significance Levels for Comparisons of Rates of Psychiatric Consultation Diagnoses in the Current Study With Rates Reported in Previous Studies

Study Format and Comparison Study	Mood Disorders	Substance Use Disorders	Cognitive or Organic Mental Disorders
Single diagnosis ^a			
Karasu <i>et al.</i> ¹	0.06	1.00	1.00
Lipowski and Wolston ²			
Cohort A	0.17	<0.0003**	0.05
Cohort B	<0.0001***	<0.0001***	0.64
Craig ³	0.91	1.00	1.00
Perez and Silverman ⁶	1.00	1.00	1.00
Hengeveld <i>et al.</i> ⁷	<0.0001***	1.00	0.47
Malhotra and Malhotra ⁸	1.00	<0.002*	1.00
Hales <i>et al.</i> ⁹	<0.0001***	<0.0001***	1.00
Kuhn <i>et al.</i> ¹⁰			
Private hospital cohort	1.00	1.00	1.00
Public hospital cohort	0.99	1.00	1.00
Wallen <i>et al.</i> ¹²	<0.0001***	1.00	<0.0001***
Ramchandani <i>et al.</i> ¹⁶	0.054	1.00	1.00
De Jonge <i>et al.</i> ¹⁸	<0.0001***	0.97	1.00
Multiple diagnoses ^b			
Loewenstein and Sharfstein ⁴	0.44	0.09	0.014
McKegney <i>et al.</i> ⁵	<0.0001***	0.02	0.83
Schofield <i>et al.</i> ¹¹	1.00	0.03	<0.0001***
Sobel <i>et al.</i> ¹³	<0.0001***	<0.0001***	<0.0001***
Clarke and Smith ¹⁴	0.05	0.42	1.00
Ormont <i>et al.</i> ¹⁵	<0.0001***	0.29	0.98
Grant <i>et al.</i> ¹⁷			
Cohort A	<0.0001***	Not available	0.99
Cohort B	0.22	<0.0003**	0.07
Diefenbacher and Strain ¹⁹	<0.0001***	<0.0001***	<0.0004**

^aRates from previous studies were compared with rates for 671 consultations in the current study in which only one psychiatric diagnosis was made.

^bRates from previous studies were compared with rates for 901 consultations in the current study in which either one psychiatric diagnosis or multiple psychiatric diagnoses were made.

*p<0.01. **p<0.001. ***p<0.0001.

Diagnoses in Inpatient Psychiatric Consultations

diagnoses were examined, we found that our study's rate of mood disorder diagnoses was significantly higher than the rate in four studies,^{5,13,15,19} significantly lower than the rate for one cohort,^{17[cohort A]} and not statistically different from the rate in four study cohorts.^{4,11,14,17[cohort B]}

We found a rate of cognitive disorder diagnoses of 32.0%; the rate for delirium diagnoses was 21.1%, and the rate for dementia diagnoses was 7.7%. In comparisons with previous studies examining multiple psychiatric diagnoses, the rate of cognitive disorders diagnoses in our study was significantly higher than the rate in two previous studies,^{11,13} lower than the rate in one previous study,¹⁹ and not significantly different from the rate in several other cohorts.^{4,5,14,15,17[cohorts A and B]} In a study that focused solely on cognitive disorders, Trzepacz et al.²⁰ found a diagnosis rate of 17% for DSM-III organic mental disorders in an inpatient consultation-liaison service referral population (133 of 771 patients); delirium was diagnosed in 77 patients (10%), and dementia was diagnosed in 45 patients (5.8%).

Before publication of DSM-IV, the now obsolete category of "organic mental disorders" included substance-induced syndromes and "organic" syndromes currently classified by their symptoms (e.g., mood and anxiety disorders due to a general medical condition).²¹⁻²⁴ Consequently, patients who meet the criteria for a DSM-IV or DSM-IV-TR diagnosis of cognitive disorder are a more exclusively defined group than were patients who formerly received a DSM-III or DSM-III-R diagnosis of organic mental disorder.²¹⁻²⁴ In light of the fact that the current category of cognitive disorders is more restrictive than the formerly used organic mental disorders category, one would expect a lower rate of cognitive disorder diagnoses, compared to the broader, "organic" category, if the cognitive disorders were not more frequently encountered.

In studies in which multiple diagnoses were considered, the rates of cognitive or organic disorder diagnoses tended to be higher after 1995. Before 1995, the average rate among studies was 16.5%, compared to 37.6% after 1995. Although there is some overlap in the rates among pre-1995 and post-1995 studies, the difference in the average rate in the two time periods is statistically significant ($p < 0.05$). The post-1995 period roughly represents the time period of significant managed care influence. In the managed care era, medical center admission criteria are more stringent, and patients who are admitted may be older and more acutely ill than patients in previous eras and thus may be more at risk for cognitive impairment, which has been shown to have an adverse effect on the hospital length

of stay.⁴⁵⁻⁵² It is also possible that local factors may affect rates of cognitive disorders. UCDMC is a level I trauma center that cares for a large number of patients with multiple traumas, including CNS trauma. Therefore, the patients in the consultation-liaison caseload at UCDMC may be at greater risk for developing delirium because of the clinical complexity of their conditions.

A concern may be raised that our study's inclusion of consultations in which multiple diagnoses were made may contaminate the apparent rate of cognitive disorders, because a patient with simultaneous dementia and depression would be counted as having a "case" of each illness, whereas studies that recorded only one diagnosis per patient would consider such a patient to have a case of only one of these illnesses. However, even in studies in which only a single diagnosis category was allowed, it seems likely that dementia or delirium would be considered the most important psychiatric illness, as these conditions are so commonly the reason for (often urgent) consultations. The rate of cognitive disorder diagnoses in our study was the second highest among the studies that considered multiple diagnoses and the third highest among the studies that considered only single diagnoses. As cognitive disorders are more common in older patients with greater medical comorbidity, the high rate of cognitive disorders may contribute to increased medical center lengths of stay.

The rate of substance use disorder diagnoses in our study was 18.6%. Compared to the rates found in previous studies that considered multiple diagnoses, this rate was significantly higher than the rate in two studies,^{13,19} significantly lower than the rate in one cohort,^{17[cohort B]} and not significantly different from the rate in several other studies.^{4,5,11,14,15} It is possible that local sociocultural factors may be related to the rates of mood and substance use disorders diagnoses found in the current study. Sacramento is an urban area with a large number of recent immigrants, many of whom are non-English speaking and have not been fully acculturated. Among California counties, Sacramento County has the second highest percentage of individuals who speak a language other than English as their principal language (Hendry Ton, M.D., personal communication, 2003). In Sacramento County, five non-English languages (Spanish, Vietnamese, Cantonese, Russian, and Hmong) are considered to be "threshold" languages (spoken by at least 5% of the Medicaid population or by 3,000 individuals, whichever is less).⁵² These factors may increase the risk of substance use and mood disorders, particularly in the context of medical illness and cultural dislocation.

When our more restricted group of 671 single-diagnosis consultations was compared to cohorts in prior studies considering single diagnoses, a slightly different picture emerges. In the smaller cohort, we found a 35.4% rate of mood disorder diagnoses, a 20.1% rate of cognitive disorders, and a 10.2% rate of substance use disorders. These rates were lower than the rates for those diagnoses in the larger group of 901 consultations in our study ($p < 0.05$). Thus, when the more complex cases are included in the analysis, the diagnosis rate for all three of these categories increases. In addition, the third most common diagnosis in the single-diagnosis cohort was adjustment disorders (11.7%).

The rate of mood disorders in the single-diagnosis cohort in our study was significantly higher than the rate in three previous studies that considered single diagnoses,^{7,9,18} significantly lower than the rate in two previous single-diagnosis cohorts,^{2[cohort B],12} and not significantly different from the rate in several other previous studies in which single diagnoses were considered.^{1,2[cohort A],3,6,8,10[both public and private hospital cohorts]} This comparison suggests that mood disorder diagnoses may not be more common in the present era when only consultations with single diagnoses are considered but may be more common when multiple-diagnosis consultations are considered.

We found a rate of cognitive disorder diagnoses of 20.1% in the single-diagnosis cohort in our study. This rate is significantly higher than the rate in one previous study that considered single diagnoses¹² and not significantly different from the rate in several other such studies.^{1-3,6-10,16,18} Even when only single-diagnosis consultations were considered, cognitive disorders accounted for a substantial percentage of consultation-liaison service diagnoses, despite the more restrictive DSM-IV diagnostic criteria. This analysis does, however, eliminate cases in which both delirium and dementia and no other psychiatric illness were diagnosed and thus likely underestimates the rate of cognitive disorder diagnoses.

Finally, the diagnosis rate for substance use disorders in the single-diagnosis cohort in our study (10.2%) was significantly greater than the rate in four other cohorts in single-diagnosis studies^{2[cohorts A and B],8,9} and not significantly different from the rate in other similar studies.^{1,3,6,7,10[both public and private hospital cohorts],12,16,18} Given that the four lowest rates of substance use disorder diagnosis were from studies published before 1987,^{2,8,9} a trend toward a higher rate of substance use disorders as a single diagnosis may be emerging in recent years.

Patients for whom consultation-liaison services were

provided had a geometric mean length of stay of 8 days, compared with 3 days for all UDCMC adult admissions, and had a higher diagnosis-related group weight for medical resource intensiveness. These findings suggest that the patients for whom consultation-liaison services are completed are a group with high levels of medical/surgical complexity. Resource decisions regarding consultation-liaison services need to take this finding into account, as a preselection bias appears to exist (i.e., referring physicians request consultation-liaison services for disproportionately large number of the most ill patients). Among primary illness groups, infectious diseases and orthopedic conditions were the most frequent among patients seen by the consultation-liaison service, with each group representing 10% of those patients.

One limitation of our study was the reliance on retrospective data gathering, rather than a prospective design. As such, we relied on the diagnoses provided by the faculty consultation-liaison service psychiatrist who saw the patient, rather than on diagnoses derived from a research diagnostic method, such as the use of standardized structured interviews and/or formal rating scales. In addition, our data source did not directly address severity of impairment resulting from psychiatric illness or the simultaneous medical/surgical illnesses. UDCMC is a university medical center with a well-staffed consultation-liaison service, and these results may not apply to institutions where consultation-liaison services are less readily available. Limitations of our analysis of data for the smaller cohort of 671 consultations with a single diagnosis, compared to previous studies that considered single diagnoses, include the concern that this cohort excludes more psychiatrically complex cases, leaving a risk of distortion. This limitation may affect the inferences drawn from analysis of the data presented in the top part of Table 2.

In conclusion, we found that mood disorders, cognitive disorders, and substance use disorders continue to be major diagnosis groups encountered in consultation-liaison psychiatry. Strict statistical comparisons with the findings of prior studies are limited by numerous methodological differences between studies and the diagnostic inconsistency resulting from the use of different diagnostic systems. Several prior studies did not cite a specific diagnostic system, some classified cases in somewhat esoteric ways, and some did not include diagnostic data for all diagnostic categories corresponding to the DSM-IV-TR diagnostic groups used systematically in our study. In addition, some of the comparison studies were completed in other countries where it is likely that diagnostic practices may be

Diagnoses in Inpatient Psychiatric Consultations

different. Despite these limitations, we found that mood, cognitive, and substance use disorders remain the core of consultation-liaison practice. Taking a broader view, there has been a trend (substantiated by our findings) toward an increasing rate of cognitive disorder diagnoses in consultation-liaison cases since 1995. Evolving diagnostic sys-

tems and managed care pressures of recent years remain sources of turbulence in consultation-liaison practice and should be assessed in further research.

The authors thank Jan Marks of the UDCMC Decision Support Office for assistance with the data.

References

1. Karasu TB, Plutchik R, Steinmuller RI, Conte H, Siegel B: Patterns of psychiatric consultation in a general hospital. *Hosp Comm Psychiatry* 1977; 28:291–294
2. Lipowski ZJ, Wolston EJ: Liaison psychiatry: referral patterns and their stability over time. *Am J Psychiatry* 1981; 138:1608–1611
3. Craig TJ: An epidemiologic study of a psychiatric liaison service. *Gen Hosp Psychiatry* 1982; 4:131–137
4. Loewenstein RJ, Sharfstein SS: Psychiatric consultations at the NIMH. *Gen Hosp Psychiatry* 1983; 5:83–87
5. McKegney FP, McMahan T, King J: The use of DSM-III in a general hospital consultation-liaison service. *Gen Hosp Psychiatry* 1983; 5:115–121
6. Perez EL, Silverman M: Utilization pattern of a Canadian psychiatric consultation service. *Gen Hosp Psychiatry* 1983; 5:185–190
7. Hengeveld MW, Rooymans HGM, Vecht-van den Bergh R: Psychiatric consultations in a Dutch university hospital: a report on 1814 referrals, compared with a literature review. *Gen Hosp Psychiatry* 1984; 6:271–279
8. Malhotra S, Malhotra A: Liaison psychiatry in an Indian general hospital. *Gen Hosp Psychiatry* 1984; 6:266–270
9. Hales RE, Polly S, Bridenbaugh H, Orman D: Psychiatric consultations in a military hospital: a report on 1065 cases. *Gen Hosp Psychiatry* 1986; 8:173–182
10. Kuhn WG, Bell RA, Frierson RL, Lippman SB: Consultative psychiatry in both private and public general hospitals. *Gen Hosp Psychiatry* 1986; 8:236–240
11. Schofield A, Doonan H, Daly RJ: Liaison psychiatry in an Irish hospital: a survey of a year's experience. *Gen Hosp Psychiatry* 1986; 8:119–122
12. Wallen J, Pincus HA, Goldman HH, Marcus SE: Psychiatric consultations in short-term general hospitals. *Arch Gen Psychiatry* 1987; 44:163–168
13. Sobel SN, Munitz H, Karp L: Psychiatric consultations in two Israeli general hospitals. *Gen Hosp Psychiatry* 1988; 10:298–304
14. Clarke DM, Smith GC: Consultation-liaison psychiatry in general medical units. *Aust N Z J Psychiatry* 1995; 29:424–432
15. Ormont MA, Weisman HW, Heller SS, Najara JE, Shindledacker RD: The timing of psychiatric consultation requests: utilization, liaison, and diagnostic considerations. *Psychosomatics* 1997; 38:38–44
16. Ramchandani D, Lamdan RM, O'Dowd MA, Boland R, Hails K, Ball S, Schindler BA: What, why, and how of consultation psychiatry: an analysis of the consultation process at five urban teaching hospitals. *Psychosomatics* 1997; 38:349–355
17. Grant JE, Meller W, Urevig B: Changes in psychiatric consultations over ten years. *Gen Hosp Psychiatry* 2001; 23:261–265
18. De Jonge P, Huyse FJ, Herzog T, Lobo A, Malt U, Opmeer BC, Kuiper B, Krabbendam A: Referral pattern of neurological patients to psychiatric consultation-liaison services in 33 European hospitals. *Gen Hosp Psychiatry* 2001; 23:152–157
19. Diefenbacher A, Strain JJ: Consultation-liaison psychiatry: stability and change over a 10-year-period. *Gen Hosp Psychiatry* 2002; 24:249–256
20. Trzepacz PT, Teague GB, Lipowski ZJ: Delirium and other organic mental disorders in a general hospital. *Gen Hosp Psychiatry* 1985; 7:101–106
21. Diagnostic and Statistical Manual of Mental Disorders, Third Edition. Washington, DC, American Psychiatric Association, 1980
22. Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised. Washington, DC, American Psychiatric Association, 1987
23. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition. Washington, DC, American Psychiatric Association, 1994
24. Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision. Washington, DC, American Psychiatric Association, 2000
25. Rodriguez JL, Peterson DJ, Muehlstedt SG, Zera RT, West MA, Bublick MP: The impact of managed care and current governmental policies on an urban academic health care center. *Surgery* 2001; 130:539–545
26. Scutchfield FD, Lee J, Patton D: Managed care in the United States. *Public Health Med* 1997; 19:251–254
27. Wachter RM, Katz P, Showstack J, Bindman AB, Goldman L: Reorganizing an academic medical service: impact on cost, quality, patient satisfaction, and education. *JAMA* 1998; 20:1560–1565
28. Taheri PA, Butz DA, Greenfield LJ: Academic health systems management: the rationale behind capitated contracts. *Ann Surg* 2000; 231:849–859
29. Karpf M, Schultze RG, Levey G: The decade of the nineties at the UCLA Medical Center: responses to dramatic marketplace changes. *Acad Med* 2000; 75:781–792
30. Lanzieri M, Hobbs R, Roy P, Richmond R: Use of a clinical care map for the management of congestive heart failure in a community hospital. *Congest Heart Fail* 2001; 7:37–42
31. Ghosh K, Downs LS, Padilla LA, Murray KP, Twigg LB, Letourneau CM, Carson LF: The implementation of critical pathways in gynecologic oncology in a managed care setting: a cost analysis. *Gynecol Oncol* 2001; 83:378–382
32. Hospitalists reduce LOS, slash costs in academic medical center. *Health Care Cost Reengineering Rep* 1998; 3:119–121
33. Kaplow M, Charest S, Mayo N, Benaroya S: Managing patient length of stay better using an appropriateness tool. *Healthcare Manage For* 1998; 11:13–20
34. American Psychiatric Association: Practice Guideline for the Treatment of Patients With Alzheimer's Disease and Other Dementias of Late Life. *Am J Psychiatry* 1997; 154(May suppl)
35. Jorm AF, Jolley D: The incidence of dementia: a meta-analysis. *Neurology* 1998; 51:728–733
36. Bourgeois JA, Seaman JS, Servis ME: Delirium, dementia, and amnestic disorders, in *The American Psychiatric Publishing Textbook of Clinical Psychiatry*, Fourth Edition. Edited by Hales RE, Yudofsky SC. Washington, DC, American Psychiatric Publishing, 2003, pp 259–308
37. Wise MG, Hilty DM, Cerda GM, Trzepacz PT: Delirium (acute

- confusional states), in *The American Psychiatric Publishing Textbook of Consultation-Liaison Psychiatry: Psychiatry in the Medically Ill, Second Edition*. Edited by Wise MG, Rundell JR. Washington, DC, American Psychiatric Publishing, 2002, pp 257–272
38. Dobovsky SL, Davies R, Dubovsky AN: Mood disorders, in *The American Psychiatric Publishing Textbook of Clinical Psychiatry, Fourth Edition*. Edited by Hales RE, Yudofsky SC. Washington, DC, American Psychiatric Publishing, 2003, pp 439–542
 39. Strain JJ: Liaison psychiatry, in *The American Psychiatric Publishing Textbook of Consultation-Liaison Psychiatry: Psychiatry in the Medically Ill, Second Edition*. Edited by Wise MG, Rundell JR. Washington, DC, American Psychiatric Publishing, 2002, pp 33–48
 40. Coyne JC, Fechner-Bates S, Schwenk TL: Prevalence, nature, and comorbidity of depressive disorders in primary care. *Gen Hosp Psychiatry* 1994; 16:267–276
 41. Simon GE, VonKorff M, Wagner EH, Barlow W: Patterns of antidepressant use in community practice. *Gen Hosp Psychiatry* 1993; 15:399–408
 42. Mack AH, Franklin JE, Frances RJ: Substance use disorders, in *The American Psychiatric Publishing Textbook of Clinical Psychiatry, Fourth Edition*. Edited by Hales RE, Yudofsky SC. Washington, DC, American Psychiatric Publishing, 2003, pp 309–377
 43. Fisher LD, van Belle G: *Biostatistics: A Methodology for the Health Sciences*. New York, John Wiley and Sons, 1993
 44. Bourgeois JA, Hilty DM, Klein SC, Koike AK, Servis ME, Hales RE: Expansion of the consultation-liaison paradigm at a university medical center: integration of diversified clinical and funding models. *Gen Hosp Psychiatry* 2003; 25:262–268
 45. Levkoff SE, Evans DA, Liptzon B, Cleary PD, Lipsitz LA, Welte TT, Reilly CH, Pilgrim DM, Schor J, Rowe J: Delirium: the occurrence and persistence of symptoms among elderly hospitalized patients. *Arch Intern Med* 1992; 152:334–340
 46. Cole MG, Primeau FJ: Prognosis of delirium in elderly hospital patients. *Can Med Assoc J* 1993; 149:41–46
 47. Saravay SM, Steinberg MD, Weinschel B, Pollack S, Alovic N: Psychological comorbidity and length of stay in the general hospital. *Am J Psychiatry* 1991; 148:324–329
 48. Levenson JL, Hamer R, Rossiter LF: Relation of psychopathology in general medical inpatients to use and cost of services. *Am J Psychiatry* 1990; 147:1498–1503
 49. Holmes J, House A: Psychiatric illness predicts poor outcome after surgery for hip fracture: a prospective cohort study. *Psychol Med* 2000; 30:921–929
 50. Rockwood K: Delays in the discharge of elderly patients. *J Clin Epidemiol* 1990; 43:971–975
 51. Fulop G, Strain JJ, Fahs M, Schmeidler J, Snyder S: A prospective study of the impact of psychiatric comorbidity on length of hospital stays of elderly medical-surgical inpatients. *Psychosomatics* 1998; 39:273–280
 52. Wancata J, Benda N, Windhaber J, Nowotny M: Does psychiatric comorbidity increase the length of stay in general hospitals? *Gen Hosp Psychiatry* 2001; 23:8–14