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Butler, Stephen F;Docherty, John P
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A Comprehensive System for Value Accounting in Psychiatry

Stephen F. Butler, Ph.D.
John P. Docherty, M.D.

Abstract

This article describes a clinical management tool, the Value Accounting System, developed for use by a national organization of psychiatric treatment facilities. The system integrates patient case-mix variables with data on services provided, key administrative and clinical processes, clinical effectiveness, and cost/price. A comprehensive database links critical quality information with fiscal information, yielding a management tool that is national in scope, standardized, and versatile enough (1) to address general questions of the effectiveness and value of psychiatric services and (2) to provide an empirical base for rational, clinical management decision making. Descriptive data are presented from an attempt to establish a database and implement the system. The management and scientific potential of the Value Accounting System to improve the quality and efficiency of mental health services are discussed.

Along with other areas of medicine, psychiatry must learn to cope with the extraordinary revolution that is currently changing the way Americans think about health care. The nation now demands more efficient health care delivery systems, greater access to health care, and acceptable outcomes at a reasonable cost. Successful functioning and participation in this new era require new and powerful management tools. One such tool is the Value Accounting System.* The system is standardized, versatile, and can provide an empirical base for rational clinical management decisions. This article presents the rationale, method, and procedures, along with a description of one effort to implement the Value Accounting System.

Background

The United States is undergoing a radical change in the primary objectives, mission, and expectations of health care. The last three decades were devoted to a national concern with development of new, demonstrably effective treatments. During this time, the health care field was remarkably successful in accomplishing this mission. Recently, however, the realization of these successes has been accompanied by an increasing sense of crisis in health care delivery. Dramatic increases in health care costs [1,2] have resulted in a new mission that moves beyond treatment developments to enhancing care of individual patients and advancing the well-being of society. This new mission requires sophisticated health service planning, which in turn requires the development of new concepts, tools, and methods.

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* The Value Accounting System has been developed as a research and management tool for the psychiatric division of an international medical corporation.

Address correspondence to Stephen F. Butler, Ph.D., vice president, Innovative Training Systems, Inc., One Gateway Plaza, Suite 601, Newton, MA 02158.

John P. Docherty, M.D., is associate medical director, Westchester Division, and vice-chair of the Department of Psychiatry at the New York Hospital, Cornell Medical Center, White Plains, NY.

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HMOs, PPOs, and other forms of managed care reflect initial efforts to change the incentives of the health system and achieve greater control over the costs and quality of health care. The effectiveness of these efforts has been questioned. The Jackson Hole Group, a think tank on health care issues, has criticized the current system of managed care with these words: "Too often, however, 'managed care' has increased administrative complexity and arms-length conflict without equivalent improvements in cost and quality" (p. 1).[3] Instead, this group argues for an entirely different relationship between insurers and providers than that which exists today.

As with other areas of medicine, psychiatry has had to contend with rising costs and the efforts of various forms of managed care to control costs. There is some evidence that current managed care plans reduce at least short-term costs associated with psychiatric care. However, little is known about the effect of managed care programs on patient outcome.[4] A recent study by the RAND Corporation[5] suggests that the quality of care for patients with psychiatric disorders may suffer under some current forms of managed care. Yet, even as some forms of managed care are found to be inadequate, the need to restructure mental health services to be more efficient and cost-effective remains. In their discussion of a 21st-century health care system, the Jackson Hole Group postulates three central requirements:

- Vast improvements in clinical information systems to improve medical decision making;
- Accountable insurer and provider organizations and relationships that are effective, yet unobtrusive in day-to-day decision making;
- A competitive market structure that rewards insurers and providers for balancing medical care costs, quality, and patient satisfaction—that is, for improving the *value* of medical care—and prohibits competition based on biased risk selection and underwriting practices (p. 2).[3]

The use of the word "value," italicized in the above quotation by the Jackson Hole Group, reflects a momentous shift of perspective for all medicine, including psychiatry. Valuable mental health service is service that yields good outcomes efficiently.[6] The concept of value encompasses the ultimate goal of controlling costs while achieving acceptable outcomes. This goal, in turn, implies the ability (1) to track costs, (2) to measure administrative and clinical processes, (3) to measure patient outcomes and satisfaction, and (4) to integrate these data (costs, processes, and outcomes) in a way that enhances administrative policy and clinical decision making.

Efforts to achieve value in health care services are not only laudable; they are rapidly becoming obligatory. The Joint Commission on Accreditation of Healthcare Organizations[7,8] and Medicare have mandated some documentation of outcomes. Such forces have resulted in a considerable interest in "outcomes management" and continuous quality improvement (CQI).

As psychiatry enters the age of CQI, the challenge is (1) to develop methodologies for operationally defining and evaluating mental health treatments, administrative structures, outcomes, consumer satisfaction, and costs; and (2) to use these data to achieve good patient care at less cost. This suggests that the task of measuring and managing mental health outcome has, at its core, questions of vital interest to the practice of psychiatry: What are the appropriate treatments, settings, providers, levels, or intensity of care for patients with particular diagnoses or sets of problems? Currently, there is little consensus on the treatment of choice for any particular psychiatric disorder.[9-11] Yet, as desirable outcomes are identified and agreed upon, practice patterns will become more consistent. Reliable outcome data are an essential first step in making treatment decisions that incorporate advances in the scientific understanding of the etiology and treatment of psychiatric disorders.[12]

To address these challenges for psychiatry, we have undertaken to develop a method for collecting and analyzing reliable and valid data on psychiatric treatments.

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Figure 1
Value Accounting System

VALUE	QUALITY	SERVICE	Resources & Personnel	• Suitable • Sufficient • Aesthetic	• Credentialing • Staffing Guidelines • Patient Characteristics
			Procedures & Processes	• Appropriate • Necessary • Current • Competent • Compassionate	• Practice Guidelines • Critical Incidents • QM Audit
		EFFECTIVENESS	Outcomes	• Access • Satisfaction • Clinical Effectiveness	• Patient Satisfaction • GAF • SF-36 • Self-report (symptom, functioning, well-being)
	FISCAL	PRICE	Cost	• Cost • Cost-benefit • Cost-effectiveness	• Cost of Resources & Personnel • Treatment Utilization • Cost-Offset

The Value Accounting System

Figure 1 presents a schematic diagram of two main components of this Value Accounting System. One component is a traditional fiscal accounting system; that is, a system that provides a detailed quantitative account and analysis of the costs of providing service.

The second component is a quantitative quality accounting system. It is a given that a financial accounting system is necessary and useful to a successful business. As in fiscal accounting, where managers use quantitative data to track the financial status of an organization, a quality accounting system quantifies key facets of quality to yield similar tracking capability. Thus quality and fiscal measures are parallel contributors to the general value of services provided.

The left side of Figure 1 lists the four domains. Derived from a classic health services research paradigm for evaluation,[13,14] this approach assumes that a quality accounting system should provide quantitative measurement of the quality of key domains. These domains encompass the following: (1) resources used to provide service, (2) clinical and administrative procedures constituting and supporting the provision of service, and (3) measures of effectiveness of service, including the consumer (patient, payer) satisfaction and clinical outcome. The fourth domain reflects fiscal data represented by the assessment of cost. Relevant characteristics of each domain are listed in the next row of boxes, while the boxes on the far right detail some possible ways to operationalize each domain.

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Figure 2

Distribution of Age for Inpatient Sample

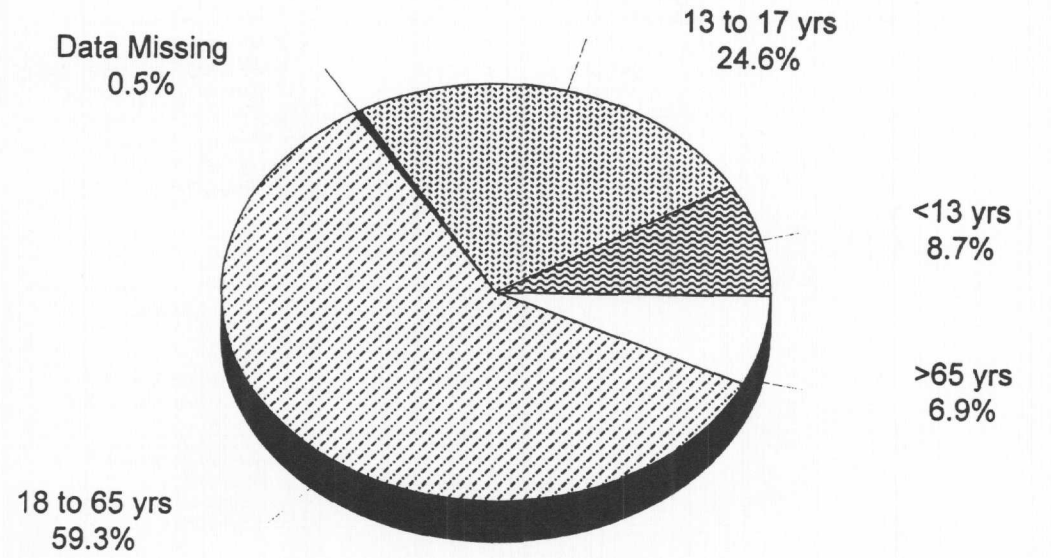

Figure 3

Distribution of Gender for Inpatient Sample

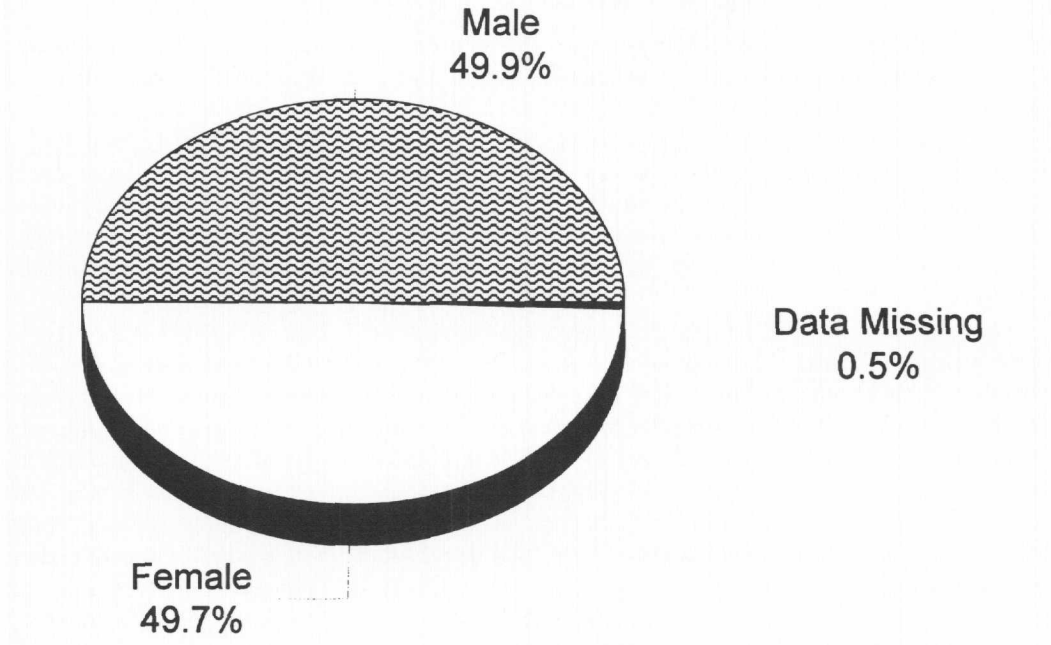

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Figure 4

Distribution of Origin for Inpatient Sample

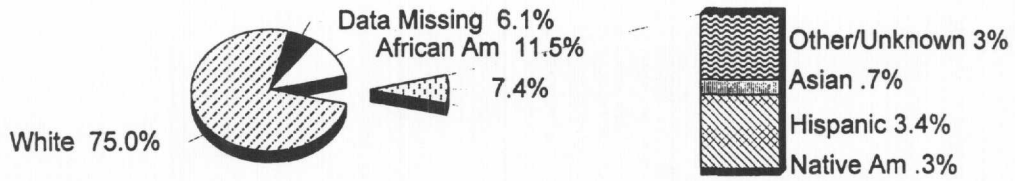
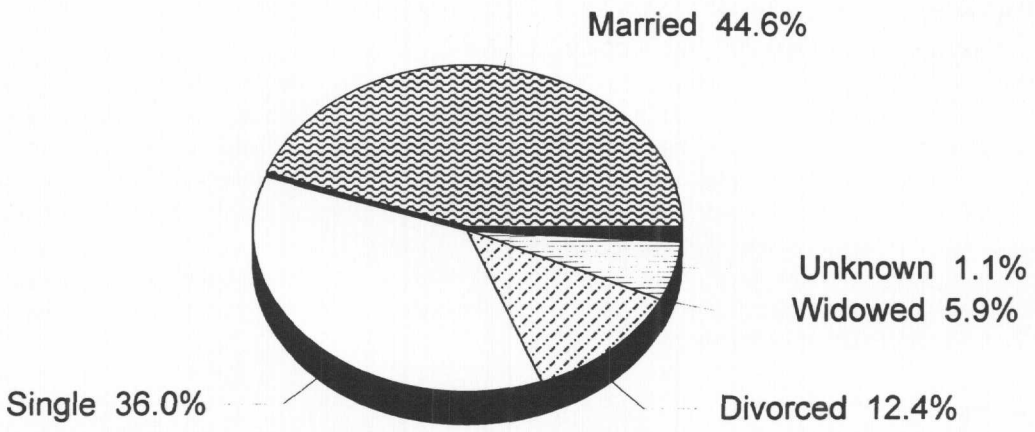


Figure 5

Distribution of Marital Status for Inpatient Sample



Note: Frequencies calculated for patients 18 years or older for marital status.

Value is the intersection between the cost (or price) of a service and the quality of that service. As Figure 1 illustrates, the measurement of value is achieved by combining quality accounting with data from fiscal accounting systems to identify value. The following sections describe an initial phase in the application of the Value Accounting System in a large psychiatric system (68 facilities in 24 states and Washington, D.C.).

Implementation of the Value Accounting System

At the heart of the Value Accounting System is a database that organized the data from each domain for statistical manipulation and reporting. The database integrates information from each domain (resources, procedures and processes, outcomes, and cost) with identified patient characteristics (case mix variables). The database is designed to be comprehensive and to include data on all patients in the

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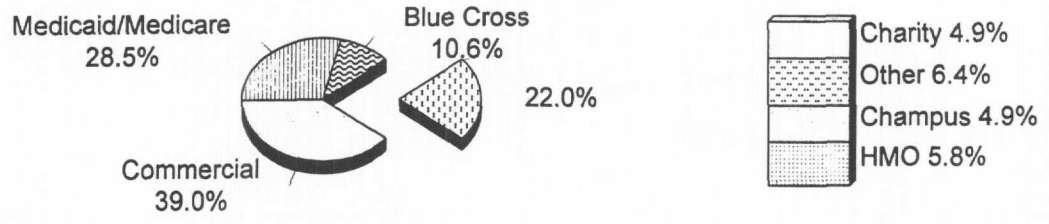
Figure 6

Distribution of Payer for Inpatient Sample



system, including inpatients, partial hospital patients, and outpatients. The general structure of the database exceeds guidelines published by the NIMH for essential clinical management data.[15]

Patient Demographics

Demographic and other case mix variables were obtained on all patients who entered treatment. Data on all inpatients treated since January 1991 and November 1993 were entered into the database. Demographic data exists on 185,207 patient admissions/intakes, of which the vast majority (93.8%) are inpatients. Data on age, sex, marital status, admission and discharge dates, and episode number are included, along with admission and discharge diagnoses (primary diagnosis plus all five axes). The Axis V Global Assessment of Functioning (GAF) ratings are available on 72,541 patients (patients discharged between November 1992 and November 1993).

Demographic data for the inpatients covered in the database are presented in Figures 2-5. Figure 6 presents the distribution of payer information for this inpatient sample. Percentages of discharge diagnoses for inpatients are presented in Table 1.

Resources and Personnel

This domain captures the data on personnel, such as FTE ratios and credentialing files. These include education, specialty, board certification, treatment, and research experience of each clinician at the facility. The database has the capacity to track each attending's patients with regard to process and outcome variables, including types of patients, diagnoses, outcomes, length of stay, and so forth. Furthermore, similar tracking is possible by facility and unit or program. This capability allows very precise description and analysis of the performance of each component in the system.

Procedures and Processes

To operationalize procedures and processes, quality management (QM) audits are conducted quarterly by a team of trained auditors.* A *QM Audit Resource Manual* has been constructed to guide intensive on-site reviews. The instrument evaluates 11 key areas of clinical and administrative operation: information and referral services, patient rights, documentation, credentialing, governing board, financial issues, inpatient assignments to physicians, family admissions, length of stay and discharge criteria, UR and case management standards, and quality assessment and improvement activities. Examples of indicators and criteria are presented in Figure 7.

* Tests of interrater reliability are planned. We expect to obtain intraclass *R*s in excess of .75 (above the standard minimum, .70).

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Figure 7

Sample Indicators of the Quality Management Audit

Topic/Standard	Indicators	Audit Methodology	Score
Documentation Documentation meets all regulatory agency, utilization/case management, and professional staff by laws and hospital requirements	Psychiatric evaluations within 24 hours include: Inventory of patient's assets/ strengths in descriptive terms Mental status that addresses: Attitudes/behavior Intellectual functioning Memory functioning Orientation	Review a total of 10 charts for the five required data elements (see indicator column). A total of 50 data elements is optimum. Include in the sample of 10: 4 inpatient active charts 4 inpatient closed charts 1 partial active chart 1 partial closed chart	Number of data elements present: 4 = 39-50 elements 3 = 27-38 elements 2 = 15-26 elements 0 = <15 elements
Patients' rights The individual dignity and rights of each patient are respected at all times	Seclusion and/or restraints (including therapeutic holds) are used only with documented presence of behaviors that are dangerous to self or others and include documented failure of less restrictive interventions	Review five charts of patients who had seclusion/ restraint criteria or therapeutic hold in past six months for clinical justification	Number of charts meeting criteria: 4 = five charts 3 = four charts 2 = three charts 0 = < three charts

Each of 50 indicators is rated from 0 (lowest) to 4 (highest), yielding a possible range of 0 to 200. Examination of quality ratings from one recent fiscal quarter (March, April, and May) for 68 facilities yielded a range of quality ratings from 103 to 195, with a mean of 172.28 and a standard deviation of 18.93 (median = 179, mode = 184). The distribution had a moderate, negative skew (–1.09), with most facilities scoring well, while a few scored quite low. Such skewness would be expected for a management tool designed to identify and improve problematic programs. A "redline" procedure might be adopted, targeting programs scoring less than a standard deviation below the mean. Over time, improvement would be observed in a "tightening" of the distribution toward the high end of the range.

OUTCOME

Clinician-rated outcome. One important perspective on outcome is the perspective of the treating clinician. The Global Assessment of Functioning (GAF) scale reflects this perspective in the Value Accounting System. This measure has several advantages. Global scales, like the GAF, are relatively easy to use and are inexpensive to process and analyze. Global scales have good face validity, integrate multidimensional decisions made about patients, and have been shown to maintain reliability and validity.[16] Finally, the GAF is widely used and recognized by the agencies and institutions interested in outcome.

The Value Accounting System is conceptualized for use in the non-research-oriented clinical setting. Using independent raters, the researcher's ideal is prohibitively expensive in these settings. Since admission and discharge GAF ratings were to be made by the attending provider (physician or psychologist), it was critical to establish and monitor interrater reliability of GAF ratings. To address this concern, the following procedures were initiated. During a pretest, each attending provider rated standard clinical vignettes. Principles for consistent use of the GAF* were reviewed

* Instructions for the GAF, based on its predecessor, the GAS, can be obtained from Dr. Jean Endicott, chief, Department of Research Assessment and Training, Office of Mental Health, New York State Psychiatric Institute, 722 West 168th Street, New York, NY 10032.

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Table 1

Distribution of Diagnostic Categories

Discharge Diagnosis	Percentage of Patients With Diagnosis
Major depression	44.6
Bipolar disorder	8.4
Substance abuse	13.1
Schizophrenic	7.5
Other psychotic	2.1
Anxiety	1.1
Somatoform disorders	<.1
PTSD	2.3
Adjustment disorder	2.9
Dissociative disorder	.8
Cyclothymic/dysthymic	2.6
Psychosexual	.1
Personality disorder	.1
Dementia	.5
Other organic	1.9
Organic	.2
Conduct disorder	1.0
Oppositional defiant	1.6
ADHD	1.4
Impulse disorder	1.3
Developmental disorder	<.1
Identity disorder	<.1
Mental retardation	<.1
Other/unknown	.8
Data missing	5.1

with attending providers during a professional staff meeting. A posttest followed, in which different standard vignettes were rated. Reliability was calculated by comparing the attending providers' ratings with "gold standard" ratings for the standard vignettes.[17] Preliminary results, based on participating facilities, are promising. An average intraclass R for the pretest is .78 (n = 29, SD = .07, range = .65 to .91). The posttest mean intraclass R is .92 (n = 8, SD = .02, range = .89 to .94). Such training and testing procedures illustrate a feasible, low-cost method for strengthening and monitoring the reliability of clinician ratings in non-research-oriented clinical settings.

The calculation of GAF change involves categorizing patients as "improved," "no change," and "worse." Based on the standard error of measurement for the GAF, "no change" is a discharge score within ±5 points of the admission score.[18] GAF data by unit, service, attending, and diagnosis are distributed to all facilities. Overall, 83.9% of patients were rated as "improved," 13.6% were rated as "no change," and 2.6% were rated as "worse." Across all patients, there is a highly significant difference between admission scores and discharge scores ($t = 349.66, p < .001, df = 72,540$). Within the "improved" group, the majority (81.8%) show clinically significant gains (greater than 1 standard deviation over admission score) on the GAF.

Patient-rated outcome. The other important perspective on outcome is patient self-report. Instruments chosen should assess symptomatology, social and work function, satisfaction with

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Table 2

Admission and Discharge Scores on the Symptom Items of the SF-36+

Symptom Measure[a]	Admission		Discharge				
	Mean	*SD*	Mean	*SD*	*df*	*t* Value	Significance
Depression	68.11	31.87	25.80	27.73	476	25.09	.000
Paranoia	30.67	35.15	15.70	25.62	476	9.06	.000
Hear voices	11.90	26.70	6.22	18.87	476	4.83	.000
Visual hallucinations	12.05	27.10	5.76	18.59	476	4.87	.000
Anxiety	68.09	32.68	38.27	32.36	476	17.33	.000
Panic	42.10	39.27	14.49	25.80	476	15.39	.000
Phobia	39.40	37.86	14.54	24.55	476	14.36	.000
Obsessions	41.65	39.44	15.32	26.90	476	14.43	.000
Compulsions	22.53	33.27	7.50	18.68	476	10.66	.000
Suicidal	37.34	40.69	9.66	23.35	476	15.26	.000
Global severity	35.72	20.58	16.83	15.00	476	20.21	.000

Note: $N = 477$.

a. Ratings are made on visual analog items from 0 (*not bothered by problem*) to 100 (*extremely bothered by problem*).

treatment, and health care resource utilization. They should be easy to use, have empirically demonstrated reliability and validity, be in the public domain, and ideally be in wide use with a large published or accessible database. We have tested the use of an expanded version of the Health Status Questionnaire, sometimes called the SF-36.[19] To generate more comprehensive and specific assessments of psychiatric and chemically dependent patients, additional items have been added. We refer to this instrument as the SF-36+. These additional items assess psychiatric symptoms, occupational and social functioning, and substance use and legal contacts.* Preliminary validity and reliability analyses for the new items are promising,[20] and publication of a complete assessment of the measure's reliability and validity will be forthcoming.

Data using the SF-36+ are routinely collected at one hospital for all adult inpatients and partial psychiatric and chemical dependency patients, as well as adolescents to age 14. For inpatients, admission and discharge data are collected on symptom measures and measures of work, school, or housework functioning, daily functioning, functioning with spouse or significant other, and functioning with family. Summary data for these symptom and functioning items are presented in Tables 2 and 3 for patients discharged over a span of six months. On admission, this population of inpatients endorses the greatest average amount of distress in the areas of depression and anxiety. For the group as a whole, significant improvement is observed at discharge on all symptom and functioning dimensions. Graphical breakdowns of these data by unit (adult psychiatry, woman's unit, adolescent unit, and chemical dependency unit) are distributed on a monthly and quarterly basis. Also reported to facilities are the medical record numbers of those patients whose discharge scores on the depression, anxiety, and suicide scales indicate worse status on these dimensions than their admission scores. This information triggers a review by the unit's TQM committee for review.

Obtaining follow-up data on patients' functioning, health, and well-being, and subsequent treatment utilization is critical for determining the long-range effects of interventions. Telephone follow-up interviews at three months postdischarge have begun at one hospital. These telephonic interviews consist of the SF-36 items, as well as some items asking about substance use, police

* We wish to acknowledge the consultation of Drs. Fred Newman, Tom McLellan, and Greg Teague in the development of these items.

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Table 3

Admission and Discharge Scores on the Functioning Items of the SF-36+

Functioning Measure[a]	*N*	Admission Mean	Admission *SD*	Discharge Mean	Discharge *SD*	*df*	*t* Value	Significance
Social	510	55.78	36.17	18.93	27.52	509	21.57	.000
Daily	510	56.16	37.31	17.14	27.35	509	21.64	.000
Spouse/ significant other[b]	407	57.92	40.10	23.61	33.06	406	16.30	.000
Family	510	59.00	37.17	27.99	34.16	509	16.90	.000

a. Ratings are made on visual analog items from 0 (*not bothered by problem*) to 100 (*extremely bothered by problem*).
b. Spouse/significant other calculated only for patients 18 and older.

contact, and days missed at work or other primary activity. Finally, patients are asked about their use of medical and psychiatric services after leaving the hospital. Their responses are compared to baseline answers collected at admission. Preliminary results on the SF-36 subscales are shown in Table 4 for a sample of 84 patients followed at three months. These patients reported significant improvement on all the subscales except physical functioning and bodily pain. The other subscales, including role functioning limited by physical problems, general health, vitality, role functioning limited by emotional problems, social functioning, and mental health, all show significant and substantial group improvement.

While these efforts are very preliminary, they suggest the feasibility of assessing inpatients in this manner. Of particular note is that different data are collected and analyzed at discharge and follow-up. That is, baseline data on all self-report items (72 items in all) are obtained at admission. Only the symptom items and functioning items that could arguably be addressed in a very brief (3- to 10-day inpatient stay) are examined at discharge. At follow-up, the focus is on functional limitations (the SF-36), substance use, legal problems, daily functioning, and service utilization. Thus the initial, intake assessment is comprehensive, while assessments at subsequent points, such as discharge and follow-up, are more targeted and brief.

Client satisfaction. When assessing improvement achieved through medical interventions, attention must be paid to whether the treatment and results meet the needs and expectations of the patient.[21] Patient satisfaction with treatment is assessed three weeks after discharge for inpatients and partial hospital patients. Patients and family members are mailed a Patient Satisfaction Questionnaire. The core of this questionnaire is the Client Satisfaction Questionnaire (CSQ) developed by Attkisson and associates.[22,23] This eight-item questionnaire has been used in several published accounts of evaluations of mental health programs, which provide some basis of comparison.[23,24] In addition to the CSQ, specific items have been added about environment (cleanliness, privacy, safety), admission procedures, billing procedures, and staff (physicians, psychologists, social workers, nurses, mental health workers). Patient and family satisfaction data are compiled and distributed to facilities quarterly.

Fiscal Data

The final domain of the Value Accounting System reflects a well-established, detailed accounting of facility level costs, including a breakdown by all categories of personnel and departments and interactive measures such as cost/patient day. In addition, charges for services entered on billing forms, such as the UB-82 form, which captures billable services and their charges, are input into the

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Table 4

SF-36 Subscale Scores at Admission and Three-Month Follow-Up

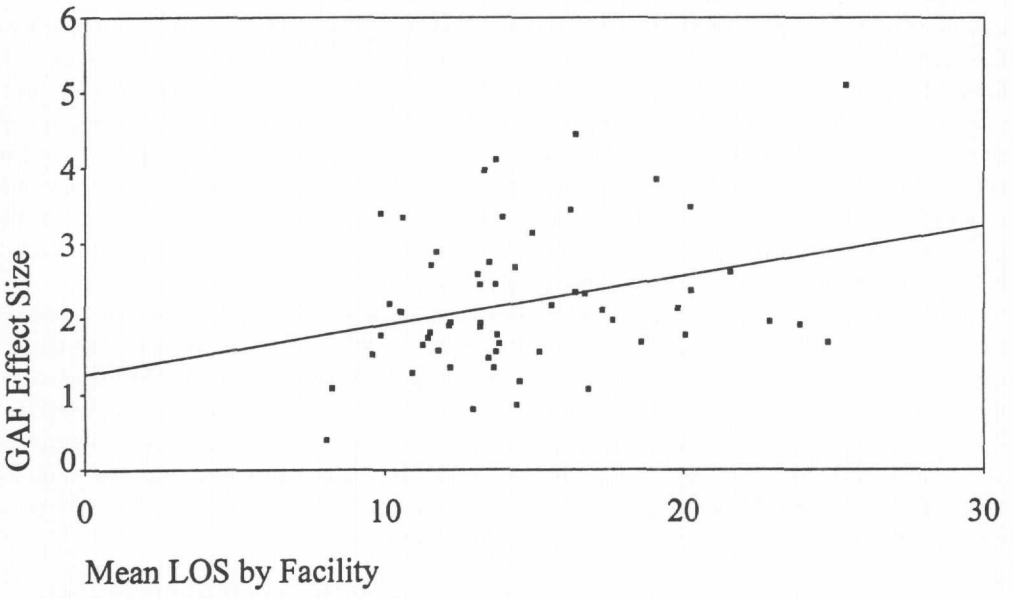
Subscale	*N*	Admission Mean	Admission *SD*	Follow-Up Mean	Follow-Up *SD*	*df*	*t* Value	Two-Tailed Significance[a]
Physical functioning	77	82.67	22.91	86.07	22.18	76	1.19	n.s.
Role physical	84	47.04	43.10	72.02	38.10	83	4.65	.000
Bodily pain	83	66.69	20.40	72.45	20.07	82	1.99	n.s.
General health	83	56.63	22.90	69.05	23.41	82	3.99	.000
Vitality	84	32.19	20.75	52.26	23.23	83	6.22	.000
Role emotional	84	23.03	36.57	61.11	43.24	83	6.78	.000
Social functioning	72	39.08	25.75	69.97	30.23	71	7.59	.000
Mental health	83	32.86	20.35	62.17	23.24	82	10.35	.000

Note: The SF-36 is rated from 0 (*greatly limited*) to 100 (*no limitation*). Thus higher numbers indicate fewer limitations.

a. Bonferroni correction for eight multiple tests sets significance level at $p < .00625$.

Figure 8

Mean LOS by GAF Effect Size per Facility



Note: $N = 58$ facilities, $r = .29$, $p = .015$.

computer and downloaded into the database. These data, along with general ledger accounting data, can be merged with outcome and utilization data described above, permitting detailed cost and cost-effectiveness analyses to be conducted.

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Integrating the Domains

The success of the Value Accounting System will be determined by its ability to relate the four domains in Figure 1 in informative ways. We are at an early stage in these analyses. We have, for instance, observed a positive, significant relationship between average LOS at inpatient units and average GAF outcome ($r = .29, p < .05$). While this is an admittedly low correlation, accounting for only about 9% of the variance, significant relationships of this magnitude are common in psychiatric treatment research. Examination of the scatterplot of this correlation in Figure 8 shows a modest trend toward better outcomes associated with longer lengths of stay in most of the facilities. The exceptions are three facilities in the lower right-hand corner that achieved smaller outcome effects yet had longer average inpatient stays. To the clinical manager, these data suggest that the three facilities are outliers whose costs (longer LOS) are not justified by their outcomes. On the other hand, cost per patient day was not related to outcome in this sample ($r = -.04$). In addition, a significant association was found between the total quality management audit score for a facility and revenues less costs ($r = .31, p < .05$), suggesting a positive relationship between maintenance of higher quality processes and profitability. Currently, the various domains are treated as being of equal weight in analyses; however, we plan future exploration of the effects of differential weighing of the domains.

Implications for Mental Health Administration and Service Delivery

The Value Accounting System integrates state-of-the-art computer and psychiatric assessment technologies and accepted scientific methodologies to specify, obtain, and organize data essential for management of mental heath services. More than ever before, integrated and organized information on personnel, processes, outcome, and costs is necessary to effectively manage modern mental health service delivery. Perhaps the greatest challenge facing mental health administrators and practitioners today is how to obtain, organize, and utilize such information to demonstrably enhance the value of mental health services. Old-style, fragmented MIS and financial accounting systems will necessarily give way to systems that integrate business and operational information, financial systems, and patient outcome data. The technical ability to process and organize systematically obtained, reliable, and valid information enables many important policy and programmatic questions to be addressed. Armed with information, the clinical manager can turn to data for making programmatic decisions and empirically evaluate the efficacy of those decisions. The Value Accounting System represents a model of such a potentially powerful management tool.

With the advent of large, integrated databases like the Value Accounting System, cardinal questions of concern to mental health service delivery can be addressed. Such questions include, for instance, the efficacy and costs of various practice patterns, the effects of different reimbursement schedules on outcome, and matching particular interventions to particular kinds of patients and problems. Ultimately, all clinical, economic, and administrative decision making will depend on reliable and valid assessments of outcome provided within an integrated information and feedback system. The challenge is to create a feedback system that can be used by frontline providers and administrators to enhance the value of mental health services.

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