Process evaluation of an on-line computer-assisted unit for intake assessment of mental health patients

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An emerging maxim accompanying the introduction of new methods and/or procedures in health care is that both process and outcome must be measured in order to adequately evaluate alternative programs. The intent of this paper is to present the results of a process evaluation of a prototype computer-assisted on-line Psychiatric Assessment Unit (PAU). The distinction between process and outcome measures is clarified by reference to appropriate target populations. The PAU assessment process is shown to be comparatively superior to the traditional psychiatric admitting process employing a psychiatric physician and ancillary support staff.

The use of on-line computer systems has a rather brief history in the behavioral sciences, particularly in the field of mental health care delivery. In a recent review, Johnson, Giannetti, and Williams (1976) noted that the unique capabilities afforded by application of this technology to intake assessment are only beginning to be exploited and that questions regarding the advantages of such applications of on-line computer technology have been considered only tentatively.

For several years, an on-line computer-assisted Psychiatric Assessment Unit (PAU) has been operational at the Veterans Administration Hospital and University of Utah College of Medicine in Salt Lake City. This system has been described extensively in several reports (Cole, Johnson, & Williams, 1975; Johnson & Williams, 1975; Schuman, 1976; Williams, Johnson, & Bliss, 1975). However, patient flow through the PAU system shall be briefly reviewed for those unfamiliar with the Utah project.

Patient flow through the PAU may be described as follows. A receptionist opens the patient's computer file by entering basic identifying information into the system. The patient is instructed in the use of the cathode ray tube terminal (CRT) and completes a brief screening test which measures ability to undergo computerized self-report testing. The PAU coordinator

then briefly interviews the patient and gathers information about the circumstances surrounding the application for care and the history of the present illness. If the patient fails the screening test and is judged to be in need of immediate inpatient care, he bypasses the regular PAU assessment system at admission and is evaluated later, when his clinical condition has improved sufficiently to permit self-report testing. In the usual case, self-report testing is possible at intake, and the comprehensive assessment process begins. First, a health technician performs a computer-prompted screening physical examination. Results are entered on the CRT. A computer-generated report is available immediately upon completion of the examination. The patient then begins self-report testing on the CRT. The particular subset of tests administered to the patient is determined by hospital service policy and the clinical coordinator. Self-report tests presently available for administration include: (1) a review of medical systems history questionnaire developed for on-line computer administration by Warner, (2) the Minnesota Multiphasic Personality Inventory (MMPI), (3) the Tellegen Differential Personality Questionnaire, (4) a test of intellectual performance and organicity screen [consisting of the Shipley-Hartford screening IQ measure, a test of episodic long-term memory (TMPE), and the WAIS arithmetic subtest], (5) the Briggs Social History and Problem List, (6) the Beck Depression Inventory and Hopelessness Scale, (7) Whitaker Index of Schizophrenic Thinking, (8) the Social Cost Benefit Index, (9) the Rotter Internal/External Locus of Control Scale, (10) the Quality of Life Scale, and (11) the Schedule of Recent Experiences. As each test is completed, the computer

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analyzes the responses and prints a narrative report. A PAU interviewer administers a structured mental status examination and the Phillips premonitory adjustment inventory, recording data on a CRT. Upon completion, a computer-derived narrative report of the interview, including an officially recognized (DSM-II) psychiatric diagnosis, is printed on a terminal printer located in the PAU office area.

The PAU coordinator reviews test reports, often in consultation with the psychiatric physician who is "on call" to the Unit. The coordinator then completes a structured problem list on the CRT. Utilizing all available information, he designates special problems from a dictionary of precoded problems, as appropriate to a given patient, and rates the severity level of each problem designated. The computer report of this procedure becomes the "initial problem list" for the patient's problem-oriented medical record. Based on this problem list, the coordinator determines an optimal initial treatment disposition for the patient.

All reports generated by the PAU system are filed immediately in the patient's medical record as part of the "defined data base." Additional copies of all reports can be printed as needed, since the patient's data remains in on-line storage as long as he or she is in an active treatment status.

Though a thorough systems analysis was necessary for design of the computerized on-line PAU, answers to questions of clinical acceptance, quality, accuracy, cost-benefit, and cost-efficiency of such a system could not be foreseen. However, an emerging maxim accompanying the introduction of new methods, technologies, or strategies in social action programs is that these alternative programs must be evaluated on the basis of merit before being blindly adopted as superior. It is our contention that we, as behavioral scientists, must hold ourselves increasingly accountable in our expenditures of public monies. For our own research efforts, we must strive to justify adequately our growing utilization of costly computer systems.

Several studies have been reported in which attempts were made to evaluate computerized assessment systems. These evaluation strategies have been reviewed elsewhere (Klingler, Johnson, & Williams, 1976). Unfortunately, (to the authors' knowledge) no fully automated systems have been studied. Thus, previous studies, though important and interesting, do not begin to provide the data necessary to justify the application of on-line computer technology to psychiatric intake assessment.

Aware of this paucity of accountability data in the area of computerized on-line assessment, an evaluation study was designed, proposed, and funded in 1975. The design of this somewhat complex study has been presented in a previous paper (Klingler et al., 1976). Data collection has been ongoing for approximately 1 year.

The research objectives of the study are threefold:

- (1) To determine whether the computer-assisted PAU can provide intake physical, psychological, and social information comparable in quality to that produced by the traditional system of an experienced admitting physician and ancillary support staff.
- (2) To determine whether the aforementioned evaluations can be provided at a cost which is more economical than that of the traditional system.
- (3) To determine whether completing the aforementioned evaluations immediately, at the time of intake, has an impact beneficial to the cost, quality, and outcome of patient care.

The two initial research objectives are designed to measure changes in the process of intake assessment as perceived by administrative and treatment staff, while the third objective is primarily aimed at assessing possible positive impacts to the patient or client. The purpose of this paper is to present the results of the evaluation study of the process of on-line computerized psychiatric assessment at the Salt Lake City VA Hospital.

PROCESS AND OUTCOME MEASURES

The distinction between process and outcome measurement may be somewhat confusing and, in a sense, artificial. Crucial to the design and understanding of any evaluative effort is careful specification of the target population for whom an innovative social action program is implemented. For this paper, the target population consists of applicants for mental health care. We are not presenting outcome data for patients; rather, we present data concerning externally and internally viewed changes in the process of patient assessment which accompany the introduction of a computerized on-line PAU.

Had we chosen to view mental health care administrators and providers as our target population, many parameters which we identify as process related in this paper would become outcome measures. A simple example may help to clarify the issue. If a computerized assessment can be performed at less cost than a traditional physician-administered examination, this represents a favorable outcome to an administrator or accountant. However, this represents a process change for the patient-consumer, and may bear no relationship whatsoever to a favorable treatment outcome (e.g., increased self-confidence in social situations). Results of process studies are presented here because process accountability is necessary (i.e., assurance that a new program has been implemented in accordance with the original design specifications upon which funding was provided). In addition, administrative and clinical acceptability of computerized systems has proven to be the salient variable affecting the ultimate utility of such systems. User acceptance of the computerized process must occur before we can hope to observe beneficial patient outcomes (Lindberg, 1974).

METHOD

Experimental Design: Rationale

In a comprehensive review of studies in mental health care settings, Erickson (1975) found special fault with: (1) the lack of experimental or quasi-experimental design in evaluative studies which often results in serious threats to the internal validity of such studies, and (2) the fact that interpretation of results of evaluation studies of health care delivery is often suspect because only one dependent variable is measured, despite the often-noted lack of correlation among evaluative criteria (May & Tuma, 1964).

The validity of the results of an evaluation study of a computerized psychiatric assessment unit thus seems to rest upon: (1) the true random assignment of applicants for clinical care to alternative patient assessment processes, and (2) the specification of multiple process measures indicative of the worth of the competing assessment procedures.

Multiple process variables emerged from the thorough systems analysis requisite for design of the PAU. For the Utah project, variable specification proceeded through the rational approach of eliciting suggestions from senior hospital staff members and cataloging conventionally recognized data collection techniques. Appropriate clinical indicators were then selected, tailored, and quantified by staff members of the project in collaboration with a number of outside consultants from the areas of clinical psychology, psychiatry, and evaluation methodology.

Experimental Design: Subjects

The subjects for the studies were 195 applicants for admission to the VA Hospital in Salt Lake City. Applicants were assigned on a consecutive basis to one of three experimental groups. Patients assigned to Group 1 received the entire PAU computer-assisted psychiatric evaluation. Patients assigned to Group 2 were evaluated initially by an admitting physician. He was assisted by additional ward personnel in the performance of ancillary evaluation functions. Patients assigned to Group 3 were evaluated by both the admitting physician (with assisting personnel) and the PAU system. For Group 3, the order of evaluation was alternated.

Each applicant for admission reported to the PAU Admitting Receptionist. She recorded the time of arrival and demographic information. The receptionist assigned the applicant to one of the three groups on a rotating basis. When the evaluation was completed in written format, results were returned to the admission receptionist. She then recorded time of completion and copied the results. The original report was placed in the patient's chart. The copy was retained for experimental purposes.

Shrinkage in sample size occurred due to a number of factors. Twenty percent of the applicants in the sample were substance detoxification patients only and, therefore, were excluded from the study. Further loss of patient subjects occurred because of admission to fixed "length-of-stay" treatment programs, patient

refusal or inability to cooperate, and elopement against medical advice. Participation in the study was as follows: Group 1, 41 patients (63%); Group 2, 37 patients (57%); and Group 3, 35 patients (54%). A few subjects in selected studies were also excluded because of transfer of chart materials to other hospitals. In an attempt to avoid past problems with evaluative research strategies, and to mimic adequately the ideal evaluation paradigm, our process variable selection scheme resulted in a somewhat novel and complex, but comprehensive, evaluative research plan. The process experiments are listed in Table 1 categorized by experimental groups utilized. These measures and experiments were selected as representative indicators of the cost efficiency and quality of the PAU admitting system contrasted with the traditional admitting physician intake process.

Assessment Quality Study

It was hypothesized that the PAU approach to psychiatric assessment would result in higher quality assessments than the traditional admitting physician and ancillary ward personnel system. For purposes of this experiment, "quality" was operationally defined as encompassing readability, organization/completeness, and clinical utility of workup components. Three psychiatrists from the University of Utah College of Medicine Department of Psychiatry rated all workup components on a 5-point anchored rating scale, with "1" denoting "very poor" quality and "5" denoting "excellent" quality. All patients in Groups 1 and 2 were rated by the three physicians. Interrater reliabilities were computed, as were between-group differences in mean ratings.

Assessment Consistency Study

It was hypothesized that intake assessment material generated by the PAU system would be more internally consistent than workups completed under the traditional system. The three psychiatrists rated "internal consistency of assessment information" and "consistency of diagnosis with presented information" on a 5-point anchored rating scale, using "1" to signify "very poor" consistency and "5" to signify "excellent." All patients in Groups 1 and 2 were rated by the three faculty members. Interrater reliabilities and between-group differences in mean ratings were computed.

Assessment Completion Time

Average length of time (in days) from application for care to assessment completion was compared for the PAU (Group 1) and traditional (Group 2) workup groups. In those cases for which a significant portion of the required workup was not completed, the entire length of stay, following Winsorization of outliers (Dixon & Tukey, 1968), was used as completion time. It was hypothesized that PAU workups would be completed more quickly than the traditional workups.

Patient Cost Study

It was hypothesized that the computer-assisted PAU

Table 1
Process Evaluation Studies of the Computerized PAU and the Traditional Admitting Physician Systems

Study	Group		
	1 (PAU)	2 (Traditional)	3 (PAU and Traditional)
Assessment Quality	x	x	
Assessment Consistency	x	x	
Assessment Completion Time	x	x	
Patient Cost	x	x	
Treatment Staff Agreement with Disposition	x	x	
Assessment Usefulness in Treatment Planning	x	x	
Assessment Accuracy			x
Agreement with Diagnosis			x

(Group 1) intake evaluations could be delivered at a cost which was less than the more typical (Group 2) admitting physician workup system. For purposes of this experiment, evaluation cost was operationally defined to include the following factors: (1) cost of personnel involved in completing all aspects of the evaluations (dictating, typing, examining, etc.), (2) the cost of space utilized by both the evaluation staff and the patient while the evaluation was in progress, (3) the overhead costs of maintaining the patient during the evaluation (e.g., meals, lodging, etc.), and (4) equipment costs (e.g., computer time) necessary for completing the patient evaluation. All cost figures were obtained from the SLC VAH Fiscal Officer. Mean cost figures for the two groups were computed.

Treatment Staff Agreement with Disposition

Subjects for this study were Group 1 and 2 patients admitted to inpatient status on the Acute Treatment Ward of the Salt Lake City VA Hospital. Treatment staff were simply asked whether they agreed or disagreed with the decision to admit to inpatient status made either by the PAU or traditional systems. Agreement was judged by either the chief psychiatric resident, one of two ward psychiatric residents, or one of two psychiatric nurses. Percentages of agreement to admit were compared for the PAU and traditional systems. It was hypothesized that inpatient treatment staff would agree more often with the PAU decision to admit than with a decision to admit arising from the traditional system.

Assessment Usefulness Study

As in the previous study, subjects were Group 1 and 2 patients admitted to inpatient status on the Acute Treatment Ward of the Salt Lake City VA Hospital. The above mentioned inpatient staff were asked to rate "assessment usefulness in treatment planning" on a 7-point anchored rating scale, where "1" denoted "no usefulness" and "7" denoted "very useful." Mean ratings for Group 1 (PAU) and Group 2 (traditional) were compared. It was hypothesized that the inpatient treatment staff would find the PAU computerized assessment more useful in treatment planning than the more traditional workups.

Assessment Accuracy Study

Unlike the previous studies, this experiment utilized all patients in Experimental Group 3. Patients received both the PAU and traditional assessments, independently and in random order. They were then immediately examined by one of six experienced psychiatrists from the Department of Psychiatry of the University of Utah College of Medicine. The psychiatrist then dictated his examination notes, and subsequently was supplied with a typed copy of the notes, the computerized PAU assessment, and the traditional workup. The psychiatrist then rated the readability, completeness, accuracy, and clinical utility of all components of both workups, using a 7-point anchored rating scale on which "1" represented "extremely poor" and "7" represented "excellent." We believed that the psychiatrist would find all components of the PAU computerized assessment to be superior in readability, completeness, accuracy, and clinical utility to the traditional counterpart. Mean ratings for both procedures were compared. This within-group study by external raters represents a strong test of the accuracy and acceptability of the PAU computerized on-line assessment process.

Agreement with Diagnosis Study

The procedure followed in this study was identical with that of the previous study. However, the psychiatrists were asked to rate their "agreement with diagnosis" from both PAU and traditional workups on a 7-point anchored rating scale, with "1" representing "extremely poor" and "7" representing "excellent" agreement. Clinical diagnosis remains an extremely problematic area in clinical psychology and psy-

chiatry (cf. Spitzer & Endicott, 1974); it was hypothesized that the mean rating of agreement with the PAU computerized diagnosis would be equivalent with the diagnostic rating for the traditional assessment group.

RESULTS AND DISCUSSION

A Comment on Test Statistics

The results to be reported in this section were analyzed using extremely simple univariate test statistics (e.g., *t*, *z*). Many researchers would alternatively prefer ANOVA or multivariate analyses, such as MANOVA or Hotellings's T^2 (Eber, 1975), for such evaluation data. However, our decision to perform simplistic analyses was pragmatically based. First, the majority of significance tests reported here resulted in significance probabilities well below .001. Thus, the concern for the experiment-wise error rate which Keppel (1973, p. 87) and many others have expressed is not strictly applicable. Second, the interpretation of analyses of variance would be encumbered by the inherent nonorthogonality of some designs due to missing subjects (Overall & Spiegel, 1969). Finally, multivariate methods were rejected because of problems in determining adequate groupings of appropriate process dependent

Table 2
Mean Assessment Quality Ratings of PAU and Traditional Workups for Groups 1 and 2 for Three Psychiatric Raters

	PAU n = 41	Traditional n = 37	<i>tf</i>
1. Evaluation Summary			
Readability	4.38	2.28	11.59***
Organization/Completeness	3.72	2.14	9.70***
2. Problem List			
Readability	4.24	3.45	3.08**
Organization/Completeness	3.28	2.78	2.03*
3. Mental Status			
Readability	4.46	2.45	8.73***
Organization/Completeness	3.00	2.15	4.12***
4. Physical History			
Readability	4.02	2.92	4.35***
Organization/Completeness	3.33	2.51	3.49***
5. Physical Examination			
Readability	4.03	2.93	4.08***
Organization/Completeness	3.44	2.79	2.66**
6. Psychological Testing			
Readability	4.69	1.69	13.45***
Organization/Completeness	3.66	1.47	11.75***
7. Social History			
Readability	4.32	1.57	13.16***
Organization/Completeness	3.63	1.39	12.82***
8. Overall Workup			
Readability	4.23	2.49	11.38***
Organization/Completeness	3.02	1.93	7.94***
Clinical Utility	3.08	2.23	6.43***

Note—A 5-point anchored rating scale was used, with "1" denoting "very poor" and "5" denoting "excellent." Interrater reliability = .91.

[†]In those cases in which sample variances differed significantly, an approximation to *t* due to Cochran (1964) was used.

**p* < .05

***p* < .005

****p* < .001

variables over experiments and power problems associated with large numbers of variables and a relatively small number of subjects. Thus, the analyses presented here, though lacking in statistical elegance, should convey the strength of our experimental results with minimal obfuscation.

Assessment Quality Study

Results of this study are presented in Table 2. Interrater reliability of quality for the three psychiatric raters was equal to .91. In addition, quality (operationally defined as readability and organization/completeness) was rated as vastly superior for all components of PAU assessments on Group 1 when compared to the traditional assessments on Group 2. Thus, the hypothesis of superior quality of the PAU workups is tenable.

Assessment Consistency Study

For this study, it was hypothesized that "internal consistency of information" and "consistency of diagnosis with presented information" would be rated superior by the three psychiatric raters for the PAU assessment (Group 1) when compared with the traditional assessment (Group 2). Results of this experiment appear in Table 3. Interrater reliability for the consistency ratings for the three psychiatric raters was calculated as .57. Between-group comparisons for both "internal consistency of information" and "consistency of diagnosis with presented information" failed to reach statistical significance. On the other hand, the PAU computerized system cannot be called inferior to the traditional assessment process based on these results.

Assessment Completion Time Study

Results of this study are displayed in Table 4. It

Table 3
Mean Assessment Consistency Ratings of PAU and Traditional Workups for Groups 1 and 2 for Three Psychiatric Raters

	PAU n = 41	Traditional n = 37	t
1. Internal Consistency of Information	3.11	3.05	.47
2. Consistency of Diagnosis with Presented Information	2.86	2.88	-.12

Note—A 5-point anchored rating scale was used, with "1" denoting "very poor" and "5" denoting "excellent." Interrater reliability = .57.

Table 4
Mean Length of Time (in Days) from Application for Admission to Assessment Completion for PAU (Group 1) and Traditional (Group 2) Workups

	PAU n = 32	Traditional n = 29	t
Assessment Completion Time	5.31	11.52	-2.49*

* $p < .01$

Table 5
Mean Cost of Intake Evaluation Workups for PAU (Group 1) and Traditional (Group 2) Assessment Patients

	PAU n = 32	Traditional n = 29	t
Cost	\$240.04	\$466.72	-2.17*

Note—Cost figures included (1) staff salary expenses, (2) computer supplies or expenditures, and (3) patient maintenance during assessment (meals, lodging, transportation, etc.).

* $p < .025$

Table 6
Inpatient Treatment Staff Agreement with Disposition of PAU (Group 1) and Traditional (Group 2) Decisions to Admit to Inpatient Status

	PAU n = 35	Traditional n = 35	z*
Percentage of Agreement	91	86	.28

Note—Raters included a chief psychiatric resident, two ward psychiatric residents, and two psychiatric nurses.

*Computed using Yates (1934) correction for continuity.

was hypothesized that the mean time (in days) from application for care to assessment completion would be less for the PAU assessment patients (Group 1) than for the traditionally examined patients (Group 2). This was the case.

Patient Cost Study

We believed that the computerized PAU (Group 1) intake assessments could be delivered at less cost (to the institution) than the more typical admitting physician workup. Mean cost figures for Groups 1 and 2 in Table 5 include all possible costs previously described in the Methods section. The PAU workups were completed for approximately 50% of the cost of traditional workups.

Treatment Staff Agreement with Disposition

This study was deemed of special significance as an indicator of treatment staff acceptance of the computerized PAU system. It was hypothesized that the inpatient treatment staff would concur more often with a PAU decision to admit to inpatient status than with an interviewing physician decision to so admit. The results in Table 6 suggest that the on-line computerized PAU process is superior, but the data analysis showed no statistical significance.

Assessment Usefulness Study

This experiment also was seen as a register of clinical acceptance and use of the PAU assessments. Inpatient treatment staff ratings of "assessment usefulness in treatment planning" were hypothesized to be higher for PAU (Group 1) inpatients than for traditionally admitted (Group 2) inpatients. Mean ratings are presented in Table 7. There is a slight trend in favor of the PAU

Table 7
Mean Inpatient Treatment Staff Ratings of Assessment
Usefulness in Treatment Planning

	PAU n = 35	Traditional n = 35	t
Mean Usefulness Rating	3.89	3.86	.09

Note—Raters included a chief psychiatric resident, two ward psychiatric residents, and two psychiatric nurses. A 7-point anchored rating scale was used, in which "1" represented "no usefulness" and "7" represented "very useful."

Table 8
Mean Assessment Quality and Accuracy Ratings for Patients
Receiving both PAU and Traditional Evaluations

	PAU	Traditional	t
1. Problem List			
Readability	6.23	4.37	5.09****
Completeness	4.86	2.86	4.44****
Accuracy	5.17	3.20	4.85****
Clinical Utility	5.06	3.03	5.12****
2. Mental Status Examination			
Readability	6.37	3.83	6.92****
Completeness	4.71	3.69	2.22**
Accuracy	4.20	3.60	1.34
Clinical Utility	4.31	3.54	1.85*
3. Physical History			
Readability	5.94	3.89	4.92****
Completeness	5.20	4.03	2.88***
Accuracy	5.03	3.91	3.25****
Clinical Utility	5.00	3.80	3.32****
4. Physical Examination			
Readability	6.26	4.23	5.06****
Completeness	6.20	4.94	3.36****
Accuracy	5.74	4.94	2.48***
Clinical Utility	5.83	4.66	3.45****
5. Psychological Testing			
Readability	6.03	1.40	12.46****
Completeness	5.20	1.31	11.51****
Accuracy	4.23	1.26	8.08****
Clinical Utility	4.31	1.20	9.44****
6. Social History			
Readability	5.29	1.97	8.01****
Completeness	4.91	1.86	7.78****
Accuracy	4.17	1.77	6.84****
Clinical Utility	4.31	1.66	6.83****
7. Overall Workup			
Readability	6.26	4.06	7.18****
Completeness	5.17	3.43	6.05****
Accuracy	4.63	3.74	2.97***
Clinical Utility	4.66	3.40	4.46****

Note—A 7-point anchored rating scale was used, with "1" denoting "extremely poor" and "7" denoting "excellent." The psychiatric raters were six members of the faculty of the Department of Psychiatry of the University of Utah College of Medicine. (n = 35)

*p < .05 **p < .01 ***p < .025 ****p < .001

process, but the result is not statistically significant. However, it is noteworthy that inpatient treatment staff view these computer-produced reports as favorably as they indicate; certainly no rejection of the concept is apparent.

Assessment Accuracy Study

This complex study was designed as a test of the

acceptability of the on-line computerized PAU to extrafacility professionals. Ratings for all components of both PAU workups and traditional assessments on a common group of patients were obtained for the dependent variables of readability, completeness, accuracy, and clinical utility. It was assumed that mean ratings would be higher for the PAU assessments than for the traditional assessments. Results are displayed in Table 8. The PAU workup was judged vastly superior by extrafacility psychiatrists, albeit previously unaccustomed to computerized reports.

Agreement with Diagnosis Study

Using the same procedure as in the previous study, the psychiatric raters were questioned concerning their levels of agreement with the PAU and traditional diagnoses. It was hypothesized that mean agreement ratings would be equivalent for the PAU and traditional diagnoses. A slight difference in favor of the PAU process was calculated, though this difference failed to reach statistical significance (see Table 9). This is somewhat of a surprise, given the conspicuous problems of categorical diagnostic labeling in the field of psychiatry (Hine & Williams, 1975). The use of Spitzer and Endicott's (1969) DIAGNO-II algorithm in the PAU assessment process gives rise to results of equivalent validity to those of traditional diagnostic procedures.

CONCLUSION

The process research objectives listed earlier of the computer-assisted on-line Psychiatric Assessment Unit (PAU) have been satisfactorily met. Specifically, the results of the eight studies presented here demonstrate that: (1) the computer-assisted PAU can provide intake physical, psychological, and social information comparable or superior in quality to that produced by the traditional system of an experienced physician aided by ancillary clinical staff, and (2) these evaluations can be completed at a cost which is substantially less than that of the traditional system.

Though our system is currently limited to a subsample of patients within a relatively small catchment area, the on-line computer-assisted PAU process should be generalizable to many applications in the field of mental health care.

The crucial test of this or any other on-line psy-

Table 9
Mean Ratings of Agreement with Diagnoses for Patients
Receiving both PAU and Traditional Evaluations

	PAU	Traditional	t
Agreement with Diagnosis	4.57	4.37	.58

Note—A 7-point anchored rating scale was used, with "1" denoting "extremely poor" and "7" denoting "excellent." The psychiatric raters were six members of the faculty of the Department of Psychiatry of the University of Utah College of Medicine. (n = 35)

chiatric or psychological assessment system focuses on evaluation of the system's beneficial effect on patient treatment goals. The experimental study of a number of patient outcome measures is nearly complete, and we feel confident that the third research objective of our project will be met with the success we have observed for the process measurements. We feel that completion of the PAU evaluations, immediately, at the time of intake, will have a markedly beneficial impact on the cost, quality, and outcome of patient care.

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