

Cost Effectiveness of Alcoholism Treatment in Partial Hospital Versus Inpatient Settings After Brief Inpatient Treatment: 12-Month Outcomes

Barbara McCrady
Rutgers—The State University

Richard Longabaugh, Edward Fink,
and Robert Stout
Brown University and Butler Hospital

Martha Beattie and Anne Ruggieri-Authelet
Butler Hospital, Providence, Rhode Island

A total of 174 alcoholics were randomly assigned to partial hospital treatment (PHT) or extended inpatient (EIP) rehabilitation after inpatient evaluation and/or detoxification. This article reports the 12-month follow-up results for the 115 subjects who consented to continue past the 6th month of follow-up. There were few differences in clinical outcomes between the PHT and EIP groups. Both reported more than 80% abstinent days during follow-up, and over 70% had a full-time occupational role, although almost a third experienced job losses during the year. Subjects showed significant improvements in psychological well-being and social behavior. One third were rehospitalized during the follow-up year. Costs for the partial hospital group were significantly lower than the extended inpatient group, leading to an overall conclusion that partial hospital treatment provides a cost-effective alternative to inpatient treatment for many alcoholics. Implications for health care planning are addressed.

Rising health care costs are a major social concern (Davis, 1982). The health and mental health fields are emphasizing cost containment and limited use of hospital treatment. Utilization review committees monitor the length of hospitalizations, and diagnosis-related groups (DRGs) preset reimbursement rates for hospital treatment (Davis, 1982). Attempts to limit the use of hospital care have led to home care for sick or elderly patients, outpatient surgery programs, and day care and community residence programs for chronic mental patients. Kiesler (1982) noted a paucity of data supporting the superior effectiveness of inpatient treatment for mental patients and argued strongly for psychologists' roles in developing alternatives.

For the treatment of alcoholism, trends are different. Major efforts were made to have alcoholism recognized as a problem worthy of medical attention, and the American Medical Association's statement on alcoholism as a disease was seen as a major advance (Block, 1956). Lobbying efforts, spurred by the proliferation of for-profit alcoholism treatment units, have resulted in approximately 30 states passing legislation that requires insurance companies to pay for the treatment of alcoholism, with inpatient benefits of 28-30 days per year. Recent research has demonstrated that providing treatment to alcoholics results in decreased use of medical care (National Institute on Alcohol

Abuse and Alcoholism, 1983; Putnam, 1982) and sharp decrease in use of sick time and time lost from work due to injuries (Saxe, Dougherty, Esty, & Fine, 1983). However, the humane efforts to legitimize the treatment of alcoholics and to demonstrate that effective treatment has positive financial implications have taken precedence over concerns about costs, resulting in strong lobbying efforts against external efforts at cost containment (*The Alcoholism Report*, 1984).

As cost containment issues become more important, the alcoholism field will have to find ways to decrease costs of treatment. In the present study, one potential alternative to inpatient rehabilitation, the partial hospital, was selected for study because it is a cost-effective alternative to inpatient treatment for medical and mental patients (e.g., Fink, Longabaugh, & Stout, 1978; Gudeman, Shore, & Dickey, 1983; Longabaugh, 1979; Luber, 1979; Washburn, Vannicelli, Longabaugh, & Scheff, 1976) and is less restrictive than inpatient treatment, allowing patients to maintain some job and community responsibilities.

In the first report on this project, Longabaugh et al. (1983) reported outcomes for patients assigned either to partial hospital or to continued 24-hour hospitalization after a brief inpatient stay. Six months after treatment, they found significant improvements in drinking, and in social and psychological functioning, irrespective of treatment setting. Because costs were one third less for partial hospital than extended inpatient subjects, Longabaugh et al. (1983) suggested that after a short inpatient stay, the partial hospital might provide a cost effective alternative to inpatient treatment, but that a longer follow-up should evaluate the stability of these outcomes.

The present study extends the window of posttreatment observation from 6 months to 1 year (as has been done by McLachlan & Stein, 1982, in a similar study) and compares the partial hospital and inpatient settings in terms of their clinical

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Correspondence concerning this article should be addressed to Barbara S. McCrady, Rutgers—The State University of New Jersey, Center of Alcohol Studies, Busch Campus, Piscataway, New Jersey 08854.

and cost effectiveness over this period of time. In particular, a more detailed cost-effectiveness analysis (CEA) of the two settings (Swint & Nelson, 1977) is carried out.

Method

Subjects

Subjects were 174 patients in a private, nonprofit psychiatric hospital. Inclusion criteria were (a) need for detoxification or intensive inpatient treatment, as determined by the admitting physician; (b) diagnosis of alcohol abuse or alcohol dependence or an entry of alcohol abuse in the problem-oriented medical record (Ryback, Longabaugh, & Fowler, 1981); (c) a score of 5 or greater on the Michigan Alcoholism Screening Test (MAST; Selzer, 1971); (d) not acutely suicidal or psychotic; (e) no irreversible organic brain syndrome; and (f) ability to pay for treatment, usually via third-party insurance.

Subject characteristics were described in Longabaugh et al. (1983). The mean age was 41.37 years ($SD = 11.99$); 67% were men, and 64% were high school graduates. Mean score on the MAST was 30.53 ($SD = 10.69$). The Quantity-Frequency Index (QFI; Armor, Polich, & Stambul, 1976) indicated mean daily alcohol consumption of 8.02 ounces of absolute alcohol ($SD = 7.89$), and 58.6% had had previous alcohol-related hospitalizations.

Procedure

Informed consent was obtained and baseline data collected during the initial hospitalization. Subjects were randomly assigned on a 2 : 1 basis to either Partial Hospital Treatment (PHT; $n = 114$) or Extended Inpatient Treatment (EIP; $n = 60$). The number of subjects assigned to the two conditions was unequal because the hospital needed to have inpatient beds available; the 2 : 1 ratio did not jeopardize the power to detect significant results in the study. Patients assigned to the PHT condition were detoxified on an inpatient basis and then commuted from home, attending treatment 6½ hours per day, Monday through Friday. Patients assigned to the EIP continued as inpatients, but participated in the same alcohol treatment program with the PHT patients. On weekdays all subjects participated in the same individual and family groups, with the same therapists. After 3:30 p.m. and on weekends, EIP subjects received individual attention from inpatient nursing staff, participated in activities therapy, and experienced the general structure and restrictions provided by a 24-hour hospitalization. Mean length of treatment for PHT subjects was 6.94 days for detoxification ($SD = 2.82$) and 15.60 days for postdetoxification treatment ($SD = 6.16$; total treatment, 22.54 days). The EIP treatment was 6.68 days for detoxification ($SD = 2.88$) and 14.76 days for postdetoxification treatment ($SD = 5.47$; total treatment, 21.44 days). There was no set length of stay for any part of the treatment, so that individually tailored treatment plans could be implemented. Inpatient detoxification and evaluation were usually expected to last 5–7 days, and the postdetoxification treatment program was expected to last 2–3 weeks.

The original design included 6 months of follow-up data collection. Subjects had to sign a second consent form to continue in the study for an additional 18 months; 56 (30.7% of PHT and 38.3% of EIP subjects) elected not to continue. Two other subjects were excluded from the analyses because their life circumstances made alcohol use impossible and their data would distort the results (one was dying from a brain tumor and was unable to drink because of the debilitating effects of the chemotherapy; one was in a maximum security prison and had no access to alcohol). A third subject was excluded because he had participated in treatment for less than a day. The sample reported on here consists of 115 subjects—78 in the PHT group and 37 in the EIP group.

The structured treatment program (McCrary, Dean, Dubreuil, &

Swanson, 1985) taught patients and families behavioral skills to maintain abstinence and provided educational materials and an introduction to Alcoholics Anonymous. Most treatment was provided in groups.

Measures

Baseline data were collected in face-to-face interviews with patients and telephone interviews with one person designated by the subject (a spouse, relative, roommate, or close friend) who could serve as a collateral data source. Telephone follow-up interviews were done monthly with patients and bimonthly with collaterals. Outcomes were evaluated by measuring drinking quantity, frequency and problem consequences, occupational functioning, legal problems, interpersonal and psychological functioning, and physical health. These measures are described in detail in Longabaugh et al. (1983).

Treatment cost estimates were derived from several sources. Direct costs of initial treatment were extracted from hospital bills. Indirect costs of treatment included income lost for time missed from work and child care costs during hospitalization. Income loss was calculated by multiplying daily income by working days hospitalized. Child care costs were estimated for subjects who were homemakers, unemployed, or disabled who had children under 10 living at home ($n = 10$). Child care costs were estimated at \$1.50 per hour, based on 8 hours per day for PHT subjects and 9.5 hours per day for EIP subjects.

Subsequent treatment costs included direct and indirect costs for re-admissions to the same or other treatment facilities and costs for outpatient treatment. Because cost data were not directly available for outpatient treatment, average treatment costs were estimated at \$35 per visit. Costs of hospitalizations at other facilities were not available and therefore were estimated at the same daily rate as the primary treatment facility (\$183/day).¹ The cost estimates did not include volunteer resources used during treatment, or legal or additional medical costs incurred during treatment or follow-up, as these data were not available.

Total treatment costs were calculated by summing the direct and indirect costs of the initial treatment, the direct and indirect costs of any subsequent hospitalizations, and the direct costs of outpatient treatment.

Results

Comparison of Study Continuers and Noncontinuers

Subjects who consented to an additional 18 months of follow-up evaluation and those who left the study at the end of the initial 6 months were compared. A chi-square revealed no significant differences in dropout rates by experimental group, suggesting that comparison of outcomes for the two experimental groups is appropriate.

Continuers and noncontinuers were compared to determine whether subject attrition changed the characteristics of the sample (see Ruggieri-Authelet, McCrary, Stout, Longabaugh, & Fink, 1983, for a more complete report). A multivariate analysis of variance (MANOVA) comparing continuer and noncontinuer baseline characteristics was nonsignificant. During treatment, the PHT group continuers had significantly longer mean lengths of hospital treatment than noncontinuers (15.60 vs.

¹ Sensitivity analyses were carried out using different estimates for several variables (e.g., child care costs, outpatient treatment costs). The analyses revealed that the results were not substantially affected by these different estimates because the costs of the initial hospitalization so completely dominate the other costs.

12.82 days), $t(112) = 2.01, p < .05$. There was no difference in length of stay for EIP subjects. After treatment, continuers completed significantly more of their six scheduled interviews than did noncontinuers ($M = 5.6$ vs. $M = 4.4$), $t(69) = 4.47; p < .001$. For collaterals, there were no significant differences in the number of interviews completed.

Separate repeated measures MANOVAs were run on subject and collateral follow-up reports of drinking, occupational functioning and hospitalizations, even though the different amounts of follow-up data available from the groups limit the usefulness of such comparisons and the generalizability of the results. Both MANOVAs were nonsignificant. Comparisons on psychosocial functioning measures (Feragne, Longabaugh, & Stevenson, 1983) using t tests revealed no differences between the two groups. On an interviewer evaluation of how well the subject was functioning (the Global Assessment Scale for Substance Abusers; W. Hargreaves, personal communication, 1977), non-continuers were rated more poorly than continuers ($M = 56.58$ vs. $M = 72.29$), $t(42) = 3.43, p < .001$.

Results for Study Continuers

Follow-up rates. The average number of subject interviews was 11.2 of a possible 12, and for collaterals, 5.7 of a possible 6. Six subjects died during these 12 months—one was in the extended inpatient group; 5 were in the partial hospital group. Two deceased subjects had been abstinent since their treatment.

Drinking behavior. Drinking results are summarized in Table 1. The positive changes in drinking behavior reported at 6 months (Longabaugh et al., 1983) continued over the next 6 months. Patient reported QFI was significantly lower than at baseline, $t(99) = 8.73, p < .001$. When the proportion of abstinent days for the year was calculated, both groups showed significant improvements over their baseline levels, although collateral reports were not as positive as subjects' self-reports. Almost a third of the subjects reported continuous abstinence for the year, with additional small proportions of the sample reporting only 1–3 days of drinking per month. The groups did not differ on drinking outcomes.

During the year, almost one third of the subjects were rehospitalized for their alcoholism, with no significant differences in rehospitalization rates by experimental group. Subjects who returned to our hospital for further treatment were assigned to their original treatment condition after their initial inpatient evaluation and detoxification. Rehospitalizations were relatively brief, averaging 10 days.

Other clinical outcomes. Subjects' reports reflected statistically significant improvements over baseline levels in all areas of psychological and social functioning, with no differences between the experimental groups on any of these measures. Almost one third of the subjects lost jobs during the year. Most job losses occurred in the first 6 months after treatment, and the employment rates at 12 months were comparable to baseline.²

Interrelationships between drinking and life functioning. Positive life adjustment was defined for five areas of functioning: (a) physical health—no physical health problems in 80% or more of the months reporting; (b) psychological health—no psychological problems reported in 80% or more of the months reporting; (c) vocational health—full-time occupational role

Table 1
Twelve-Month Drinking and Life Task Outcomes

Measure	PHT ($n = 78$)		EIP ($n = 37$)	
	Baseline	12 month	Baseline	12 month
QFI ^a				
<i>M</i>	8.74	0.48	6.44	1.24
<i>SD</i>	8.73	1.04	5.41	3.07
Proportion abstinent days				
Client report				
<i>M</i>	0.24	0.85	0.26	0.82
<i>SD</i>	0.26	0.22	0.31	0.28
Collateral report				
<i>M</i>	0.23	0.68	0.32	0.71
<i>SD</i>	0.29	0.29	0.37	0.32
Continuously abstinent 0–3 drinking days per month	<i>NA</i>	27.7%	<i>NA</i>	32.4%
Rehospitalizations				
Client report	<i>NA</i>	34.6%	<i>NA</i>	27.0%
Collateral report	<i>NA</i>	32.1%	<i>NA</i>	24.3%
Days rehospitalized				
<i>M</i>	<i>NA</i>	9.62	<i>NA</i>	10.92
<i>SD</i>		5.52		7.73
Employed full-time ^a	67.9%	62.7%	67.6%	70.6%
Full-time role	75.6%	71.6%	81.1%	82.4%
Work missed due to drinking	51.3%	25.6%	56.8%	18.9%
Job losses due to drinking	6.4%	10.3%	2.7%	16.2%
On disability	6.4%	9.0%	5.4%	2.9%
Arrested	6.4%	5.1% ^b	13.5%	8.1%
RSSI				
<i>M</i>	0.92	0.69	0.88	0.68
<i>SD</i>	0.23	0.29	0.23	0.24

Note. PHT = partial hospital treatment; EIP = extended inpatient treatment; QFI = Quantity-Frequency Index; RSSI = Residential Status and Stability Index.

^a $n = 67$ for PHT; $n = 34$ for EIP because of missing data. ^b Includes one jailed subject who is excluded from other analyses.

(employed, homemaker, or student) at least 80% of the time and no job losses; (d) social health—no arrests; (e) drinking health—no hospitalizations during the year. Subjects were categorized into one of six outcome categories based on drinking status (abstinent, occasional drinking, or more frequent drinking) and life adjustment (good life adjustment or some life problems). As can be seen in Table 2, 63.2% reported good life adjustment, irrespective of their frequency of drinking.

The number of successful life areas was counted for each subject. An ANOVA for the drinking outcome groups was significant, $F(2, 105) = 3.63, p < .05$, with the abstinent group having the most successful life areas ($M = 4.06$), the middle group being next ($M = 3.72$) and the poorest drinking outcome group also having the fewest areas of successful life functioning ($M = 3.38$).

Cost effectiveness. In these analyses, we compared the two groups on total costs associated with initial treatment, contin-

² Complete information on these analyses are available from the first author.

Table 2
Drinking Outcomes and Life Functioning

Drinking status	Life adjustment (%)	
	Good	Some problems ^a
Abstinent ^b	22.6	6.6
Occasional drinking ^c	15.5	8.5
More frequent drinking ^d	25.5	21.7
Total	63.2	36.8

^a Some life problems defined as problems in ≥ 2 areas of life functioning. ^b $n = 31$. ^c $n = 25$; occasional drinking defined as abstinent or moderate drinking $\geq 80\%$ of months reporting. ^d $n = 50$.

ued treatment, and rehospitalizations. Cost data included room and board, ancillary charges, costs of the specialized alcoholism treatment program, plus estimated costs incurred for time lost from work and child care costs during treatment. Costs were related to treatment outcomes by determining the costs necessary to accrue a certain incremental improvement in outcome, and the two groups were compared on these cost-effectiveness estimates.

As can be seen in Table 3, the total costs of treatment were high, but significantly lower for the PHT than the EIP group, $t(111) = 3.05$, $p < .003$. Initial treatment costs in the PHT group were almost \$1,700 less per subject. Outpatient and rehospitalization costs were comparable. However, PHT subjects tended to be more likely than EIP subjects to be hospitalized at other facilities (18% vs. 8%). The range of costs of rehospitalization was broad (\$0 to \$10,713).

Cost-effectiveness estimates are shown in Table 4. Unit costs of improvement were defined as difference between baseline and follow-up abstinent days divided by total treatment costs, yielding an estimate of how many abstinent days were obtained per \$100 of treatment costs. These figures favored the PHT group, Mann-Whitney $U = 966$, $z = -2.04$, $p < .05$. A similar analysis of changes in the amount of alcohol consumed (as measured by the QFI) favored the PHT group, Mann-Whitney $U = 1017$, $z = -2.19$, $p < .05$. To determine how much it cost to produce one continuously abstinent subject, total treatment costs were divided by the number of abstinent subjects. These costs appear to be less for PHT than EIP subjects, although statistical tests of these figures are inappropriate because the numbers are calculated using whole population data rather than aggregating across individual cases. The costs to produce a subject who either abstained or drank infrequently was lower than for complete abstinence, and this ratio also favored the PHT group.

Discussion

The first 12 months of follow-up revealed several major findings: (a) significantly lower treatment costs for post detoxification partial hospitalization than inpatient treatment; (b) lower cost-effectiveness estimates for partial hospitalization than inpatient treatment; and (c) positive clinical outcomes with no differences between the two settings. There were also advantages to the partial hospital that could not be defined in cost or effectiveness terms, including the patient's greater availability to

family, friends, and community during treatment, and the lesser loss of freedom.

The conclusions about the greater cost effectiveness of the partial hospital must be considered in light of the kind of CEA completed. The cost analyses included direct costs of initial treatment, outpatient treatment, and rehospitalizations, as well as estimated costs for time lost from work and child care. These latter figures were estimates and based on 1979-1980 figures, but as they were small relative to the costs of hospitalization, different estimates would not have altered the outcomes substantially. Our cost estimates did not include more indirect costs of alcoholism, such as lost productivity, costs of motor vehicle accidents, involvement in the criminal justice system, use of social welfare programs, or costs of fire or public safety personnel attributable to subjects who continued to drink (Saxe, Dougherty, Esty, & Fine, 1983). These latter costs, although socially significant, are difficult to estimate and most appropriate for large sample analyses because of their low rate of occurrence. Our data, albeit incomplete, suggest that social costs did not differ between the two groups. We believe that our CEA captures the bulk of the costs of treatment for this patient population.

The results need to be compared to treatment outcomes reported from other comparable clinical populations. The population under study was middle class and socially stable. In studies with comparable populations, Pettinati, Sugerman, DiDonato, and Maurer (1982) reported that 38% achieved continuous abstinence 1 year after inpatient alcoholism treatment; 28% were abstinent with good adjustment; and 30.7%

Table 3
Treatment Costs (\$)

Treatment costs per patient	PHT ($n = 78$)		EIP ($n = 37$)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Initial hospitalization				
Room and board	1,022.73	433.12	3,099.27	866.74
Ancillary charges	295.44	298.41	266.32	177.71
Day treatment program	1,482.24	585.09	1042.43	388.80
Work missed	351.78	423.49	403.11	390.39
Child care	12.76	61.95	40.05	112.75
Total inpatient costs	3,164.95		4,851.18	
Outpatient treatment	687.88	605.82	627.16	602.18
Rehospitalizations				
Inpatient ^a	486.93	1,037.36	688.66	1514.43
Day treatment program	104.74	341.87	95.00	343.26
Other facilities ^b	383.30	1,122.60	84.27	336.53
Work missed ^c	107.47	299.23	75.69	272.36
Child care	2.01	13.73	10.60	42.79
Total rehospitalization cost	1084.45		954.22	
Total treatment costs	4,983.04	2,195.58	6,432.56	2697.90

Note. PHT = partial hospital treatment; EIP = extended inpatient treatment.

^a $n = 22$ for PHT and 11 for EIP. ^b $n = 14$ for PHT and 3 for EIP. ^c $N = 76$ for PHT on this variable because of missing data.

Table 4
Cost Effectiveness Estimates

Measure	PHT ^a	EIP ^b
Abstinent days/\$100 treatment costs ^c		
<i>M</i>	5.4	4.2
<i>SD</i>	3.0	3.3
Changes in QFI/\$100 treatment costs ^d		
<i>M</i>	0.2	0.1
<i>SD</i>	0.2	0.1
Total treatment costs/abstinent subject	\$18,935	\$21,637
Total treatment costs/abstinent or moderate drinking subject	\$9,966	\$13,222

Note. PHT = partial hospital treatment; EIP = extended inpatient treatment.

^a *n* = 78. ^b *n* = 34. ^c Number of abstinent days over baseline.

^d Ounces reduction in alcohol consumed.

were hospitalized. McLachlan and Stein (1982) reported 33% abstinence rates after inpatient or day hospitalization, and a 33% combined rate of alcohol and medical rehospitalizations. Thus, the abstinence (29.2%) and rehospitalization rates (32.2%) in the present study are similar to other studies with comparable populations, lending further support to the generalizability of the results.

The costs of the partial hospital were high, at more than \$3,000 for the initial treatment and almost \$5,000 for the year. PHT subjects were somewhat more likely to be rehospitalized at other facilities. With the small number of these hospitalizations, it is difficult to speculate on the reasons for this difference. It is notable that the average cost savings of \$1,500 per patient were substantial, but not as dramatic as might be hoped for by health planners and insurance executives. These costs were somewhat elevated because the treatment was provided in a private psychiatric hospital rather than a free-standing alcoholism rehabilitation facility, which might have lower costs. It is important that less costly alternatives such as outpatient treatment be evaluated to determine whether they would provide an even more cost-effective alternative to the partial hospital for many patients.

One limitation of the study is that 32% of the initial subjects did not participate in the extended follow-ups. Because there was no differential dropout rate from the two experimental groups, comparisons between the groups are appropriate, but the dropouts might affect the overall levels of treatment outcome across groups. Our findings, as well as two recent studies (LaPorte, McLellan, Erdlen, & Parente, 1981; Sobell, Sobell, & Maisto, 1984), have found no differences in outcomes between subjects who were easily followed and those who were not, and few differences between subjects who continued or discontinued in research follow-ups. Drinking outcomes and costs of treatment may be representative of the entire population, but the 32% noncontinuer rate should be considered. A second possible limitation of the study is the primary reliance on self-report data. Collaterals reported more frequent drinking than did clients. However, client and collateral reports were parallel, their reports of rehospitalizations were almost identical, and

data from both sources suggested no group differences on outcome measures. Interpretations based on client reports may provide an overall positive bias to the results, although several studies have reported close agreement between client reports and objective data sources, such as police records (Sobell & Sobell, 1975; Sobell, Sobell, & Samuels, 1974).

Despite these limitations, the present results suggest that health care planners should seriously reconsider the pivotal role that the inpatient rehabilitation facility currently plays in the alcoholism treatment network. Research has not supported the superiority of the residential setting over less restrictive alternatives, nor of longer over shorter lengths of treatment (Mosher, Davis, Mulligan, & Iber, 1975; Page & Schaub, 1979; Stein, Newton, & Bowman, 1975; Willems, Letemendia, & Arroyave, 1973). Further research is needed to evaluate the effectiveness and cost savings of a range of treatment alternatives, and to determine which subgroups of alcoholic patients need the most intensive and costly treatments and which can benefit as much from less restrictive and more economical alternatives.

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