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Abstract

This study was designed to assess whether centralized intake and assessment in a drug abuse treatment system would lead to improved outcomes. Clients entering treatment through a centralized intake unit (CIU) or through individual programs (non-CIU) were interviewed at admission, and at 1-month and 1-year post-admission. Interviews included measures of treatment access and satisfaction, psychiatric symptoms, social support, and Addiction Severity Index composite scores. At treatment entry, CIU participants had more employment and psychological problems, lower social support, were more often required to be in treatment, and more often placed on a waiting list. In analyses controlling for baseline differences between groups there were main effects of time, but no CIU status effects or CIU status by time interactions. The CIU may have improved access to treatment for a more disabled population, however, clients entering treatment through the CIU did not have better outcomes than those entering treatment directly.

Introduction

The economic cost associated with substance abuse, including costs due to healthcare, lost productivity and crime, was estimated at $246 billion in 1992. Half of those costs were borne by substance abuse clients and their families, and 42% were borne by federal, state, and local government (Harwood, Fountain, and Livermore, 1998). An estimated $3.4 billion dollars were spent on substance abuse treatment and prevention in 1992 (Young, 1994), so that treatment costs represents a small proportion of the total cost. Two-thirds of all substance abuse treatment is provided in the public sector (Mechanic, Schlesinger and McAlpine, 1995). Treatment has been shown effective in reducing drug and alcohol use, in ameliorating associated health and social problems among those treated (McLellan, Luborsky, O'Brien, Woody and Druley, 1982; Hubbard et al., 1989; Miller and Hester, 1986; Simpson and Sells, 1990), and in reducing economic costs associated with substance abuse (Finigan, 1996; Gerstein et al.,1994).

Government and private agencies have experimented with strategies to extend treatment to more of those in need. Such strategies often reflect managed care approaches, and involve systemic efforts to increase access and control costs. But innovation has occurred primarily in the private sector: models for managing care in publicly-funded mental health (Hargreaves, Shumway, Hu, and Cuffel, 1998) and substance abuse treatment (Amaro, 1999) have lagged behind those in the private sector. Recent attempts to redesign publicly funded substance abuse treatment systems have focused on Medicaid recipients (e.g., Callahan, Shepard, Beinecke, Larson, and Cavanaugh, 1994), although some efforts have been made to include both Medicaid insured and uninsured populations (Barron et al., 1999). Ball and Ross (1991) suggested that differences in program characteristics may account for outcome differences seen among these programs, and such characteristics are likely to be greater in public as compared to private systems (McLellan et al., 1993). One area where differences between programs in public systems occur concerns intake, assessment, and referral, and centralizing and standardizing these procedures may yield greater efficiency (Becnel et al., 1999).

The use of centralized intake to improve drug abuse treatment was applied in 1970, in the Illinois Drug Abuse Program (Massing, 1998, p. 94). Later, the federal Special Action Office for Drug Abuse Prevention prepared a Central Intake Unit (CIU) Manual (DuPont, 1974), issued contracts to implement CIUs, and some cities have operated CIUs since the 1970's (Zold-Kilbourn, Tucker, and Berry, 1999). In 1990, the Center for Substance Abuse Treatment (CSAT) initiated a Target Cities Demonstration Program to implement CIUs in treatment systems. Nineteen cities, including San Francisco, were funded to develop CIUs that would assess clients using standard procedures, match clients to treatment, and refer clients to treatment in the community.

At least two types of benefits may accrue as a result of centralizing assessment and referral services. Short term benefits may include improved access to treatment (DuPont, 1974) measurable as increased access for hard to reach populations (Stephens, Kaye and Chen, 1999) or as decreased length of time to admission, and improved client satisfaction with the admission process (Scott and Foss, 1999). Improved access, particularly where it includes efforts to match clients to the most appropriate treatment, may lead to improved retention (Stephens et al., 1999). Few reports discuss outcomes associated with centralized intake in drug treatment. Scott and Foss (1999) reported that CIU participants in Chicago were more likely to appear for their initial assessment, more likely to initiate treatment, and more satisfied with the assessment process as compared to a pre-CIU group. Wickizer et al. (1994) found that referral to treatment from CIUs was associated with higher treatment completion rates. The authors speculated that centralized intake improved patient-treatment matching, which in turn resulted in greater treatment completion. Conversely, Rohrer et al. (1996) found that CIU participants in Polk County, Iowa, were less likely to complete treatment than persons entering treatment in counties where CIUs did not operate.

This study was designed to investigate whether centralized intake and assessment would result in improved treatment outcomes, including both short and longer-term outcomes. Outcomes for substance abuse clients who entered treatment through the CIU were compared to outcomes for those who entered treatment directly at the program level.

Materials and Methods

The San Francisco Central Intake Unit (CIU)

The publicly funded drug abuse treatment system in San Francisco provides over 12,000 unduplicated admissions each year, through contracts with 30 community-based treatment agencies and more than 80 subprograms. The CIU operated as an overlay on this existing system, and could refer clients to any of the agencies or subprograms. Persons seeking treatment could approach an individual program, or contact the CIU for assessment. CIU services were advertised in the community, among treatment providers, and a toll-free-phone number was publicized. Over time, the CIU became a substantial access point, completing 2600 assessments in 1996 (San Francisco Target Cities, 1996a).

Initial assessment in the individual treatment programs in the San Francisco system varied from program to program, while the CIU included standardized assessment based first on a locally developed instrument and later on the Addiction Severity Index (ASI; McLellan, Luborsky O'Brien and Woody, 1980). In conjunction with this assessment information, CIU assessors then gave further consideration to special client needs (e.g., health, mental health, criminal justice), and made referrals to programs that could serve identified needs. In contrast to intake workers at individual treatment programs, who would be concerned with how well the client fits their program, and who may have had program pressures to increase admissions or to reject cases for whom the program was not well suited, CIU assessors could respond to the needs of the client in terms of the programs available systemwide. CIU assessors were recruited from community agencies, and so had some understanding of community services to which they would refer. They learned about the spectrum of treatment services through systematic training, by making referrals daily, and from the referral experiences of other assessors. Consequently, CIU assessors developed a sophisticated understanding of the treatment system to which they referred.

In the referral process, the ASI was used to determine level of problem severity, and to point toward appropriate level of care. Assessors and clients then reviewed considerations such as client preference, program waiting lists, housing issues, proximity of program to client's home, and

concurrent mental health and medical needs. Referrals were made to programs that provided level of care indicated and preferred by the client, and where program resources were available to meet client needs. Clients, of course, were free to take and follow the referrals given, or to ignore the referral altogether, seeking services or not in any of the San Francisco funded programs.

The CIU was accompanied by its own management information system, which was intended to support client-treatment matching and automated tracking of treatment availability. The Target Cities initiative was intended to promote systemic change, and the San Francisco Target Cities Project made efforts to better link substance abuse services with mental health services, with the Social Security Administration, and with Head Start and with criminal justice interventions in the community. The management information system, and the development of linkages with related community services, were intended to create a more integrated treatment system.

Study Recruitment and Sample Characteristics

To assess whether accessing treatment through the CIU affected outcomes, 7 sentinel programs were selected for inclusion in the study. Larger treatment programs were selected because they were more likely to receive higher numbers of referrals from the CIU during the recruitment period, and programs were selected to represent residential, day treatment, and outpatient modalities. Two women-specific programs were selected to ensure adequate representation of women. The number of participants recruited from each program and for each group (CIU vs. non-CIU), along with program modality and gender mix is given in Table 1.

Table 1

Program characteristics and number of participants in 7 sentinel programs (n=451)

| Program | Modality | Gender Focus | Baseline Sample Size | | |
			CIU	Non-CIU	Program Total
1	Residential	Men	70	49	119
2	Residential	Women	16	33	49
3	Day Treatment	Co-ed	10	49	59
4	Outpatient	Women	3	9	12
5	Outpatient	Co-ed	46	47	93
6	Outpatient	Co-ed	10	17	27
7	Residential	Co-ed	43	49	92
Group Totals			198	253	451

The evaluation goal was to compare outcomes for clients who did and did not receive the CIU intervention. Clients who were referred to treatment may or may not have actually entered treatment, and this was true whether clients were assessed at an individual program or at the CIU. To hold treatment entry constant across groups, only clients who entered treatment in one of the sentinel programs were recruited into the study.

CIU and non-CIU cohorts were recruited in overlapping time frames. The non-CIU group was recruited from March 1995 through July 1996, and the CIU group was recruited from May 1995 through February 1997. Research staff coordinated with CIU staff weekly to identify clients who had been referred to any of the sentinel programs. Research staff also coordinated with intake staff at each program to determine whether a CIU referred client entered the program, and identified clients were recruited into the study. To recruit the non-CIU cohort, research staff coordinated with program intake workers to identify new admissions who were not referred by the CIU, and those so identified were recruited into the non-CIU cohort. Research staff attempted to recruit all eligible persons entering the sentinel programs during the observation window, and to complete the baseline interview within 2 weeks of admission.

Using these procedures, 463 participants were recruited. A few cases were deleted from analyses because the self-reported admission date was different than the actual admission date and

fell outside the eligibility period (n=6), or because the interviewer assessed client responses as invalid (n=6). A total of 451 cases were analyzed, including 198 CIU and 253 non-CIU participants. Mean number of days from treatment admission to baseline interview was 8.7 (SD=9.3). The sample had a mean age of 36.8 (SD = 8.8) and mean education of 12.3 years (SD = 2.1); 35% were women. About half (50%) were African-American, 31% were White, 7% were Latino/a, 3% were Asian and 8% were of other ethnicity. Cocaine was the drug of choice for 38%, followed by alcohol (23%).

Data Collection

Interviews were conducted following admission (baseline), and at 1-month and 12-months post-admission. At baseline, respondents provided tracking information to be used in locating them for follow-up interviews. All the procedures followed for recruitment of participants and data collection were reviewed and approved by the Institutional Review Board of the University of California San Francisco.

Treatment access measures. At baseline only, participants were asked 5 questions concerning their experience in accessing treatment for the current episode. Four of the questions were dichotomous, and concerned whether the participants were required to be in treatment, had applied to any other treatment in the past 30 days, were now in the program they wanted, and had been placed on a waiting list. One question, asking clients how difficult they found getting into the current treatment program, was coded using a 5 point Likert scale with responses ranging from "very difficult" to "not at all difficult."

Treatment satisfaction measure. At 1-month post-admission participants were asked about satisfaction with treatment using a modified version of the Client Satisfaction Questionnaire-8 (CSQ-8: Nguyen, Attkisson and Stegner, 1983), which has been used in substance abuse treatment settings as well as mental health, primary medical care, and other human services environments (Attkisson and Greenfield, 1994). Six of the original questions concerning the quality of service received were used: whether the respondent received the kind of service wanted, whether the respondent would refer a friend to the program, whether services helped with client problems,

overall satisfaction, and willingness to return to the program (see also Chan, Sorensen, Guydish, Tajima, and Acampora, 1997). Participants responded to each item on a scale of 1 (least satisfied) to 4 (most satisfied). Item responses were summed to a total score that ranged from 6 to 24, with 24 indicating highest satisfaction.

Treatment outcome measures. At all 3 time points, interviewers administered the ASI (McLellan et al., 1980), the Beck Depression Inventory (BDI: Beck, 1972), Brief Symptom Inventory (BSI: Derogatis and Melsaratos, 1983), and a measure of social support. ASI composite scores were derived from questions in each problem area, using formulae to weight the items (McGahan, Griffith and McLellan, 1986). Composite scores range between 0 and 1 with higher scores indicating greater problem severity during the 30 days preceding interview and have been shown sensitive to treatment effects (McLellan et al., 1985). The BDI consists of 21 items, each rated on a 4 point scale from 0 to 3, reflecting depressive symptoms in the past 7 days. Item scores were summed to a total, and higher scores reflect greater depressive symptoms. The BSI consists of 53 items, each rated on a scale of 0 to 4, reflecting a range of psychiatric symptoms in the past 7 days. Item responses were summed and divided by 53 to give a General Symptom Index, where higher scores reflect greater psychiatric symptoms. The social support measure included 15 questions that asked about self-esteem, emotional support, and social interactions (Cohen, Mermelstein, Kamarck, and Haberman, 1985). Item responses were coded using a five-point Likert scale, and summed to give a total score, where higher scores indicate greater social support.

Follow-up interviews. Approximately 1 month and 12 months after baseline respondents were re-interviewed. In computing 12-month follow-up rates 4 CIU and 4 non-CIU participants who died between 1 and 12 months were excluded, giving 12-month follow-up rates based on living participants (n=443). One-month follow-up interviews were completed for 402 of the 451 participants, giving an 89% follow-up rate. At 12 months, 367 of 443 living participants were interviewed, giving an 83% follow-up rate. Follow-up rates were higher in the CIU cohort at both 1 month (92% vs. 87%) and 12 months (87% v. 80%), and these differences were significant only at 12 months, X^2 (1, N=443) = 4.43, p < .05).

Attrition analysis. While follow-up rates were above 80% at each time point, 77% (n=340) of living participants completed both follow-up interviews. These cases included 156 of the 194 (80%) living CIU participants and 184 of the 249 (74%) living non-CIU participants, giving a non-significant difference in the proportions of each group completing all 3 interviews.

Participants who were (n=340) or were not interviewed (n=111) at all time points were similar in terms of gender, ethnicity, education, drug of choice, and mean scores for 10 outcomes measured at baseline. Those not interviewed at every time point had a lower mean age than those consistently interviewed (35 v. 37.3 years), t (449) = -2.21, p < .05.

Data Analysis

The analysis plan was designed to: (a) compare study groups at baseline, (b) compare groups on time in treatment, (c) compare groups on the short term outcomes of treatment access and satisfaction, (d) assess whether changes in outcomes occurred over time, and (e) assess between-group differences at 12-month follow-up.

Comparison of study groups at baseline. CIU and non-CIU groups were compared on demographic characteristics and outcome variables as measured at baseline. Outcome variables included ASI composite scores in 7 areas (medical, alcohol, drug, legal, social, employment, and psychological), and summary scores for the BDI, BSI, and social support measure.

Comparison of study groups on time in treatment. Retention in treatment was calculated as the number of days a client remained continuously in treatment from admission to discharge. Admission and discharge dates were extracted from a county treatment episode database or, for 20% of cases that were not found in the county database, from treatment program records. For 7 cases, discharge dates could not be determined through either of these sources, and retention data were treated as missing. Mean number of days in treatment was compared between groups (CIU/non-CIU) for each of 3 modalities (residential, day treatment, outpatient), using t-tests.

For participants in residential and day treatment, time from admission to discharge reflects actual treatment participation on a daily or (for day treatment) almost daily basis. For outpatient treatment, California reporting requirements were that cases should be closed within 30 days of the

last clinical contact, and that the discharge date reported should be the date of last clinical service. Bias may have been introduced when programs kept cases open after the last clinical contact, and reported some later discharge date. Although such bias would inflate estimates of time in treatment for outpatient cases, one would not expect that such bias would be differential by CIU/non-CIU status.

Treatment access and satisfaction. For the 4 dichotomous treatment access questions, CIU and non-CIU participants were compared using Chi Square analyses. For the question concerning difficulty of getting into treatment, having 5 response categories, the groups were compared using the Mann Whitney test. Treatment satisfaction mean scores, derived from all completed 1-month interviews (n=402), were compared between groups using t-tests.

Assessment of change over time. To assess change over time mixed effects regression analyses were applied (Littell, Milliken, Stroup and Wolfinger, 1996). These models had several advantages over traditional ANOVA approaches in that they simultaneously fit the model coefficients and the correlated error structure, they did not require complete data from each subject, and they allowed random effects so that, for example, intercepts and slopes over time could be considered different for all subjects (Hedeker and Gibbons, 1997). A series of 10 regression analyses were applied, one for each individual outcome, to asses whether significant changes occurred across all time points. Each analysis included factors for CIU status (CIU vs. non-CIU), time (baseline, 1-month and 12-month follow-up), gender, drug of choice (heroin, not heroin) and history of injection drug use, with the baseline value of the dependent measure included as a covariate. Time was treated as a class variable. Gender, drug of choice, and history of injection drug use were included because the groups differed on these demographic variables. Baseline values of dependent measures were included as covariates because the two groups differed on three of these measures at baseline.

Assessment of between-group differences. The time by setting interaction for each outcome was analyzed. A significant interaction would indicate that the pattern of change over time differed

by group, and would suggest group differences that may be attributable to the CIU/non-CIU condition.

Results

Comparison of Study Groups at Baseline

CIU participants (n=198) differed from non-CIU participants (n=253) on 3 demographic variables (Table 2). The CIU group included fewer women, more heroin users, and more person with a history of drug injection. At baseline, CIU participants had greater employment and psychological problems, and lower social support (Table 3).

Comparison of Study Groups on Time in Treatment

For participants having known discharge dates (N=444), mean number of days from admission to discharge were compared between groups. Among clients receiving residential treatment (n = 259) mean time in treatment was 63.5 days (SD = 48.2) in the CIU group, and 70.6 days (SD = 78.9) in the non-CIU group, t (214) = .873, p = 0.38. Among those receiving day treatment (n = 59), the mean was 105.4 (SD = 67.3) in the CIU group and 84.5 (SD =86.4) in the non-CIU group, t (57) = .718, p = 0.47. Among clients receiving outpatient treatment (n = 126), the mean among CIU cases was 123.2 (SD=78.7) and 140.4 (SD = 98.2) among non-CIU cases, t (124) = 1.07, p = 0.29.

Table 2.

Demographic characteristics of clients entering treatment through Central Intake Unit (CIU) or through usual procedures (non-CIU).

Characteristic	Total N=451	CIU (n=198)	Non-CIU (n=253)	t/Chi value	p value [a]
Mean age [b]	36.8 (8.8)	37.5 (8.7)	36.2 (8.8)	-1.49	NS
Mean years of education [b]	12.3 (2.1)	12.3 (2.2)	12.3 (2.0)	0.02	NS
Gender					
Female	35% [c]	28%	40%	7.24	.007
Ethnicity					
African-American	50%	48%	52%	2.54	NS
White	31%	33%	30%		
Latino/a	7%	6%	8%		
Asian	3%	3%	3%		
Other	8%	10%	6%		
Drug of Choice [d]					
Cocaine	38%	36%	40%	17.16	.009
Alcohol	23%	23%	23%		
Heroin	11%	16%	7%		
Amphetamine	9%	6%	12%		
Cannabis	4%	4%	3%		
Alcohol and Other Drug	9%	7%	10%		
Other	6%	9%	5%		
History of injection drug use	31%	36%	26%	4.60	.032
History of incarceration	53%	51%	54%	.48	NS
Mean number of prior treatment episodes (including detoxification) [b]	4.9 (8.3)	5.1 (9.2)	4.8 (7.5)	-0.49	NS

a.   Comparisons made using t-test or Chi Square techniques.
b.   Expressed as mean (standard deviation).
c.   All percentages rounded to nearest whole number.
d.   Drug of choice as reported by client at time of intake.

Table 3.

Comparison of outcome measures at baseline for clients entering treatment through Central Intake Unit (CIU) or through usual procedures (non-CIU).

Outcome Measure	Total (n=451) Mean (SD)	CIU (n=198) Mean (SD)	Non-CIU (n=253) Mean (SD)	t	p value
ASI Composite Scores					
Medical	.27 (.36)	.26 (.36)	.27 (.35)	0.51	NS
Employment	.87 (.19)	.90 (.16)	.85 (.21)	-2.75	.006
Legal	.11 (.19)	.12 (.20)	.10 (.18)	-1.16	NS
Alcohol	.23 (.27)	.21 (.26)	.25 (.27)	1.64	NS
Drug	.16 (.12)	.16 (.12)	.15 (.12)	-0.34	NS
Social	.20 (.22)	.21 (.23)	.20 (.21)	-0.41	NS
Psychological	.23 (.23)	.26 (.24)	.21 (.23)	-1.95	0.052
BSI Global Severity	1.0 (.71)	1.06 (0.75)	0.92 (0.67)	-2.07	NS
BDI	15.14 (9.89)	15.89 (10.32)	14.55 (9.52)	-1.43	NS
Social Support	38.0 (11.90)	35.48 (12.01)	39.93 (11.43)	4.00	0.0001

Note: Volumes represent mean (standard deviation). ASI = Addiction Severity Index; BSI = Brief Symptom Inventory; BDI = Beck Depression Inventory.

Treatment Access and Satisfaction

CIU participants were more likely to be required to be in treatment (55% v. 41%; X^2 (1, N = 449) = 9.18, p < .01), and more likely to be placed on a waiting list once they contacted the treatment program (43% v. 28%; X^2 (1, N=437) = 11.15, p < .001). CIU and non-CIU participants did not differ on the proportion who had applied to other programs in the past month (16% v. 19%; X^2 (1, N=447) = 0.94, p = 0.33), on the proportion who said they were now in the program they wanted (68% v. 74%; X^2 (2, N=448) = 4.09, p = 0.13), or on level of difficulty of getting into treatment, X^2 (1, N=449) = 0.25, p = 0.61. Mean treatment satisfaction scores for those interviewed at 1-month follow-up (n=400) were similar for CIU (mean = 20.50, SD = 3.8) and non-CIU participants (mean = 20.21, SD = 4.2), t (398) = 0.71, p = 0.47.

Assessment of Change Over Time

Comparisons for individual outcomes are summarized in Table 4, where the last three columns give significance for main effects of time, CIU status, and time by CIU interactions.

Main effects of time. There were main effects of time for 8 of the 10 outcomes, such that employment, legal, alcohol, drug, and social ASI composite scores decreased over time, BDI (depression) and BSI (psychiatric symptom) scores decreased, and social support increased.

Assessment of Between Group Differences

There were no significant main effects of CIU status or time by CIU interactions, suggesting that the pattern of change over time did not differ by CIU status (Table 4).

Table 4.

Results of mixed effects regression analysis to assess effects of time, CIU status, and time x CIU status interactions

Outcome Measure	CIU (N=198)			Non-CIU (N=253)			Time	CIU	Time x CIU
	Baseline	1 month	12 months	Baseline	1 month	12 months			
ASI Composite Scores									
Medical	.281	.278	.280	.287	.283	.258	NS	NS	NS
Employment	.879	.880	.735	.870	.900	.754	.0001	NS	NS
Legal	.114	.063	.064	.108	.068	.074	.0001	NS	NS
Alcohol	.204	.101	.125	.225	.112	.109	.0001	NS	NS
Drug	.159	.086	.080	.160	.098	.085	.0001	NS	NS
Social	.193	.144	.153	.189	.165	.151	.0005	NS	NS
Psychological	.244	.214	.206	.231	.230	.242	NS	NS	.10
BSI	.966	.775	.800	.927	.791	.762	.0001	NS	NS
BDI	14.840	11.133	11.512	14.380	10.841	10.672	.0001	NS	NS
Social Support	38.152	41.605	42.873	39.303	42.421	42.057	.0001	NS	NS

Note: Values reported are Least Square means.
Time was entered as a class variable. Analyses controlled for gender, lifetime history of drug use (y/n), and drug of choice (Heroin, amphetamine, other). ASI = Addiction Severity Index; BSI = Brief Symptom Inventory; BDI = Beck Depression Inventory

Discussion

Clients accessing substance abuse treatment through the CIU, as compared to those accessing treatment on their own, were more often male, more often heroin users, and more often had a history of injection drug use. At baseline, participants in the CIU group reported greater severity of employment and psychological problems, and lower social support. While it cannot be demonstrated from the data, because representativeness is not assured, the CIU may have served a population that was more disabled than those who negotiated access to treatment on their own. Over time, 40% of referrals to the CIU came from treatment agencies (San Francisco Target Cities, 1996b), suggesting that agencies referred clients to the CIU when they either could not or would not accept the client. That the CIU may have improved access for a more difficult to treat population is generally consistent with findings of Scott and Foss (1999), who found that the Chicago CIU improved treatment access.

CIU and non-CIU participants did not differ on most measures of treatment access and satisfaction. However, CIU participants were more likely to be required to be in treatment, and more likely to have been placed on a waiting list even after completing the CIU assessment and contacting the receiving program. The Target Cities Project worked closely with the county Drug Court, and served as the Regional Management Authority for SSI recipients who were disabled due to drug and alcohol addiction, and who at that time were mandated to treatment. These factors may explain why those in the CIU group were more likely to be mandated to treatment. That CIU participants were more likely to be placed on waiting lists at the receiving program may suggest either that programs gave a higher priority to persons who approached them directly, or that persons referred from the CIU were seen by the provider as less desirable clients.

Time in treatment did not differ between the groups, suggesting that, whatever barriers may have existed prior to treatment, CIU and non-CIU participants experienced similar retention once engaged in treatment. Length of time participants remained in treatment may not be directly comparable to other treatment studies. Two of the residential programs and the day treatment program included in this study were based on the Therapeutic Community model, with intended

lengths of stay from 6 months to 1 year. Length of stay calculations for all participants were based on date of admission and date of discharge, but date of discharge may lag behind date of last service particularly for outpatient programs. The recruitment strategy attempted to identify and interview all eligible persons in sentinel programs within two weeks of admission. Those leaving treatment within this initial 2-week period were less likely to be recruited into the study. All of these factors would work to increase the mean length of stay for persons in the study sample.

Analysis of change over time showed significant change in both groups, and changes observed were in the direction of reduced ASI problem severity, reduced psychiatric symptoms, and increased social support. These findings are consistent with literature showing that, over time, clients entering drug abuse treatment tend to show improved outcomes (Hubbard et al., 1989; Miller and Hester, 1986; Simpson and Sells, 1990). The absence of CIU effects or CIU by time interactions suggests that, while both CIU and non-CIU groups improved, one group did not improve more than the other. With one exception, the possibility of improved treatment access, these data do not show that the use of centralized intake improved outcomes. This conclusion is consistent with Rohrer et al. (1996) and contrary to Wickizer et al. (1994), although both studies relied on treatment completion, an outcome that was not measured in this study.

There are several explanations as to why the San Francisco CIU intervention did not improve longer term outcomes. One is that centralized intake procedures may not affect the treatment process, or that their impact is minor by comparison with the effect of treatment itself. Second, efforts to send clients to the most appropriate treatment were constrained by client preference and service availability. Client preference was important in the referral process, and clients would not be referred to a program against their preference, even if the assessor thought a different treatment may be more appropriate. The treatment system also has demand for treatment in excess of capacity, particularly for residential treatment, so that clients could not readily access some types of care, whether referred by the CIU or not. Third, the treatment slot management component of the CIU management information system never came on line, so assessors did not have regularly updated information about treatment availability systemwide. The City and County

of San Francisco, although paying for treatment, did not reserve treatment capacity to support the CIU, so that clients referred by the CIU did not have preferential access to treatment. Last, the CIU was an optional point of entry to the system. Clients could seek to enter any treatment program directly or they could seek entry after receiving a referral from the CIU. Importantly, they could also seek to enter a program to which they had not been referred after seeking CIU services. These issues represent both design features, needed to accommodate the CIU to the local treatment system, and design failures, occurring in the context of a major system redesign. These issues may have attenuated the impact of the CIU on treatment outcomes, particularly since admission into the most appropriate treatment identified in the assessment process could not be assured. These constraints notwithstanding, San Francisco did implement centralized intake, assessment, and referral procedures, with trained staff and linkages to community services, and the CIU may have been expected to produce improved outcomes (Becnel et al., 1999; Stephens et al., 1999; Wickizer et al., 1994).

Study limitations include generalizability, non-equivalence between groups at baseline, and reliance on self-reported outcome measures. The CIU cohort was comprised only of clients who had completed a CIU assessment and entered treatment in sentinel clinics. This strategy excluded those who received a CIU assessment but were not referred to substance abuse treatment, those who were referred but did not enter substance abuse treatment, and those who were referred to and entered a treatment program outside the sentinel group. This limits generalizability of findings as well as the ability to answer broad questions about the CIU population, such as the number who received treatment referrals and the number of those who subsequently entered treatment. While the study recruitment team worked closely with CIU staff and program staff to identify persons eligible for study, there was no documentation of the number of eligible cases that were missed. Last, it was not possible to demonstrate that CIU and non-CIU samples were representative of their respective populations. Given the size and complexity of the San Francisco treatment system, a purposive sample was drawn that was intended to reflect major modalities and larger providers, which limited ability to generalize to the entire system.

Non-equivalence between groups at baseline is at once a finding, suggesting that the CIU served a different population, and a confound with respect to between group comparisons on follow-up. In comparing differences between groups, the analysis controlled for demographic and drug use variables where baseline differences were apparent, and included the baseline value of the dependent measure as a covariate. With the exception of time in treatment, outcome measures depended on self-report. Self-report measures of drug abuse have been shown to be reliable (Sobell, Kwan and Sobell, 1995; Weatherby et al., 1994) and valid (Barbor, Brown and Del Boca 1990; Maisto, McKay and Connors 1990) where, as in this study, interviews were confidential and there were no consequences for reported drug use (Kosten, Gawin and Schumann, 1988). To the degree that underreporting of problem severity was present, it would inflate measures of change over time in both conditions. Only differential underreporting by condition would affect the main conclusion. In drug abuse treatment research it is common practice to refer, as in this study, to "treatment outcomes," a term that may imply a causal relation between outcomes observed and treatment received. In the absence of a no-treatment control group, the change over time observed in this study may or may not be attributable to treatment. Still, whatever process or event caused change over time, one might conclude that the change process was not substantially impacted by the CIU intervention.

In the national Target Cities project, CIUs were intended to provide standardized assessment and referral, client-treatment matching, and data systems that would facilitate treatment access. These goals were met to greater and lesser degrees in San Francisco and in other cities, as planners developed CIUs in their local context (Guydish and Muck, 1999). The San Francisco CIU intervention may have improved treatment access for a more highly disabled population, but clients entering treatment through the CIU did not have better outcomes than those entering treatment directly.

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