

Client Outcomes II: Longitudinal Client Data from the Colorado Treatment Outcome Study

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LIKE MANY U.S. COMMUNITIES, DENVER HAS BEEN enacting a series of changes in its mental health system over the last ten years in response to the growing national consensus regarding the inadequacy of the community treatment system for persons with serious and persistent mental illness (SPMI) (Demmler 1983; Mechanic 1987; Mental Health Association of Colorado 1984; Shern, Surles, and Waizer 1989). In Denver these changes were facilitated by funding increases associated with client-initiated litigation against the city and state¹ and by the award of the Robert Wood Johnson Foundation (RWJF) grant (Shore and Cohen 1990). The changes, when taken together, constituted a major system reform in Denver. We will discuss some early results from the Colorado Treatment Outcome Study (CTOS) and how this system reform affected the characteristics of the treatment system, the attitudes and satisfaction of the work force, and the outcomes experienced by clients.

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¹ *Arevalo v. Denver*, Case #81 CV 6961, District Court, City and County of Denver, 1981; *Goebel v. Denver*, Case #81 MH 270, Probate Court, City and County of Denver.

System Reform in Denver

The reform of the Denver system, in line with the overall RWJF initiative, was designed to restructure the mental health system in order to address system fragmentation and diffusion of responsibility so that treatment of the complex needs of individuals with SPMI could be improved. Some of the needs identified were for housing, income, and basic social supports, in addition to a variety of mental health and rehabilitative services (Morrissey and Goldman 1984; Turner and TenHoor 1978).

Prior to the reform, the Denver mental health system comprised a variety of private not-for-profit and government agencies, each linked autonomously with the state mental health authority (Demmler 1993; Goldman et al. 1990). Four community mental health centers (CMHCs), a Denver city-operated general hospital, two speciality clinics for individuals of Hispanic or Asian heritage, and a state hospital formed the major elements in the treatment system. Each CMHC served one quadrant of the city.

Until 1981 the city's Department of Health and Hospitals administered the mental health center that served the core urban area. City revenue shortfalls in 1981 prompted a multimillion dollar reduction in its funding of mental health services, eliminating outreach and day care programs designed specifically for individuals with severe disabilities. These funding reductions precipitated a class action suit² against the city and the state, which, although it is now under appeal, was initially decided in favor of the plaintiffs. As part of the court-ordered remedy, the state was required to produce a plan for service improvement in Denver, which formed the basis for the system reform efforts (Glover and Johnson 1986). Contemporaneous with this state-level planning activity were unrelated efforts by Denver mental health administrators to develop services bridging the four catchment areas.

Based upon the state's remediation plan, the Colorado legislature appropriated 4.1 million dollars for the treatment of persons with SPMI (Demmler 1993). Three-quarters of these funds were allocated for service improvements in Denver, which represented about 17 percent of Colorado's population.

The funds in Denver were used to enhance current services and to develop new ones; most prominent among the latter was the citywide

² See note 1.

intensive case management (ICM) program. This program, which was independent of the existing CMHCs in Denver, was designed to serve individuals characterized by homelessness, incarceration for minor offenses, repeated hospitalization, and other indications of poor community adaptation (Sherman 1988). It represented the first major structural and functional change in the system. The appropriation also funded an acute treatment facility designed as an alternative to hospitalization; a homeless outreach program; enhanced triage and emergency services; two drop-in centers; an outreach program that targeted clients living in boarding and nursing homes; and expanded day treatment programs.

At approximately the same time as the court-ordered remedies, the RWJ Foundation announced the Program on Chronic Mental Illness (PCMI) (Shore and Cohen 1990). Denver's successful RWJF application built upon the momentum associated with the core elements of the remediation plan. Following receipt of the award, Denver began to develop the central mental health authority, called the Mental Health Corporation of Denver (MHCD), in July 1989. The MHCD was the recipient of all state funds for mental health services, subsuming the four existing CMHCs and the ICM program within its organizational structure. The city therefore had established both a single organizational point of responsibility for mental health services, the MHCD, and a single point of accountability for the neediest clients, the ICM program. These two interventions, plus the expansion of existing case management and treatment services, were designed to improve the continuity of care and integration of services for individuals with serious disabilities and to enhance their quality of life and clinical status. We will present research that assesses the degree to which the central tenets of the reform succeeded in achieving these client outcome goals.

Methods

The new funding in Denver and the receipt of the RWJF award provided the opportunity to construct a quasi-experimental study contrasting the outcomes experienced by clients in Denver with those of individuals served by systems in other urban areas of the state that were not undergoing dramatic change. In its simplest form, the study may be conceptualized as a nonequivalent control group design in which five repeated measures of client needs and outcomes were used to document the sub-

jects' response to the attempts at system reform. A sample of 785 individuals was followed for five years; personal interview data were collected yearly from each client, as were comparable data from both collaterals (family and friends) and primary mental health care providers who were identified by the client. Only the client-reported data on needs and outcomes will be featured here.

Data were also collected from mental health providers about their attitudes and job satisfaction during each of the five years. Site data reflecting the staffing, case load, and other features of the CMHCs in both Denver and the contrast site were collected to augment the RWJF evaluation site-level data (see Morrissey et al. in this issue). In our analyses, we will attempt to integrate the client, provider, and service system data in order to document the system change and to understand its effect on providers and client outcomes.

The Study Sites

Service system research is difficult to conduct, which may explain the dearth of information available on the impact of alternative systems (Hargreaves and Shumway 1989). Problems arise in selecting comparable alternative service systems to be contrasted and in understanding the processes through which system changes are mediated.

Given the importance of state mental health authorities in organizing, financing, and regulating services, we chose to hold the influence of state policy constant, and thus we only evaluated potential contrast sites within Colorado. The sociodemographic and social area characteristics of sites were compared, as were the characteristics of individuals who used public mental health services. The Peaks area, comprising the cities of Colorado Springs and Pueblo, was chosen as the most comparable to Denver. The demographic characteristics of the community and clinical characteristics of the Peaks and Denver treatment populations are summarized in table 1.

Selection of the Study Sample

The sample was selected in the spring of 1988 from all active adult (18+) clients who met the Colorado criteria for SPMI. Colorado's criteria resembled those of many states (Schinnar, Rothbard, and Kanter 1991) in its choice of duration, disability, and utilization of intensive service as

TABLE 1
 Contrasts between Two Areas of Colorado in 1986

Characteristics	Denver	The Peaks
Of the social area		
Total population	507,000	518,000
Adult and elderly population	77.3%	70.1%
Minority population	32.3%	21.6%
Child abuse rate per 100,000	1,293	1,004
Population in poverty	13.1%	12.5%
Unemployment rate	5.2%	8.5%
Of persons admitted		
With SPMI	21.8%	15.8%
Minority, with SPMI	34.8%	26.2%
Male	58.0%	59.0%

Abbreviation: SPMI, serious and persistent mental illness.

the primary definers of SPMI status. At the time of the study, no specific diagnostic criteria were employed. Each subject was required to have identified mental health problems of at least one year's duration, to have substantial dysfunction in at least two life skill areas, and to have experienced an episode of inpatient, 24-hour residential treatment or partial hospitalization. A total of 3,053 individuals who met criteria for inclusion in the original sampling frame was identified from both sites.

Although not featured in these analyses, two client characteristic variables were used to stratify the sample: (1) an empirically developed typology identifying four clinically distinct types of clients (see Shern et al. 1985), which were then sampled in approximately equal proportions; (2) a preferential sample of clients, classified as "most in need" (MIN), who were the original recipients of ICM services in Denver. A nomination process was used in both Denver and the Peaks to identify individuals who met MIN criteria that included several indicators of poor community adjustment.

A sample of 1,567 clients was invited to participate in the study; approximately 50 percent ($n = 785$) ultimately gave consent. Demographic and diagnostic characteristics of the sample and the sampling frame are presented in table 2. Although small differences were obtained for marital status and age, the sample is generally representative of the overall

frame from which it was selected. In addition to the variables in table 2, the two groups were contrasted using admission problem and level of functioning data from provider-generated Colorado Client Assessment Records (Ellis, Wilson, and Foster 1984). The groups were not found to

TABLE 2
Representativeness: A Comparison of Selected Characteristics
of Study Participants and Nonparticipants

Characteristic	Overall sampling frame ^a (n = 2,925)	Participants (n = 754)	Nonparticipants (n = 2,171)
Gender (%)			
Male	54.0	56.0	53.3
Ethnicity (%)			
White	67.8	70.4	66.9
Black	14.3	12.5	14.3
Hispanic	15.4	15.4	15.3
Marital status at admission (%)*			
Single	56.4	61.8	54.5
Married	7.3	7.3	9.6
Div./sep.	29.2	26.7	30.0
Widowed	4.2	4.2	5.8
Employment status at admission (%)			
Total unemployed	91.6	91.1	91.8
Diagnostic category at admission (%)			
Schizophrenic	54.4	56.9	53.5
Depression	23.1	22.7	23.3
Personality	7.4	8.5	7.0
Type (%)			
Type 1	15.9	16.2	15.8
Type 2	34.8	36.1	34.4
Type 3	17.2	15.4	17.8
Type 4	32.1	32.4	31.9
MIN status (%)			
MIN	25.5	26.5	25.1
Age as of January 1, 1988*			
Mean age (years)	41.7	39.7	42.2
Years since current admission*			
Mean no. of years	2.4	2.8	2.3

^a The representative and response-rate analyses were completed on those clients for whom admission data were available. There are approximately 128 cases (4.2%) for whom these data were not available at the time of the analyses.

* $P \leq .05$.

Abbreviation: MIN, most in need.

differ significantly on the 13 problem scales used in the instrument. Similar comparisons with the statewide adult population with SPMI also indicated that the sample was generally representative.

Field Procedures

After obtaining informed consent for participation in the study, each subject was personally interviewed using a highly structured questionnaire. Prior to conducting interviews, the field staff received approximately one week of training using a training curriculum adapted from that of Brodsky et al. (1979). Following the interview, consent was obtained from the subjects to contact a provider and a collateral (preferably a family member) who were familiar with their situation. In year 1 of the study, 92.6 percent of the client participants gave permission to contact providers, and 71.6 percent consented to have collaterals interviewed. About 93 percent of providers and 81 percent of collaterals identified by the respondents were successfully interviewed. Following their initial interview, clients were recontacted yearly for four years. As a result of an aggressive follow-up strategy, the yearly follow-up rates ranged between 82.5 and 87.6 percent.

Instrumentation

The research questionnaire was designed to provide a multidimensional assessment of the clients' clinical and social-psychological status, objective and subjective quality of life (QOL), and met/unmet needs for services and supports. We used structured research instruments that we had employed in our typological research and that had been utilized in other assessments of treatment populations with SPMI (Ciarlo and Reihman 1977; Grosser and Vine 1991; Larsen et al. 1979; Lehman 1988; Rosenberg 1979; Shern and Dilts 1987; Tessler, Fisher, and Gamache 1988; and Tessler, Killian, and Gubman 1987); the research team developed several measures for this study. Comparable versions of the instrument were developed for the provider and collateral respondents. The final content of the questionnaires was reviewed by consumer, provider, and collateral focus groups for its appropriateness of content and adequacy of coverage.

Three major areas of measurement will be reported here: continuity of care, met and unmet need for services, and client outcomes.

Continuity-of-Care Measures. In order to present a strategy parallel-

ing that reported by Lehman et al. in this issue, continuity was defined as the likelihood that an individual saw a case manager, therapist, or psychiatrist sometime during the year and by the number of times that this person reported being terminated from mental health care during the same period. These data were obtained from the consumer respondents during their interviews.

Met and Unmet Need for Services. This area was measured on six scales that assessed need for and receipt of self-care, vocational, treatment, crisis, case management outreach, and case management referral services. Each scale was composed of multiple items addressing specific services (see Shern et al. [1985] and Coen [1990] for a discussion of scale content and development). Respondents were asked to report whether they needed each service and whether they had received it during the previous month. The service need scales ranged from three to nine items and had internal consistency coefficients that varied from 0.43 to 0.82; most were above 0.65. Unmet need within a service area was calculated by subtracting the number of services received from the number needed.

Outcome Measures. Both objective and subjective QOL measures were included. Lehman's (1988) subjective QOL measures were used to assess overall satisfaction with leisure activities, residential situation, interpersonal relationships, safety, finances, and family as well as clients' overall subjective assessments of their general QOL (alphas ranged from 0.80 to 0.90).

Respondents were also asked about the nature of their family and other interpersonal contacts, use of leisure time, work and home productivity, residential stability, and use of alcohol and illegal substances. Each of these objective QOL areas was assessed by multiple-item scales or indices. Alphas for scale scores that were expected to be internally consistent ranged from 0.67 to 0.71.

Psychiatric symptoms were measured using the Colorado Symptom Index (CSI), a multi-item scale on which the respondents report the frequency with which they experience specific symptoms that are grouped into two major constellations: anxiety and psychosis. The scale was modified from a similar scale in the Denver Community Mental Health Questionnaire (Ciarlo and Reihman 1977) and designed to include item content similar to that assessed by the Colorado Client Assessment Record (Ellis et al. 1984). The symptom scales were internally consistent, with alphas ranging from 0.77 for anxiety to 0.85 for psychotic symptoms.

Self-esteem was assessed using the Rosenberg Self-Esteem Scale (1979) and was scored in two subscales: negative and positive self-evaluation (alphas = 0.76 and 0.79, respectively). Satisfaction with services was measured using the scales developed by Larsen et al. (1979) (alpha = 0.92).

Analyses

For these analyses, respondents were assigned to either Denver or the Peaks, consistent with the site from which they were initially recruited and without regard to any change in residence or ongoing participation in their original CMHC or hospital program. Substantial, differential movement from their original programs occurred. In year 5, 72.2 percent of Denver clients reported receiving some form of service from within the original study agencies, in contrast to only 65.8 percent of the Peaks group. Future analyses will investigate the client characteristics and outcomes that distinguish individuals who continue to be enrolled in their home agency programs from those who leave.

Client outcomes in each site were assessed using a repeated-measures analysis of covariance controlling for gender, race, and cohort, as well as for interactions between these factors. (Cohort is a variable that reflects whether the respondent was initially sampled as an active case or whether he or she was admitted to treatment during the recruitment phase of the research.) We were interested in the statistically significant effects of site, evaluation year, and especially site by evaluation-year interactions, which would indicate differential changes across sites. The SAS general linear model repeated-measures procedure was employed. The cell means used in the figures were least-squares, which were adjusted for other effects in the model as well as for the nonproportional or unequal cell sizes inherent in this quasi-experimental design.

Because we used repeated-measures procedures, only subjects who were interviewed in each of the five follow-up years have been included in the analyses. Five hundred and forty-one individuals met this criterion, with no significant differential attrition by site. This represented 72 percent of the original sample of 785, after adjusting for our 5 percent mortality rate.

With approximately 70 percent of the total subjects included in the five-year sample ($n = 541$), this subsample did not differ significantly from the full sample of 785 on either demographic or clinical characteris-

tics. However, five-year participants were slightly younger and had a higher frequency of psychotic symptoms, lower self-esteem, and greater needs for self-care, crisis, and mental health treatment services than individuals who did not participate every year. They also tended to report higher levels of interpersonal contacts and higher levels of satisfaction with services than subjects who were not interviewed every year. It appears, therefore, that exclusion of those individuals who did not participate every year produced a relatively more impaired sample.

Results

The results will be presented in three sections. The first contains information regarding the specific ways in which aspects of the system changed during the five study years; it complements the data presented by Morrissey et al. in this issue. Second, in the context of these system changes, data on changes in the attitudes of providers about various aspects of their work situation will be detailed. Finally, client-reported data will be analyzed to address both specific hypotheses derived from system and provider data and the findings presented by Morrissey et al.

System Changes

The overall structure of the Denver mental health system before 1988 and the major changes associated with both the litigation and the RWJF initiative were discussed in the introduction. The chronology is further detailed in Demmler (1993). In addition to the infusion of new resources in Denver and its structural reorganization in 1989, both intended to improve the functioning of the system, noteworthy reductions in staff and programs occurred in 1991 as a result of serious financial problems at the new MHCD. Between February 1991 and September 1991, two mental health teams were closed and four other teams were merged into two large ones. In what was perhaps the most important change, the ICM program, a hallmark of the system reform, was closed in July 1991, and the remaining case managers were reassigned to other MHCD teams, which effectively eliminated their structural autonomy. The number of clinical full-time employees (FTEs) on teams that treated CTOS subjects in Denver dropped from 115 to 69 between 1990 and 1991, while the clinical FTEs increased slightly in the Peaks. Similarly,

the ratio of clients to direct-care FTEs in Denver increased dramatically between 1990 and 1991 from 30.6 to 44.9, while these ratios remained relatively stable in the Peaks.

These and other data reported by Demmler (1993) and Morrissey et al. (this issue) demonstrated that the Peaks system was relatively stable. Although the Denver system improved between 1988 and 1990, it showed a decline in organizational functioning in 1991 and 1992; client and work force changes were hypothesized to parallel these changes.

Human Resource Data

Providers who completed client assessment questionnaires were also asked to respond to an attitude survey about their work environment (Coen 1993). The questionnaire assessed the following six dimensions of work environment: overall job satisfaction, dissatisfaction with management, satisfaction with working conditions, evaluation of coworkers' skills and supports, professional gratification, and perceived likelihood of being laid off.

From 124 to 151 providers responded each year, with a yearly average of 138 respondents. Response rates ranged from 86 percent to 90 percent over the five years of the study. Providers from both within and outside of the public mental health system responded to the survey. Because of the clients' movement away from the study CMHCs and hospitals, progressively more providers from outside the system were included, increasing from 1 percent in the first year to 32 percent in the final year.

Three general findings emerged from these data. First, providers from outside of the public mental health system consistently reported greater satisfaction with their work and more job security than public sector employees. Interestingly, neither personal gratification with work nor evaluation of coworkers differed between service settings. Second, Denver staff consistently reported lower levels of satisfaction and perceived job security than providers from the Peaks.

Finally, and most important for these analyses, the changes in job satisfaction across years differed by site. Denver staff satisfaction decreased during the reorganization in 1989 when the MHCD formally assumed leadership of the system. Following a rebound in 1990, it decreased significantly in 1991 in conjunction with the financial crisis. Throughout this period, the Peaks remained relatively stable on the dimensions of satisfaction.

The human resource data, in conjunction with the site data, suggest that both the reorganization and the financial crisis disrupted the functioning of the mental health system in Denver. Staff were increasingly dissatisfied, CMHC functioning was disrupted, and in 1991 the city's resources were substantially reduced. The Peaks did not experience any of these disruptions; both the site and human resource data indicated that the Peaks was stable. Based on these and Morrissey's data, we predicted that, compared with the Peaks, both outcome and continuity-of-care measures would be somewhat lower in Denver during the first two years of the project (1988-89), would improve in 1990, would be most negatively influenced by the financial crisis in 1991, and would rebound in 1992. In the following discussion, these general hypotheses guide our analyses of the client data.

Client-Reported Impact of the System Reform

Client impact has been conceptualized as occurring in three interrelated areas. First, in accordance with the major goals of the reorganization, continuity of care should improve. Second, the hypothesized improvement in continuity of care and system integration should coincide with decreasing the unmet needs across the range of human services required by persons with serious psychiatric disabilities. Finally, the hypothesized improved delivery-of-care system should result in clients having a better QOL, improved psychiatric status, and greater satisfaction with services.

Continuity of Care. Continuity of care was assessed in two ways. First, subjects were asked to report if they had seen a case manager, a psychiatrist, or a therapist other than a psychiatrist during the past year. Greater continuity of care would be indicated by increasing rates of contact with any of these providers. The second indicator of continuity described breaks in service. Each year, subjects were asked to report if they had been terminated from services or had stopped receiving services for any reason. More continuity would be indicated by a drop in the rate of terminations from treatment.

The probability of being served by a case manager in each of the five years of the study is depicted in figure 1. The ANOVA of these data indicated a significant effect of year ($F = 38.39$; $df = 4, 2068$; $P < .0001$), demonstrating a significant decrease in the likelihood of having a case manager across years. No significant effect of site was obtained but the

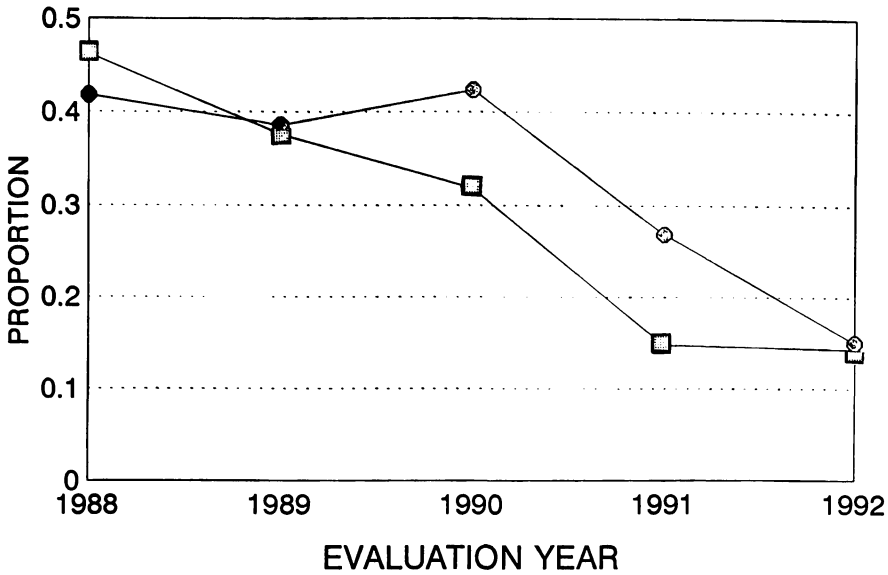


FIG. 1. Mean proportion of five-year sample seeing a case manager during the last year, by site for five years ($N = 526$). —●—, Denver; —□—, Peaks.

site-by-year interaction was significant ($F = 4.53$; $df = 4, 2068$; $P < .0012$). The form of the curve for Denver fit the general expectations from the human resource and site-level data. Although the probability of having a case manager decreased each year in the Peaks, it was initially flat in Denver and showed an improvement to the highest level of 0.39 in 1990. Following 1990, the probability decreased dramatically each year until 1992, when it essentially equaled that of the Peaks at 0.14.

As contact with case managers decreased during the study period, they were generally dropped from the configuration of providers that clients reported seeing. It is interesting to note that most clients in both sites who reported seeing a case manager in year 3, the year with the highest probability of having a case manager in Denver, continued to report seeing some type of provider in years 4 and 5. That is, the reduction of case managers did not appear to be associated with attrition from care.

In figure 2, the likelihood of being served by a therapist, other than a psychiatrist, in each of the five study years is displayed. Both the year ($F = 17.07$; $df = 4, 2068$; $P < .0001$) and site-by-year interaction ($F = 9.77$; $df = 4, 2068$; $P < .0001$) effects are significant, as is the site effect

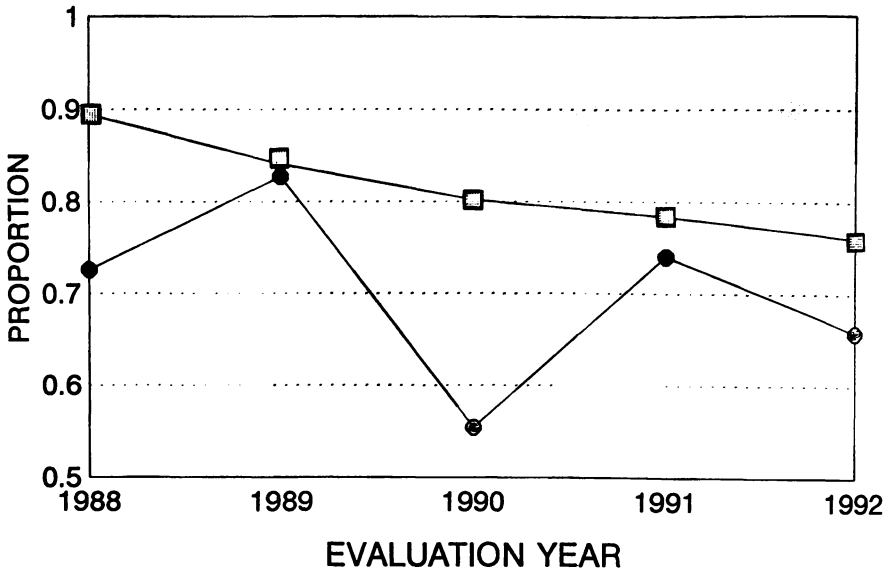


FIG. 2. Mean proportion of five-year sample seeing a therapist during the last year, by site for five years ($N = 530$). —●—, Denver; —□—, Peaks.

($F = 8.65$; $df = 1, 521$; $P < .0001$). Clients in Denver (mean = .71) were significantly less likely than recipients in the Peaks (mean = .84) to have a therapist. For both sites, the rate dropped across the study period. Compared with the Peaks, the likelihood of having a therapist increased in Denver during the year 1–2 interval, sharply decreased during years 2–3, and again increased in the interval between years 3 and 4.

Although the rate of seeing a nonpsychiatrist therapist or case manager dropped over the five years of the study, the rate of seeing a psychiatrist remained relatively stable. Persons served in Denver were significantly more likely than Peaks respondents to have seen a psychiatrist. Across the five years, 89 percent of Denver respondents, in contrast to 85 percent of Peaks residents, reported seeing a psychiatrist at least once during the year, resulting in a significant site effect ($F = 3.93$; $df = 1, 521$; $P < .0481$). The probability of seeing a psychiatrist did not appear to be impacted by the reorganization, as evidenced by a nonsignificant site-by-year interaction.

The continuity-of-care analyses indicate that in both sites a case manager was the least likely provider to be seen. On average, in both sites and for all study years, only 28 percent of clients reported seeing a case

manager during the year. Predictably, in light of reform objectives, this rate increased somewhat during the early years of the reorganization in Denver. However, following the 1991 downsizing, case managers were dropped in favor of more traditional providers, that is, therapists. Significantly, rates for both case managers and nonpsychiatrist therapists decreased across the five study years in both sites. Although we will not discuss this in detail here, significant site-by-year interactions, indicating reductions in Denver clients' receipt of case management referral ($F = 5.04$; $df = 4, 2120$; $P < .0005$) and outreach services ($F = 2.89$; $df = 4, 2124$; $P < .0211$) and increases in mental health treatment services ($F = 14.85$; $df = 4, 2123$; $P < .0001$), paralleled the findings for the continuity-of-care variables. The data therefore indicate that whereas the Denver system reform appeared to be working initially to increase contact with case managers, these early gains were lost.

The second strategy for evaluating continuity of care was to examine client-reported terminations from treatment. As shown in figure 3, which depicts the percent of clients who reported terminations from treatment, a significant effect by year was obtained ($F = 2.67$; $df = 4, 2000$; $P < .0306$), showing a decrease in terminations in year 3. Al-

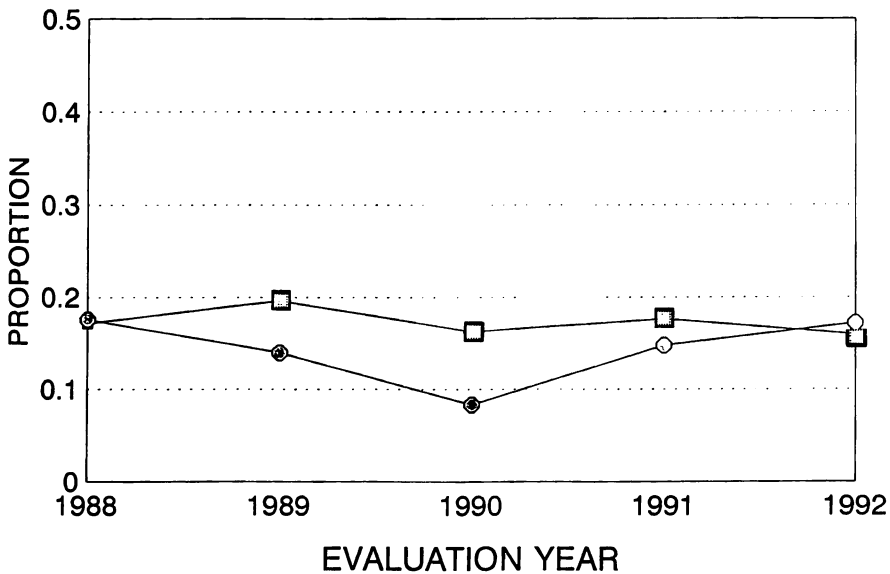


FIG. 3. Mean proportion of five-year sample terminating from treatment during the last year, by site for five years (N = 509). —●—, Denver; —□—, Peaks.

though the site-by-year interaction does not meet conventional levels of significance ($F = 2.11$; $df = 4, 2000$; $P < .0777$), the pattern in Denver, shown in figure 3, reflects improvement in continuity of care in years 2 and 3, that is, fewer terminations, although the trend was reversed in years 4 and 5.

Unmet Need for Services. One of the primary goals of improving system integration is improvement in meeting the broad range of human service needs of persons with SPMI. In this second set of analyses, we examine changes in unmet need across six service types. For these analyses unmet need was calculated by subtracting the number of services received from the number needed for each service type. No site-by-year interactions were detected for self-care, vocational, or crisis services. A modest interaction was obtained for treatment services ($F = 2.55$; $df = 4, 2124$; $P < .04$). In Denver, unmet need for treatment services decreased during the first four years of study, from 1.44 needed services that were not received in year 1 to 0.89 in year 4; unmet needs increased to 1.15 in year 5. In the Peaks, unmet service needs increased modestly throughout the five-year period, from 0.93 unmet needs in year 1 to 1.00 in year 5.

Two components of case management services, referral and outreach, were measured separately. The site-by-year interaction for unmet need for outreach services approached significance ($P = 0.12$), and the main effect of year was significant ($F = 4.11$; $df = 4, 2120$; $P < .003$). No site differences were obtained. In general, unmet need for outreach services was low across all five years, averaging only 0.1 unmet service needs (s.d. = 0.85). Unmet need increased in both sites during year 1, sharply decreased in Denver in year 2 while remaining stable in the Peaks, and increased in years 4 and 5 in Denver while declining in the Peaks. Although the overall interaction term does not reach conventional levels of significance, the differential change between sites in years 2–3 is significant ($P < 0.02$). The general form of the interaction conforms with expectations from the site and human resource data analyses.

The interaction for case management referral services is statistically significant ($F = 2.95$; $df = 4, 2124$; $P < .02$). The level of unmet need for these services is greater than for outreach services, averaging 0.88 services (s.d. = 1.43). In addition to the interaction, the main effects of site ($F = 4.68$; $df = 1, 531$; $P < .04$) and year ($F = 2.60$; $df = 4, 2124$; $P < .04$) are also significant. Figure 4 displays the unmet need scores for

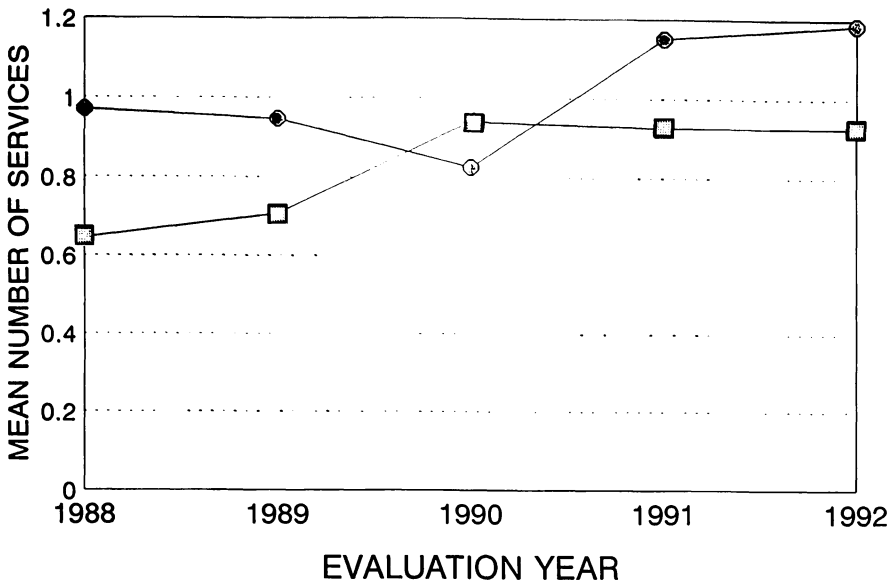


FIG. 4. Mean number of unmet case management referral services for five-year sample, by site for five years (N = 541). Total number of services = 8. —●—, Denver; —□—, Peaks.

the two sites. The form of this interaction conforms to expectations. Unmet need for services decreased during the first three years of the study in Denver and sharply increased between years 3 and 4. In contrast, unmet needs increased in the Peaks between years 2 and 3 and remained relatively stable in years 3 through 5.

Three of the six service types showed significant or marginally significant interactions between site and year. In general, the direction of the interactions conformed to expectations, showing differential improvement in Denver during the early phases of the intervention, and declining after the system was downsized in 1991. For treatment services, the increase in unmet need did not occur until the final year of the study, although it clearly occurred between years 3 and 4 for both types of case management services.

Client Outcomes. The ultimate rationale for the RWJF national intervention and for the reform in Denver was to improve the outcomes experienced by individuals served by the new, modified mental health system. Because few specific outcomes were anticipated, client changes

were measured across a broad spectrum of outcome variables that may be roughly categorized into three areas: quality of life (both objective and subjective), social-psychological status, and satisfaction with services.

Paralleling Lehman's (1988) notions and using many of his objective scales, several QOL indices were calculated. No site-by-year interactions were found for the following: the use-of-leisure-time scale; a productivity index combining home, work, volunteer, and student activities; an index of residential stability; or a measure of alcohol consumption featuring both frequency and quantity of alcohol consumed during the last month. One objective QOL indicator, frequency of non-family-based interpersonal contacts, produced a significant interaction ($F = 5.00$; $df = 4, 2128$; $P < .0005$), although the main effects of neither site nor year were significant. The form of this interaction did not conform to our hypotheses because Denver was relatively stable across years, and clients in the Peaks reported sharp declines in interpersonal contact during years 3-5.

Six subjective QOL measures were also obtained. Only one significant site-by-year interaction was found. Generally conforming to our expectations from the site and human resource data, Denver clients' feelings of safety increased during years 1 through 3, showed a marked decline in year 4, and increased again in year 5. Conversely, the Peaks showed declines during the first three years and improvement in year 4, followed by further declines in year 5. No significant site-by-year interactions were found for the other five QOL areas, which included satisfaction with finances, leisure, housing, family relations, and interpersonal relations. Similarly, no interactions were detected for changes in self-esteem, including both the positive and negative self-evaluation subscales of the Rosenberg measure.

Two symptom subscales measuring anxiety and psychotic symptoms were included in these analyses. Whereas the interaction term for anxiety was not significant, it was significant for psychotic symptoms ($F = 4.68$; $df = 4, 2120$; $P < .001$), as was the main effect of year ($F = 5.87$; $df = 4, 2120$; $P < .0001$). The interaction is displayed in figure 5, where positive change reflects increases in symptom frequency. (In contrast to earlier figures, the effects of figures 5 and 6 are expressed as standard scores.) Although the general pattern of the changes in Denver fits expectations (showing an increase in symptoms early in the reorganization, a decrease in year 3, and a sharp increase in year 4), the same general pattern also appears in the Peaks.

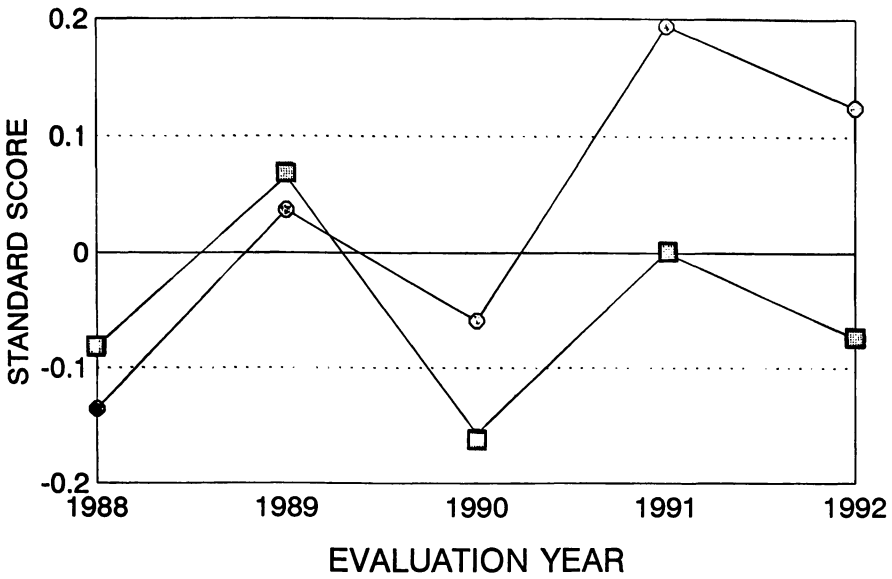


FIG. 5. Mean psychotic-symptoms scale scores for five-year sample, by site for five years (N = 539), expressed in standard score format. ●, Denver; □, Peaks.

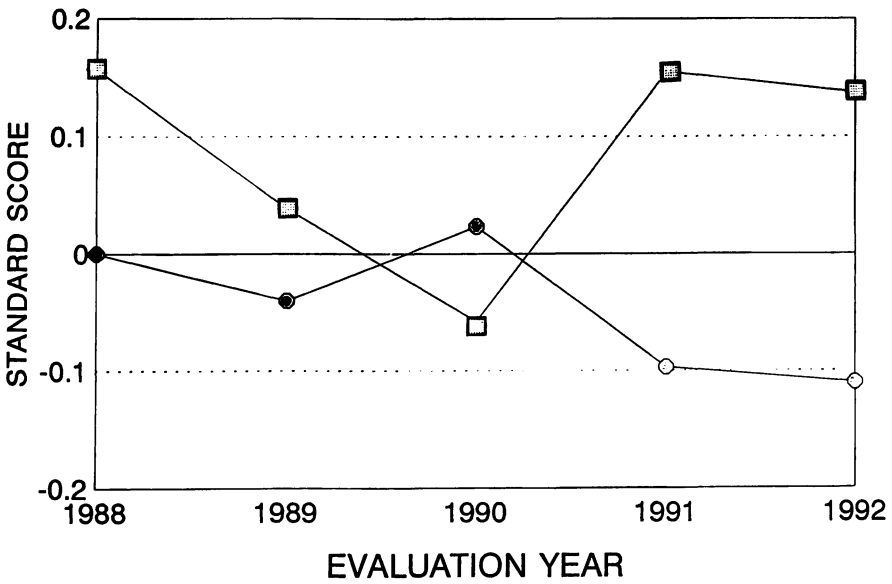


FIG. 6. Mean satisfaction-with-services scale scores for five-year sample, by site for five-years (N = 456), expressed in standard score format. ●, Denver; □, Peaks.

Finally, satisfaction with services is displayed in figure 6. The site-by-year interaction term was significant ($F = 4.47$; $df = 4, 1788$; $P < .002$), whereas the effect of neither site nor year reached conventional levels of significance. Individuals who were not receiving treatment during any given year did not respond to these items. Therefore, only individuals who reported receiving services at every follow-up point are included. Positive changes in this variable indicate increases in satisfaction. This interaction conforms with our expectations for differential changes across the sites. In Denver, satisfaction with services showed net improvement through the first three years of the intervention and markedly decreased following the financial crisis and team reorganizations in 1991. An opposite trend occurred in the Peaks, where satisfaction generally decreased throughout the first three years of the study and increased in the year 3-4 interval.

Discussion

In this study we have attempted to link a series of related substudies in order to detail the nature of the intervention in Denver, document changes in the Peaks, understand concomitant changes in staff attitudes, and, finally, explore the associated consequences at the client level for continuity of care, unmet need, and outcomes. A few clear impressions emerge from the data. First, important changes occurred in the Denver mental health system. Over the five-year study period in Denver, a structural reorganization took place, innovative services targeting the neediest and most vulnerable clients were introduced, and a financial crisis occurred that resulted in substantial reconfiguration of the adult treatment teams, including elimination of the independent intensive case management service. Second, although there was no clear shift in staff attitudes in the early phases of the intervention, job satisfaction was adversely influenced by the system downsizing.

Finally, the impact of these changes on clients appears to be limited. The clearest pattern was detected in the areas most directly related to services. In the first three years of the intervention in Denver, the likelihood of having a case manager increased, and the degree of unmet need for case management services decreased. After 1991, however, the proportion of Denver clients seen by case managers quickly decreased—ultimately equaling that of the Peaks at only about 14 percent. A similar

pattern was found for terminations from treatment. Not unexpectedly, unmet need for case management services also increased in Denver following the 1991 crisis. During the first four years of the intervention, unmet need for treatment services declined in Denver relative to the Peaks, but began to increase during the fifth project year. Overall satisfaction with the service system in Denver paralleled the system-level changes.

Of the relatively large number of client outcome variables, only the measure of psychotic symptoms, the frequency of interpersonal contacts, and safety judgments changed differentially across sites. Although the symptom and safety measures roughly paralleled the uneven system changes in Denver, Denver clients evidenced a relatively steady increase in their interpersonal functioning over the five years of the study. The system reform appears to have had little impact on the QOL of individuals who were enrolled in the system at the onset of the study.

Is the glass half empty or half full? If we originally expected to dramatically alter the course of an individual's life by better integrating the system through structural change and by adding case management services, the intervention failed. If our expectations were more modest and our goals were to determine if, by structurally reorganizing the system, we could begin to impact the pattern of service and providers available to clients, the results indicate success. The success, however, appears fragile. Although the structural changes in Denver are still in place, case management rather than therapeutic services were targeted for reduction. Although their value remains an open question in this study, case management services have been demonstrated to be beneficial (Solomon 1992). Rather than being incorporated into the fabric of the system, these innovative case management services depended on additional resources, such as RWJF funding. In terms of services, the long-term impact of the reform may be limited by the continuing shortage of funds and by the preference for therapist-based treatment over case management services.

The financial crisis in Denver interrupted the progress that was under way and may have caused us to underestimate the benefits that ultimately would have accompanied the reorganization. The impact of these financial problems on staff and clients may underscore a potentially negative consequence of a single mental health authority both administering and solely providing public care for large urban communities. To the degree that power and budgetary authority are centralized in one entity,

management errors or unanticipated environmental changes that adversely affect the authority may result in more negative consequences for a city than would have occurred with a single administrative entity and several independent mental health providers, assuming that the likelihood of all providers making the same mistake is relatively small. The increasing homogeneity of service systems that may result from centralization can be a problem. Single points of authority may lead to more standardized services and management practices and a related decrease in service options for clients. They may also result in less flexibility to anticipate or accommodate important environmental changes. Therefore, centralization of administrative and clinical authority may have important, and to some degree unanticipated, consequences for the functioning of a service system.

It is perhaps instructive that the reform had its clearest impact in areas most closely tied to the functioning of the service system (i.e., case management and satisfaction with services). In contrast, QOL determinants are more complex than the interactions with the treatment system. Therefore, the effect of organizational changes in the system may have no simple and direct impact on QOL.

These findings have implications for research on large system reform efforts conducted at the consumer level. Although changes in QOL and clinical status will surely remain the ultimate goals of these interventions, it may be important to include a series of measures that are more proximal to the intervention than the ones we used. We had assumed that by measuring contact with providers and changes in unmet need for services, we would be able to assess the changes in system functioning. However, only some of the measures that were most proximal to the system clearly showed effects of change. More focused measures of the system changes in specific services, evaluation of access, acceptability of the service options, and so forth may be more sensitive to the effects of system reform from the client's perspective than aggregate measures of the client's need and receipt of services. In earlier analyses, using data from years 1 and 2, we have demonstrated that changes in unmet need are significantly related to QOL improvements, suggesting a path through which system improvements may impact outcome (Shern 1993). More targeted measures of system impact may be useful both in documenting specific effects and in modeling the indirect impact of system interventions on client outcomes.

It is important to underscore other limitations of these early analyses. First, particularly in the Peaks, these intent-to-treat analyses included a significant number of individuals who were no longer receiving services from the public mental health system. When the analyses are restricted to individuals who did not move from the public system, a different pattern of results may emerge. Such a subsample would have received a "larger dose" of the intervention and therefore may more clearly reflect the effects of system change. Because we have complete information about each client's contact with the public system in another data set, we will be able to measure more sensitively the intensity and patterns of care.

Second, the study goal of incorporating client variables into the analyses has yet to be completed. A typology has been developed (Shern 1990) that may help us to understand whether system changes are experienced differentially by various types of clients. With the exception of covariance adjustments for gender and race, individual client differences are not represented in these analyses. The heterogeneity in the client population makes it essential to understand the relationships between client characteristics and system reform.

Third, the client outcomes discussed here reflect only the client perspective. Although client views are the standard by which other perspectives can be understood, it is important to assess client changes from the collateral and provider perspectives. Strupp and Hadley (1977) have noted that these other perspectives may reflect differing value systems on the impact and importance of client change. For a more complete understanding of the system reform, we will pursue the multiperspective analyses of outcome. Further analyses, therefore, may add to our understanding of the Denver system reform.

These first analyses have clearly indicated that the reforms were successful in modifying the system of care and that the modifications affected both changes in staff attitudes and some client services and outcomes. The impact of the system reform on clients' quality of life was less than we had hoped. Better measures of system impact and more complete models of mediating and intervening processes are needed to increase our very limited knowledge of how system-level interventions are related to client-level outcomes. Only when we more completely understand these processes will we be able to use policy tools effectively to create systems that better meet client needs and facilitate their recovery.

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