Assertive Community Treatment Versus Usual Care in Engaging and Retaining Clients With Severe Mental Illness

Heidi A. Herinckx, M.A.
Ronald F. Kinney, M.S.
Gregory N. Clarke, Ph.D.
Robert I. Paulson, Ph.D.

Objective: **Two assertive community treatment teams were compared with a usual-care control condition based on their ability to engage and retain clients with serious and persistent mental illness in community-based mental health services.** ***Methods:*** **Clients were randomly assigned to one of two assertive community treatment teams (N=116) or to usual care (N=58). Survival analysis was used to compare clients' length of engagement and retention in service in the two treatment conditions and in usual care. Cox regression analyses were conducted to determine whether demographic, program, or client variables were significantly associated with length of retention in treatment. Data on these baseline variables were collected after clients made initial contact with their community mental health provider. Clients were observed for up to 870 days.** ***Results:*** **By the end of the observation period, the assertive community treatment teams retained 68 percent of their clients, compared with 43 percent in usual care. In both types of treatment, clients were at greatest risk of dropping out of services during the first nine months. The risk of dropout was associated with the type of treatment. Usual-care clients were more than twice as likely as assertive community treatment clients to drop out for reasons related to dissatisfaction with treatment. Each additional night homeless during the six months before enrollment in the study resulted in a 14 percent increase in the probability of dropout.** ***Conclusions:*** **Assertive community treatment clearly demonstrated a greater ability than usual care services to engage and retain clients in community mental health care. (*Psychiatric Services* 48:1297–1306, 1997)**

It is generally recognized that persons with serious and persistent mental illness need a support system that facilitates living and functioning adequately in the community. Community mental health programs provide this support by delivering comprehensive services that assist individuals to manage daily living, obtain work, build and strengthen family and friendship networks, manage symptoms and crises, and prevent relapse.

Because of the persistent nature of serious mental illness, lifelong access to services is often necessary. When long-term supports are withdrawn, gains made by clients are often steadily lost over time (1–3). Therefore, continuity of care has become a key component of service delivery. Above all, continuity of care ensures long-term access to a comprehensive set of services and establishes a supportive, dependable relationship with a service provider (4).

Despite the potential benefits, engaging and retaining individuals with serious and persistent mental illness in service is not always easy. Individuals described as "difficult to treat" are especially challenging to retain in treatment. These clients are often identified as being noncompliant with medication and resistant to keeping appointments for office-based services. They commonly have a diagnosis of schizophrenia, a history of repeated hospitalizations and homelessness, a need for daily structure, frequent and severe crises, and no social network (5–7).

For clients to reap the benefits of support services, engagement and retention is crucial. The assertive outreach component of the assertive community treatment model has been consistently identified as invaluable in engaging clients who are heavy users of psychiatric hospitalization and emergency services and who are difficult to engage in traditional, office-based community treatment (8,9). The assertive community treatment team begins by assisting a potential client with a concrete task, such as leaving the hospital or finding housing. The primary goal in the engagement period is to develop a trusting relationship between the team and the client (10). The team explains the program and attempts to connect with the client's support structure,

Ms. Herinckx, Mr. Kinney, and Dr. Paulson are affiliated with the Regional Research Institute of Portland State University, P.O. Box 751, Portland, Oregon 97207. Dr. Clarke is with the Kaiser Permanente Center for Health Research in Portland.

such as collateral agencies and family members, if one exists.

Sensitive to the fact that many individuals have been rejected or overwhelmed in the past, the team assesses the client's needs, strengths, and weaknesses and assumes responsibility for the client's well-being (11). Team members meet clients on the clients' own turf and at the clients' convenience in the community. Staff may visit clients in prison or drive several hundred miles to visit clients to fully engage them in service. Some clients have multiple staff contacts a day; many have more than two contacts a week during the initial engagement period (10). In addition to assertive outreach, other critical components of assertive community treatment programs that may help engage and retain clients in service include a small caseload ratio (ten clients per staff member), a shared caseload, and consumer participation in treatment planning (12,13).

Although the assertive community treatment model is designed to facilitate engagement and retention of clients in services, only a limited number of studies of the model have actually examined engagement and retention. Teague and colleagues (9) reported that assertive community treatment teams scored significantly higher than standard case management programs on overall fidelity to a continuous treatment model, including a higher rating on assertive engagement.

Bond and associates (14) have presented the most comprehensive review to date of clients' retention in assertive community treatment programs. Retention was defined as uninterrupted services over a 12-month period. For six of the nine studies reviewed, the average retention rate was 84 percent, compared with 54 percent for control programs. Among the four studies with control groups (15–18), two studies demonstrated improved retention of clients associated with assertive community treatment, while two studies showed no differences between such treatment and usual care.

With the exception of the studies by Bond and colleagues, no other randomized trials of assertive community treatment have examined retention of clients as an outcome variable. Moreover, attrition is most often described as dropping out of the research study, with no indication of whether subjects also drop out of clinical services. Although there does appear to be an overall trend toward better retention of clients in assertive community treatment programs relative to usual care (19), most studies of such programs do not report whether their retention of clients in services is statistically different from that of control subjects. Consequently, it is difficult to draw definitive conclusions from the current literature on assertive community treatment.

Studies of assertive community treatment have also not examined factors that may mediate the engagement and retention process. In related literature, Mowbray and associates (20) found that engagement status for homeless mentally ill clients was highly related to both frequency and hours of contact with the program. Within the initial four months of service, clients identified as fully engaged had a median of 30.5 contacts, partly engaged clients had four contacts, and disengaged clients had a median of only one contact. Clients referred from community mental health centers were more successfully engaged, while clients referred from shelters and hospitals were less successfully engaged. Engagement status was not associated with any client characteristics, including gender, race, age, substance abuse at the time of screening, or baseline residential history.

In a similar study of psychiatric aftercare, Axelrod and Wetzler (21) found that better retention of clients was associated with shorter time to first treatment appointment, increased number of previous hospitalizations, increased length of hospital stay, less denial by the client of the need for treatment, and the client's greater perceived need for medication. Factors not associated with increased retention were demographic or diagnostic variables, social support factors, the client's negative view of the hospital, and the client's passive or alienated attitude toward treatment.

In the study reported here, we compared clients who received services from assertive community treatment teams, one staffed by consumers and one by nonconsumers, and clients who received usual community mental health care. We examined their engagement and retention in services, the pattern of withdrawal from services over time, and factors that may be associated with retention in community mental health services. Based on the literature, we theorized that clients who had demographic and clinical characteristics associated with being "hard to treat," such as homelessness, greater severity of symptoms, a diagnosis of schizophrenia, and drug and alcohol abuse, would be significantly more difficult to engage and retain in community mental health services.

Program factors may also be associated with clients' retention, such as enrollment in assertive community treatment services rather than usual care, length of time to first treatment contact, number of contacts with the program, caseload size of the provider, and referral by a community mental health agency rather than a hospital or crisis stabilization center.

The study was designed to test three main hypotheses. First, we hypothesized that the two assertive community treatment programs would demonstrate higher engagement and retention of clients over time than the community treatment program providing usual care. Because of the assertive outreach component of the teams, we expected that they would be more tenacious in engaging and retaining clients, which would lead to fewer withdrawals from services. Both teams were based on the same model. Therefore, we did not expect that any differences between the teams in engagement or retention would be found.

Second, we hypothesized that clients with a history of homelessness, rehospitalization, and drug and alcohol abuse, those who were more symptomatic, and those diagnosed as having schizophrenia would be at greater risk of disengagement from services.

Third, we hypothesized that a shorter time to the first treatment

contact, a small caseload, and referral from a community mental health agency rather than a hospital or crisis stabilization unit would be associated with increased engagement and retention in service. Clients with a recent history of stabilization in the community, as demonstrated by referral through a community mental health agency, were predicted to have greater success in staying stabilized and engaged with their assigned community mental health provider.

Methods

Subjects and recruitment

The observation period for this study began in March 1996 and ended in July 1996. Subjects were recruited over an 18-month period before the observation phase (March 1994 through October 1995). Because the county mental health office acts as the gatekeeper for clients in mental health services, we employed one county mental health worker to identify clients being discharged from state and local hospitals or transferring to new service providers within the community. As the county identified individuals in need of service, the research staff screened them. If they were eligible, they were randomly assigned to assertive community treatment or usual care.

With the exception of random assignment, the client enrollment procedure established for this study was no different from the usual procedure for linking clients to services within the community. Referral sources were aware that there was a one-third chance for a client to be randomly assigned to usual care. In this case, the client would continue to work with the referring agency unless the agency and county gatekeeper found alternative community services. In addition, we accepted referrals directly from mental health agencies in the community.

Several implementation issues arose that prolonged the subject recruitment phase. First, the two assertive community treatment teams were newly created for this research project and were building their caseloads from scratch. Because both teams shared the same clinical staff (a psychiatrist and a nurse practitioner), a bottleneck occasionally occurred in which subject recruitment had to be slowed so that initial clinical assessments could occur in a timely fashion. Second, unforeseen staff turnover within the agency providing the assertive community treatment affected the team's abilities to take on additional clients. Finally, due to housing shortages in this area, the capacity of the teams to provide housing resources was limited, and alternative housing strategies had to be implemented to ensure adequate provision of services.

Although the assertive community treatment model is designed to facilitate engagement and retention of clients in services, only a limited number of studies have actually examined engagement and retention.

The sampling frame consisted of all adult clients residing in the Portland metropolitan area who met the Oregon State definition of a chronically mentally ill person and priority 1 criteria. The Oregon definition corresponds to the definition by Goldman and colleagues (22) in that it addresses diagnosis, duration, and disability. Oregon defines an adult with chronic mental illness as a person 18 years of age or older who satisfies two criteria. The person must have a severe mental disorder as identified by a psychiatrist, a licensed clinical psychologist, or a nonmedical examiner certified by the Oregon Mental Health Division. The diagnosis must indicate a schizophrenic, major affective, or paranoid disorder or another severe mental disorder, and the person must have a documented history of persistent psychotic symptoms other than those caused by substance abuse. The second criterion in the Oregon definition is that the person must demonstrate impaired role functioning in two of three areas—social role, daily living skills, and social acceptability. Subjects with mental retardation were not included in the study.

Over the 18-month enrollment period 189 subjects were approached and screened for participation in the study. Nine failed to meet eligibility criteria, and two individuals declined to participate in the study. A total of 178 individuals consented to participate and were randomly assigned to one of three conditions: the consumer-staffed assertive community treatment team (N=58), the assertive community treatment team that was not staffed by consumers (N=59), and usual care (N=61).

After random assignment, three more individuals were dropped from the study because of discharge planning conflicts. These clients were engaged in treatment by other providers even though they were referred to our research project. One other individual was found to be unable to complete the baseline interview because of a developmental disability and was therefore dropped from the study. The remaining sample of 174 subjects was used in these analyses. No significant differences in clinical or demographic characteristics were found between this sample and the 15 individuals excluded from the study.

The assertive community treatment programs

Staff for the two experimental conditions (the assertive community treatment teams) were hired, trained, and supervised by a local consumer-run mental health agency, which also administratively operated the two programs (23). Each team consisted of four full-time and one part-time case

manager, one of whom was the team leader.

Staff members on the consumer-staffed team were self-identified mental health consumers with a *DSM-III-R* axis I diagnosis. Over the life of the project, the majority of the staff on this team had a diagnosis of bipolar disorder (50 percent); other diagnoses included major depression, schizoaffective disorder, and cyclothymia. Members of the other assertive community treatment team reported no diagnosable mental illness. Most members of the consumer-staffed team held a bachelor's degree, while most members of the nonconsumer team held a master's degree. The consumer-staffed team had on average more previous experience in the mental health field (8.6 years, compared with four years).

The teams shared a psychiatrist, a nurse practitioner, and a clinical director. The psychiatrist was responsible for the initial psychiatric assessment and medication monitoring and participated in treatment planning. The clinical director provided clinical consultation to the two teams and handled administrative tasks. To ensure that each team was free to develop its own culture and work style and to prevent potential contamination from each other's operations, the two teams were housed in separate facilities.

At the beginning of the research project (February and March 1994), all staff on both teams received training in the assertive community treatment model. In addition, both team leaders and the clinical director visited the Thresholds Bridge Program in Chicago as well as a rural assertive community treatment program in Madison, Wisconsin. The teams were trained in accordance with assertive community treatment principles: assertive outreach to clients; services delivered in vivo; small caseloads; assignment of the caseload to the entire team rather than to individuals (18,24); provision of training in social skills, activities of daily living, and symptom management; 24-hour, seven-day-a-week availability of staff for crisis intervention; continuous care; support and education to families and significant others; a comprehensive array of services for meeting client needs; supported housing based on consumer choice; use of community and nontraditional resources in addition to traditional mental health services; and ultimate responsibility for each client with regard to services provided (25).

Usual care

Subjects assigned to usual care, the control condition, received mental health services from agencies in the Portland metropolitan area. The majority of subjects received services from one of four major community mental health centers (CMHCs) and a number of smaller, more specialized agencies. A comprehensive array of services, such as housing, psychiatric services, vocational and skills training, day treatment, money management, and vocational rehabilitation, were available to both the assertive community treatment teams and the usual-care control group. At the start of the study, none of the CMHCs providing usual care operated assertive outreach case management teams.

By the end of the observation period, the assertive community treatment teams had retained 68 percent of their clients, compared with 43 percent for usual care.

The engagement process

The research team screened clients to ensure that they met eligibility requirements for the study. After clients consented to participate and were randomly assigned, it was up to the service providers to begin to engage clients in services.

On their own initiative, the two assertive community treatment teams established a joint protocol to ensure that clients would be contacted promptly. During the initial enrollment visit, a client was randomly assigned to one of the assertive community treatment teams, and the research staff then gave the client a welcome letter from the team. The letter stated that the client would be contacted by telephone no later than two working days from the initial enrollment visit and that the first face-to-face contact would occur no later than five working days after the initial enrollment visit.

The team tailored its approach to meet the individual needs of clients. Clients could receive any or all of the services offered by the team based on clients' own preference and project staff's assessment of need. For clients receiving usual care, mental health professionals from the referring agency worked with the county gatekeeper and directly with other community mental health agencies to link clients with services, as these agencies would under normal circumstances.

Independent variables

Several demographic, psychiatric, and program characteristics were examined as potential mediators of retention of clients in treatment. Unless otherwise indicated, information for all variables was gathered by self-report at the baseline interview. Demographic variables were gender, age, and number of nights homeless in the past six months. Treatment or program variables included the study condition (the two assertive community treatment teams and usual care), number of days from enrollment to first treatment contact by the assigned provider, caseload size (obtained from enrollment records for the clients in assertive community treatment and reported by providers for clients receiving usual care), and referral source (CMHC versus crisis stabilization center or psychiatric hospital).

Table 1

Demographic and clinical characteristics of clients assigned to two assertive community treatment teams staffed by consumers and nonconsumers and to usual care

Characteristic	Consumer team (N=57)		Nonconsumer team (N=57)		Usual care (N=49)		Total (N=163)	
	N	%	N	%	N	%	N	%
Gender								
Male	36	63	35	61	28	57	99	61
Female	21	37	22	39	21	43	64	39
Diagnosis								
Psychotic disorder	34	60	35	61	28	57	97	60
Affective disorder	23	40	22	39	21	43	66	41
Alcohol or drug use								
None or moderate	32	56	26	46	29	59	87	53
Severe	17	30	25	44	12	25	54	31
Mean±SD age (years)	36.3±10.1		38.0±11.4		35.1±8.9		36.5±10.3	
Mean±SD nights homeless in the past six months	1.2±3.7		0.4±0.7		0.4±0.6		0.7±2.3	
Mean±SD days hospitalized in the past six months	0.9±0.9		1.1±1.1		1.3±2.3		1.1±1.5	

Psychiatric variables included a diagnosis of schizophrenia (present or absent) provided by the referral source at enrollment; client-reported medication compliance (medication always or mostly taken as prescribed versus occasionally or never); number of psychiatric hospitalizations in the past six months; severity of symptoms score, assessed with the expanded 24-item version of the Brief Psychiatric Rating Scale (26,27); and alcohol and drug use scores on the Alcohol Use Scale and Drug Use Scale (28) (severe or extremely severe use versus moderate, mild, or no use).

The Brief Psychiatric Rating Scale (BPRS) examines psychotic, depressive, and negative symptoms and has been widely used to rapidly assess psychopathology in persons with serious and persistent mental illness. Most psychometric studies have been conducted using an earlier 18-item version (29). Overall, interrater reliability has been acceptable (30–32). The Alcohol Use Scale and the Drug Use Scale are 5-point scales that anchor the symptom questions on *DSM-III-R* criteria for abuse and dependence and incorporate level of impairment into the rating. A study of an early version of these scales showed high interrater reliability and high concurrent validity (33).

These standardized instruments were administered as part of an extensive battery at the initial interview, which also assessed the client's level of functioning, quality of life, personal networks, and empowerment. The majority of instruments used were adopted from a study conducted by Solomon and Draine (34), comparing outcomes of clients with chronic mental illness who received case management from consumer-staffed and non-consumer-staffed assertive community treatment teams.

Some evidence exists that intensity of service may also be associated with successful engagement and retention in treatment (20). For the assertive community treatment teams, data on the initial intensity of services were collected as part of the daily completion of contact logs. In contrast, usual care provided data on initial service intensity to clients during an interview conducted approximately two months after treatment began.

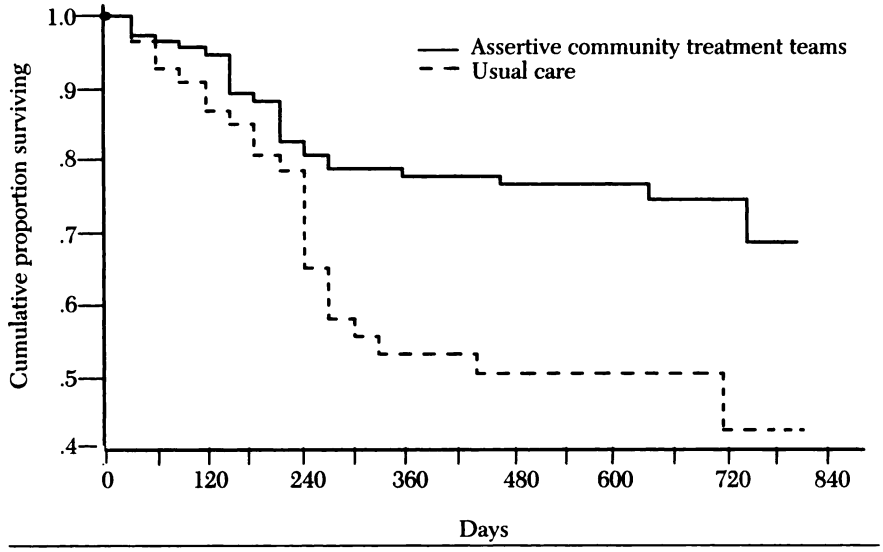
Survival analysis

Survival analysis (35) was used to test whether clients in assertive community treatment were engaged and retained at higher rates over time than those receiving usual care. Survival analysis allows use of data from all subjects in a study despite their varying lengths of participation, either until the occurrence of an event or until the end of the observation period. The event of interest in this study was disengagement from the service provider for service-related reasons. If the target event did not occur before the end of the observation period, or if the client experienced an event, other than the event of interest, that led to service termination, a case was considered "censored." A censored case was not excluded from the analysis; however, it was considered differently than a case with an event of interest in the calculation of the statistics used in this analysis (that is, survival functions and hazard rates).

To study the process of engagement and retention of clients in treatment, two survival analyses were performed. The first emphasized initial engagement because the observation period began at the time of random assignment. In this analysis, all clients in the study were "at risk" for engaging in services, including those clients who were never actively engaged in services. We refer to this intent-to-treat sample as clients who were eligible for treatment. The second analysis emphasized the period after the initial engagement process had begun. This observation period began at the time of the client's first face-to-face contact with his or her provider, which served as an indicator that engagement was under way. We refer to this sample as clients who were engaged in treatment.

Figure 1

Survival analysis of treatment retention of 116 clients receiving assertive community treatment and 58 clients receiving usual care



For both of these analyses, the event of interest, or terminating event, was disengagement. Types of disengagement were related to the client's dissatisfaction with services, that is, "firing" the provider or feeling that services were not needed. Other reasons for disengagement related to service delivery, including clients' being dropped or transferred from services by the mental health provider. All other forms of termination from services were not considered disengagement. For example, clients who dropped out because they no longer wanted to participate in research interviews, who moved out of the service area of the assigned providers, or who died during the course of the study were categorized as censored.

Based on the hypotheses above, we combined data from the two assertive community treatment teams and compared these data with data from the usual-care condition in all analyses. However, to ensure that no differences existed, we also compared the two assertive community treatment teams with each other. Survival functions—the cumulative proportion of subjects engaged and retained in treatment over time—were generated by the life table procedure. Group comparisons were made using the log rank statistic. For the engaged-in-treatment sample, multivariate Cox proportional hazard models were used to test for factors that might mediate retention in community mental health services.

Results

The sample

The demographic and clinical characteristics of the 163 clients who began treatment are presented in Table 1. The mean±SD age of the clients was 36.5±10.3 years. Most of the clients were male (61 percent). Schizophrenia was the most common diagnosis (60 percent). A substantial number of clients (33 percent) reported drug and alcohol abuse or dependence issues. Approximately one-third (31 percent) had also been homeless, and nearly two-thirds (61 percent) had been hospitalized in the past six months.

These clinical and demographic characteristics resembled the characteristics of target samples in other studies of assertive community treatment. Most of the clients in this sample were white (82 percent); 9 percent were African American, and 10 percent were from other ethnic minority groups. Because no significant differences were found across the three treatment conditions in any demographic or clinical characteristics, randomization appeared to have produced equivalent groups.

Postrandomization

Eligible-for-treatment sample. Of the subjects assigned to usual care, nine did not engage with their service provider and therefore never began treatment, compared with only two subjects assigned to assertive community treatment (χ^2= 12.42, df=1, p<.01; N=174). To examine differences across conditions in the length of time clients were engaged and retained in treatment services, survival analysis was conducted based on the 174 individuals in the sample at the point of randomization.

Survival functions for the combined assertive community treatment teams and for usual care are shown in Figure 1. The values of these functions represent the probability of being engaged and retained in treatment with the initial provider over time. The mean±SD survival time for clients assigned to usual care was 500±45.7 days, compared with 690±28.7 days for clients assigned to the assertive community treatment teams.

As illustrated in Figure 1, clients in assertive community treatment and in usual care experienced the greatest risk of disengagement during the first nine months of service. Within the first six months, attrition from usual care reached 19 percent, whereas attrition from the assertive community treatment teams was 12 percent. The difference between the two conditions was even more pronounced between the sixth and ninth month. The usual-care condition lost an additional 23 percent of its clients, compared with 9 percent for the assertive community treatment teams.

The rate of client attrition slowed considerably between the ninth and 15th months for both the assertive community treatment teams (1 percent dropout) and usual care (8 percent dropout). By the end of the observation period (870 days), the combined teams had retained 68 percent of their clients. In contrast, the retention rate for usual care was 43 percent. Assertive community treatment clients were engaged and retained in significantly greater numbers over time than clients in usual

care (log rank statistic, $\chi^2=8.98$, df=1, p<.01; N=174). No difference in dropout rates was found between the two assertive community treatment teams.

Engaged-in-treatment sample. An additional survival analysis was performed on data from the 163 subjects who had at least one face-to-face contact with their assigned provider. Nine clients in usual care and two clients in assertive community treatment who never experienced a first contact with their provider were not included in this analysis. No significant differences were found in clinical or demographic characteristics between the analyzed sample and these 11 individuals.

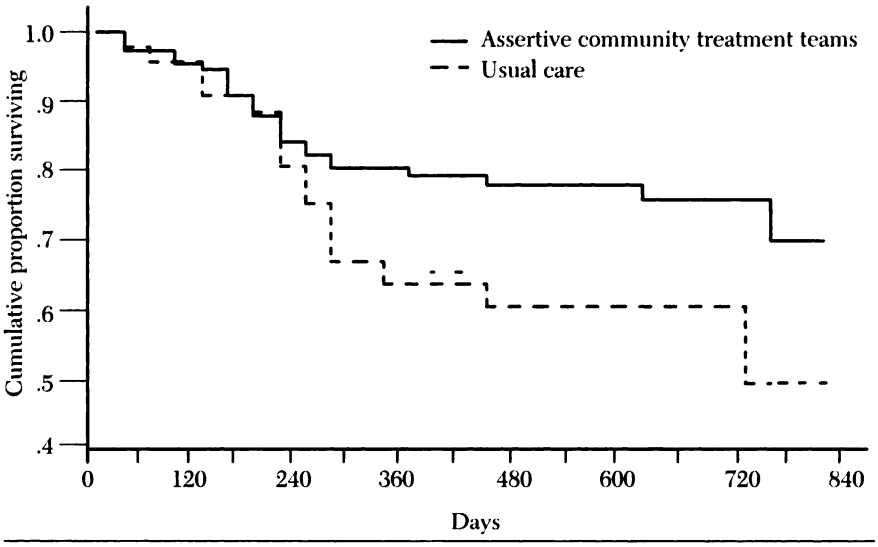
Survival functions for the two teams combined and for usual care are shown in Figure 2. The values of these functions represent the probability of remaining in treatment with the initial provider over time. The mean survival time in treatment for clients receiving usual care was 560±47.9 days, compared with 691±28.1 days for clients receiving assertive community treatment.

As Figure 2 shows, the survival functions were quite similar for the combined assertive treatment teams and usual care during the first six months of services. The cumulative proportion of clients who dropped out of service during this period was 12 percent for both teams. However, clients in usual care dropped out of service at a much higher rate than clients in assertive community treatment between the sixth and ninth month: 22 percent, compared with 8 percent. Although the survival curve leveled off for the assertive community treatment teams at approximately nine months, the risk of client loss from usual care did not stabilize until about 15 months after treatment onset, with an additional 6 percent of clients lost.

By the end of the observation period (870 days), the combined assertive community treatment teams retained 69.8 percent of their clients, while usual care retained only 49.6 percent. The difference in number of clients retained by the teams and by usual care showed a trend toward statistical significance (log rank test, $\chi^2=3.63$, df=1, p=.057; N=163). No significant difference in retention between the two assertive community treatment teams was found.

Figure 2

Survival analysis of treatment retention of clients in assertive community treatment and usual care who had at least one face-to-face contact with the care provider (N=163)



Multivariate Cox regression

A Cox proportional hazards model was used to determine which mediating variables were significantly associated with length of retention in treatment. We tested a multivariate model, comparing the variance in service retention explained by the assertive community treatment intervention relative to that explained by other program variables and by demographic and clinical variables.

Because most of the data for variables in this analysis were collected as part of the baseline interview, 20 clients who dropped out of services or the research study before completion of the baseline interview were

Table 2

Results of Cox regression analysis of variables associated with retention of clients in assertive community treatment teams or usual care

Variable	Coefficient	Z[1]	p	Exponentiated beta
In the equation				
N nights homeless	0.13	2.59	.009	1.14
Assertive community treatment versus usual care	0.85	2.21	.027	2.33
Not in the equation				
Medication compliance	—	—	.709	—
N days hospitalized			.180	—
Total score on the Brief Psychiatric Rating Scale	—	—	.194	—
Alcohol or drug abuse	—	—	.418	—
Caseload size	—	—	.409	—
N days from intake to treatment	—	—	.422	—
Referral source	—	—	.429	—
Gender	—	—	.597	—
Age	—	—	.653	—
Diagnosis of psychotic disorder	—	—	.635	—

[1] Z=coefficient/SE

excluded from the analysis. Twelve additional clients were excluded because they were not taking prescribed medications at the time of the baseline interview and therefore answered "not applicable" to the medication compliance question; four clients had missing values on other variables used in this analysis. Comparisons between these 36 clients and the remaining 127 indicated no differences in any demographic or clinical characteristics. (The final total was 126 rather than 127 clients because one other case was censored before the earliest terminating event in an interval.)

Predictors were entered into the equation using forward stepwise selection. Selection criteria were based on the Wald statistic ($p<.05$ for entry and $p>.10$ for removal at a subsequent step). The overall regression model yielded a significant goodness-of-fit statistic for likelihood ratios ($\chi^2=7.47$, df=2, $p=.02$; N=126). As shown in Table 2, the significant terms in the model were number of nights homeless during the previous six months and type of treatment (assertive community treatment versus usual care). None of the other program or demographic characteristics predicted survival time in treatment. The clinical characteristics examined also demonstrated no predictive value. (The analysis was also conducted without the clinical variable on medication compliance to increase the total N for the analysis to 138. However, no difference in the pattern of results was found with the larger sample.)

The ratio of the estimated hazard (exponentiated beta) indicates the magnitude of the relative risk associated with different levels or categories of a particular predictor. The estimated risk of dropout from the intervention was approximately two and a third times greater (exponentiated beta=2.33) for clients in usual care than for clients in assertive community treatment. In addition, a one-unit (one-night) increase in the number of nights homeless during the previous six months was associated with a 14 percent increase (exponentiated beta=1.14) in the hazard rate for dropout.

In a post hoc analysis, we also examined the impact of service intensity on client engagement and retention during the first 60 days of services (the initial engagement period). This analysis could be carried out only with the engaged-in-treatment sample (clients with at least one face-to-face contact). No statistical differences were found between the assertive community treatment teams and usual care in the mean number of contacts clients received during this period.

We also compared service intensity for those who dropped out of and those retained in assertive community treatment and usual care. Once again, no differences were found, either between the two teams or between the teams and usual care. Due to differences across conditions in the way intensity data were collected and the potential risk of reporting bias, service intensity was not included in the Cox regression analysis as a possible predictor of engagement and retention in treatment.

Discussion and conclusions

The assertive community treatment teams were more successful at both engaging and retaining clients in services than was usual care. Nearly 20 percent of the clients assigned to a usual-care provider never successfully connected with the provider, compared with only 2 percent of the clients assigned to assertive community treatment teams. The teams also retained 25 percent more clients in services over a two-and-a-half-year period than did usual care. For both assertive community treatment and usual care, clients were at greatest risk of dropping out of services during the first nine months. Thereafter, very few clients in the assertive community treatment programs dropped out of service. In contrast, usual-care clients continued to drop out at a fairly steady rate for another half-year. From these results, it appears that usual care may not provide adequate outreach to ensure both initial engagement with the provider and continued retention in services.

It is commonly assumed that the most difficult-to-treat clients are younger and highly symptomatic and that they have schizophrenia and abuse drugs and alcohol. However, none of these client characteristics were related to engagement or retention. Multivariate Cox regression analyses indicated that shorter time in treatment was associated with both a recent history of homelessness and enrollment in usual-care programs. The relative risk of disengagement associated with these factors was moderate in magnitude but notable, with usual-care clients having more than twice the risk of dropout compared with assertive community treatment clients, and each night homeless during the six months before enrollment increasing the risk of disengagement from a provider by nearly 15 percent.

The latter result appears to suggest that more effort should be devoted to the engagement process when dealing with recently homeless individuals. The relative risk associated with the treatment condition corroborates the findings from the survival analysis, in which usual-care clients demonstrated a higher overall rate of attrition from services.

With regard to the initial engagement period, we found no differences between the three conditions in intensity of services provided. Nevertheless, clients in assertive community treatment were engaged and retained in higher numbers than clients in usual care. This finding suggests that there may be an important qualitative difference in the engagement processes that characterize assertive community treatment and usual care.

Additional research is needed to provide qualitative descriptions of the engagement strategies that are most effective as well as the ingredients crucial for successful long-term rehabilitative relationships. As Burns and Santos (36) point out, it is important to assess the rewarding aspects of the relationship between clinicians and consumers that are not captured by standard outcome measures. This work is under way. McGrew and associates (37) recently asked clients in assertive community treatment what they liked most and least about their case managers. Clients identified the helping relationship developed with case managers, the availability of

staff, having someone to talk to, and the provision of problem-solving support as among the most helpful features of assertive community treatment.

In interpreting the results of this study, it is important to keep two issues in mind. First, the subject recruitment period was substantially longer than anticipated, spanning 18 months rather than the planned six to nine months. To control for potential differences in engagement due to smaller caseloads for the assertive community treatment during the period that the teams were building their clientele, caseload size (at the time of treatment onset) was added as a predictor to the Cox regression analysis. However, caseload was not found to be related to length of time in treatment.

Second, the method for gathering disengagement dates for clients enrolled in usual care may have introduced some recall bias. These dates were collected by self-report during client interviews once every six months for clients in usual care, whereas dates of client dropout from the assertive community treatment teams were usually obtained as part of routine weekly data collection from the teams' case managers. Consequently, the distribution of the survival function may be slightly skewed or less accurate for usual care within any given six-month interval. Nevertheless, the overall shape of the distribution would not be affected.

It is also important to note that little information was available for clients who dropped out either before engaging in treatment or after engaging in treatment but before completing the baseline interview (N=31), thus limiting the ability to characterize early dropouts and compare them with the rest of the sample. In future research it would be better to collect a more comprehensive set of data at the time of enrollment into the study rather than at the time of the baseline interview. A challenge for future research would be to obtain data on the treatment status of clients who never connected with their assigned community mental health provider. For example, what happens to clients who do not connect with their assigned providers, and under what circumstances do clients who may not accept treatment initially become engaged in treatment with a different provider?

Most treatment studies that have reported attrition rates tend to limit comparisons between the dropout sample and the retained sample to an examination of potential differences in demographic or clinical characteristics. If no differences along these dimensions are found, it is assumed that dropout is not systematic in nature. However, the study reported here demonstrated that dropout from services can vary significantly as a function of type of treatment. As Draine (38) noted in an examination of randomized field trials of case management, an interaction may occur between attrition and type of intervention that could have an important bearing on the interpretation of results. Our findings corroborate the higher rates of attrition for clients receiving traditional aftercare reported by Bond and colleagues (14).

Usual care may not provide adequate outreach to ensure both initial engagement with the provider and continued retention in services.

Other studies have shown that dropout rates are also related to the differential effectiveness of the same intervention for different clients. For example, McGrew and coworkers (39) found that higher-functioning clients were more likely to drop out of service. In addition, clinical drug trials have shown that dropout tends to be highest among clients for whom the intervention is the most effective as well as clients for whom the intervention is the least effective (40,41). Further research is also needed to investigate the types of engagement strategies that work for clients with particular needs, as well as the extent to which engagement and retention affect more distal outcomes, such as rehospitalization, level of functioning, and quality of life.

This study points out the importance of distinguishing between different reasons for dropout and, in particular, between clients' dropping out of treatment and subjects' dropping out of the research project. That is, clients sometimes drop out because the research protocol is too time consuming, because their interest in study participation wanes over time, or for some other reason related to the research but not to treatment. To determine whether the assertive community treatment model is better at retaining clients than another intervention, it may be problematic to assume that the decision to drop out of the research project is equivalent to dropping out of treatment. In many research studies, clients are not allowed to continue with the treatment service after withdrawing from the research project. However, clients sometimes drop out of the research project but continue receiving services from the assigned provider. In both cases, clients are often lumped together into a single dropout category, even though their circumstances may be very different.

These caveats notwithstanding, the assertive community treatment model has demonstrated greater ability to engage and retain clients in the community than usual-care services. In fact, one of the most robust outcomes of assertive community treatment is its demonstrated ability to reduce hospital and emergency service utilization as well as improve housing stability (42). It seems likely that reduction in emergency utilization and lower rates of hospitalization found in other studies of assertive community treatment may be partly attributable to the success of the assertive community treatment model in engaging and retaining clients in the communi-

ty. It appears that assertive community treatment may prove to be a valuable piece in solving the revolving-door puzzle. ♦

Acknowledgments

This research was supported by grant 1-HD5-SM51349-01 from the Center for Mental Health Services. The authors thank Karen Lewis, B.A., Evelyn Oxman, B.A., and Gary Bond, Ph.D., for helpful comments and suggestions.

References

1. Stein LI, Test MA: Alternative to mental hospital treatment: I. conceptual model, treatment program, and clinical evaluation. Archives of General Psychiatry 37:392–397, 1980
2. McRae J, Higgins M, Lycan C, et al: What happens to patients after five years of intensive case management stops? Hospital and Community Psychiatry 41:175–179, 1990
3. Audini B, Marks IM, Lawrence RE, et al: Home-based versus out-patient/in-patient care for people with serious mental illness: phase II of a controlled study. British Journal of Psychiatry 165:204–210, 1994
4. Bachrach LL: Continuity of care and approaches to case management for long-term mentally ill patients. Hospital and Community Psychiatry 44:465–468, 1993
5. Stein LI, Diamond RJ: A program for difficult to treat patients. New Directions for Mental Health Services, no 26:29–39, 1985
6. Surber RW, Winkler EL, Monteleone M, et al: Characteristics of high users of acute psychiatric inpatient services. Hospital and Community Psychiatry 38:1112–1114, 1987
7. Dennis DL, Buckner JC, Lipton FR, et al: A decade of research and services for homeless mentally ill persons: where do we stand? American Psychologist 46:1129–1138, 1991
8. Witheridge TF: The assertive community treatment worker: an emerging role and its implications for professional training. Hospital and Community Psychiatry 40:620–624, 1989
9. Teague GB, Drake RE, Theimann HA: Evaluating use of continuous treatment teams for persons with mental illness and substance abuse. Psychiatric Services 46: 689–695, 1995
10. Dixon L, Krauss N, Kernan E, et al: Modifying the PACT model to serve homeless persons with severe mental illness. Psychiatric Services 46:684–688, 1995
11. Witheridge TF, Dincin J: The Bridge: an assertive outreach program in an urban setting. New Directions for Mental Health Services, no 26:65–76, 1985
12. McGrew JH, Bond GR, Dietzen L, et al: Measuring the fidelity of implementation of a mental health program model. Journal of Consulting and Clinical Psychology 62: 670–678, 1994
13. Witheridge TF: The "active ingredients" of assertive outreach. New Directions for Mental Health Services, no 52:47–64, 1991
14. Bond GR, McGrew JH, Fekete DM: Assertive outreach for frequent users of psychiatric hospitals: a meta-analysis. Journal of Mental Health Administration 22:4–16, 1995
15. Bond G, Witheridge TF, Dincin J, et al: Assertive community treatment for frequent users of psychiatric hospitals in a large city: a controlled study. American Journal of Community Psychology 18:865–891, 1990
16. Bond GR, Miller LD, Krumwied RD, et al: Assertive case management in three CMHCs: a controlled study. Hospital and Community Psychiatry 39:411–418, 1988
17. Bond GR, McDonel EC, Miller LD, et al: Assertive community treatment and reference groups: an evaluation of their effectiveness for young adults with serious mental illness and substance abuse problems. Psychosocial Rehabilitation Journal 15:31–43, 1991
18. Bond G, Pensec M, Dietzen L, et al: Intensive case management for frequent users of psychiatric hospitals in a large city: a comparison of team and individual caseloads. Psychosocial Rehabilitation Journal 15:90–98, 1991
19. Scott JE, Dixon LB: Assertive community treatment and case management for schizophrenia. Schizophrenia Bulletin 21:657–668, 1995
20. Mowbray CT, Cohen E, Bybee D: The challenge of outcome evaluation in homeless services: engagement as an intermediate outcome measure. Evaluation and Program Planning 16:337–346, 1993
21. Axelrod S, Wetzler S: Factors associated with better compliance with psychiatric aftercare. Hospital and Community Psychiatry 40:397–401, 1989
22. Goldman HH, Gattozzi AA, Taube CA: Defining and counting the chronically mentally ill. Hospital and Community Psychiatry 32:21–27, 1981
23. Nikkel RE, Smith G, Edwards D: A consumer-oriented case management project. Hospital and Community Psychiatry 43: 577–579, 1992
24. Essock SM, Kontos N: Implementing assertive community treatment teams. Psychiatric Services 46:679–683,1995
25. Witheridge TF: The "active ingredients" of assertive outreach. New Directions for Mental Health Services, no 52:47–64, 1991
26. Lukoff D, Nuechterlein KH, Ventura J: Manual for the expanded Brief Psychiatric Rating Scale. Schizophrenia Bulletin 12:594–602, 1986
27. Ventura J, Green M, Shaner A, et al: Training and quality assurance on the BPRS: "the drift busters." International Journal of Methods in Psychiatric Research 3:221–224, 1993
28. Drake RE, Osher FC, Noordsy DL, et al: Diagnosis of alcohol use disorders in schizophrenia. Schizophrenia Bulletin 16:57–67, 1990
29. Guy W, Cleary P, Bonato RR: Methodological Implications of a Large Central Data System. Amsterdam, Excerpta Medica, 1975
30. Bech P, Larsen JK, Anderson J: The BPRS: psychometric developments. Psychopharmacology Bulletin 24:118–121, 1988
31. Gebbard GO, Coyne L, Kennedy LL, et al: Interrater reliability in the use of the Brief Psychiatric Rating Scale. Bulletin of the Menninger Clinic 51:519–531, 1987
32. Andersen J, Larsen JK, Schultz VE, et al: The Brief Psychiatric Rating Scale: dimensions of schizophrenia: reliability and construct validity. Psychopathology 22:168–176, 1989
33. Drake RE, Osher FC, Wallach MA: Alcohol use and abuse in schizophrenia: a prospective community study. Journal of Nervous and Mental Disease 177:408–414, 1989
34. Solomon P, Draine J: The efficacy of a consumer case management team: 2-year outcomes of a randomized trial. Journal of Mental Health Administration 22:135–146, 1995
35. Singer JD, Willett JB: Modeling the days of our lives: using survival analysis when designing and analyzing longitudinal studies of duration and the timing of events. Psychological Bulletin 110:268–290, 1991
36. Burns BJ, Santos AB: Assertive community treatment: an update of randomized trials. Psychiatric Services 46:669–675, 1995
37. McGrew JH, Bond GR, Dietzen L, et al: A multisite study of client outcomes in assertive community treatment. Psychiatric Services 46:696–701, 1995
38. Draine J: A critical review of randomized field trials of case management for individuals with serious and persistent mental illness. Research on Social Work Practice, in press
39. McGrew JH, Wilson RG, Bond GR: Client perspectives on helpful ingredients of assertive community treatment. Psychiatric Rehabilitation Journal 19:13–21, 1996
40. Weiden PJ, Dixon L, Frances A, et al: Neuroleptic noncompliance in schizophrenia, in Advances in Neuropsychiatry and Psychopharmacology, Vol 1: Schizophrenia Research. Edited by Tamminga CA, Shulz SC. New York, Raven Press, 1991
41. Warner R: Recovery From Schizophrenia: Psychiatry and Political Economy, 2nd ed. New York, Routledge, 1994
42. Mueser KT, Bond GR, Drake RE, et al: Models of community care for severe mental illness: a review of research on case management. Schizophrenia Bulletin, in press