This is to certify that the

thesis entitled

An Examination of Assertive Community Treatment
For Persons With Severe Mental Illness:
Changes and Patterns in Service Utilization

presented by

Maureen Hilary Rumptz

has been accepted towards fulfillment
of the requirements for

Master of Arts degree in Psychology

Thomas L. Reischl
Major professor

Date May 21, 1992

AN EXAMINATION OF ASSERTIVE COMMUNITY TREATMENT FOR PERSONS WITH SEVERE MENTAL ILLNESS: CHANGES AND PATTERNS IN SERVICE UTILIZATION

By

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of requirements
for the degree of

MASTER OF ARTS

Department of Psychology

1992

ABSTRACT

AN EXAMINATION OF ASSERTIVE COMMUNITY TREATMENT
FOR PERSONS WITH SEVERE MENTAL ILLNESS:
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Using a longitudinal nonequivalent comparison group design, the Assertive Community Treatment program was compared with traditional community-based programming on the dimensions of state and local psychiatric hospitalizations, emergency service contacts, and the amount of intensive helping services and skill training and follow-up services provided to consumers in both groups. Over time, ACT members spent fewer days in state hospitals than the Comparison group, experienced declining admissions and days spent in local hospitals, and had a reduction in in-person emergency service contacts. Simultaneously, ACT consumers increased their use of inpatient night care facilities in order to manage their illness. This service utilization pattern enabled ACT to be less expensive with regard to inpatient hospitalization costs. ACT members received more intensive helping services than the Comparison group and these services were related to number of admissions and days spent in inpatient night care facilities.

ACKNOWLEDGEMENTS

This thesis is the result of a lot of work and support from a number of people. First, I would like to thank Tom Reischl for always making time to work on this project, for teaching me so much about research and writing, and for his never-ending support and guidance throughout this process. I would also like to share my appreciation with Bill Davidson for his assistance and encouragement, and for teaching me an invaluable lesson about research - "just do it." I also would like to thank Carol Mowbray for improving this study by sharing her expertise in this area.

I would like to thank my T.A.C. for their technical assistance and encouragment throughout this project. My friends, Tim Speth, Madeline Wordes, Barb Schillo, Susan Jackson, and others, were a constant source of love and support and I am very grateful. Words cannot adequately express the deep appreciation I feel for your continual support and love Tim, and I can only hope you know how integral you are, to this project and to my life. And to Madeline - your belief in me never wavered and sustained me through many difficult times. I also need to thank my family for providing me with a background of love and support for doing whatever I wanted to do, which allowed me this opportunity.

Special thanks and appreciation go to the C-E-I Community Mental Health Board, especially Glenn Stanton and Jo Benson, for sponsoring this research and providing me with endless assistance. I would also

like to express my gratitude to Sam Marano and the rest of the ACT staff for collaborating with me on this project. I have a deep respect and admiration for the work that they do. Finally, I would hope that this research will serve to guide future programming, research, and policy with regard to severe mental illness and I need to thank the participants in this project for working with me to make this possible.

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CHAPTER I

Introduction

In order to live in the community, persons with severe mental illness require adequate support through effective community-based aftercare programs. Several issues have impeded the successful development, implementation, and use of such programs in the United States. The mental health system has itself been a barrier to the development of community-based aftercare services in that there has been a lack of coherent public policy, fragmentation of responsibility, and insufficient funding (Test, 1981). Programs have often been implemented without research indicating that they are an effective and desirable option for those afflicted with severe mental illness. There are also many barriers (e.g., lack of transportation, lack of daily living skills, difficulty with interpersonal relationships, low motivation, high vulnerability to stress) which prevent persons with severe mental illness from engaging in given community-based treatment programs. These issues, and others, have necessitated the advent of programs which acknowledge and work within these contexts.

Acting on the premise that community treatment programs need to address many unique issues as well as work within a constraining system, Test and Stein developed the Training in Community Living (TCL) model. The philosophy of the Training in Community Living model assumes that by moving treatment directly into the community, assisting with the

learning of basic living skills, and helping the consumer manage the illness, staff are able to correct the treatment gap that so many persons with severe mental illness experience. Using a true experimental design to evaluate this model, Test and Stein (1980) concluded that almost all experimental patients experienced a sustained community tenure without suffering the disruption to life and reinforcement of the patient role frequently incurred through hospitalization.

Subsequently, this program has been implemented on a broad scale in the United States over the last two decades. Several studies of research replications based on the Training in Community Living model have all suggested that the Training in Community Living model reduces hospital use, yet most do not suggest that programs based on this model improve quality of life or satisfaction (Bond, Miller, Krumwied, & Ward, 1988; Bond, Witheridge, Dincin, Wasmer, Webb, & De Graaf-Kaser, 1990; Witheridge & Dincin, 1985; Hoult, Reynolds, Charbonneau-Powis, Weekes, & Briggs, 1983; Mulder, 1982). With these conclusions in mind, this review examines the literature that has been generated from the assessment of the Training in Community Living model replications to date and the implications of these findings for future research and mental health policy are discussed.

Training in Community Living Model

In 1978 Test and Stein developed the Training in Community Living (TCL) model in Madison, Wisconsin. Conceptualized in the early 1970's as an alternative to hospital treatment for long-term psychiatric patients, this outreach model used a team approach to teach coping

skills, daily living skills, and problem solving techniques through intensive contacts with clients in their own surroundings (Mowbray and Freddolino, 1986; Test and Stein, 1978). This program responded to many of the administrative and policy factors which to this point had plagued community mental health programs. The idea of a team approach where team members act as advocates in the community ensured that responsibility for a persons' well-being was not fragmented, but instead comprehensive. This model was hypothesized to be cost effective because time in costly institutional settings was hypothesized to be significantly less.

The philosophy of the Training in Community Living model assumed that by moving treatment directly into the community, assisting with the learning of basic living skills, and helping the consumer manage the illness, staff would be able to correct the treatment gap that so many persons with severe mental illness experience. The three goals of the Training in Community Living model were: 1) to increase the length of community tenure, 2) to increase autonomous functioning, and 3) and to insure a satisfactory quality of life. This outreach model used a team approach to teach coping skills and problem solving techniques through intensive contacts with the consumers in their own surroundings in order to attain these goals (Mowbray and Freddolino, 1986; Test and Stein, 1978). These operational techniques allowed staff members to provide the community support that was so desperately needed but traditionally lacking in conventional community mental health care.

Test and Stein evaluated the Training in Community Living model by comparing the effectiveness of the innovative model for treating those

patients seeking in-hospital admission with the traditional model for treating this population which involved short-term progressive in-hospital treatment plus community aftercare. Subjects were randomly assigned to either the experimental (n=65) or control (n=65) groups and assessment data was gathered at baseline and every four months for a span of 28 months through face-to-face interviews by research staff wherein several measures (Demographic Form, Community Adjustment Form, Self-Esteem Scale, Symptomatology Rating, and Family Burden Form) were implemented to assess the two treatment models.

Of the 65 TCL clients only 12 were rehospitalized (18 percent) compared with 89 percent of the 65 control clients. The TCL participants spent significantly more time in independent living situations, less time unemployed, earned more income, had more positive social relationships, expressed greater satisfaction with life and were less symptomatic than the controls. With respect to costs and benefits, Weisbrod, Test, and Stein (1980) reported that direct treatment costs were slightly higher in the community-based TCL model than in the hospital-based model. However, the TCL model provided benefits such as a doubling of client earnings and work productivity. In addition, family and community burden was not greater with the TCL model than with the more traditional approach (Test and Stein, 1980).

In summary, Test and Stein (1978) concluded that almost all experimental patients experienced a sustained community tenure without suffering the disruption to life and reinforcement of the patient role frequently incurred through hospitalization. The researchers suggested that the consumers sustained community living was not gained at the

expense of their quality of life, level of adjustment, self-esteem, or personal satisfaction with life. Instead, relative to the control group, the experimental group showed enhanced functioning in several areas and demonstrated less subjective distress and greater satisfaction with their lives (Test and Stein, 1978).

Replication Studies

Several studies of research replications based on the TCL model have shown hospital utilization results very similar to those of the TCL model program, although most have not duplicated the quality of life or satisfaction differences. In 1979, Mulder (1982) evaluated the Harbinger Alternative Treatment Program in Kent County, Michigan to determine the effectiveness of treatment and cost of care for the experimental (n=59) and a randomly assigned control group (n=62) who received conventional community mental health system care. Mulder (1982) arrived at three conclusions based on his evaluation. First, the Harbinger program kept members out of the hospital at a rate far exceeding the control group. For the 30 months, the control group used 5,530 days of hospital care while the Harbinger group used only 959 days for a total difference of 4,571 days. Second, at 30 months, the cost data clearly indicated that per member per year costs were significantly lower for Harbinger members. Third, in-person interviews demonstrated that Harbinger members were as well off or better as a group than were control group members.

Bond, Witheridge, Dincin, Wasmer, Webb & De Graaf-Kaser (1990) examined a large-city adaptation of the TCL model. Using a one year pre and one year post experimental design, half of the participants were

randomly assigned to the Assertive Community Treatment (ACT) intervention and the other half to a drop-in center. The researchers found that the ACT members averaged significantly fewer state hospital admissions and days than did the individuals in the Control condition. The ACT members also had greater satisfaction with program services and lower per-member treatment costs.

A study done in Australia (Hoult, Reynolds, Charbonneau-Powis, Weekes, and Briggs, 1983) had findings essentially the same as those of Harbinger, ACT, and the original TCL experiment. Of 120 individuals presenting to a hospital for care, 60 were assigned to the control group whereby they received standard hospital care and aftercare. The 60 individuals in the experimental group were taken back to the community by the staff team which provided them and their relatives with comprehensive and assertive care patterned after the TCL program. The researchers found that it was possible to treat most persons with severe mental illness in the community. During the 12 month study, 96 percent of the control group were admitted to the hospital and 50 percent were readmitted. Of the experimental group, 40 percent were admitted and only eight percent were readmitted. Control group members spent an average of 53.5 days in the psychiatric ward, whereas the experimental group members spent an average of 8.4 days in the ward for a difference of 45.1 days. In addition, the experimental program placed no more burden on the community and family than the control program did. In fact, the members and their families were more satisfied with the experimental program. Finally, the cost data suggested that the experimental program cost significantly less than the traditional

program.

The Bridge, a program of Thresholds in Chicago, was established in 1978 to stop revolving door rehospitalization. Based on the TCL model, this replication reinforced the original conclusions drawn by Test and Stein. The Bridge approach was empirically proven to prevent a large number of rehospitalizations. For 41 members who participated in the demonstration phase of the Bridge intervention, the average number of admissions dropped from 3.3 in the year prior to the intervention to 1.9 during the year after intake, and the average number of days hospitalized dropped from 87.1 to 36.6 (Witheridge, Dincin, and Appleby, 1982).

The reduced hospital use by the Bridge participants had profound implications for the cost of psychiatric care. For the 41 members who participated in the demonstration project, Witheridge et al. (1982) found a significant reduction in the estimated direct cost of hospital care. The cost dropped from $734,000 in the year before the intervention to $492,000 in the year after intake, for a savings of $242,000 a year. Bond (1984) factored in the cost of the Bridge intervention and concluded that the reduction in days hospitalized in the years before and after intake equaled an estimated savings in total treatment costs (inpatient plus the Bridge intervention) of $5,700 per member per year. These savings and reduced hospital days enabled the mission of the Bridge to be realized; that is, to ensure that individuals who are at the highest risk of rehospitalization be worked with in the community so that they may live there in comfort, dignity, and satisfaction (Witheridge and Dincin, 1985).

Barland and Higgins (1980) replicated the TCL model research in Spokane, Washington. In this study, 61 persons with Schizophrenia between the ages of 18 and 60 were treated using the TCL model. In this quasi-experimental design, participant data two years prior to the intervention was compared with participant data during two years of TCL treatment. Although conclusions based on this study were limited due to the nature of the design, the results parallel the TCL research. Hospitalization was reduced by 90 percent from the levels reported for two years prior to the intervention. The average annual cost per person was also reduced from $13,907 for the baseline period to $12,490 for the experimental period, a savings of over $1,000 per year for each participant.

The New Traverse Program of Grand Traverse/Leelaunau Community Mental Health Services in Michigan was developed in 1981 based upon the TCL model. Evaluation results were consistent with the early TCL research regarding reduction in hospitalizations and enhanced functioning. Participants had a 60 percent decrease in days spent in hospitals as compared with the year prior to joining the New Traverse Program. Also, level of functioning, as measured by the Global Assessment Scale, increased an average of 15 points over one year. In addition, participant and community satisfaction increased as did consumer independence (Michigan Department of Mental Health, 1985). Again, the nature of this design limited the conclusions that could be drawn from this research, but the consistency in the findings only serves to reinforce the original model.

While results such as these substantiate the argument that the TCL

model is effective for reducing psychiatric inpatient hospitalizations (Bond, Miller, Krumwied, and Ward, 1988), many questions remain about the effectiveness of this model. The hospitalization data has been difficult to interpret because none of the studies extended beyond two and one half years follow-up and all examined hospitalization as a single independent outcome rather than looking at the impact of the model on various types of hospitals (e.g., state vs. local). None of the studies took into account that hospital utilization was not an independent outcome measure but rather a variable controlled, in part, by staff members. Also, most of the research has not demonstrated that this model is also successful in increasing quality of life and satisfaction, two important components of program effectiveness. Previous research has also neglected to evaluate the relationship between the amount and type of community-based services and hospitalization patterns.

Before the role of the TCL model in the mix of community mental health services can be thoroughly evaluated, these issues and others must be addressed through research. Future research would benefit to extend these studies by comparing replications of the TCL model to current traditional programming offered through community mental health centers and analyzing different types of hospital utilization outcomes separately (in terms of admissions and number of days) and over longer time periods. Future studies should also examine the changes and patterns in hospital utilization as well as community-based service provision.

Present Study

The rationale for this research was formulated through a compilation of material from theoretical and experimental articles which were identified through the Psychological Abstracts, a review of pertinent references in well-known studies, and through suggested readings from individuals well rehearsed in this field.

The present study involved an examination of an intervention designed to maintain and enhance community living for individuals suffering from a mental disorder who were not responsive to traditional community-based aftercare services. The intervention was a replication of the TCL model and was rationally designed and guided by an awareness of the issues which have made traditional programs ineffective for this population. The participants in this study were adults with severe mental illness who were either a member of the Assertive Community Treatment (ACT) intervention in Lansing, MI or a participant in traditional community-based aftercare services offered through Clinton-Eaton-Ingham Community Mental Health in Lansing, MI. The main objectives of this study were to examine the Assertive Community Treatment intervention across three years on two dimensions: 1) hospital and emergency service utilization and cost and 2) community-based service utilization.

The first goal of this research was to determine if the participants in ACT spent less time in or had less contact with (in terms of days, admissions, contacts and length of stay) hospital settings and emergency services (including state and local hospitals and emergency services) than participants in the comparison group.

Following in the traditional research in this area, this study examined the institutional service utilization patterns of the participants. Results from previous research suggested that persons treated under the Training in Community Living model spent less time in these institutional settings and more time in the community than persons treated in traditional community-based aftercare settings. The goal of this research was to examine the changes and patterns in number of admissions, days, and contact with three types of inpatient psychiatric hospital facilities (state, local, and inpatient night care) and emergency services over four years.

This study also explored the total costs per year for treating individuals with the ACT program compared with treatment defined as traditional. This cost analysis was partial because it only represented 1992 direct costs of inpatient psychiatric hospitalization care and did not factor in the cost of the ACT program and other community-based services.

The second goal of this research was to ascertain whether participants in ACT received more, or different, community-based services (including intensive helping services and skill training and follow-up services) than participants in the comparison group and if this had a relationship with their hospitalization rates. Research studies which have examined the amount and type of community-based services used by mental health consumers are lacking and, therefore, we are without a clear explanation of the relationship that amount and type of community-based services may have with institutional service utilization patterns.

CHAPTER II

Method

Design

Using a pre-post nonequivalent comparison group design, the main objective of the current study was to examine the impact of the ACT program over time on subsequent hospital and community-based service delivery compared to traditional programming for persons with severe mental illness.

To avoid violating the participants' rights, human subjects issues were considered and examined carefully. Confidentiality was assured through the use of code numbers instead of names. Before research began, confidentiality issues were reviewed by the Michigan State University Human Subjects Committee and the C-E-I Community Mental Health Recipient Rights Board.

Sampling Procedures

Prior to implementing the Assertive Community Treatment program in August of 1986, the Residential Screening Committee at Community Support Services generated a list of candidates appropriate for admission based on the following criteria: 1) three or more hospitalizations in a three month period, 2) long-term hospitalization (minimum of 6 months length of stay), 3) high emergency service use (as rated by the Clinton-Eaton-Ingham Emergency Service staff), 4) reluctance to be involved in the current service system except on an emergency basis, and 5) Regional

Psychiatric Hospital resident status in the Clinton-Eaton-Ingham catchment area. Persons who met this criteria were slowly admitted into the ACT program over a period of one and one half years until it reached full capacity (n=60). These individuals were chosen first, before the others on the list of potential candidates, because they demonstrated the greatest need for ACT based on reluctance to be involved in the current service system and high number of admissions to, and days in, inpatient facilities. However, all of the individuals on the list were appropriate for the program and were known as the most "difficult" consumers to help.

Since 1986, several cases had been closed at ACT and new cases opened. Cases were only closed if an individual died, moved out of the area, or if ACT was not successful at keeping them out of the hospital. The sample for this study included all persons who were currently in the ACT program or who had been at one time (n=64). All other persons (n=41) who met the multiple criteria, but were not initially admitted to ACT, served as the Comparison group for this study. These 41 individuals received traditional community-based aftercare services.

Sample Characteristics and Representativeness

Of the original sample of 105 individuals, only 69 (ACT n = 39; Comparison n = 30) had four complete years of data so only those 69 cases were used in the analyses. To assure that this final sub-sample was representative of the original sample, the demographic data was analyzed for both the original sample of 105 and the final, smaller sample of 69 (see Table 1). Between-group differences among percentages of respondents in each category revealed that the final sample closely

matched the original sample on all of the demographic variables.

Chi-Square analyses indicated that there were no significant differences between the ACT group and Comparison group on any of the demographic variables measured for either the original sample or the final sample. Therefore, the variables of gender, race, age, and primary diagnosis were analyzed for the combined sample (ACT and the Comparison group together) rather than for each of the two groups separately.

In this study's original sample and final sample, see Table 1, both groups were predominantly Caucasian and over sixty percent male. African Americans, Hispanics, American Indians, and Asians were under-represented in both samples. Most of the individuals in both groups were between the ages of thirty and thirty-nine and very few were over fifty years of age. In both the ACT group and the Comparison group, almost everyone had a primary diagnosis of Schizophrenia.

Measures

For this study, archival data was collected on demographic variables, hospital and emergency service utilization variables and community-based service utilization variables over a four year period of time. Data was collected for each case on all variables from one year before each individual start date through three years post program start date or June 8, 1990, whichever came first. The start date for each person in the ACT program differed because of the staggered start-up of project services. The start date for persons in the Comparison group was August 18, 1986, the earliest possible start date for any person in the ACT program.

The analyses included all cases that had four complete years of

data. In the event of missing data within a year (due to a person's death, exit from the area, or termination from the Community Mental Health system), the data for that year was not included in the analyses.

The data was accessed through the Community Mental Health Board's computerized data management system. Trained personnel at Community Mental Health entered data onto the computer system from hospital records and service contact forms. This data was accessed, re-coded, and cleaned by the project director of this research study. The reliability of the computerized information for the ACT group and the Comparison group was not checked against the hospitalization and community-based service records in the participants' files because data in the archive was not a more complete source of information than the data on the computer system. In fact, the computerized information was a more complete accounting of the services received by consumers for two reasons: it was the record used to bill for costs and because paper forms had more of an opportunity to be misplaced or misfiled.

Hospital and emergency service utilization measures. State hospital admissions and days were assessed in terms of the number of admissions and total days spent in state hospitals in Michigan, generally for long-term care. Local hospital admissions and days were examined in terms of the number of admissions and total days spent in local hospitals in Michigan, generally for shorter-term care than offered by state hospitals. Inpatient night care admissions and days were measured in terms of the number of admissions and total days spent in an inpatient facility which was crisis-oriented and offered short-term inpatient care during the night hours and several mandatory

programs during the day.

The average per day room cost of each of these three hospital settings was calculated for both the ACT group and the Comparison group (using state, local, and inpatient night care days data) over the three year time period. The cost figures used in this analysis were determined by obtaining the 1992 per day room charge for all of the state hospitals used by participants in this study and then averaging them to arrive at an average per day room charge for state hospitals. The same was done for local hospitals and inpatient night care. For a more complete estimate of costs to the ACT program, the 1992 ACT budget was added to the total hospitalization costs over the three year time period.

In-person emergency service contacts were assessed in terms of the frequency of in-person visits to the Emergency Services unit at a local medical center. This unit was a crisis care referral service and not an inpatient facility.

Community-based service utilization measures. Initially, rational strategies of data reduction were used to combine over 100 community-based services into eight definable categories including medical services, sixty minute therapy services, thirty minute therapy services, phone contacts, sheltered workshop services, day treatment services, brief face contacts, and transportation services.

Medical services included services provided by a doctor, psychiatrist, or by a medication clinic which included medication disbursement and monitoring as well as physical and mental health check-ups and appointments.

Sixty and thirty minute therapy services included therapy services provided by a trained therapist or counselor to the ACT or Comparison group member for a period of thirty minutes or sixty minutes. These therapy sessions usually occurred within the confines of the staff member's office.

The fourth service that was assessed was phone contacts which included all telephone contacts made between ACT or Community Mental Health staff and ACT or Comparison group members.

Sheltered workshop services included attending a local sheltered workshop to go out on a work crew, if work was available, or do other activities with other workshop members. The sixth community-based service that was assessed was day treatment services. These were services that were offered on a daily basis at a local hospital.

All of the above mentioned community-based service variables were available to both the ACT group and the Comparison group and were used in all between groups analyses. The last two service variables were available only to the ACT group and were, therefore, only used in within group analyses of the ACT program. The first of these services, unique to the ACT program, was brief face contacts. These were face-to-face services performed in the community by ACT staff with ACT members which included daily living activities such as grocery shopping, food preparation and nutrition, training to take a bus, medication monitoring, and house cleaning. The second service available only to ACT members, and therefore not comparable across the two groups, was transportation services. These included transporting ACT members to appointments, activities, or other places where they needed to go.

Development of community-based service composite variables. In the following discussion of further data reduction on the community-based service utilization variables, the six service variables comparable across both the Comparison group and the ACT group (and, therefore, used in all between groups analyses) will be discussed as well as the eight service variables solution (including the variables which were unique to the ACT group and used for within group analyses only).

A correlation matrix (see Table 2) indicated high correlations between many of the eight community-based service utilization variables so a principal components analysis of the eight variables aided in the development of an even smaller number of theoretically meaningful community-based service utilization variables. This analysis was also performed excluding the two variables unique only to ACT (see Table 3). The initial solution for both analyses revealed two components, both of which had eigenvalues over 1.00. Therefore, a meaningful two component solution, accounting for 67% of the total variance in the eight service equation and 66% in the six service equation, was retained.

A varimax rotation for the eight community-based service utilization variables revealed the solution in Table 4. The first component, labelled intensive helping services, represented direct assertive outreach services provided face-to-face by an ACT staff member or community mental health case manager to a consumer. The second component, skill training and follow-up services, described skill training and follow-up services not performed in person by ACT staff persons or community mental health case managers. The principal

components solutions provided the justification for constructing two community-based service utilization variables for further within group data analyses.

The varimax rotation for the six community-based service utilization variables, see Table 5, revealed a similar solution. Again, there was a two component solution, intensive helping services and skill training and follow-up services. As was true for the eight community-based service utilization variables solution, the principal components solutions provided the justification for constructing two community-based service utilization variables for further between group analyses.

CHAPTER III

Results

Data Analysis Strategy

The following analyses were performed on the data to document the impact of the Assertive Community Treatment program on subsequent service delivery. A series of Group X Time repeated measures ANOVA's were used to detect between group differences and changes over time for hospital and emergency service variables (including state hospital admissions (long term care), local hospital admissions (short term care), inpatient night care admissions, state hospital days (long term care), local hospital days (short term care), inpatient night care days, and in-person emergency service contacts). Group X Time repeated measures ANOVA's were also used to detect between group differences and changes over time for the two community-based service utilization variables (including intensive helping services and skill training and follow-up services). The initial analysis for the entire series of Group X Time repeated measures ANOVA's was an independent sample t-test on all hospital, emergency service, and community-based service variables during the year before each individual start date. All of the t-test results were insignificant except where mentioned in the text. The partial cost of state hospitalization, local hospitalization, and inpatient night care was computed for both of the groups over each of the three years after the program start date. As a way to examine the

unique impact of the ACT program services, multiple regression analyses were conducted to examine the predictive associations between community-based service variables and hospital and in-person emergency service outcomes for ACT consumers.

Hospital Admissions

State hospital admissions (long term care). A Group X Time repeated measures ANOVA was used to evaluate whether ACT members had fewer admissions to state hospitals (long term care) compared to the comparison sample after the program start date. The results listed in Table 6 suggested no significant between group differences and no time effects. There was also no significant program effect, suggesting that the ACT program did not have a significant impact on state hospital admissions. The ACT group means for state hospital admissions (long term care) went down one and two years after the program start date and then increased slightly during the third year of the program. The comparison group means for state hospital admissions (long term care) consistently increased over the two years after the program start date and then declined in the third year after the program start date.

Local hospital admissions (short term care). A Group X Time repeated measures ANOVA of local hospital admission (short term care) variables (see Table 6) revealed that there were significant changes over time in local hospital admissions for short term care. The ACT group means for local hospital admissions (short term care) indicated a continual decline over the three years after the program start date. The comparison group means for local hospital admissions (short term care) revealed an initial decline one year after the program start date

followed by an increase in admissions during the second year and a decline during year three. These findings indicate that both the ACT group and the comparison group had a similar pattern of declining admissions to local hospitals (short term care) over the four year assessment period.

Inpatient night care admissions. A Group X Time repeated measures analysis of variance (Table 6) noted a significant between group difference on inpatient night care admissions: the ACT group means consistently increased over time while the comparison group means decreased in the first year after program start date and then only slightly increased during year two and year three. These findings indicated that the ACT group had significantly more admissions to inpatient night care over time than the comparison group. In addition, the ANOVA results indicated a trend level Group X Time effect ($p < .10$) which suggested that there may have been a program effect for inpatient night care admissions.

Length of Hospital Stays

State hospital days (long term care). A Group X Time repeated measures ANOVA was used to evaluate whether ACT clients spent fewer days in state hospitals (long term care) compared to the comparison sample after the program start date. The means and standard deviations for all four assessment periods in Table 7 indicated that the comparison group spent more days overall in the state hospitals (long term care) and there was a general trend for both groups to spend more days in the state hospitals (long term care) over time. However, the significant Group X Time effect suggested that the increases in the number of days

for the comparison group were stronger than the increases for the ACT group. These findings support the hypothesis that ACT clients spent significantly fewer days in state hospitals (long term care) than the comparison sample and that the comparison group seemed to be more dependent on state hospitals (long term care) as a treatment strategy.

Local hospital days (short term care). An independent sample t-test indicated that there were pre-test differences between the ACT group and comparison group on local hospital days (short term care) (t= -2.23, p<.05). The group means in Table 7 indicated that the comparison group spent significantly fewer days in local hospital settings (short term care) in the year prior to the program start date compared to the ACT group.

A Group X Time repeated measures ANOVA revealed significant Group and Time effects as illustrated in Table 7. The group means indicated a sharp decline in local hospital days (short term care) for both groups in the year after the program start date followed by a slight increase in days during year two and a decline during the third year. However, at all four assessment points, ACT clients spent significantly more days in local hospitals for short term care.

Inpatient night care days. A Group X Time repeated measures analysis of variance was used to evaluate whether ACT clients spent fewer days in inpatient night care compared to the comparison sample after the program start date. The results listed in Table 7 indicated that the ACT group spent significantly more days in inpatient night care compared to the comparison group. The ACT group means consistently increased over the four year assessment period and the comparison group

means dropped dramatically in year one and then only increased slightly over years two and three indicating that the ACT members spent significantly more days in inpatient night care for short-term, crisis care than the comparison group. Contrary to the original hypothesis, this finding (in conjunction with the same result for inpatient night care admissions) illustrated that the ACT members used this type of short-term, crisis care more often and for longer time periods than the comparison group members.

Hospital Cost Assessment

Direct costs (for 1992) for staying in state hospitals (long term care), local hospitals (short term care), and inpatient night care were applied to the ACT group and the comparison group to determine the total costs for hospital care over the three years after the program start date (see Table 8). Over the three year assessment period, the comparison group spent more days in state hospitals and the ACT group spent more days in inpatient night care while both groups reduced their use of local hospitals. State hospitals were more expensive than local hospitals or inpatient night care costing $1,118,150 for the ACT members over three years and $3,682,800 for the comparison group. Even though the ACT group experienced higher costs over the three years for both local hospitals ($1,006,943 for ACT and $459,151 for the comparison group) and inpatient night care ($182,706 for ACT and $42,961 for the comparison group), their reduction in days spent in state facilities enabled them to be more cost effective overall with regard to hospitalization costs. ACT members incurred just over 2.3 million dollars in total hospital costs over the three year assessment time and

comparison members incurred more than four million dollars in total hospital costs.

The ACT budget (for 1992) was added to the hospitalization costs for the ACT program over the three year assessment time for a better, yet still crude, estimate of costs to the ACT group. With this cost ($447,928.00 per year) added to the hospitalization costs for ACT members over the three year assessment period, the cost difference between the two groups became narrower. In this analysis, the ACT members incurred a little over 3.6 million dollars in costs and the comparison group members incurred a little over four million in costs. This cost analysis was very limited and future research should examine more total costs (including program costs, staff costs and community-based services costs) for a more meaningful estimation of the cost effectiveness of ACT.

In-Person Emergency Service Contacts

In-person emergency service contacts. An independent sample t-test revealed pre-test differences between the ACT group and the comparison group on in-person emergency service contacts ($t = -2.59$, $p<.01$). The group means indicated that the comparison group had significantly fewer in-person emergency service contacts in the year prior to the program start date compared to the ACT group.

A Group X Time repeated measures ANOVA was used to evaluate whether ACT members had fewer in-person emergency service contacts than the comparison group over the three years post program start date. The means and standard deviations for all four assessment periods in Table 9 indicated significant changes over time for both groups and a

significant program effect. The group means showed that while the ACT group had significantly more emergency service contacts in the year before the program start date than the comparison group, by the third year after the program start date the ACT group reduced this number to fewer contacts than the comparison group had in that same year. The comparison group means remained fairly stable over time. This finding suggested that the ACT program did have a significant effect on its members by reducing in-person emergency service contacts.

Community-Based Services

Intensive helping services. A Group X Time repeated measures ANOVA (Table 10) was used to evaluate whether the ACT sample received more intensive helping services than the comparison sample over all four assessment periods. The data revealed significant between group effects, significant changes over time and a significant interaction effect. It was interesting to note that the ACT group means indicated a sharp increase in the number of intensive helping services received during the first year after the program start date, followed by a decline in these services over the second and third years post program start date. As would be expected because no intervention was involved, the comparison group means indicated a fairly stable pattern of intensive helping services over the four assessment periods.

Skill training and follow-up services. A Group X Time repeated measures ANOVA of skill training and follow-up services (see Table 10) revealed significant changes over time. The ACT group means suggest that the ACT group received an increase in skill training and follow-up services in the first year after the program start date followed by a

slight decline and levelling off during years two and three. The comparison group means revealed that the comparison group received a slight increase in skill training and follow-up services over all four assessment points.

Exploratory Relationship Among Community-Based Service Variables and Hospital and Emergency Service Variables

A multiple regression analysis was conducted for the ACT group only (n=39) to analyze variance accounted for by intensive helping services variables and skill training and follow-up services variables (for the three years after the program start date) in predicting state hospital admissions and days (long term care), local hospital admissions and days (short term care), inpatient night care admissions and days, and in-person emergency service contacts. The purpose of this analysis was to explore the relationship between the amount of intensive helping services and skill training and follow-up services provided to ACT members and the amount of hospital and emergency services they utilized.

As reported in Table 11, both community-based service variables accounted for little variance in most of the inpatient hospital and emergency service measures as illustrated in Table 11. However, they did account for a significant percentage of variance for inpatient night care admissions and days for the three years after the program start date. This finding suggested that the more intensive helping services that ACT participants received, the higher the number of admissions and days spent in inpatient night care. This finding may have reflected the fact that the ACT program had members who needed a lot of community-based services and a lot of short-term, inpatient

crisis care. Or, that having frequent contact with ACT members may have produced a better early warning system and placement into inpatient night care, rather than delayed treatment and eventual state or local inpatient psychiatric hospitalizations.

CHAPTER IV

Discussion

Results of this research indicate that the ACT program was able to change the traditional patterns of service utilization for its members. ACT members spent fewer days in state hospitals (long term care) than the Comparison group. Over time, ACT consumers also experienced declining admissions and number of days spent in local hospitals (short term care) and a reduction in in-person emergency service contacts. Over the same time period, ACT consumers spent an increased amount of time, compared with the comparison group, in a less restrictive, less disruptive, short-term inpatient facility in order to manage their illness.

There was a significant relationship between the amount of intensive helping services that ACT consumers received during the three years after the program start date and the number of admissions and days spent in inpatient night care facilities. ACT members received over four times as many intensive helping services and skill training and follow-up services in the first year after the program start date than they did in the previous year and significantly more than the Comparison group. Interestingly, the amount of community-based services that ACT members received dropped over the second and third years of the program as quickly as they increased during the first year of the program.

Use of Hospitals

Previous studies found that assertive community treatment programs were more effective in reducing inpatient hospitalizations than traditional community-based aftercare (Test & Stein, 1980; Bond, Miller, Krumwied, & Ward, 1988; Bond, Witheridge, Dincin, Wasmer, Webb, & De Graaf-Kaser, 1990; Witheridge & Dincin, 1985; Hoult, Reynolds, Charbonneau-Powis, Weekes, & Briggs, 1983; Mulder, 1982). Some of these studies examined hospital admissions, some examined the length of stay in hospitals, and some evaluated both. All of these studies, however, used hospitalization as a single outcome without separately measuring the use of various types of inpatient psychiatric hospitals. In addition, the longest follow-up assessment period in all of these studies was two and one half years.

This study, however, examined hospitalization rates for several types of inpatient care including state hospitals (long term care), local hospitals (short term care), and inpatient night care (less restrictive, short-term crisis care) over three years. Results indicated that the ACT program impacted each of these types of inpatient psychiatric care differently, thus illustrating the importance of looking at each separately. In addition, this research examined in-person emergency service contacts which most other ACT replications have not done.

This study suggested that an assertive community treatment program in a medium-sized, industrialized, mid-western city was more effective in keeping members out of state hospitals (for long term care) than traditional community-based programming in the same city. This finding

was significant because state hospitals cost more than local hospitals and are also more disruptive to a persons life in the community therefore making readjustment post-hospitalization difficult.

Reducing the number of admissions and days spent in state hospitals for long term care was one of the goals of the ACT program. ACT staff suggest that the number of admissions and days were kept lower than the comparison group through intensive contact with members so that signs of illness usually warranting a state hospital stay could be arrested early through shorter-term, less costly and disruptive interventions. If ACT consumers needed to be hospitalized in a state facility due to overflow from full local hospital facilities or seriousness of condition, ACT staff members worked with them and the state facility to restore functioning as quickly as possible and prepare with them for return to the community.

Over time, persons in both the ACT group and comparison group had fewer admissions and spent fewer days in local hospitals. However, ACT program members spent more days in local hospitals than persons who received traditional community-based programming. It is not exactly clear why this was true except that the ACT members may have used local hospitals a little more because they were using state hospitals less.

Interestingly, although the ACT group made less use of state hospitals than the comparison group and over time decreased their use of local hospitals, they more frequently used the inpatient night care unit at a local medical center over the three years in ACT. While it is true that the goal of the ACT program was to minimize the use of hospitals for their members, staff acknowledged that the illnesses that most of

their members present warrant and necessitate the use of psychiatric inpatient facilities from time to time. When this was necessary, the local inpatient night care facility was the least restrictive, least disruptive, and least costly option compared to state or local hospital admissions.

The inpatient night care unit was restrictive only at night (from 9:00 pm until morning). During the day, consumers were free to move about the community as they chose with the exception of a few mandatory meetings and sessions. This type of hospitalization ensured that the ACT members were supervised closely enough that their illness could be brought under control but did not disrupt community living as much, or for as long a period of time, as local or state hospitalization.

Coinciding with this conscious program decision to make use of the local night care unit rather than state or local hospitals were local historical events. During the time period of the study, the number of inpatient night care beds was increased while several state and local hospitals closed or reduced the number of available beds. This allowed more people to be admitted into inpatient night care facilities and reduced the number that could be admitted into local or state facilities. These events may help to explain the findings that ACT members used inpatient night care more over time while using local and state facilities less.

These hospital utilization findings have direct consequences for the cost of hospital care for both the ACT group and the comparison group. The comparison group spent more days in state hospitals and the ACT group spent more days in inpatient night care while both groups

reduced their use of local hospitals over the three year assessment period. State hospitals were more expensive than local hospital or inpatient night care costing an average of $28,671 per ACT member over three years and $122,760 per comparison group member over the same time period. Even though the ACT group experienced higher costs over the three years for both local hospitals (an average of $25,819 over three years for each ACT member and $15,305 per comparison group member) and inpatient night care (an average of $4,685 for each ACT member and $1,432 for each comparison group member over three years), their reduction in days spent in state facilities enabled them to be more cost effective overall with regard to hospitalization costs. On average, ACT members incurred just over 59 thousand dollars each in total hospital costs over the three year assessment period and comparison members incurred more than 139 thousand dollars each in total hospital costs over the same time period.

However, this gap becomes more narrow when the cost of the ACT program was added in. This brings the cost per ACT member up to over 81 thousand dollars over the three year assessment period compared to 139 thousand dollars for the comparison group members.

These findings further illustrate the importance of measuring each type of inpatient psychiatric hospital separately in order to more fully understand where to impact in order to decrease costs. Future research should attempt to examine program and community-based service costs to clarify whether ACT is really less expensive.

Use of Emergency Services

The ACT program had a significant effect on reducing the number of in-person emergency service contacts over time. There were two possible reasons for this reduction in contact. One was that through daily outreach and intensive contact, the ACT program taught its members significant problem solving skills so that contact with a crisis counselor was not necessary as often. The other explanation was that there was not actually a reduction in the number of emergency services needed but rather a shift in who was performing those services. Once in the ACT program, members may have utilized the ACT on-call crisis counselors in place of the emergency service crisis counselors. This dimension of care has not been investigated in previous research and further research is warranted.

Of all of the hospital and in-person emergency service outcome variables, in-person emergency services was the only true independent outcome measure. Staff members for both ACT and the comparison group always had a role in determining whether, and for how long, their members would utilize state and local hospitals and inpatient night care and, therefore, these were not true independent outcome measures. In-person emergency service utilization, on the other hand, was not directly influenced by ACT or comparison group staff members.

All of these hospital and emergency service findings have a role in determining the impact of the Assertive Community Treatment program on its members. They indicate that the original hospital findings of the Training in Living model and other TCL replications hold true when examined over a sustained period of time and in comparison to a

nonequivalent comparison group. However, the results of this study go beyond this finding and also allow us to examine the changes and patterns in utilization for the various types of hospital and emergency services used by both groups. Future research would benefit by continuing to look at changes and patterns in various types of service utilization over time, in different locations and with different populations, and with a randomly assigned control group. Future efforts should also extend beyond looking at hospitalization and emergency services as outcomes of program success and focus on other independent measures of success including quality of life, symptomatology, life and program satisfaction, and social support.

Use of Community-Based Services

Results of this study indicate that the ACT program provides more intensive helping services than does traditional community-based programming. This finding was not surprising because providing intensive, assertive, outreach services was a basic ACT program element whereas it was not a basic program element for traditional case management. It was interesting to note that the results of this study identified intensive helping services as a predictive component of inpatient night care admissions and days over the three year assessment period for ACT members. From these relationships, it appears that the services that ACT provides to its members are related to increasing the number of admissions and days spent in less restrictive, less costly inpatient night care units. These findings suggest that ACT members receive more intensive helping services and also require short-term crisis care more often.

It was also interesting to note the pattern of intensive helping services that the ACT members received over the three years they were in ACT. ACT members received an increase in intensive helping services during the first year they were in the program, followed by a continual decline in services over their second and third years in the program. Key ACT staff members explained that the intensive provision of a lot of services was necessary during that first year in order to stabilize the ACT member in the community. After that first year of teaching daily living skills, monitoring medication, and therapy, ACT members gradually required less intensive helping services because they had learned to do things on their own.

Another explanation for the trend is that most of the sample entered the ACT program during the one and one half year implementation phase of the program. Since ACT staff did not have a full caseload at that time, it was possible to provide more services to the consumers who were in the program. Once ACT reached full capacity, the staff did not have as much time to devote to providing intensive helping services.

In addition, over the course of the study the requirements of the ACT program by the local Community Mental Health Board have changed requiring ACT staff to spend more time doing paperwork and having interdisciplinary team meetings and to spend less time in the community. These structural changes were a result of the social economy; rather than experiencing direct budget cuts as many programs did, the ACT program experienced an increase in cumbersome red tape that they were required to process in order to receive funding. This increase in office time may have been part of the reason that ACT staff provided

less intensive helping services to consumers during their second and third years in the program.

While the provision of intensive helping services declined rapidly during those two years, the provision of skill training and follow-up services remained fairly stable. This was due, in part, to the fact that ACT staff did not need direct contact with consumers to provide these services. Phone contacts were performed from the office and skill training was taught at local sheltered workshops or day treatment centers. There may have been a coinciding shift in increasing these in-indirect service options while decreasing the intensive helping services.

Methodological Concerns

Issues which threaten the validity of these results limit their generalizability. Individuals were deliberately chosen for potential selection into ACT because they met a set of specific criteria. From this potential pool, individuals were deliberately chosen for ACT because they demonstrated the greatest need, as subjectively determined by the selection committee, for ACT based on reluctance to be involved in the current service system and high number of admissions to, and days in, inpatient facilities. While all of the individuals in the potential pool were appropriate for the program and were known as the most "difficult" consumers to help, the ACT members may represent a different group. Due to this sampling procedure, the results of this study are not generalizable to other populations. Under ideal circumstances, a randomized selection process would have helped to ensure comparability and generalizability.

The small sample size of this study also limits the generalizability of the results. The initial sample of 105 was reduced to 69 (ACT n=39 and comparison n=30) for most of the analyses due to incomplete data. This decrease in sample size increased the possibility of not finding significant results when there were some. This final sub-sample may also be different than the original sample of 105 because they remained active in ACT or the comparison group for at least three years while the other 36 individuals had incomplete data. The final sub-sample may have been easier to work with or more compliant than those who did not have three years of complete data.

Implications for Program Development, Research, and Policy

The current study has several important implications for program development for persons with a severe mental illness who are reluctant to use the traditional mental health service system. This research contributes to the existing body of literature by suggesting that ACT decreases the number of days spent in state and local hospitals therefore increasing community tenure. With regard to hospitalization costs and ACT program costs, ACT is less expensive than traditional community-based programming. This research suggests that ACT programs are an effective aftercare option for reducing state and local hospitalizations and should be implemented on a more widespread basis for this population if a reduction in hospitalizations is the desired outcome.

The results of the current study also have several implications for extended research investigating the issues that surround assertive community treatment for persons with severe mental illness. Research

efforts must focus on developing independent outcome measures such as satisfaction, emergency service utilization, and symptomatology. In addition, research efforts must focus on developing and using uniform measures across studies. Although the effect of ACT on hospital use has been evaluated by well-designed and executed studies, until some uniformity is achieved in measuring the outcomes and reporting the results it will be very difficult to clearly interpret the impact of the intervention.

Future research should also utilize randomly selected, randomly assigned control groups that receive standard treatment which should reflect current practice (Taube, Morlock, Burns, & Santos, 1990). Today, standard treatment includes a full range of case management, emergency services, and inpatient and outpatient programs. The type and amount of services provided by the control and experimental groups must be assessed in detail so that more meaningful comparisons can be made. The traditional community based aftercare models used in previous studies have included long and short-term progressive in-hospital treatment plus traditional community aftercare (sometimes including case management) provided by local community mental health centers (Test & Stein, 1980; Mulder, 1982; Hoult, Reynolds, Charbonneau-Powis, Weekes, and Briggs, 1983) and drop-in centers (Bond, Witheridge, Dincin, Wasmer, Webb & De Graaf-Kaser,1990) but have not been described in any more detail. Some of the previous research did not utilize a control or comparison group but evaluated study participants before and after the program to study hospital utilization changes (Witheridge, Dincin, and Appleby, 1982; Barland and Higgins, 1980; Michigan Department of Mental Health, 1985).

With traditional community-based services constantly evolving it becomes difficult to compare across studies without uniformly measuring the components of traditional aftercare and the experimental intervention.

The results of this study also suggest the need for further research on mature replications of TCL models in order to avoid start up problems, staff inexperience, and uneven program implementation (Mowbray, 1990). Evaluations of newly implemented interventions must be continued beyond one or two years after the program start date because effects may not be seen during the implementation phase or during a short follow-up assessment period.

Finally, future research should use better methods of estimating program costs and cost shifting. The methods used in the present study were crude, involving only total hospital costs for members in the ACT group and the comparison group and ACT program costs. Research on cost effectiveness should also include assessments of program and community services costs as well as the shifts in cost from one payer to another. Cost reporting should be standardized and should include more general costs per program member as well as total program costs. This would allow program planners and administrative staff better information in evaluating whether programs are truly cost efficient.

The current study also identified important implications for mental health services planners such as the National Institute of Mental Health, state departments of mental health, and individual providers. This examination of the changes and patterns in service utilization for ACT and comparison group members suggests that ACT is effective, as a current system of care, in maintaining lower number of days spent in

state hospitals and reducing local hospitalizations thereby decreasing hospital costs. The overall current system of care could be improved for individuals like those in the comparison group by creating more assertive community treatment interventions. However, this approach is only effective at treating individuals once they are labelled and involved in the current system of mental health care. More funding must be directed toward prevention research in this area.

It is a great challenge to provide community-based mental health services to consumers whose severe mental illness makes them reluctant to use the current service system and for whom the traditional system doesn't work very well. Past research has acknowledged that assertive outreach models are an effective strategy in engaging this group of consumers in a treatment plan that reduces inpatient hospitalizations. Efforts must be made now to build on and extend this research in an effort to efficiently and effectively address the needs of consumers who otherwise are not adequately served.

Table 1

Distribution on Demographic Variables for the Combined (ACT and Comparison Group Together) Original Sample and Final Sample (With Complete Data Over Four Years)

Variable Name	Original Sample (n=105)	Final Sample (n=69)
Gender		
Female	41 (39%)	26 (38%)
Male	64 (61%)	43 (62%)
Race		
Caucasian	85 (81%)	60 (87%)
African American	15 (14%)	5 (7%)
Hispanic	3 (3%)	3 (4%)
American Indian	1 (1%)	1 (2%)
Asian	1 (1%)	0 (0%)
Age		
less than 30	11 (10%)	6 (9%)
30 thru 39	51 (48%)	40 (58%)
40 thru 49	27 (26%)	13 (19%)
50 thru 59	8 (8%)	4 (6%)
60 and over	8 (8%)	6 (8%)
Primary Diagnosis		
Schizophrenia	99 (94%)	65 (94%)
Borderline Personality	6 (6%)	4 (6%)

Table 2

Correlation Coefficients Among Eight Community-Based Service Variables During the First Year of the Program (n=39)

		2	3	4	5	6	7	8
1	Medical Services	.64**	.46**	.54**	.56**	.01	-.05	-.06
2	60 Minute Therapy Services	---	.59**	.47**	.47**	.07	-.05	-.08
3	30 Minute Therapy Services		---	.50**	.56**	-.05	-.08	-.10
4	Brief Face Contacts			---	.77**	-.00	.04	.04
5	Transport Services				---	-.08	-.09	-.12
6	Phone Contacts					---	.29*	.28**
7	Sheltered Workshop						---	.99**
8	Day Treatment							---

*$p < .05$; **$p < .01$

Table 3

Correlation Coefficients Among Six Community-Based Service Variables During the First Year of the Program (n=69)

		2	3	4	5	6
1	Medical Services	.64**	.46**	.01	-.05	-.06
2	60 Minute Therapy Services	---	.59**	.07	-.05	-.08
3	30 Minute Therapy Services		---	-.05	-.08	-.10
4	Phone Contacts			---	.29*	.28*
5	Sheltered Workshop				---	.99**
6	Day Treatment					---

*$p < .05$; **$p < .01$

Table 4

Principal Components Analysis of Eight Community-Based Service Variables During the First Year of the Program (n=39)

Community-Based Services	Components	
	Intensive Helping Services	Skill Training and Follow-Up Services
Transport Services	.84	-.08
Brief Face Contacts	.82	.08
Medical Services	.80	-.01
60 Minute Therapy Services	.78	-.01
30 Minute Therapy Services	.77	-.08
Sheltered Workshop Services	-.04	.97
Day Treatment Services	-.06	.97
Phone Contacts	.01	.49
FINAL STATISTICS		
Eigenvalues	3.25	2.12
% Total Variance:	41%	27%
% Common Variance:	60%	40%

Table 5

Principal Components Analysis of Six Community-Based Service Variables During the First Year of the Program (n=69)

Community-Based Services	Components	
	Intensive Helping Services	Skill Training and Follow-Up Services
60 Minute Therapy Services	.89	.01
Medical Services	.83	.01
30 Minute Therapy Services	.80	-.06
Sheltered Workshop Services	-.07	.97
Day Treatment Services	-.09	.97
Phone Contacts	.06	.50
FINAL STATISTICS		
Eigenvalues	2.28	1.98
% Total Variance:	38%	33%
% Common Variance:	54%	46%

Table 6

Means (and Standard Deviations) for the ACT Group and the Comparison Group on Number of State (long term care), Local (short term care), and Inpatient Night Care Hospital Admissions (using the number of possible days each client was available to be admitted)

Variable Group	Assessment Time								F-tests		
	Pre-Program Year		First Year of Program		Second Year of Program		Third Year of Program		Group Effect	Time Effect	Group x Time Effect
	M	SD	M	SD	M	SD	M	SD	(1,58)	(3,56)	(3,56)
State Hospital Admissions (long term care)											
ACT	.00	.00	.00	.00	.00	.00	.00	.00	1.64	.67	1.30
Comparison	.00	.00	.00	.00	.04	.20	.00	.00			
Local Hospital Admissions (short term care)											
ACT	.00	.00	.00	.00	.00	.00	.00	.00	.27	3.34*	.86
Comparison	.00	.00	.00	.00	.00	.00	.00	.00			
Inpatient Night Care Admissions											
ACT	.01	.01	.01	.01	.01	.01	.01	.01	6.93**	1.62	1.70
Comparison	.00	.00	.00	.00	.00	.01	.00	.00			

*p<.05; ** p<.01; *** p<.001

Table 7

Means (and Standard Deviations) for the ACT Group and the Comparison Group on Number of State (long term care), Local (short term care), and Inpatient Night Care Hospital Days

Variable Group	Assessment Time								F-tests		
	Pre-Program Year		First Year of Program		Second Year of Program		Third Year of Program		Group Effect	Time Effect	Group x Time Effect
	M	SD	M	SD	M	SD	M	SD	(1,67)	(3,65)	(3,65)
State Hospital Days (long term care)											
ACT	11.05	44.31	8.62	36.43	15.00	66.86	28.51	87.77	5.71*	3.40*	3.05*
Comparison	19.47	58.31	56.30	120.07	83.27	137.46	83.63	147.21			
Local Hospital Days (short term care)											
ACT	32.13	34.87	21.49	28.86	24.26	35.13	9.31	16.77	6.03*	5.35**	1.59
Comparison	16.97	25.44	11.83	22.22	11.90	23.07	8.90	17.71			
Inpatient Night Care Days											
ACT	7.59	12.34	8.00	11.19	8.59	13.11	11.87	17.25	8.96**	1.36	.98
Comparison	5.73	9.48	1.33	2.82	3.50	10.83	3.87	7.45			

* $p<.05$; ** $p<.01$; *** $p<.001$

Table 8

Total Costs for the ACT Group (n=39) and the Comparison Group (n=30) for State Hospitals (long term care), Local Hospitals (short term care), and Inpatient Night Care

Variable Group	Assessment Time			Total Costs Over Three Years
	First Year of Program	Second Year of Program	Third Year of Program	
State Hospital (long term care) Costs				
ACT	$ 184,800.00	$ 321,750.00	$ 611,600.00	$1,118,150.00
Comparison	$ 928,950.00	$1,373,900.00	$1,379,950.00	$3,682,800.00
Local Hospital (short term care) Costs				
ACT	$ 393,022.00	$ 443,674.00	$ 170,247.00	$1,006,943.00
Comparison	$ 166,495.00	$ 167,433.00	$ 125,223.00	$ 459,151.00
Inpatient Night Care Costs				
ACT	$ 51,355.20	$ 55,141.00	$ 76,209.80	$ 182,706.00
Comparison	$ 6,584.00	$ 17,283.00	$ 19,093.60	$ 42,960.60
Total Hospital Costs				
ACT	$ 629,177.20	$ 820,565.00	$ 858,056.80	$2,307,799.00
Comparison	$1,102,029.00	$1,558,616.00	$1,524,266.60	$4,184,911.60

Table 9

Means (and Standard Deviations) for the ACT Group and the Comparison Group on Number of In-Person Emergency Service Contacts

Variable Group	Assessment Time								F-tests		
	Pre-Program Year		First Year of Program		Second Year of Program		Third Year of Program		Group Effect	Time Effect	Group x Time Effect
	M	SD	M	SD	M	SD	M	SD	(1,67)	(3,65)	(3,65)
Emergency Service Contacts											
ACT	5.56	5.53	1.72	2.28	1.33	2.03	.80	.95	.34	7.90***	5.66**
Comparison	2.17	3.40	2.50	5.09	1.53	1.98	1.93	2.21			

**$p < .01$; ***$p < .001$

Table 10

Means (and Standard Deviations) for the ACT Group and the Comparison Group on Number of Intensive Helping Services and Skill Training and Follow-Up Services

Variable Group	Assessment Time								F-tests		
	Pre-Program Year		First Year of Program		Second Year of Program		Third Year of Program		Group Effect	Time Effect	Group x Time Effect
	M	SD	M	SD	M	SD	M	SD	(1,67)	(3,65)	(3,65)
Intensive Helping Services											
ACT	24.18	16.70	103.28	48.42	70.05	31.03	31.31	22.88	18.57***	31.8***	34.1***
Comparison	28.40	28.37	28.50	28.71	32.47	34.78	34.50	33.56			
Skill Training and Follow-Up Services											
ACT	11.03	39.69	48.64	93.50	39.13	64.29	41.77	46.52	1.19	7.64***	1.47
Comparison	10.47	31.26	19.67	71.76	23.37	82.54	29.17	62.35			

* $p<.05$; ** $p<.01$; *** $p<.001$

Table 11

Standardized Regression Coefficients (betas) for Community-Based Services Variables Predicting Hospital and In-Person Emergency Service Utilization for ACT Members Over Three Years (n=39)

Community-Based Services Variables	Hospital and In-Person Emergency Service Utilization Variables						
	State Hospital (long term care)		Local Hospital (short term care)		Inpatient Night Care		In-Person Emergency Service
	Admissions	Days	Admissions	Days	Admissions	Days	Contacts
Intensive Helping Services	-.18	-.34	.16	-.21	.50*	.49*	.29
Skill Training and Follow-Up Services	-.17	-.22	-.11	-.34	.04	-.05	.05
Equation Total R^2	.05	.13	.04	.13	.24*	.25*	.08

*$p < .01$

LIST OF REFERENCES

LIST OF REFERENCES

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