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Policy Implications of Assertive Community Treatment Research  
and  
A Four-year Cost Analysis on a Capitated Assertive Community Treatment  
Program

By

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# Policy implications of assertive community treatment research

## 1.0 Introduction

Assertive community treatment (ACT) evolved out of the recognition by Mary Ann Test, PhD and Leonard Stein, MD that successful treatment and integration of people suffering severe and persistent mental illness (SPMI) in the community required that the elements of quality hospital care were brought to the patient in his or her living situation. Its construction was intended to address the "revolving door" that patients with mental illness commonly experienced, where patients oscillated between inpatient and outpatient psychiatric care without appreciable gains. Thus, ACT was originally designed to facilitate successful transition from acute episodes of psychiatric and functional decomposition towards comprehensive, community-based rehabilitation. In the 1970s, this ideology was realized into practice when Test and Stein developed the first such community-based alternative to inpatient psychiatric care (Stein, LI and Test, MA, 1980).

ACT is an intensive model of mental health case management delivered by a multidisciplinary team of professionals consisting of, at minimum, a psychiatrist, a nurse, a social worker, and a rehabilitation specialist. Most also have vocational rehabilitation counselors and substance abuse counselors. Traditionally, the most important tenets of the ACT model include a low patient to staff ratio of 10:1, 24-hour availability to the consumer, sharing of caseloads across ACT staff, integrated services of which a substantial majority are delivered in the community and directly by the ACT team, time-unlimited services, and active family inclusion in the rehabilitation process. There is currently debate on some of the functionally important tenants of ACT, though active research and collaboration has led to several fidelity scales and manuals of ACT research (McGrew, JH and Bond, GR, 1995; Teague, GB, Bond, GR, and Drake, RE, 1998; Allness, DJ and Knoedler, WH, 1998).

ACT proved to be an efficacious treatment mode with costs that were comparable to hospital-based psychiatric care (Weisbrod, BA, Test, MA, and Stein, LI, 1980; Test, MA and Stein, LI,

1980;Weisbrod, BA, Test, MA, and Stein, LI, 1980). The success sparked the launch of numerous other ACT and ACT-like programs, as well as research on ACT. Indeed, it is the most extensively studied case management model of care for people with SPMI(Mueser, KT, Bond, GR, Drake, RE *et al*, 1998).

Today, ACT is recommended for individuals suffering SPMI at high risk for hospitalization or have been difficult to engage in other types of services due to ACT's high cost and lack of adequate experimental evidence demonstrating efficacy with lower risk patients (Lehman, AF and Steinwachs, DM, 1998). These recommendations also suggest targeting people suffering schizophrenia and who are at high risk for discontinuation of treatment or for repeated crises. An estimate of the proportion of schizophrenics that received ACT services was attempted, but was not successfully determined (Lehman, AF and Steinwachs, DM, 1998).

### *1.1 Reviewing ACT Effectiveness*

Two of the earlier reviews on ACT studies (Olfson, M, 1990;Hargreaves, W and Shumway, M, 1989)revisited the original Stein & Test papers as well as some of the earlier replications of the ACT model. In terms of costs and hospital use, they pointed to the observation that programs yielded cost neutrality overall, though tests of significance were not always reported. These ACT programs realized their cost-shifting most significantly through reducing hospital utilization. Breaking down the cost sometimes uncovered the more expensive nature of direct costs for the experimental over the control groups. This was usually offset by more favorable indirect costs incurred by the ACT group. In terms of clinical outcomes, the reviewers note that the effects on symptomatology were mixed while the effects on subjective quality of life were generally not seen to be advantageous over comparison conditions. However, all of these earlier studies that evaluated patient satisfaction with their services found ACT clients to be significantly happier with their care than control clients. The consistency of the findings is quite noteworthy given that there were a number of methodological flaws within studies and variability in methodological implementation between studies. In sum, both reviews agree that ACT is an effective alternative to hospital-based care.

Four subsequent qualitative reviews on ACT research are in general agreement on the overall effectiveness of ACT interventions with some minor differences in interpretation. The Schizophrenia PORT recommendations for ACT are mainly derived from a review by Scott & Dixon (Scott, JE and Dixon, LB, 1995) which reviewed seven previous review articles and three additional ACT studies not included in those appraisals. Burns & Santos reviewed the results of 8 randomized clinical trials of ACT published between 1990 and 1994 (Burns, BJ and Santos, AB, 1995). Mueser *et al* published a paper on the research of case management centering on a qualitative review of ACT and intensive case management (ICM) research, since these two modalities were the best studied (Mueser, KT, Bond, GR, Drake, RE, and Resnick, SG, 1998). 44 studies on ACT were reviewed employing 11 outcome domains for comparison. The newest review by Bond *et al* summarized previous reviews as well as including expert insight (Bond, GR, Drake, RE, Mueser, KT *et al*, 2001). All confirmed the consistent finding that ACT reduces psychiatric hospital use while increasing housing stability and community integration, outcomes that are highly correlated with each other. There were also no findings of negative outcomes due to ACT intervention. The two reviews that looked at quality of life found only a moderate improvement in this domain, due to the mixed findings (Mueser, KT, Bond, GR, Drake, RE, and Resnick, SG, 1998; Bond, GR, Drake, RE, Mueser, KT, and Latimer, E, 2001). Clearer findings would have been likely given more accurate measurement in change in quality of life and a greater number of studies evaluating quality of life as an outcome. The reviews of symptomatology findings were mixed. The Bond *et al* and Mueser *et al* reviews concluded that there is a positive, though not strong, effect of ACT on symptomatology. The Burns & Santos review found that clinical gains were not convincingly demonstrated while the Scott & Dixon review made a stronger claim that there was evidence that ACT programs have a positive effect on symptomatology. Aside from the Scott & Dixon review, which concluded that there was evidence of gains in social functioning, the other three felt that social functioning is only marginally affected. The effects of ACT on employment and substance abuse were determined to be unclear given the few studies assessing this domain according to the Burns & Santos and



the Mueser *et al* review. However, the literature suggests that an intensive vocational component would be necessary to make any significant gains in employment outcomes.

### **1.2 Policy Context of ACT**

There is substantial pressure to keep health care costs down. US mental health expenditures were in excess of \$69 billion in 1996 with approximately 53% of the burden on the federal, state, and local governments ( 1999). Due to factors that prevent market forces from adequately providing services at a reasonable rate (product knowledge asymmetry, repercussions of the service that affects society, and access inequity), these governmental programs must provide coverage for the majority of the costliest and most severely ill persons suffering mental disease. And now with the major shift in Medicaid towards managed care, benefits for acute care, substance abuse services, and even outpatient visits are being restricted. This is particularly troubling when considering the literature suggesting that less educated, poorer patients experience considerable hardship with bureaucratic red tape(Mechanic, D, 1999). Thus, functional and comprehensive mental health policy is needed. In this light, ACT appears to be a suitable mitigating intervention that may not only ease the difficulties of organizational hurdles, but also provide outreach to certain high-risk populations to make available mental health services. From a policy standpoint, the question is how to bring forward the findings from the research into the policy arena. Policy makers need to be informed of the costs involved and the aspects of implementation that will make ACT an effective alternative in rehabilitating their community's severely mentally ill.

### **2.0 Analysis of Cost**

Given the intensity in which ACT services are performed, it is not surprising that in exchange for its benefits the ACT model is costly. For policy makers, the question is: Is ACT less costly or more cost-effective than current standard care? There is a resource allocation consideration in justifying the costs of ACT services for this small, but expensive subset of mental health service

users. How are policy makers to know if their ACT program has a fiscal advantage over standard care or how past research informs their local ACT program?

## 2.1 *The Cost Analysis*

In the health care field, cost refers to the value of resources consumed and opportunities forgone due to mental illness. This includes direct costs, which are incurred in the treatment and service provision of the illness, and indirect costs, which are resources lost due to the illness, such as lost work days or funds by family members. The distinction between the two is not set in stone, but is usually dictated by the context, such as in a risk contract.

While a cost analysis focuses on the experimental intervention's impact on costs and service utilization, a cost-effectiveness study evaluates the relative cost and change in outcome of one intervention compared to another and yields a cost-effectiveness ratio to help in this assessment. Briefly, the cost-effectiveness ratio is given as:

$$\frac{(\text{experimental treatment cost} - \text{comparison intervention cost})}{(\text{outcome change with experimental treatment} - \text{outcome change with comparison intervention})}$$

Thus, the cost-effectiveness ratio is expressed as the estimated average cost for a gain (or loss) of one unit of the outcome measure resulting from the intervention of interest. When a treatment is cheaper and yields a better outcome it is termed the "dominant choice," with clear policy implications. When there is an ambiguous choice between treatments, a cost-effectiveness ratio can aid in the evaluation, though the relative importance and value of the improvements (or deteriorations) in outcomes are left for the policy makers.

Since sample characteristics, such as demographics, severity of illness, and trial site, may not always be comparable between an experimental and comparison subject, these sources of variation in cost are adequately dealt with using regression models with cost as the dependent variable and while controlling for these various sample characteristics. Assumptions that these regression models are based upon can also be tested with sensitivity analyses to determine the robustness of findings (Hargreaves, W, Shumway, M, Hu, TW *et al*, 1998).

Though the process may be technical and theoretically demanding, cost-effectiveness studies can be very practical and informative for decision makers interested in the costs of alternative interventions in relation to their real-life effects on particular health and socially related outcomes. It can aid in formulating fiscal and program policy and in introducing new and potentially superior interventions. Criticisms of cost-outcome analyses include its byproduct of focusing on economic efficiency, its attempts at placing monetary values where inappropriate (Weisbrod, BA, 1983), and the lack of standard, complete, and practical methodology for feasible execution (Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998).

## *2.2 Reviews on the Cost-Effectiveness of ACT*

A comprehensive review by Bond *et al* gives an overview of the more recent research and a recent review paper on cost-effectiveness of ACT programs (Bond, GR, Drake, RE, Mueser, KT, and Latimer, E, 2001). The authors note that the decrease in hospital use consistently experienced in ACT programs is so substantial that it offsets these costs. ACT's lower costs over other mental health services is attributed to the demonstrated reduction in hospital use, although the authors caution comparison between studies since the way in which costs were measured and the comprehensiveness of the costs analyses were not always similar. The review also cites some cost-effectiveness studies that obtain 'a unit of clinical effectiveness between ACT and an alternative.' In general, ACT has been found to be more cost-effective, though statistical significance is not always reached. Nevertheless, the authors claim that "ACT services are justified from an economic point of view to the extent that they generate more benefits per dollar than alternative programs: it would be setting too high a standard, in relation to other health and social services, to require that the cost of ACT services be completely compensated by a reduction in other costs." They also assert that this economic characteristic of ACT services should be stressed since the overall mental health trend is towards less hospitalization, possibly compromising the cost neutrality of ACT programs.

A timely review of the literature on the economic impact of ACT programs by Eric Latimer compared and aggregated the results of 19 randomized and 15 non-randomized trials that

evaluated economic outcomes of ACT implementation (Latimer, E, 1999). Almost all of the studies showed that the ACT intervention was less costly or of comparable cost to a comparison intervention. However, the differences among the studies make it difficult to give a prediction of how much ACT programs should cost. The author concluded that the impact of ACT on housing costs and outpatient services is unclear, while the effect on emergency room use is marginal. Also, regression models using 5 variables (study design, comparison condition, ACT fidelity, prior hospital use, and follow-up duration) extracted from research reports were employed to predict the percentage reduction in hospitalizations. The final model predicted that a high-fidelity ACT program could reduce hospitalizations by 58% over a year if the usual care alternative is a case management intervention and by 78% if the alternative intervention is even less coordinated than standard case management. Using the estimated cost of ACT services in Quebec and the results of the regression analysis, Latimer noted that for ACT programs to break even, they need to target clients with high use of and at high risk for hospitalization.

### ***2.3 5 Criteria for a Compelling ACT Cost Analysis***

Through which lenses does one view a cost analysis? A classic economic perspective would view a program in terms of a bottom line, placing values on costs and benefits. A social welfare perspective would also serve to inform decision makers of the larger impact ACT might have on the criminal justice system, family burden, or productivity. A statistician would examine the methodological soundness of the analysis. Simple and concise criteria for policy makers are needed to make judging cost analyses easier. I propose 5 criteria that guide a policy maker through a methodological review of ACT cost analyses. The following criteria are not comprehensive, but complete enough to make a cost analysis interpretable for decision makers.

**2.3.1 CRITERION #1** – The study should incorporate at least 3 years of follow-up cost data and 1 year of baseline cost data.

Though program and research goals dictate the sufficient time frame, studies determining ACT's effects on cost should have approximately 3 years of follow-up with discounting in mind. There

are already a good number of studies that involve a shorter time frame, but few that characterize the long-term pecuniary effects that would be helpful to decision makers that believe in thinking longitudinally. For instance, since there is inconclusive evidence on the effects of time-unlimited delivery of ACT on clients, studies with longer time frames would provide an insight into the fiscal consequences of decisions to provide ACT over several years. In one of New Hampshire's ACT programs targeting dually diagnosed patients, cost-effectiveness was not found until after three years of follow-up (Clark, RE, Teague, GB, Ricketts, SK *et al*, 1998). The longer time frame would not only benefit the cost analysis, but also the assessments of changes in expected outcome areas, especially in the domains of social functioning (Taube, CA, Morlock, L, Burns, BJ *et al*, 1990).

Not only are there policy implications, but also there are methodological grounds for performing cost analyses with longer time frames. First, analyses of longer follow-up periods allow for characterization of program maturation and its impact on costs and outcomes (Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998). Some recommend that cost analyses should account for 6 months of start up time for ACT programs (Taube, CA, Morlock, L, Burns, BJ, and Santos, AB, 1990). Second, more extensive follow-up cost data will allow for aggregation over more data points to decrease the skewness of distributions and increase the power, especially in repeated-measure analyses. Finally, the effects of external influences on costs, like policy changes, are spread out over time. In fact, documentation of policy changes during the study should be noted so that the effects of ACT on costs and outcomes are better characterized and not mistaken for policy effects (Burns, BJ, 1998;McHugo, GJ, Hargreaves, W, Drake, RE *et al*, 1998). For example, the recession occurring at the time and an attempt to save the California mental health system motivated the enactment of the California State-Local Program Realignment Act in 1991. It replaced the state general fund appropriation for mental health funding for a funding scheme that gave counties a percent of the state sales tax and the state vehicle license fee collected. It caused a shift in control over public mental health funds from the state to the counties, giving counties fiscal authority to allocate mental health resources as they saw fit. This created an incentive to distribute more mental health services from the hospitals to

the community. In an environment where hospitalization is discouraged, the cost-effectiveness of ACT programs would be altered.

One year of baseline costs and utilization data should be incorporated into a cost analysis. Characterization of pre-treatment costs and service utilization can reduce regression to the mean artifacts (McHugo, GJ, Hargreaves, W, Drake, RE, Clark, RE, Xie, H, Bond, GR, and Burns, BJ, 1998; Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998). There are statistical and clinical regressions to the mean. In the context of cost analyses, statistical regression to the mean is due to unreliable measures and selection criteria that choose subjects into a study based upon extreme costs. However, these extreme costs are due to natural variation and are expected to decrease back to the mean for that individual, regardless of any intervention. Clinical regression to the mean is a true decrease in severity of illness over time expected of any individual that is at a very sick point in their illness. Baseline costs and utilization data would also allow for better characterization of subjects to see how experimental and comparison subjects differed and to provide information on the intervention affected use of resources.

### **2.3.2 CRITERION #2 – A cost analysis should have an adequately large sample size.**

Adequate sample size in cost analyses and cost-effectiveness studies is an important issue. Too small a sample size will result in decreased sensitivity (lower power) to detect differences in cost between separate groups. Cost-effectiveness studies may have sample sizes with adequate power to detect differences in clinical outcomes, but inadequate power to detect comparable differences in the cost aspect of the trial. Clinical outcomes usually have variance of lower magnitude compared to the higher variance and right-skewed distribution usually present in cost data owing to the presence to high-cost outliers. The ideal sample size would give an 80% chance of finding a true difference between interventions (power=0.80) while keeping the keeping the cut off point for the probability that the difference is not due to chance at 5% ( $\alpha=0.05$ ). However, estimating appropriate sample sizes with power calculations is mired in a lack of available data on the expected variation or distributional shape of various cost data. In the least, Gray *et al* recommend log-transforming the cost data in handling skewed data with high

variance(Gray, AM, Marshall, M, Lockwood, A *et al*, 1997). This does not improve power, but brings the distribution of the residuals closer to the normal distribution assumed in statistical tests.

Hargreaves *et al* also recommend Monte Carlo methods (or Bootstrap methods), where the experimental subjects and the controls are “re-randomized” to the treatment or control condition. The analysis is run again and an F-value is obtained. This process is reiterated many times (on the order of 10,000) each producing a new F value for each of the tests. The distribution of this large set of F values for each test is then examined in percentile form to determine where the F-value from the actual analysis (when patient treatment assignment is correctly labeled) falls. Thus if the true F is at the 95th percentile of the F distribution, it is significant at  $P=.05$ , while if it is at the 99.9 percentile then it is significant at  $P=.001$ . This approach to assessing significance makes no assumptions about the sampling distribution of F values, but instead estimates the sampling distribution from the distribution of the observed data (Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998;Hargreaves, W, 2001).

Related to the statistical importance of sample size, tests of significance should be included for all quantitative comparisons and attrition should be noted and explored for sources of systematic bias that would compromise internal and external validity.

### **2.3.3 CRITERION #3 – The study should include a control group or comparison condition.**

For researchers and decision makers alike, it is the effect of ACT on cost that is relevant in cost analyses and cost-effectiveness studies. However, many other factors, like demographics and policy shifts, contribute to changes in cost and outcomes even when accounting for as many independent variables as possible. The conventional way to deal with all the extraneous factors is to include in the analysis a comparison group that has the same exposure to these outside factors as the experimental group. This way one can be more confident that the observed outcomes are a result of the intervention, rather than something else. In this light, it can be seen why before vs. after treatment-type studies (with no comparison group) are suspect.

Randomization resolves most issues of confounding by external factors if it is implemented properly (separation of recruitment from randomization, adjustment for attrition bias, intent-to-treat analysis). If randomization were not performed, the equivalence of the comparison group should be compared at baseline with sample characteristics ranked in importance according to its estimated relevance to the treatments and outcomes of interest (Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998).

Furthermore, the control or comparison condition should be well defined (Frank, RG, 1993). It is more helpful for decision makers to compare ACT services with available mental health services, such as standard case management, since the question is usually which alternative to use (Taube, CA, Morlock, L, Burns, BJ, and Santos, AB, 1990;Essock, SM, Drake, RE, and Burns, BJ, 1998).

**2.3.4 CRITERION #4 – The analysis should include direct costs comprehensively.**

An appropriate analysis of costs, conceptually divided into direct and indirect costs, for public mental health clients includes a consideration of all resources used, not just mental health treatment services. This is because of the nature of severe mental illness, in which the disability spans beyond mental health care and into other social domains, such as community services, housing, employment, and law enforcement. With the institution of alternative mental health programs and policies cost shifting may occur from one payer to another (Taube, CA, Morlock, L, Burns, BJ, and Santos, AB, 1990;Burns, BJ, 1998;Frank, RG, McGuire, TG, and Newhouse, JP, 1995;Weisbrod, BA, 1983). It is therefore important to comprehensively monitor service utilization and their costs since Medicaid may be paying for a one type of service while the county may be paying for another. Shifts from one to the other may have significant implications in ACT implementation and financing.

The types of direct costs to include depend on the specific goals of the study and the expenditures that are more meaningful in characterizing the resources used in the care for ACT clients. For studies assessing the cost effects of ACT programs, the following direct costs should



be measured: mental health treatment costs, maintenance costs, medical care costs (Taube, CA, Morlock, L, Burns, BJ, and Santos, AB, 1990;Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998). I am defining direct costs as those expenditures incurred by clients for mental health services and expenditures for which the provider is responsible. Available mental health treatments vary somewhat between mental health systems and even by ACT programs, but usually include inpatient care, emergency services, skilled nursing care, residential and day treatment, case management, outpatient therapy, substance abuse treatment, and vocational rehabilitation. Another important mental health treatment expenditure is medication costs. They are becoming an increasingly important component of treatment, representing 9% of the \$69 billion spent on mental health care in 1996 ( 1999). Maintenance costs represent personal expenditure of resources for sustenance, housing, and clothing. The details of how best to gather and estimate these costs are not the scope of this paper. The reader is referred to other works detailing the methods for utilization data collection (Hargreaves, W, Shumway, M, Hu, TW, and Cuffel, B, 1998;Weisbrod, BA, 1983;Wolff, N, Helminiak, TW, and Diamond, RJ, 1995).

Note that direct costs as defined above do not include social service costs and criminal justice costs, which are traditionally regarded as direct costs. This distinction is important in clearly identifying cost shifts, since these services are usually provided by separate public entities with funding incompletely associated with the funding for mental health services.

### **2.3.5 CRITERION #5 – The analysis should include indirect costs.**

In an ACT cost analysis, the most relevant indirect costs include social services costs, time and productivity costs, costs of family burden, civil commitment and criminal justice costs. These are costs most impacted by severe mental illness and involved in cost shifting.

Social services costs include the value of homeless shelter stays, food programs, and money management programs. Time and productivity costs refer mainly to the value of productive time lost by the patient or family members due to illness. Family burden costs refer to the money and value of resources family members use towards the support and treatment of the patient. Civil

commitment and criminal justice costs include the cost of law enforcement interventions, correctional facility stays, legal services, and judicial services.

Table 1 shows 11 ACT studies evaluating the cost of ACT. The table characterizes the studies by the 5 criteria above. Only two studies had three years of follow-up cost data with only one of these using a randomized design in the analysis. Sample sizes were generally lower than 100 in a cohort. This most likely does not give the studies enough power to detect differences in cost. Most of the studies had a controlled, randomized design and most of the newer trials included do not incorporate indirect costs. Five of the studies demonstrated cost-neutrality or cost-effectiveness and five did not.

Though not a cost-effectiveness study, the paper by Wolff *et al* was included to provide an exceptional example of how detailed direct and indirect cost data collection can be for an ACT program. However, without a comparison group and baseline data, the cost of ACT reported has limited utility in assessing the fiscal effects of ACT.

### **3.0 ACT Financing Schemes**

Even if decision makers and researchers deem ACT cost-effective, both the cost and outcome advantages could be lost to poor financing schemes. So the question shifts to: How should ACT be financed for best implementation?

Currently, almost all ACT programs are publicly funded through Medicaid, state, county, or municipal funds(Clark, RE, 1997). Private insurers have shied away from offering ACT services due to the high costs expected of this intervention, the inability of the typical beneficiary to contribute to premiums or co-pays, and the administrative complexity, incompatibility, and uncertainty of reimbursing these services. Furthermore, the cost-effectiveness of ACT is usually not realized in the short-term, but over months to years, and there are few incentives for private insurers to entertain long-term responsibility for severely ill and historically high-cost patients. This style of “dumping” leaves the public sector to put ACT programs into operation. However, ACT services are now becoming more commonly purchased from private providers as it may be

easier to contract out to an existing mental health provider, rather than starting up a new ACT program (Clark, RE, 1997) (Frank, RG, McGuire, TG, and Newhouse, JP, 1995). In negotiating for the care of their SPMI population, many public health agencies have employed risk contracts.

### *3.1 Risk Contracts*

Risk contracting for mental health care involves forming an agreement between a provider and a purchaser of mental health services where the provider not only provides mental health services, but also bears a degree of financial risk. In the case of ACT programs, a county mental health department may want to cover SPMI clients by purchasing ACT services from a private, non-profit mental health services provider. However, the health department would not provide all the resources the agency might use to care for these clients. Instead, there is an agreement as to the limits on what is paid for by the county and how much.

Risk contracts are used because they can control costs and influence the access to and the effectiveness of mental health services. They do this through several mechanisms, including setting capitation rates, allotting a designated amount to care for the target population, and by creating competition among potential vendors to provide care for a preset group of beneficiaries, rather than having health plans compete to attract enrollees (Frank, RG, McGuire, TG, and Newhouse, JP, 1995). However, the main “risk” involved refers to the expected costs of care on the basis of patients’ clinical characteristics. It addresses resource consumption more so than clinical outcomes, such as death rates or quality of care.

If ACT is to be implemented, what should the financing scheme look like such that services are delivered efficiently while not creating perverse incentives that would compromise effectiveness? The manner in which mental health programs are reimbursed is tightly linked to the service utilization behaviors that are ultimately exhibited, especially if ACT services are contracted out. This is of utmost relevance in implementing ACT programs. The struggle to contain costs while providing effective, accessible services to the severely mentally ill requires a policy that is sensitive to how financial incentives work synergistically and antagonistically with the ACT model

in achieving the desired goals. Reimbursement approaches and incentives should be consistent with mental health program models. This is not always feasible to accomplish since funding can originate from various sectors of government and within these sectors, from separate programs with different goals.

Three broad types of financial strategies are discussed here: retrospective reimbursement, prospective reimbursement, and under the category of prospective reimbursement, partial capitation.

Retrospective reimbursement takes the form of fee-for-service payments. This has been the typical Medicaid reimbursement scheme for case management services, where case managers bill for direct contacts with clients. Certain types of services are counted as reimbursable, while others are not, creating an incentive to provide only those services that will bring in revenue. Several ACT programs in Wisconsin, Delaware, Rhode Island, and New Hampshire have been funded in this manner (Clark, RE, 1997). The payment schedule should be redefined for compatibility with ACT and for creating specific incentives in service provision since most fee-for-service reimbursement systems would not support the ACT model without modification.

There are problems with a retrospective payment scheme that can undermine successful ACT performance. Since payment is given for each service provided, there is an incentive to see compliant clients more than "difficult" clients. This may lead to neglecting the needs of some clients while making contacts with overserved clients that are not clinically meaningful, possibly to the point of cost inflation and dependence on the part of overserved clients on providers. There is also an incentive to provide services with direct contact with the client over indirect services (like linkage to or contact with other community services or benefit programs). In a randomized study comparing intensive case management with a fee-for-service versus a partially capitated reimbursement scheme, case managers of the fee-for-service program gave less indirect contacts and their clients had an increase in unmet needs for intensive case management services in comparison to the capitated program (Shern, DL, Donahue, SA, Felton, C *et al*, 1995). Retrospective payment schemes also pose a potent risk of unintended consequences that may

shift the focus of service delivery excessively so as to neglect other domains of client needs. Fee-for-service financing schemes have this potential because they work by creating targeted incentives, singling out one aspect of treatment through differential reimbursement (Clark, RE, 1997).

Prospective reimbursement schemes, in contrast, use broad incentives in influencing clinical and fiscal provider behavior. The most typical form of prospective schemes is capitation, in which a purchaser gives a provider a set amount to cover all the specified health care for a beneficiary. There is an incentive for efficiency as the provider is at risk for any expenditure above the capitation rate. In a pure capitation contract, all financial risk rests with the contracted provider. However, the contracted provider would have a higher degree of flexibility and could invoke more creativity in service provision since the purchaser gives up some control over the decisions made for individual clients. Because a prearranged amount is set per beneficiary, the total expected costs for a certain population is fairly well known compared to retrospective schemes. This is advantageous for decision makers in allocating resources because it fixes maximum liability for the purchaser and it provides a degree of confidence that their SPMI population has available funds for their care.

Capitation of ACT programs is interesting in lieu of the initially observed trends that capitated plans generally enroll healthier, less costly beneficiaries and have incentives to undertreat. As this was occurring with capitated Medicare insurance plans, the 1997 Balanced Budget Act sought to reduce this "cherry picking" through risk adjustment. In other words, the capitation payments would be based upon the health status of beneficiaries. However, this type of plan is not without its ironies. The regression models to predict cost would use the historical costs of care for patients of varying diagnoses. These costs would come from fee-for-service data as this is the most complete data available. Since conditions requiring hospitalizations are more expensive, there would be a financial penalty on those plans that provide quality outpatient care (Iezzoni, LI and Ayanian, JZ, 1998). Probably the most important decision that has to be made in designing capitation contracts is setting the capitation rate (the two examples below illustrate the

influence capitation rates have on program cost-effectiveness). As mentioned before, ACT programs typically focus on very expensive patients with their costs varying considerably. One would not be able to confidently assume that low cost patients would adequately cover the costs of more expensive patients. If a capitation rate is too low, ACT programs might use "quick fixes" to bring down immediate costs, such as relying on respite care or disenrolling high-cost clients. This is usually at the expense of longitudinal goals, like rehabilitation. Just as in fee-for-service funded programs, capitated ACT programs are prone to the influence of financial incentives. The flexibility in capitated service delivery may take the form of decreased fidelity to the ACT model if the provider finds a financial advantage in doing so.

The suggested remedies for restrictive capitation schemes include risk, in which capitation payments are based on outpatient as well as inpatient diagnoses to account for multiple illnesses; use of "partial capitation," which combines aspects of capitation payments as well as fee-for-service concepts; and service requirements, such as minimum requisite numbers of particular services. I will focus on partial capitation.

Partial capitation, also known as "soft capitation," has become a very popular risk contracting strategy to publicly fund ACT services (Clark, RE, 1997; Shern, DL, Donahue, SA, Felton, C, Joseph, GR, and Brier, N, 1995; Frank, RG, McGuire, TG, and Newhouse, JP, 1995). It particularly benefits newer, smaller, and rural-based health plans and it encourages more complete submission of claims (Iezzoni, LI and Ayanian, JZ, 1998). In partial capitation, the risk is shared between the ACT provider and the purchaser. In some partial capitation contracts, the ACT provider is responsible for the majority of services while the purchaser is liable for the other services (like medication or inpatient services). The former is usually the prospective component of the contract while the latter is usually the retrospective component. Other capitation contracts may also designate a cut-off dollar amount, above which the purchaser becomes liable for health care expenditures, while another cut-off amount is set below which the contracted provider must return these revenues to the purchaser. Thus, profits are limited in exchange for risk buffering. Cheaper bids can be elicited with this type of scheme in a competitive procurement process since

the providers know they are not at full risk. This can result in even greater cost savings (or less financial loss) for the public agency purchasing ACT services.

Four ACT-style programs that have employed partial capitation are reviewed here: the Los Angeles PARTNERS program (Young, AS, Sullivan, G, Murata, D *et al*, 1998;Kapur, K, Young, AS, Murata, D *et al*, 1999;Kapur, K, Young, AS, and Murata, D, 2000), the Village and Stanislaus Integrated Service Agencies (Chandler, D, Hu, TW, Meisel, J *et al*, 1997;Chandler, D, Meisel, J, Hu, TW *et al*, 1997), and the Alameda county STRIDES program (Chandler, D, Spicer, G, Wagner, M *et al*, 1999).

The Los Angeles PARTNERS (People Achieving Rehabilitation Together Need Empowering Respectful Support) program was implemented to provide care for costly, publicly funded, severely mentally ill individuals. The funding for 200 hospital beds (total budget of \$9 million) was taken to pilot the PARTNERS initiative and cover 500 of the 15% most expensive adult users of Los Angeles County Department of Mental Health (LACDMH) funded services.

LACDMH contracted with 6 nonprofit community organizations to cover mental and medical health care, dental care, housing, social and vocational rehabilitation, 24-hour crisis response, transportation, and substance abuse treatment for 50 to 100 clients (either directly or through subcontracting). Thus, each community organization was called an integrated service agency (ISA) under the PARTNERS initiative.

The LACDMH paid a capitation rate to the ISAs ranging from \$14,000 to \$21,000 per patient annually for their services. Though the ISAs were financially responsible for all institutional, crisis, and outpatient services in the county, they were not financially responsible for pharmaceuticals and acute hospitalizations paid for by fee-for-service Medicaid, Medicare, or private insurance.

The same proportion of "very high cost," "high cost," and "moderate cost" clients (based on historical costs) were assigned to each ISA without risk adjustment. The agencies had the authority to disenroll clients they felt were unsuitable for community treatment. The client could

also refuse to participate in the program since enrollment was voluntary. In this case, another client of the same cost band would replace the disenrolled client.

Of the 1,561 patients enrolled in the PARTNERS program during the first year of program implementation, 1,188 were disenrolled (76.1%). The rate of disenrollment was higher than the rate at which the county could assign replacement clients. Direct observation and discussions with key informants suggested that many disenrollments were due to concerns that the agency did not have the capacity to provide for their clients while being at full financial risk with reimbursements well below prior treatment costs (continuously enrolled clients had a mean cost of \$26,300 in the 5 years prior to enrollment; disenrolled clients had a mean cost of \$34,600). The authors also noted that the ISAs were not large enough for high-cost clients to be counterbalanced by low-cost clients and that the capitation rate was set substantially lower than historical costs (Young, AS, Sullivan, G, Murata, D, Sturm, R, and Koegel, P, 1998).

The authors suggested that this high rate of disenrollment might have been reduced if capitation rates were adjusted for historical costs and severity of illness or if the county shared in the financial risk of the most costly clients. They recommended that clinical screening be incorporated into risk contracts in order to inform both the purchaser and provider of a client's severity of illness and appropriateness of a program for that individual. Furthermore, they suggested increased training and/or consultation for programs caring for severely ill patients. However, besides risk adjustment the studies did not directly test these recommendations.

The authors explored risk adjustment as a potential means to encourage providers to keep their high-cost patients rather than disenrolling them. If costs could be predicted fairly well with a regression model, use of risk adjustment in the contracts would provide confidence for the ISAs and the county in negotiating appropriate capitation rates while covering the most costly clients.

The best model, which included the greatest number explanatory variables, only explained 16.4% of the in-sample variability in costs and 10% of the projected out-of-sample variability in costs.

The theoretical maximum amount of variability that could be explained by this model was 34.5%.



Models excluding prior costs had inferior predictive value and the effect of diagnoses on future costs was found to be a blunt adjuster. In sum, the risk adjustment schemes had insufficient power to predict costs and would have been inadequate to use alone in setting capitation rates (Kapur, K, Young, AS, and Murata, D, 2000). The statistical models were also used to predict the effects of a blended payment scheme on disenrollment rates. It was predicted that a payment scheme with a fixed prospective component and a cost reimbursement component or one with a prospective component and a co-insurance reimbursement component would have little effect on disenrollment. However, there were limitations with the models above (inaccuracy, missing data, lack of optimal predictor variables) that may have affected reliability.

The mean annual costs and the cost distributions were analyzed before and after enrollment into the PARTNERS program without a comparison group. The researchers found that there was little change in mean annual costs after the implementation of the PARTNERS program for these mental health patients. However, there was an interesting shift in the distribution of the costs. The lower-cost patients increased in cost to the county while the high-cost patients dramatically decreased in cost regardless of MediCal eligibility. The government costs, defined as costs paid by the county and MediCal costs paid by the state and federal government, increased for those that were MediCal eligible (n=549). The authors suggest that this is evidence of some cost shifting from county costs to MediCal costs (Kapur, K, Young, AS, Murata, D, Sullivan, G, and Koegel, P, 1999).

The PARTNERS program was not the first attempt by California to adopt capitated ACT services. An earlier demonstration in the early 1990's also used capitation contracts to finance two ACT-style programs (also referred to as integrated service agencies), one called the Village ISA, located in Long Beach, and the other called the Stanislaus ISA (SISA). This demonstration was part of a randomized cost-outcome trial with control clients in each respective county randomly assigned to usual care (Chandler, D, Hu, TW, Meisel, J, McCowen, M, and Madison, K, 1997; Chandler, D, Meisel, J, Hu, TW, McGowen, M, and Madison, K, 1997).

Each provided for approximately 100 clients with a capitation rate of \$15,000 per year, though during the baseline year costs were \$5,040, \$9,100, and \$5870 for clients assigned to the Village ISA, SISA, and comparison group, respectively. Thus, unlike the PARTNERS program, these ACT programs were capitated well above historical costs. This capitation contract placed financial responsibility for all mental health services on the ISAs, but excluded substance abuse treatment costs and non-mental health costs. The ISAs were also exempt from some medication and inpatient costs, but the nature of this part of the contract was unclear. Also unlike the PARTNERS program and other ACT programs, historical costs and service utilization were not considered in study eligibility. Instead, clinical discretion and eligibility for public benefits were the main criteria in the selection process.

The average cost was \$19,200 for Village ISA clients and \$17,800 for SISA clients in the second year of program implementation. Their respective comparison clients had average costs of \$6,300 and \$8,100. Service utilization shifted from inpatient care towards rehabilitation services for both ISAs in comparison to the control conditions, though the Village ISA had a greater shift in the distribution of services. The ISAs were able to somewhat “level out” the distribution of resources used; initially, a small proportion of the group was using a very large part of the resources. However, at the SISA program there was a portion of low service users that received very little services. There was no significant difference in non-mental health costs between the ISAs and the control groups.

The ISAs were able to reduce hospital care, improve employment outcomes, and improve independent living in relation to the comparison groups, though the Village ISA had a significantly greater impact on employment outcomes than the SISA because it had a specialized vocational rehabilitation program. Though not significant, trends for better outcomes for ISAs were found in decreasing conservatorship use, reduced family burden, increased social support, and greater quality of life. No appreciable impacts were made in decreasing arrests, homelessness, criminal victimization, or in improving measures of self-esteem, symptomatology, or physical health.

Thus, the benefits in outcomes and service utilization from the ACT programs were achieved at a cost 2 to 3 times higher than usual care. Cost-effectiveness was not conclusively demonstrated because the capitation rate was set much higher than baseline costs. Thus, the incentives to save costs were rather blunt as were the incentives to provide more services to the lowest service users. The authors suggested a lower capitation rate and establishing minimum standards as remedies. Interestingly, the authors did not mention another obvious remedy, to select for high-cost clients. The flexibility created by the capitation scheme was demonstrated in the shift from inpatient care to rehabilitative services. Furthermore, the inclusion of targeted vocational programs produced superior outcomes for employment goals.

The STRIDES (Step Towards Recovery, Independence, Dignity, Empowerment, and Success) program was initiated in Alameda County, CA to pilot an ACT program and evaluate its cost effectiveness in a randomized trial (Chandler, D, Spicer, G, Wagner, M, and Hargreaves, W, 1999; Chandler, D and Spicer, G, 1 A.D.). The STRIDES program was assigned 30 public mental health clients while 30 other clients were assigned to usual services. All 60 were in a locked subacute facility (L-facility) at the time of assignment and were expected to remain there for at least 4 to 6 months longer. The only significant difference between these two cohorts involved prior state institutionalization; 67% of the ACT group had a history of state hospitalization versus 33% of the comparison group. As a marker for severity of illness, this would conservatively bias the ACT group as patients with state hospitalizations are generally more ill and incur greater mental health costs.

The county formed a partial capitation contract with the ACT program with a capitation rate of \$26,000 per person per year. The ACT team was to provide standard ACT services along with other mental health services used by their clients with this capitation rate. The STRIDES program provided most of the services themselves as opposed to contracting out certain services. The capitation terms were "soft" because the county paid for the first \$60,000 in emergency and inpatient costs. The ACT program was responsible for the next \$60,000 before the county would again become financially responsible for these services. However, for the next

three years of program implementation, the terms were changed so that responsibility for the initial \$500,000 of costs alternated between the ACT program and the county.

Historically, the ACT group had a baseline average cost of \$68,311 while controls averaged \$72,607 (no test of significance given). After four years of capitated services (not including the 4 months of start up), the ACT group averaged \$22,611 in mental health costs while the comparison group averaged \$33,822. However, the authors noted that from the perspective of the county, the net cost to the county is the total cost of ACT implementation minus the reimbursements for Medicaid. From this perspective, the ACT team cost the county \$11,035 per client while the control group cost \$25,682. No tests of significance were given.

The ACT clients left the L-facility more quickly and more completely as a group than the controls even after one year of capitated services. In effect, ACT clients spent seven times as many days in the community and had greater access to community services (both  $p < 0.0001$ ). There was no difference found in quality of life, satisfaction with services, or employment outcomes, though there was a trend for ACT clients to have better living arrangements. Interestingly, the ACT group was rated with lower ratings of functioning than the control group at 6 months, but then had significantly higher ratings by one year of capitated services. This suggests some transitional difficulty for ACT clients coming out of the L-facility and into the community so quickly.

Thus, overall cost savings were demonstrated mainly due to speedier transfer into the community and less institutional care for the ACT cohort. Though the lower power places limitations on generalizability and validity, the partial capitation scheme appeared to create the service flexibility and reduce risk, allowing for some gains in community tenure and functional status through ACT intervention.

#### **4.0 Time-limited ACT services**

Time-unlimited service is one of the tenants of the original PACT model. This precept originates from the early observations that discontinuation of PACT services after 14 months of enrollment led to status regression and rehospitalization within 14 months after services were

removed(Stein, LI and Test, MA, 1980). However, this arm of the study was uncontrolled so it cannot be certain that if community care were to continue, there would be status regression anyway. From a policy standpoint, cost containment and service availability are pressuring ACT services to be delivered in a time-limited fashion. Others have argued that time-unlimited delivery of ACT to some consumers can lead to dependence, contrary to the goals of ACT (Sherman, PS and Ryan, CS, 1998). Also, service in perpetuity leaves less capacity to care for other potential clients who are in great need of services. Even if we were to take the assumption that there is a subsample of consumers that are candidates for successful transfer out of ACT, we do not know what characteristics identify this subsample. When should ACT clients leave their intensive support for less intensive services? The few related studies looking at time-limited delivery of ACT do not give a conclusive answer, but their experiences do provide insight.

In time-limited delivery, clients are transferred to other available mental health service systems or a less intensive tier of ACT services, which ideally match to the needs of the client. Most studies on time-limited services have pointed to optimistic results of a time-limited delivery approach (Salyers, MP, Masterton, TW, Fekete, DM *et al*, 1998) (McRae, J, Higgins, M, Lycan, C *et al*, 1990; Sherman, PS and Ryan, CS, 1998; Dixon, LB, Krauss, N, Kernan, E *et al*, 1995; Rosenthal, RN, Miner, CR, and Hellerstein, DJ, 2000) although one study besides the original PACT study observed less than optimistic results after ceasing ACT services (Audini, B, Marks, M, Lawrence, RE *et al*, 1994).

Salyers *et al* retrospectively examined the records of 107 ACT clients receiving full ACT services before transferring to a step-down tier of less intensive services (Salyers, MP, Masterton, TW, Fekete, DM, Picone, JJ, and Bond, GR, 1998). The step-down group was compared to a nonequivalent control group of ACT clients that were engaged in the same full ACT program, but stayed in ACT because they did not meet the subjective criteria to be in the step-down program. Transfers to the less intensive program were based on the case-by-case clinical discretion of ACT providers after meeting an initial screening criterion (using approximately one visit per month from ACT providers). Factors influencing the decision of which clients were ready for step-down

transfer included lack of hospitalizations in the past year, housing stability, substance abuse status, and subjective evaluation of level of functioning.

There was no detectable deterioration of functioning due to the transfer. Neither group experienced a change in the number of hospital admissions, although the transfer group had a significant decrease in the number of hospital days, while the control group experienced a slight increase. The transfer group had a substantial drop in the hours of services per month while the control group had no significant change in service intensity.

Step-down clients who were retransferred back into standard ACT services due to increase in service utilization were also examined. In terms of predicting successful step-down clients, it was found that those with substance abuse tended to be retransferred and that level of functioning and hospital use were not related to likelihood of being retransferred back into ACT.

The authors recommended factors that they felt were essential to successful transfer from ACT. These factors were provider decision of transfer readiness on a case-by-case basis, continuity of care (e.g. interagency transfer, conservation of providers between intensive and step-down ACT teams, and continuity of the service model), gradual transfer, and communication between ACT and step-down teams. It is of note that the researchers did not randomize their sample nor did they test the recommendations given above. Thus, these recommendations may not be generalizable to all groups or even appropriate in all situations even though the researchers believe in their import.

Sherman and Ryan examined the effects of discontinuing ACT services on clients' acuity rating (Sherman, PS and Ryan, CS, 1998). This rating mainly encompassed level of function but also covered substance abuse, income, and housing status. Clients "graduated" from the program if they were rated as having high stability for six consecutive months. However, graduating from the ACT-like program did not mean cessation of services. Indeed, these persons still received some case management from their previous providers, and most simultaneously received outpatient services at community mental health centers. In a 29-month data collection period,

four of the 112 clients that attained graduation status were readmitted into the ACT-like program. This figure does not account for those who may have decompensated but did not come back to the program. Therefore, the 4% readmission rate, encouraging as it might be, cannot be interpreted with substantial confidence. The 29-month period in which there was data collection was vaguely defined and the 112 clients graduated within the time period of Nov. 1986-Apr. 1989, a 30-month time period. No spread of the graduation date distribution was given, so it is not clear if most of the clients "graduated" early (1986) or later (1989).

The second part of this study examined subsequent acuity ratings of those who did not "graduate," but were rated as having high stability for two consecutive assessments (rather than six). So although these clients did not "graduate" and although they were still receiving ACT, services they did reach a level of notable progress. Within the 29-month data collection period, 87 clients achieved this level of progress and they did so in an average time of 9.5 months with a wide spread around this mean. These clients were then tracked with ratings for each of the following 6 months. Of these clients, 53% remained stable, 20% decreased in level of functioning before gradually improving, and 28% decreased level of functioning and did not improve. Only 4 of the 87 were ever rated worse than having moderate stability (3 on a scale from 1 to 5).

These researchers concluded that because over half (53%) of the graduated clients stayed at the highest rating of functioning, using the criteria of six consecutive ratings of "most stable" was probably ultraconservative. They also attributed some of the success of the "graduates" to support services they received even after graduation; ongoing relationships with community mental health centers were important for successful transfer.

McRae *et al* studied the effects of transferring all patients of an ACT program, called community support program (CSP), to mainstream mental health services following a policy decision calling for its termination after 5 years of operation (McRae, J, Higgins, M, Lycan, C, and Sherman, W, 1990). By the time CSP ended, the 72 CSP clients were hospitalized 70% less and used residential care 190% more than before enrollment in CSP. The savings in hospital use reduction offset the cost of the CSP program.

Hospitalization, service utilization, and cost data were retrospectively gathered for the 2-year time period following transfer. Due to the total discontinuation of the CSP, there was no control group. 6 patients refused treatment. It is unclear whether these 6 patients were included in the analysis, thus making the hospitalization, service utilization, and cost appear lower than they really were.

It was found that hospital admissions, hospital days, and precommitment evaluations increased insignificantly. The number of mainstream service contacts (defined as psychiatric evaluation, group therapy, psychotherapeutic treatment, medication management, or day treatment) significantly increased while case management service utilization significantly decreased after CSP ended. The cost analysis revealed that although there was a drop of about \$1,500 per patient annually after the two-year follow-up, this drop was insignificant considering the absolute high cost of these clients. The researchers concluded that there were no adverse effects of the transfer, owing such stability to the long-lasting effects of the CSP and the continuity of care during transfer. The researchers also concluded that the small costs savings did not originate mainly from the termination of the CSP, but rather the primary benefit came from increasing the caseload from 9 clients per case manager to 50.

The characteristics of patients not at all hospitalized for the duration of the follow-up (2 years) were also examined. This subset of "successfully" transferred clients consisted of 36 of the 69 living patients. They tended to be of older age, assessed to have a higher level of functioning, and used more structured residential care. A further definition of "older age" and "higher level of functioning" was not given, though the reported age range was from 20 to 57, with a mean age of 33. Of the total sample, 99% had schizophrenia-spectrum disorders.

Audini *et al* analyzed the effects of discontinuing ACT services, called the Daily Living Programme (DLP), in the UK with a randomized, controlled trial. In a previous study, DLP clients were found to have superior outcomes as compared to the control group, with significantly lower inpatient days and somewhat better clinical and social outcomes. After 30 months of enrollment, 33 of the original DLP clients were then randomized to continue DLP services (DLP-II) while another 33 had DLP services discontinued and replaced with usual care (DLP-control). The



usual care was characterized by employing hospital care to deal with acute situations, followed by outpatient care at local clinics. The authors analyzed hospital episode data, as well as rating subjects on their clinical outcomes, social functioning, and satisfaction at 0, 4, and 15 months after randomization. Data was also collected from the original control group (n=70) that had never received DLP services at all, though these clients were not randomized into this third group.

The DLP-II and DLP-control groups increased significantly in days of hospitalization as compared to their experience in the initial 20 months of DLP enrollment. This increase in hospital days and the total number of admissions were not significantly different between the two groups. Both the DLP-II and DLP-control groups still had an advantage over the original control group in the number of inpatient days (23% less) and mean number of admissions (12 for DLP-II & 14 for DLP-control versus 40 for original controls) after 15 months of disenrollment. So while there was loss of the substantial outcome advantage in terms of hospitalizations, the groups that had DLP services still maintain an advantage over the group that never received DLP care at the end of follow-up.

Both DLP groups deteriorated from most clinical and social gains achieved during the initial 30 months of DLP services. However, the clinical outcomes of these two groups were almost always better than the original control group except on economic subscales, on which the original controls held jobs at a higher rate by 15 months of follow-up. The DLP-II group was found to have significantly higher patient and relative satisfaction scores. However, this finding is not entirely clear as many clients were living with a relative, the ratings collected from client relatives was not complete, and the relatives knew which treatment the client was assigned to.

The results of this study were not optimistic in light of the deterioration in outcomes. There were caveats to the implementation of this study that may have attributed to the findings. The authors noted a compromise of quality of services as compared to the quality in the initial 30 months of DLP implementation. There was a noticeable drop in staff morale as evidenced by increased sick leave and study leave as compared to before this arm of the trial and there was a loss of continuity of care between hospitalizations and community care due to a negative media

occurrences involving suicides and a murder by patients in DLP. Also the treatment team had a larger caseload as they started serving other clients not in the study. The authors further noted that many of the DLP-controls may have been receiving some DLP services due to the insistence of some clients and family members and despite discouragement to do so.

Two other researcher groups examined the effects of time-limited ACT services that were adapted to target individuals suffering SPMI with co-occurring substance use disorder or homelessness. A pilot study by Rosenthal *et al* assessed the substance use status, and the use of group therapy and psychiatric hospitalizations of 18 clients (without a comparison group) after stopping ACT-like treatment, but continuing manualized treatment integrating psychiatric and substance abuse outpatient services. These clients had been receiving substance abuse treatment and ACT services for at least 12 months. Though these individuals required intensive ACT outreach in initiating substance abuse treatment, weaning them off ACT services was not followed by substantial hospitalizations (only 2/18), substance abuse relapses (2/18), or disengagements in group therapy after 6 months. The authors concluded it might be feasible to step dually diagnosed clients down from intensive ACT-like services.

Dixon *et al* commented on the effects of time-limited services of a modified ACT model directed for homeless persons with SPMI. It was their observation that some clients could be taken out of ACT programs successfully. They noted that such patients had a history of few inpatient admissions and that ACT intervened at a critical time in their lives, helping them to manage their mental illness on an outpatient basis, before stepping down to a less intensive form of case management (Dixon, LB, Krauss, N, Kernan, E, and Lehman, AF, 1995). Though the demonstration was initially thought to be ending when funding stopped, it was continued when the state felt funding for these services was worthwhile. Thus, testing of their hypothesis was not conducted.

In contrast to the original Stein & Test, McRae *et al*, and Audini *et al* study samples, the Salyers *et al* and the Sherman & Ryan study samples were transferred more gradually from ACT services to less intensive services. In the latter two studies there were gradual transfers with continuity in

services and service providers, though the former three studies did report attempts to prepare the clients for discontinuation of ACT services. Furthermore, the people in the transfer sample had attained a level of functioning and recovery that suggested they were likely to be successful in a less intensive form of service delivery. Thus the outcomes give some weight to the assertion that there are observable characteristics and patterns that predict client stability such that these characteristics and patterns can be used in a policy decision to confidently ration resources for ACT services in a clinically just manner. However, care should be taken to avoid ethically questionable policy practices that cause undue discrimination.

## **5.0 Conclusion**

ACT is seen as the “last resort” alternative to hospitalization in many mental health systems because of its reputation as an effective alternative to hospital care for the severely mentally ill. However, standard care is improving in many parts of the country and shifts towards community care and away from hospital care are taking place. These trends are likely to invoke policy changes aiming to improve efficiency and reduce costs, making treatment alternatives requiring substantial investment of resources, like ACT, volatile (Mueser, KT, Bond, GR, Drake, RE, and Resnick, SG, 1998). This should raise antennae over the cost-effectiveness of ACT programs. Research should explore other advantages besides hospital reduction that ACT might serve. Effects on emergency use, locked care, and clinical outcomes should be more extensively explored. Older studies were broad. The aim now is to evaluate other areas that inform policy makers on their particular concerns over ACT implementation.

ACT has a useful role in the current environment of mental health care that warrants its dissemination. Though implementation of ACT programs are informed through research, further adoption of ACT programs have been noted to be more influenced by ideology, self-promotion, financing issues, and cost shifting within systems (Drake, RE, 1998; Burns, BJ and Santos, AB, 1995). However, dissemination has been and continues to be advanced through the publication of handbooks (Allness, DJ and Knoedler, WH, 1998), through the advocacy of the National Alliance for the Mentally Ill, and as evidenced by adoption of many principles of the ACT model

into the standard mental health case management programs currently available in English-speaking countries. The latest estimate of current ACT programs exceeds 400(Latimer, E, 1999).

In this era of managed care, treatments that are of low intensity and low cost are viewed as superior. Even if ACT is eventually funded by managed care organizations, what influences will they exert that result in a more deviated structure from traditional ACT programs and how will these changes affect the effectiveness of ACT? Unless we better understand the mechanisms by which ACT creates its benefits, policy forces may mutate ACT services and ACT provider practices in ways that render it of less utility to the people we are trying to serve.

Table 1: 11 ACT cost and cost-effectiveness analyses described by 5 criteria.

Study	Time-frame		Sample size (comparison condition) <sup>*</sup>		Study type	Direct Costs <sup>+</sup>	Indirect Costs <sup>#</sup>	Cost-effective?
	Pre	Post	N ACT	N CMP				
(Weisbrod <i>et al.</i> , 1980; Test & Stein, L.J., 1980)	0	12 mo	65	65 (H-B)	randomized	MHT, GMT, M	SS, TPC, CJS, FB	Yes
(Jerrell, JM and Hu, TW, 1989)	0	24 mo	x/35 <sup>1</sup>	y/35 <sup>1</sup> (UC)	randomized	MHT	None	No
(Wolff <i>et al.</i> , 1995)	0	1 yr	94	0	None	MHT (including Medicare costs), GMT, M	SS, TPC, CJS, FB	N/A
(Chandler <i>et al.</i> , 1997; Chandler <i>et al.</i> , 1997)	1 yr	1 yr <sup>2</sup>	99, 111 <sup>3</sup>	92, 103 <sup>3</sup> (UC)	randomized	MHT, GMT, M	TPC, CJS, FB	No <sup>4</sup>
(Clark <i>et al.</i> , 1998)	0	3 yrs	100	93 (SCM)	randomized	MHT (including substance use treatment), GMT, M	SS, TPC, CJS, FB	No <sup>5</sup>
(Essock <i>et al.</i> , 1998)	0	18 mo	131	131 (SCM)	randomized	MHT	SS, CJS	Yes <sup>6</sup>
(Knapp <i>et al.</i> , 1998)	3 mo	45 mo	32 & 28 <sup>7</sup>	70 (H-B)	randomized	MHT, GMT	SS, CJS	Yes <sup>8</sup>
(Salkever <i>et al.</i> , 1999)	18 mo	18 mo	91	53 (SCM)	randomized	MHT	None	No
(Kapur <i>et al.</i> , 1999)	5 yrs	3yrs	1,563	0	Pre-post	MHT (including Medicare costs)	None	No
(Lehman <i>et al.</i> , 1999)	0	12 mo	77	75 (UC)	randomized	MHT (including substance use treatment), GMT	None	Yes
(Chandler, D and Spicer, G, 1 A.D.)	3 yr	4 yr	30	30 (UC)	randomized	MHT	None	Yes

SCM=standard case management, UC=usual care, H-B=hospital-based care

<sup>+</sup> MHT=mental health treatment, GMT=general medical treatment, M=maintenance

<sup>#</sup> SS=social services, TPC=time and productivity costs, CJS=criminal justice system, FB=family burden

<sup>1</sup> No mention of how many of the total 35 were in the experimental and control groups

<sup>2</sup> this post-assignment period was for the 2<sup>nd</sup> year of operation and does not include the 1<sup>st</sup> year's costs

<sup>3</sup> there were two ACT programs and two comparison groups evaluated in this study

<sup>4</sup> The lack of cost-effectiveness is to a major part due to the high capitation rates given to the programs

<sup>5</sup> However, ACT was found to be cost-effective during the last year of follow-up.

<sup>6</sup> There was only cost-effectiveness found for patients who were hospitalized at study entry

<sup>7</sup> n=32 for DLP-continuing and 28 for ex-DLP; see summary of study under "Time-limited ACT" section

<sup>8</sup> Though cost-effectiveness was demonstrated over the 45-month period, there was none demonstrated in the last 25 months

## **A four year cost analysis on a capitated ACT program**

### **6.0 Introduction**

Most of the literature on assertive community treatment (ACT) concludes that for the care of the severely and persistently mentally ill, ACT programs are effective and cost neutral, if not less costly, compared to other forms of psychiatric case management. However, these findings may not be generalizable to all public mental health systems due to differences in planning and implementation. The intended goals of policy makers may be undermined through perverse incentives inadvertently created by a funding scheme inappropriate for the policy milieu. The cost advantage of ACT may be lost due to policies that restrict access to psychiatric hospitals since the main mechanism by which costs are reduced is through decreasing hospital use. Examining the effects of ACT under different funding schemes can help characterize the policy environments compatible with ACT, in terms of cost, efficacy, and populations that stand to benefit the most.

Differences in methodologies employed to assess ACT programs and methodological factors such as small sample sizes and short study periods from previous ACT cost studies have also limited generalizability. Small pilot ACT programs are very helpful in testing the waters, but results from larger ACT programs can be more informative. Large-scale ACT programs more significantly perturb existing mental health systems as they oversee the care for a larger number of clients. Though a good number of studies have a randomized study design, very few had sample sizes greater than 100 per cohort. This may be enough to detect promising changes in clinical outcomes, but many times there is not enough power to detect differences in cost. Even in randomized trials, we are left wondering what systematic exclusions took place due to the consent process that make many people with severe and persistent mental illness wary. Studies examining ACT programs for longer periods will better inform policy makers about the natural history of both ACT programs and their clients. Unfortunately, there are few cost analyses of ACT with study periods greater than 3 years and with large sample sizes.

Thus, it would be quite informative to see how regional adaptations of the ACT model fare against standard care, especially in terms of cost. The following part of my thesis is a cost analysis of San Francisco's pilot ACT program. It is unique in that it analyzes the cost of three large ACT programs with the same capitated funding scheme over 4 years of service. The findings presented here suggest that San Francisco executed a well-devised plan on ACT implementation that will serve as a precedent for future implementations of successful ACT programs through capitation of services.

### *6.1 Other studies on capitated ACT services*

Three other sets of studies have examined the effects on cost of ACT interventions funded through a capitation scheme. The major themes coming from these papers suggest that the client selection process and the amount of the capitation rate are very important in the success of a capitated ACT program to reduce costs. It is of note that, despite differences in cost outcomes, all of the following ACT programs increased community tenure of their clients, and first study discussed below noted improvements in vocational outcomes and independent living outcomes.

The Village and the Stanislaus integrated service agencies (ISA) (Chandler, D *et al*, 1997), two ACT programs in California with the same funding arrangement, were given a capitation rate of \$15,000/patient/year while average costs of the ACT clients were \$5,040 and \$9,100/patient/year respectively. Randomized control clients had a baseline cost of \$5,870. Furthermore, client selection was largely based upon clinical discretion and eligibility for Medicaid and Medicare rather than high historical costs and mental health utilization. These factors ultimately made the ACT programs much more costly than the control conditions. After one year of services (fiscal year 1991-1992), the Village ISA cost \$19,200 versus \$6,327/patient/year for controls while the Stanislaus ISA cost \$17,800 versus \$8,143/patient/year for controls. Thus, it appears that these ACT programs were given too generous a capitation rate compared to historical costs. Also, the screening process was unlikely to be sensitive enough to target the most costly clients since eligibility did not depend upon baseline costs or history of service utilization.

The Los Angeles county Department of Mental Health instituted the PARTNERS program in fiscal year 1994, which consisted of six ACT programs that were given a capitation rate of \$14,000 to \$21,000 (Kapur, K, Young, AS, Murata, D, Sullivan, G, Koegel, P, 1999). This capitation rate proved to be too small a capitation rate, especially since the ACT programs were fiscally responsible for the long-term subacute skilled nursing facilities, called institutions for mental disease (IMD). Furthermore, there was a mechanism allowing the ACT program to unilaterally disenroll high cost clients. In fact, 76.1% of the 1,561 initially enrolled clients were disenrolled in the first year alone. Not surprisingly, the ACT clients who remained enrolled in the PARTNERS program cost \$26,300 while those who were disenrolled cost \$34,600 during the baseline period (1993 dollars). Consequently, cost savings were not demonstrated. In this case, the screening process actively targeted public mental health clients in need of intense mental health treatment as suggested by their high cost and high service utilization. However, since the ACT teams had a larger role than the county in determining which clients they would keep, the more expensive clients were preferentially disenrolled. This defeated the original goals of targeting services for the clients who use a disproportionate amount of the mental health services and who are the most costly.

The cost analysis on the STRIDES ACT program was the only study on capitated ACT services to show cost savings (Chandler, D, Spicer, G *et al*, 1999; Chandler, D, and Spicer, G, 1 A.D.). The STRIDES program of Alameda County, CA was started in 1995 by the Telecare Corporation to serve a subset of 30 of the most costly mental health clients. Historically, these randomized clients cost the county an average of \$68,311/patient/year while controls cost \$72,607. All clients in both groups were in an IMD upon enrollment. A capitation rate of \$26,000/patient/year was given to the ACT program. By the end of the fourth study year, costs were reduced to \$22,611/patient/year, showing a significant cost advantage compared to control subjects, who cost \$33,822 during that last study year. Unlike the LA PARTNERS program, the STRIDES program largely used a funder screening mechanism to determine which clients the ACT program would serve. Also, the capitation rate was set low enough, compared to historical costs, to allow



for cost savings. However, the small sample size and the stakes the Telecare Corporation had in the findings limit generalizability.

The positive findings from the study on the STRIDES program and the lessons learned from the Village/Stanislaus ISAs and PARTNERS program set the stage for San Francisco's ACT program. Like the STRIDES study, we explore a partially capitated ACT program with funder screening and a capitation rate well below historical costs. Unlike the STRIDES program, which only studied 30 ACT clients against 30 controls, we present findings comparing 256 ACT clients to 285 comparison clients over 4 years of ACT intervention.

### **7.0 San Francisco Single-Point-of-Responsibility (SPR) Programs**

Community Mental Health Services (CMHS) of the San Francisco Department of Public Health initiated the implementation of three pilot ACT programs called Single-Point-of-Responsibility (SPR) programs in 1997. The funding mechanism was a set of competitive capitation contracts, where bidders could be existing county-operated programs or other non-profit organizations. CMHS chose three bidders to develop the SPR programs, one to serve 200 clients, and the others to serve 100 clients each. Between the three programs a total of six ACT teams were launched. The SPR programs target patients with severe and persistent mental illness who had a recent history of high services cost. The primary goals of these programs are to improve consumer outcomes and reduce their dependence on expensive 24-hour locked care, primarily institution for mental disease (IMD) care.

CMHS identified 825 potential candidates for enrollment into SPR services on the basis that they had cost the county in excess of \$20,000 during both fiscal years 1996 and 1997, were thought amenable to ACT services, and who gave informed consent when approached by the program to which they had been assigned. Enrollment began in March 1997 and by 9 months the SPR programs were at full capacity. By June 30, 2000 a total of 453 were enrolled, while 338 of the potential candidates did not enroll and 34 died or left the county.

### *7.1 Capitation rate and services covered*

The SPR programs deliver mental health services that are capitated at a rate negotiated separately by each contractor. All capitation rates were close to \$18,000/member per year (1999 dollars) in the initial year of program implementation, though cost of living increases were subsequently granted. It was intended for the capitated funding scheme to bestow flexibility in delivering ACT services. So long as the clients' needs are provided, the SPR programs get paid the capitation rate. To avoid setting an overly restrictive capitation scheme, CMHS employed partial capitation to share the risk in mental health care costs between the SPR programs and the county.

The SPR programs are responsible, either directly or through another provider, for the care and cost of all mental health services needed by each client. However, there are some services that are exempt from the capitation rate. They are not financially responsible for all IMD care, medication costs, conservator services, and supplements to residential care. These services are paid directly by the county. Although it initially covered the cost of all non-Medicare hospitalizations, the county subsequently adjusted the capitation scheme such that the SPR programs are responsible for days 5 through 9 of each hospital episode. This was done to reduce acute inpatient hospital use. Medication costs were not included to prevent incentives to avoid the newer, more expensive antipsychotic medications. However, contractors are responsible for the cost of medication support services by physicians and other clinicians, as well as physician visits to IMDs and inpatient wards. Medicare-funded hospitalization costs are also exempt from the capitation rate and are paid directly by Medicare.

The San Francisco Single-Point-of-Responsibility programs deliver "ordinary" ACT services. "Ordinary" ACT services are different from the Wisconsin ACT model in that "ordinary" ACT programs are not examined and certified by an expert in the original Wisconsin PACT services. Since launching a Wisconsin-type ACT model would require intensive training, particular experience, and guidance by professionals, most communities are implementing "ordinary" ACT programs. Furthermore, these local programs may see the need to adjust their service structure

according to the unique characteristics of the client population, the financial and policy environment, and the compatibility with the existing mental health care system.

CMHS intended to have the SPR teams deliver ACT services, nevertheless, it was open to elaborations of the standard ACT model in order to best serve the diversity of the client population. For instance, the separate SPR teams direct their services to certain groups such as the Latino, African-American, Asian populations as well as gay, lesbian, transgender and substance abuse populations. As mentioned above, the capitated funding scheme provided for the freedom to deliver services, such as vocational rehabilitation and substance abuse services, either directly or through another provider.

Though the delivery of ACT services by the SPR programs may not hold strict fidelity to the original ACT model, it was found to hold adequate fidelity so that it could be said that ACT services were truly being delivered. In preliminary evaluations of the three pilot SPR programs, the expanded Community Program Philosophy Scale (CPPS) (Hargreaves W, written personal communication. January 1999) was used to estimate how closely the six ACT teams resembled other ACT teams nationally. Based upon scaled staff responses to a questionnaire, the CPPS survey suggested that the six teams are similar to each other in organization and in service delivery and that the six teams are delivering services similar to other ACT programs in the nation. Furthermore, an ACT expert from the original Madison, Wisconsin ACT program visited and gave a one-day training on delivering ACT services to the SPR staff.

## **8.0 Methods**

256 ACT clients were compared to 285 non-equivalent comparison clients in an intent-to-treat quasi-experimental analysis. These clients represent a subsample of all SPR clients and comparison clients with enough for 5 years of mental health utilization data by June 30, 2001. Total mental health services cost, the use of locked care, and psychiatric emergency services use over the study period were compared between the two groups with repeated measures analysis of variance (RM ANOVA). Treatment assignment and use of an institution for mental disease

care during the baseline year were the dichotomous independent variables included in the analysis, while adjusting for baseline cost.

Comparison clients are those public mental health clients who were selected to be eligible for SPR services, but for one of four reasons were never enrolled: (1) They were considered not capable of giving informed consent to SPR treatment. (2) They were excluded by mental health staff (usually non-SPR staff or conservator) who thought they were not ready for SPR services or would be better served by staying with their current services. (3) They chose not to enroll in SPR services. (4) They were impossible to locate. Instead of ACT services, the comparison clients received standard mental health care. This included case management services and psychiatric outpatient services as well as the same psychiatric emergency and hospitalization services and skilled nursing facility care that are available to the ACT clients.

The mental health services and cost data for the study period were drawn from the Billing Information System (BIS) dataset collected by CMHS. This dataset contains individual demographic data; inpatient, emergency room, conservator, and locked skilled nursing facility episode location and dates; diagnosis given during each episode; and cost data. These records cover utilization of public mental health care services from 1991 to June 2001. Medicare costs are not collected as part of the BIS dataset as they reflect service utilization that does not directly affect the county fiscally. Medication costs are also not included in this dataset.

### **8.1 Study period**

The most recent data available was for the fiscal year ending on June 30, 2001. For ACT clients, the study period included one year of baseline services (the year before enrollment) and 4 years of follow-up data. In order to have had 4 years of follow-up data by June 30, 2001, these clients had to have been enrolled close to the time that the SPR program started recruiting clients in March of 1997. In effect, the outcomes will reflect the influence of start-up and program maturation. For comparison clients, the study period was the earliest available five-year period following June 30, 1995.

Many ACT clients were in an institution for mental disease upon enrollment as it was hoped that the ACT team would facilitate that client's discharge from the IMD to the community. An IMD is simply a locked skilled nursing facility whose services are geared towards those with mental illness or whose percentage of clients with a mental illness diagnosis exceeds 50%. The records of contact between the client and an ACT professional were usually not recorded during the time period from administrative enrollment to discharge from the IMD. Nevertheless, the administrative enrollment date (upon which capitation payments began) was used as the enrollment date for ACT enrollees in the analysis even though the patient probably did not receive full ACT services until after discharge from the locked skilled nursing facility.

Since they did not enroll in any ACT program, comparison clients do not have a true enrollment date. To select an analogous study period, we selected the earliest available five-year period with services data following June 30, 1995. The first year of each comparison client's study period was considered his or her 'baseline' year. In this way the designated 'baseline' year for the comparison clients (usually from the summer of 1995 to the summer of 1996) was earlier in time than the baseline year for ACT clients (usually from March 1996 to March 1997).

## **8.2 *Schizophrenia diagnosis***

Patients were identified as either having schizophrenia or not. Since patients with schizophrenia-spectrum diagnoses are generally more disabled, a schizophrenia diagnosis also served as a marker of disease severity. Diagnosis for each mental health service episode was obtained along with the rest of the billing information given by the provider. However, different providers may have given a different diagnosis on separate occasions. An overall diagnosis for each client was determined as follows. If a client had no or one inpatient episode, then all the outpatient diagnoses and the one inpatient diagnosis (if present) in the five-year study period were pooled. If half or more of the diagnoses were of the schizophrenia-spectrum disorders, then the client was considered as having schizophrenia. If a client had two or more inpatient episodes, then that client was considered as having schizophrenia if half or more of the inpatient diagnoses were schizophrenia-spectrum disorders. Inpatient diagnoses were considered more reliable than

outpatient diagnoses since more professionals see the patient and more emphasis is given in determining a diagnosis.

### **8.2 Analysis of cost, locked days, and ER use**

In the analysis of cost, only mental health utilization costs were included. We did not examine cost shifting by including expenses such as criminal justice costs, civil service costs, social services costs unrelated to mental health care, or time and productivity costs. Since the BIS dataset did not record Medicare-funded services and medication costs, they were also not included in the analysis. However, an attempt was made to retrieve and estimate Medicare-funded psychiatric hospitalizations through chart reviews. All costs were converted to 1999 dollars to make costs between years comparable.

A locked day can be an acute psychiatric hospitalization day, a day in an institution for mental disease, or a day in a state hospital. Locked days was included because it is a marker for poor psychiatric function, indicates less time in the community, and is the most expensive type of psychiatric care. Furthermore, it is inherently a more sensitive and reliable measure than mental health service utilization costs as it has less variance and fewer outliers.

Use of psychiatric emergency services and crisis management services were also analyzed to gain insight into the clinical stability of the subjects. Although clients in an IMD are less likely to require emergency services since they are already in a clinical facility, this did occur. Thus psychiatric emergency services use is not limited to those clients living in the community. To use emergency and crisis services in monitoring psychiatric stability for clients living in the community, it needs to be correlated with lack of locked care.

Least square means of utilization cost, locked days, and emergency room use over the study period were aggregated into 52 4-week periods. These three outcomes variables were compared between the two groups in a repeated measures analysis of variance (RM ANOVA). The best polynomial fit for the cost and ER use trends were determined through hierarchical analysis of the significance in the increase in  $R^2$ . The two cohorts were compared as a whole on all three

outcome variables. However, there was a time by baseline cost by treatment assignment interaction in the ANOVA on cost and use of emergency services that warranted substratification. To better test for the effect of ACT services on cost and psychiatric emergency care both the ACT and comparison groups were divided into four tiers, with clients in a tier similar to each other in terms of baseline values. First, each cohort was divided into two groups depending on whether the patient needed IMD care during the baseline period or not. Finally, within each "IMD" and "No IMD" group the clients with baseline costs above the median cost ("high cost") were separated from those below the median cost ("low cost").

The actual cumulative net costs of the total sample and each subgroup were determined by taking the difference between the cost of the ACT group and the comparison group for each 4-week period. Then, the difference in cost was then added to the cost of the subsequent 4-week period. This analysis explores how much the county invests in the SPR programs and how much of this monetary investment is or is not recuperated over time.

## **9.0 Results**

### ***9.1 Comparison of ACT vs. comparison clients at baseline***

As demonstrated in table 2, the ACT cohort was a more costly group, had more locked care, and used more psychiatric emergency care during the baseline year before enrollment than their comparison counterparts. ACT clients with enough for 4 years of service data and one baseline year had averaged \$56,233 and 170 locked days in FY1996. A few ACT clients and comparison clients reached over \$200,000 during the baseline year. The mean cost for comparison subjects at baseline was \$49,220 and mean number of locked days was 134. In addition, the ACT cohort had a greater percentage of clients with a schizophrenia-spectrum illness than the comparison group. Thus, of the people eligible for ACT services, San Francisco enrolled the more severely ill public mental health clients, creating a conservative bias. The effect of this bias makes the detection of any cost advantage more difficult and the apparent findings of pecuniary losses more likely.

<i>Baseline variable</i>	<i>ACT (n=256)</i>	<i>Comparison (n=285)</i>
<i>Cost</i>	\$56,223	\$49,220
<i>Locked days</i>	170 days	134 days
<i>% in IMD</i>	53%	37%
<i>ER minutes</i>	1334	980
<i>Schizophrenia Dx</i>	80.86%	70.18%

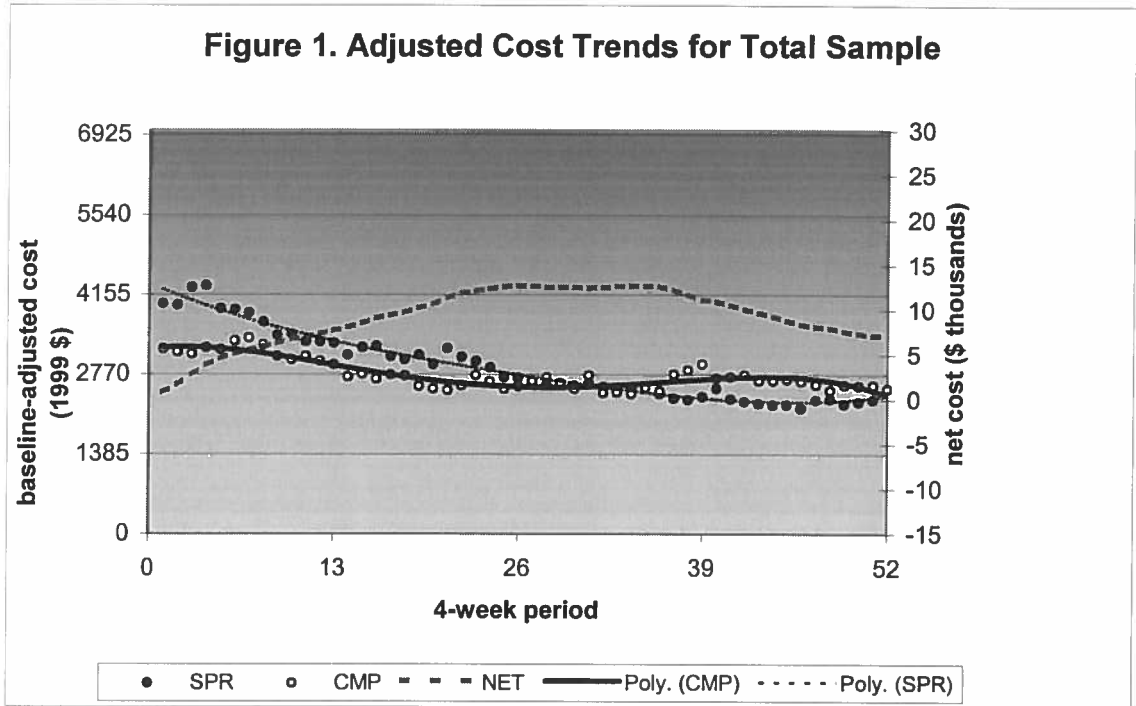
Though the comparison clients were more likely to move away from San Francisco or stop using mental health services, all public mental health clients were eliminated from the analysis who moved away or who stopped receiving services. Comparison clients also had longer gaps of time between mental health services, reflecting the more intensive nature of ACT services compared to standard care.

Once the ACT programs reached their capacity of 400 clients, turnover has been low. Programs have stayed consistently at capacity and only a handful of clients have died. Of the 849 preliminary eligibles only 44% were excluded. In the first year only 4.7% were disenrolled, 3.3% in the second year, and 1.9% in the third year. This 48.7% first year exclusion rate demonstrates a more successful retention of high cost clients compared to the 76.1% exclusion rate experienced by the LA PARTNERS program in the first year of program operation. As shown in Table 3, most of the documented terminations reflect persistent refusal by the client to participate in ACT services. CMHS does not allow programs to unilaterally disenroll clients, although the programs have proposed a few involuntary terminations that CMHS has approved.

<i>Reasons for exclusion</i>	<i>Number of clients that were eligible for ACT services</i>
<i>clients refused</i>	109
<i>excluded by non-SPR staff</i>	64
<i>excluded by conservator</i>	29
<i>not locatable</i>	28
<i>reason not recorded</i>	146

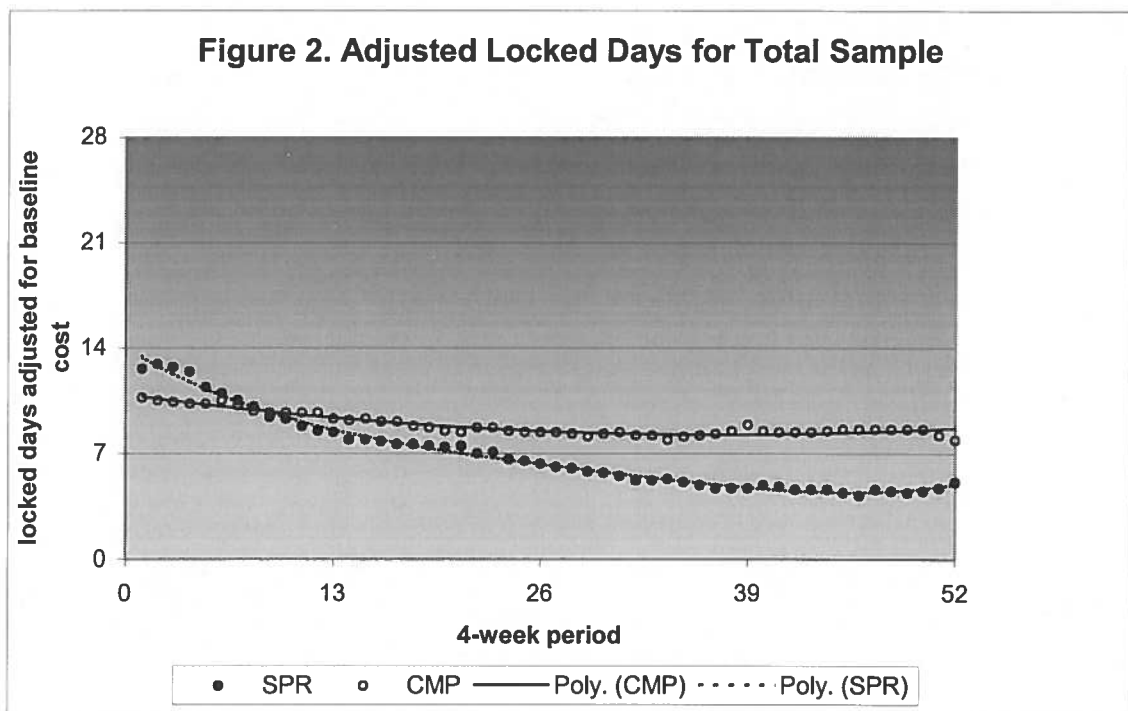


9.2 Trends for the total sample



The results of the cost, locked days, and psychiatric emergency care analyses for the total sample are depicted in figures 1-3 and tables 4-6. In each cost of care graph, the left hand y-axis represents the least square mean cost (adjusted for baseline cost) for each 4-week period. Time was in terms of 4-week periods, so \$1,385 is the 4-week equivalent to the \$18,000 annual capitation rate for an ACT client and each subsequent tick mark represents a multiple of the capitation rate. The right hand y-axis represents the cumulative net cost (or savings) incurred by the county. Figure 1 shows that the county had a maximum investment of about \$12,500 per ACT client at two years. During the 4<sup>th</sup> year of services, the cost of care for the ACT clients dropped in relation to comparison clients. Thus we see the net cost trend towards cost neutrality, resulting in about \$7,000 of total investment per client after 4 years of operation. However, the significant within subjects interaction between baseline cost and treatment assignment (Table 4 and Table 6) indicates that the effect of ACT services on cost and emergency care use depend upon how much the client cost the county to begin with. Thus, subanalyses are needed to better inform any policy decisions relating to the effect of ACT interventions on cost and psychiatric emergency care. Sample sizes of each subgroup are shown in Table 7.

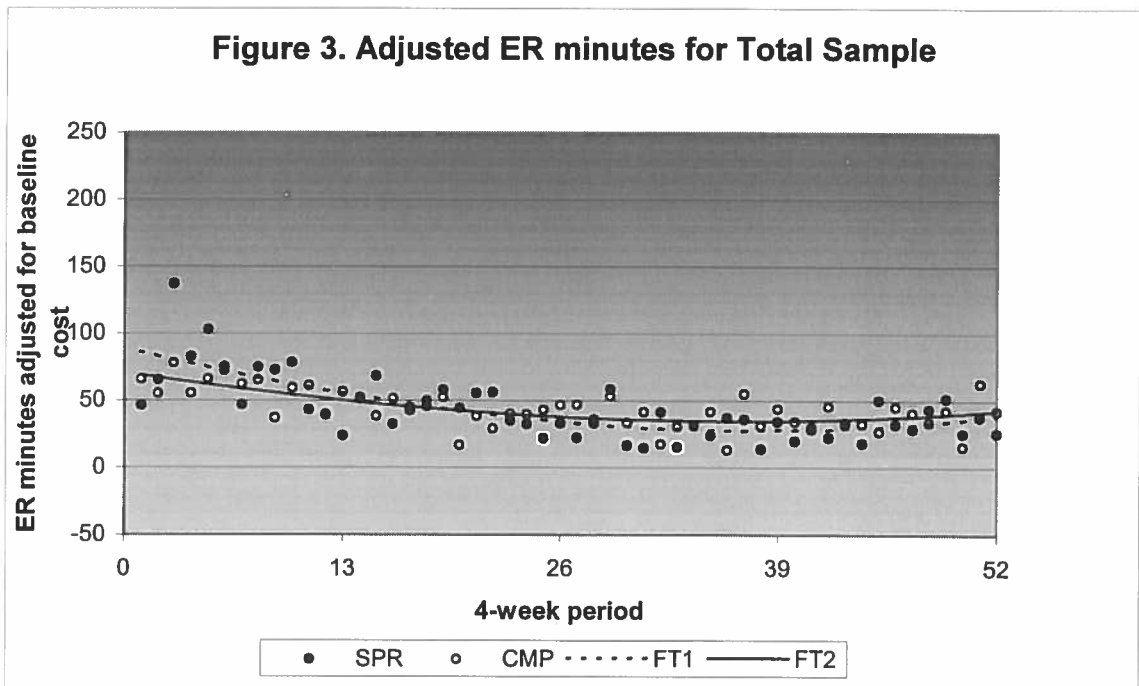
<b>Table 4 – RM ANOVA of cost - Tests of significance for within subjects effects</b>			
<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	1.11	0.2752
<i>Time* treatment assignment</i>	51	3.75	<0.0001
<i>Time* baseline cost</i>	51	5.3	<0.0001
<i>Time* baseline IMD status</i>	51	1.25	0.1101
<i>Time* baseline cost* baseline IMD status</i>	51	2.16	<0.0001
<i>Time* baseline cost* treatment assignment</i>	51	1.44	0.0207
<i>Time* treatment assignment* baseline IMD status</i>	51	2.28	<0.0001
<i>Time* baseline cost* treatment assignment* baseline IMD status</i>	51	0.82	0.8150



The RM ANOVA on locked days did not detect any significant interactions (Table 5). It did show that the effect of ACT services on the locked days trend is significantly different from that of the comparison group, indicating that ACT reduces the number of locked days at a faster rate and increases the amount of time ACT clients experience in the community. This effect is independent of the significant effects of baseline cost and baseline use of IMD services on the locked days trends.

<b>Table 5 - RM ANOVA of locked days - Tests of significance for within subjects effects</b>			
<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	4.25	<0.0001
<i>Time* treatment assignment</i>	51	2.60	<0.0001
<i>Time* baseline cost</i>	51	3.97	<0.0001
<i>Time* baseline IMD status</i>	51	7.52	<0.0001
<i>Time* baseline cost* baseline IMD status</i>	51	1.03	0.4128
<i>Time* baseline cost* treatment assignment</i>	51	0.54	0.9973
<i>Time* treatment assignment* baseline IMD status</i>	51	0.91	0.6506
<i>Time* baseline cost* treatment assignment* baseline IMD status</i>	51	0.73	0.9258

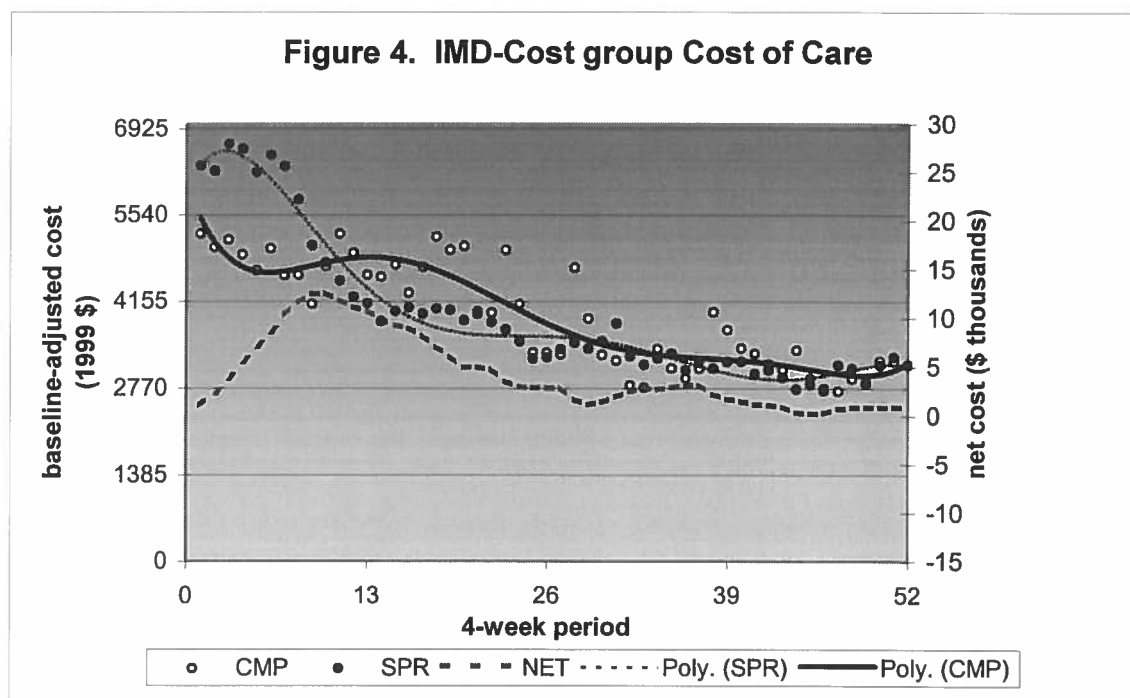
In the overall comparison of psychiatric emergency care, there were no differences found between the time trends of both groups. However, significant interactions were dealt with through the subgrouping strategy described in the methods section. Note that the negative values for ER minutes are due to the adjustment for baseline costs.



variable	df	F value	p-value
Time	51	1.34	0.0553
Time* treatment assignment	51	1.04	0.3972
Time* baseline cost	51	1.09	0.2986
Time* baseline IMD status	51	1.60	0.0040
Time* baseline cost* baseline IMD status	51	1.66	0.0022
Time* baseline cost* treatment assignment	51	1.07	0.3389
Time* treatment assignment* baseline IMD status	51	1.36	0.0440
Time* baseline cost* treatment assignment* baseline IMD status	51	1.57	0.0061

	IMD-High Cost	IMD-Low Cost	No IMD-High Cost	No IMD-Low Cost
ACT	92	44	69	51
Comparison	29	77	80	99
Total	121	121	149	150

**9.3 Group 1: Some IMD days during baseline and above-median baseline costs**



This first subgroup included the most costly ACT and comparison clients. Table 7 shows that the comparison clients in this subgroup represent the smallest sample. In the last 2 years of ACT

operation, the county pulled 20 comparison clients into SPR services. It is by no accident that the majority of these 20 have come from this subgroup, since these clients are the most costly and use the most in terms of hospitalization and other locked care. In fact, these comparison clients cost over \$85,000 during the baseline care. Since they did not have enough for 4 years of services, they were not included in the analysis.

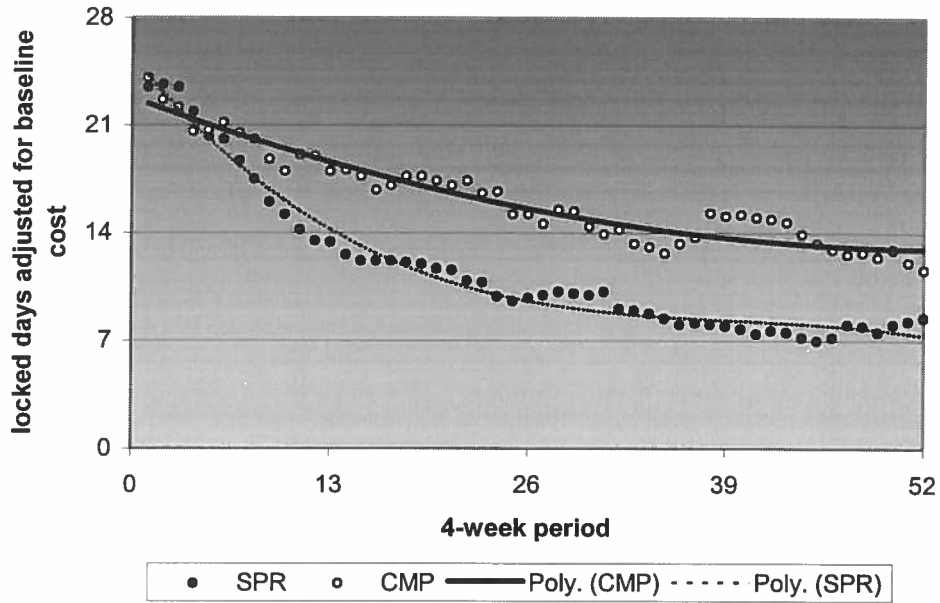
<b>Table 8 – RM ANOVA of cost for IMD/High Cost group – Tests of significance for within subjects effects</b>			
<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	1.03	0.4221
<i>Time* treatment assignment</i>	51	1.49	0.0131
<i>Time* baseline cost</i>	51	1.73	0.0010
<i>Time* baseline cost* treatment assignment</i>	51	1.19	0.1690

In the RM ANOVA on this subgroup, the baseline cost by treatment assignment interaction was suppressed (Table 8). Thus, the difference between the ACT and the comparison group time trends is not only significant ( $p=0.0131$ ), but also independent of baseline cost. The ACT group starts out as more expensive and drops down in cost more dramatically than the comparison group, though both reach an adjusted four-year cost just above twice the capitation rate (Figure 4). Cumulative net costs in this group break even by 2 years and hover just above the breakeven point. Keeping in mind that 20 expensive comparison clients were taken out of this subgroup, cost neutrality would have been more convincingly demonstrated if they were included.

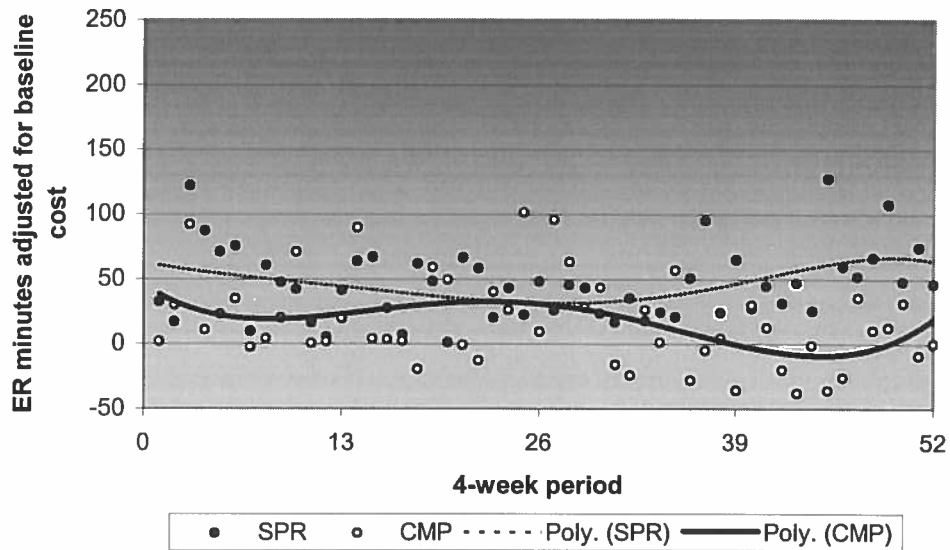
Figure 5 sheds light on the most likely source of the cost savings. At the onset of program operation this subgroup spent over three-quarters of their time in locked care. The ACT clients were brought into the community at a faster rate so that, by the end of the study period, ACT clients were experiencing about 8 days in locked care on average, while comparison clients experienced about 13 days of locked care per 4-week period.

The time by baseline cost by treatment assignment interaction was also suppressed ( $p=0.0919$ ) in the RM ANOVA of emergency services use in this subgroup (Table 9), although not as

**Figure 5. Adjusted Locked Days for IMD-High Cost group**



**Figure 6. Adjusted ER Usage for IMD-High Cost group**



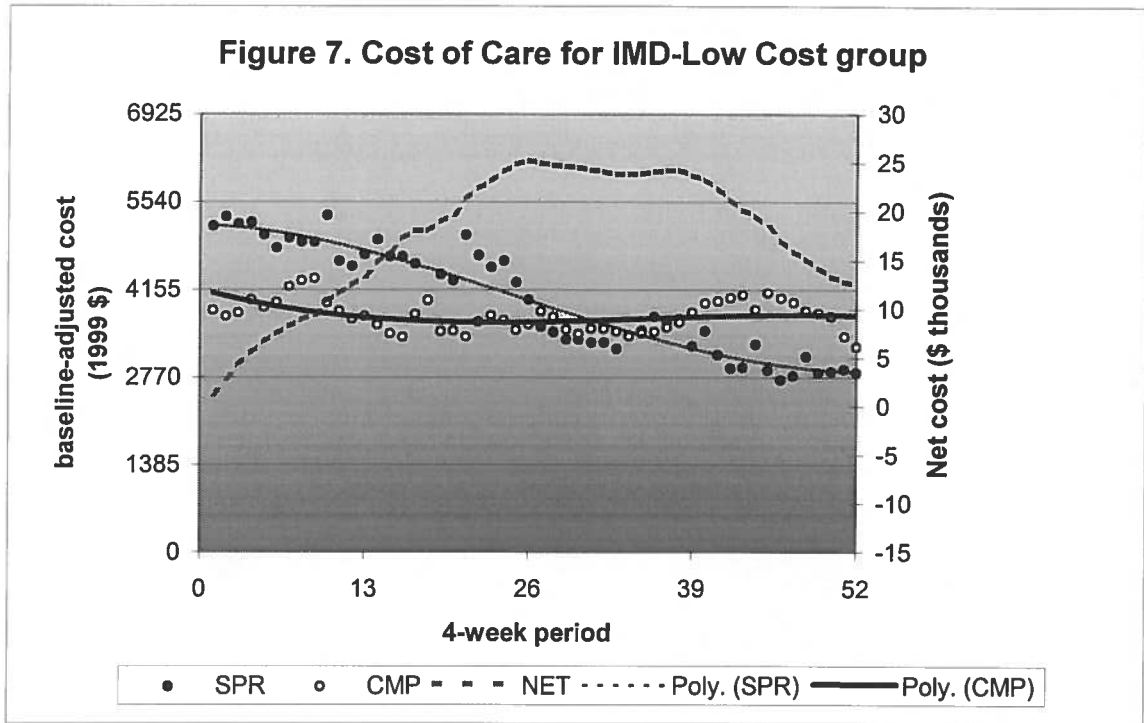
completely as in the cost analysis due to the trend towards significance. None of the main effects were significantly different, though qualitatively it seems that the comparison group is using less

emergency services. Again, this is not surprising since comparison subjects were in an IMD for a longer period of time, which usually buffers a patient from needing emergency services.

<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	0.60	0.9888
<i>Time* treatment assignment</i>	51	0.88	0.7075
<i>Time* baseline cost</i>	51	0.98	0.5515
<i>Time* baseline cost* treatment assignment</i>	51	1.27	0.0919

**9.4 Group 2: Some IMD days during baseline and below-median baseline costs**

Table 10 shows that the time by baseline cost by treatment assignment interaction was not fully suppressed ( $p=0.0012$ ). Thus, the apparently steeper drop in cost for the ACT group (Figure 7) cannot be independently explained as due to ACT intervention since baseline cost also contributes to the cost trend. As seen in the unstratified cost analysis, the effect of treatment assignment on the time trend is different depending upon baseline costs. Qualitatively, the comparison clients stay relatively stable at a level just under three times the capitation rate, while ACT clients drop from almost four times the capitation rate down to twice the capitation rate by the end of year 4. In this subgroup, it is not until the third year of ACT services that costs drop below the cost of comparison services. Interestingly, the investment the county had to make in this subgroup was twice as much as observed in the first subgroup (\$25,000/client vs. \$12,500/client). However, by the 4<sup>th</sup> study year, the net costs began to drop so that by the end of the study period, the net costs in this subgroup were about \$12,800/client.



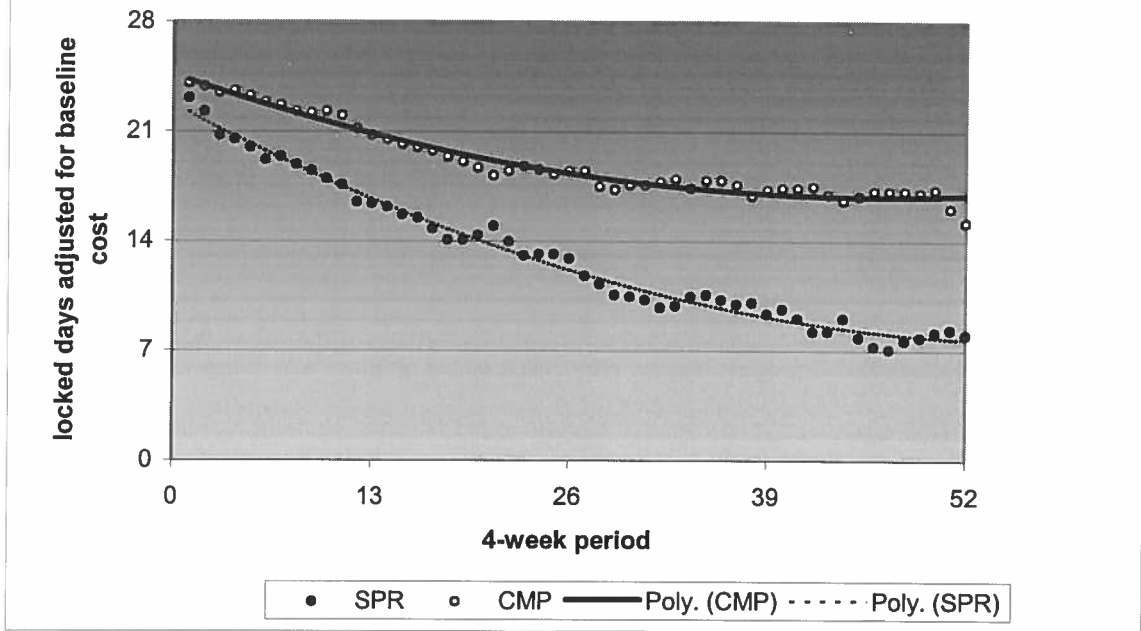
**Table 10 – RM ANOVA of cost for IMD/Low Cost group – Tests of significance for within subjects effects**

<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	3.12	0.9888
<i>Time* treatment assignment</i>	51	1.62	0.7075
<i>Time* baseline cost</i>	51	4.47	<0.0001
<i>Time* baseline cost* treatment assignment</i>	51	1.72	0.0012

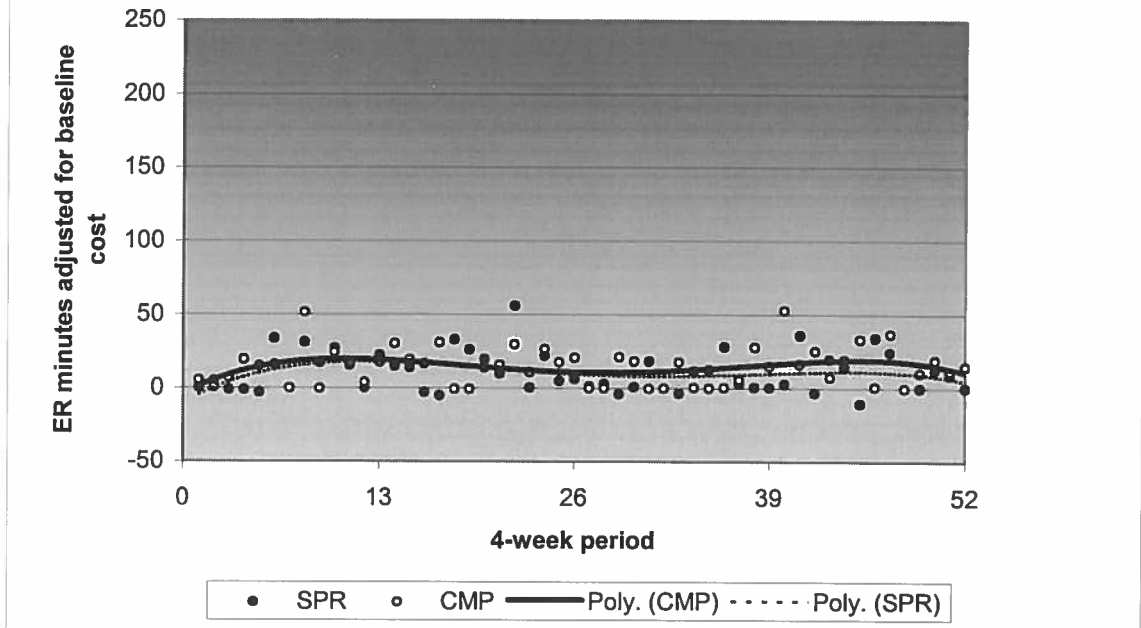
Just as in the first subgroup, the subjects in this subgroup started out spending approximately three-quarters of their time in locked care (Figure 8). Though comparison clients leveled out at about 17 days of locked care per 4-week period, ACT clients dropped to 8 days of locked care per 4-week period by the end of the study period. Also like the IMD-High cost subgroup, ACT clients in the IMD-Low cost subgroup decreased in use of locked care from about 23 locked days per 4-week period down to 8 days. Unlike the first subgroup, the use of locked care by comparison clients of this second subgroup dropped to an average of only 17 days per 4-week period. So though it would seem that this subgroup should also have broken even if reduction in locked days is the main cost saving mechanism of ACT. The positive net costs to the county in this subgroup means that there are significant costs elsewhere.



**Figure 8. Adjusted Locked Days for IMD-Low Cost group**



**Figure 9. Adjusted ER Usage for IMD-Low Cost group**

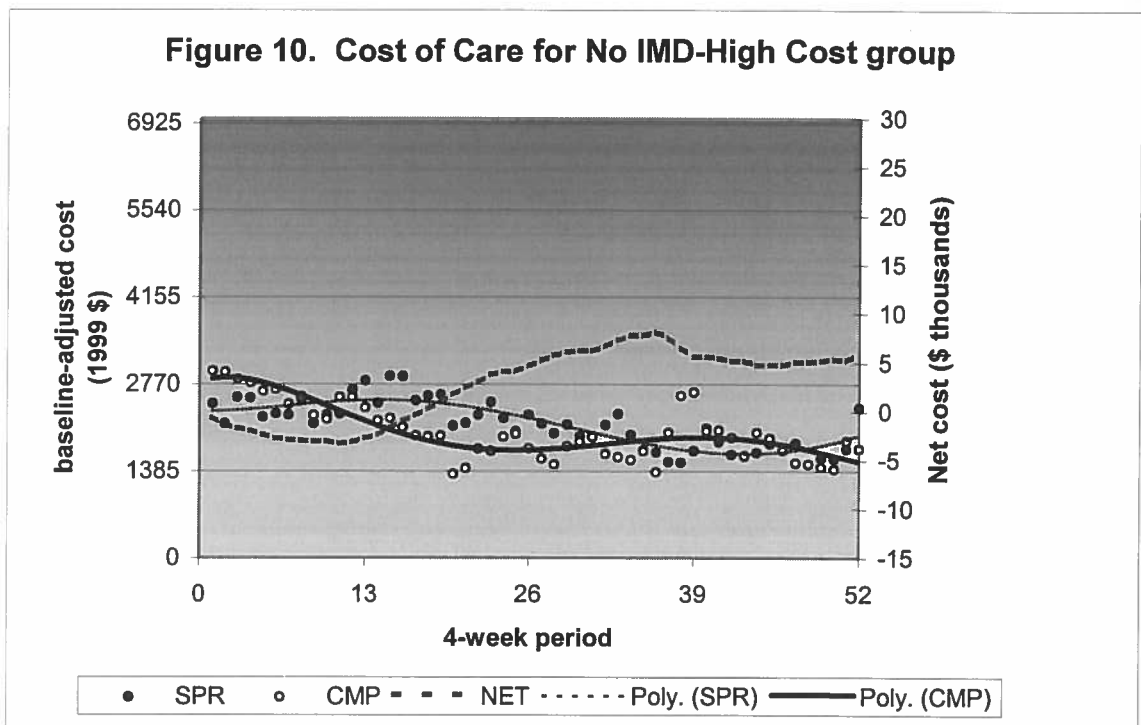


The low levels of emergency service (Figure 9) compared to those seen in the IMD-High cost group suggest not only that the clients in this subgroup are more clinically stable, but also that

their pattern of service utilization is different. Because the county has not broken even in this subgroup despite a larger reduction in locked days in the ACT group and lower use of emergency services, clients in this IMD-Low cost subgroup are receiving a significant amount of county-funded mental health services, such as supplements to residential care. Perhaps the clients in this subgroup are in a stage where they are able to spend more time in the community, but they do so through the facilitation of residential treatment facilities and halfway houses.

<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	3.34	<0.0001
<i>Time* treatment assignment</i>	51	3.40	<0.0001
<i>Time* baseline cost</i>	51	3.13	<0.0001
<i>Time* baseline cost* treatment assignment</i>	51	3.20	<0.0001

**9.5 Group 3: No IMD days during baseline and above-median baseline costs**



Though the ACT intervention seems to have a significantly different effect on the cost time trend than comparison services (Table 12), the time by treatment assignment by baseline cost

interaction confounds the independent contribution of ACT in this third subgroup. However, several qualitative points can be made from the cost trends in Figure 10. First, the cost of care of this subgroup is less than seen in the two subgroups that had some IMD care during baseline. Second, though the actual polynomial time trend may be different, the two groups are comparable in terms of absolute cost. Adjusted mean costs for both subgroups were brought from approximately twice the capitation rate down to a level just above the capitation rate. In terms of cumulative net costs, the county has remained near the break-even point. During the 4<sup>th</sup> year, net costs were level at about \$5,000/client since costs between the two groups did not differ much. This \$5,000/client net cost may be tolerable compared to the \$72,000 that the county pays for each ACT client over 4 year, especially given the trade-off of increased community tenure.

<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	1.40	0.0327
<i>Time* treatment assignment</i>	51	1.45	0.0200
<i>Time* baseline cost</i>	51	2.66	<0.0001
<i>Time* baseline cost* treatment assignment</i>	51	1.91	0.0001

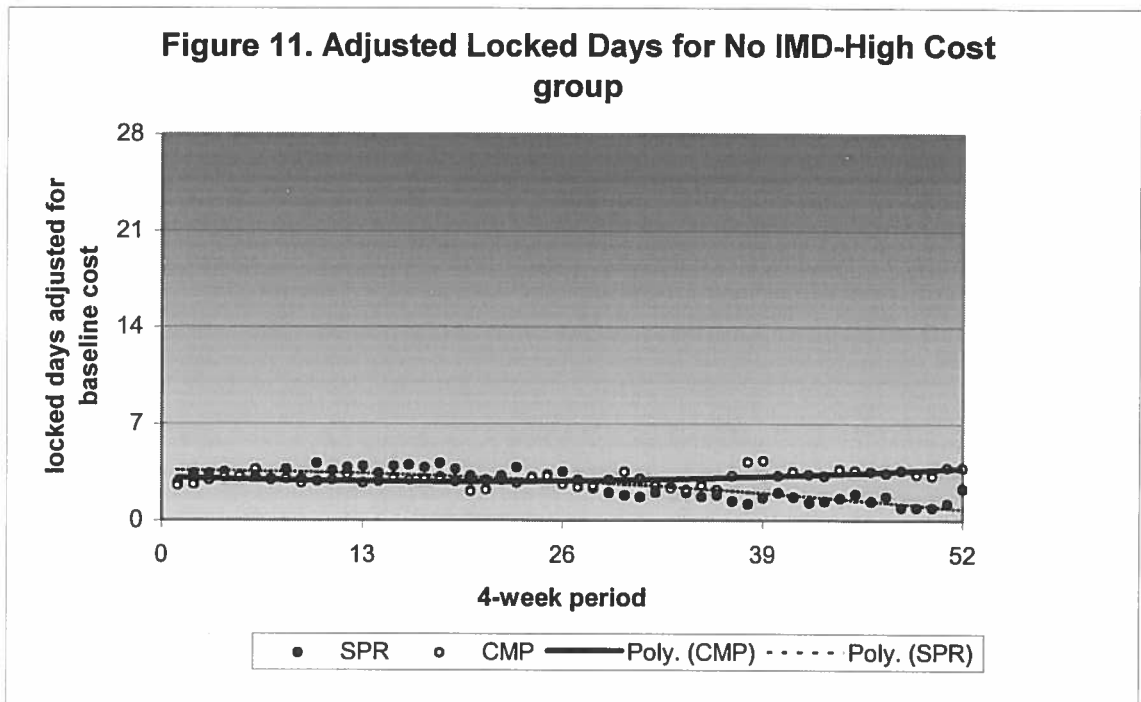
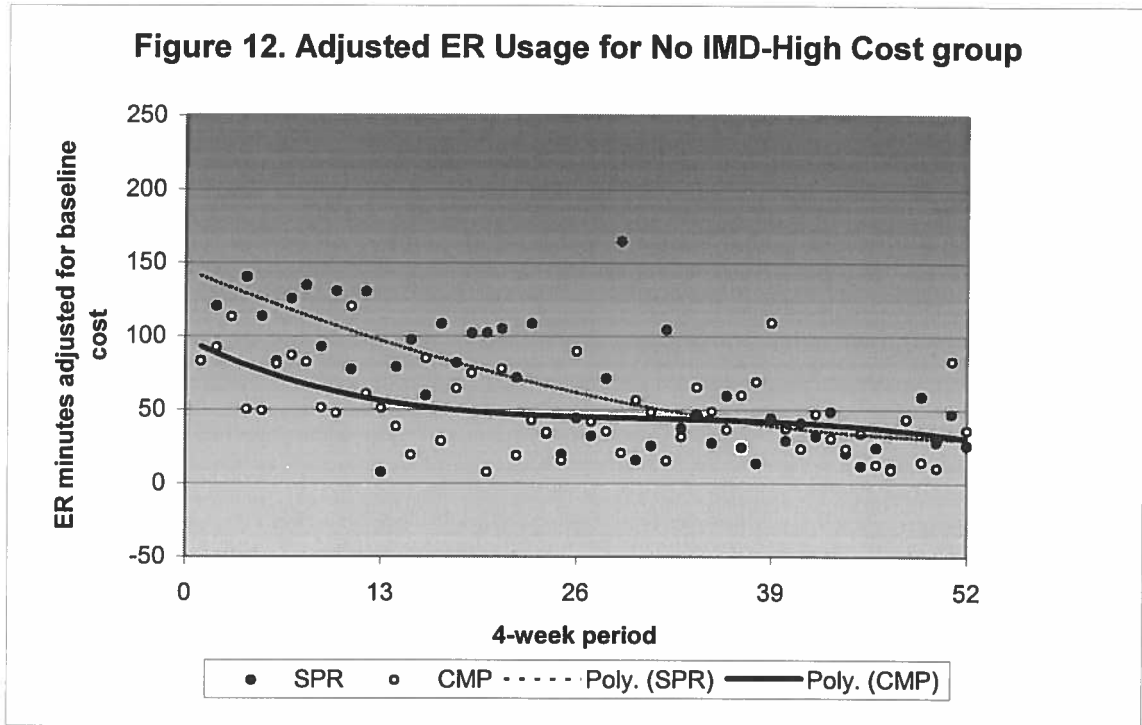


Figure 11 illustrates the trends in use of locked care. Though the comparison clients consistently used about 3 locked days per 4-week period for the duration of the study period, the ACT clients in this subgroup began to experience a decrease in the 4<sup>th</sup> study year. In absolute terms this decrease may seem trivial, but in relative terms it may ultimately lead to cost neutrality and suggests clinical success in maintaining long-term community tenure.



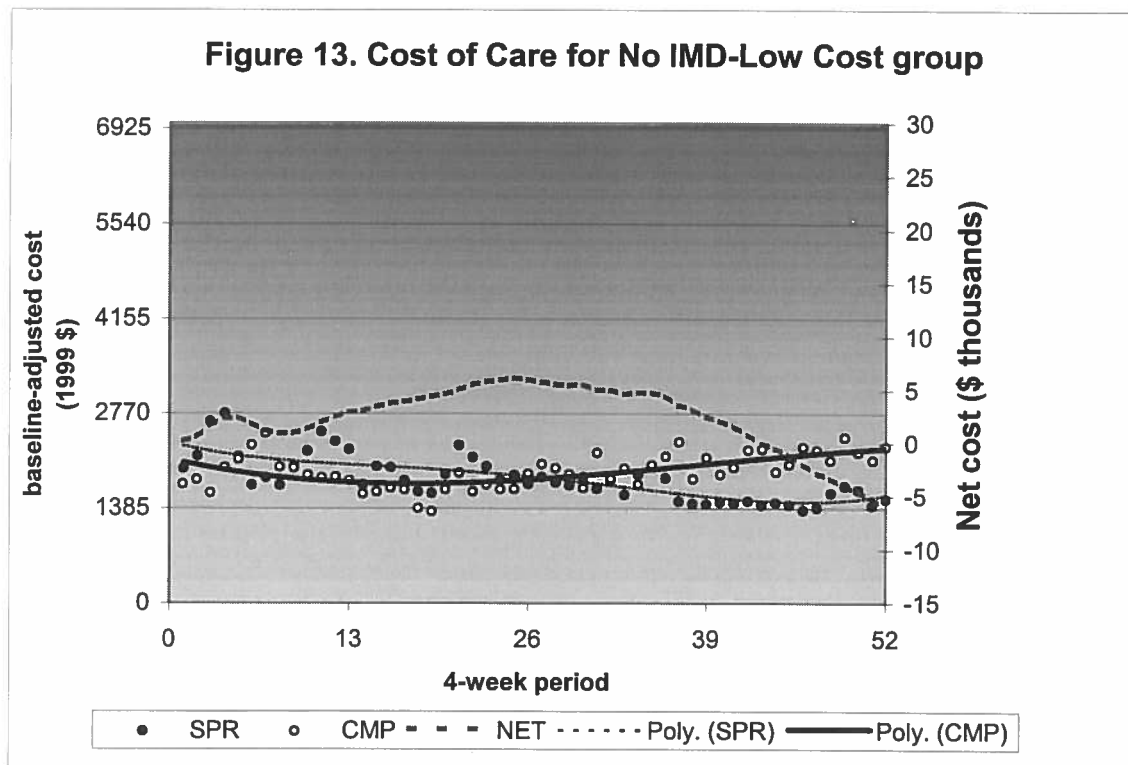
<b>Table 13 - RM ANOVA of ER use for No IMD/High Cost group – Tests of significance for within subjects effects</b>			
<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	1.65	0.0026
<i>Time* treatment assignment</i>	51	1.40	0.0313
<i>Time* baseline cost</i>	51	1.17	0.1961
<i>Time* baseline cost* treatment assignment</i>	51	1.46	0.0188

Figure 12 shows that both groups experience a drop in the use of emergency services. It is of note that the relative amount of emergency services use by this third subgroup is less than that seen in the IMD-Low cost group. These clients also start with greater ER use than the IMD-High cost group. However, the significant three-way interaction (Table 13) and the poor baseline

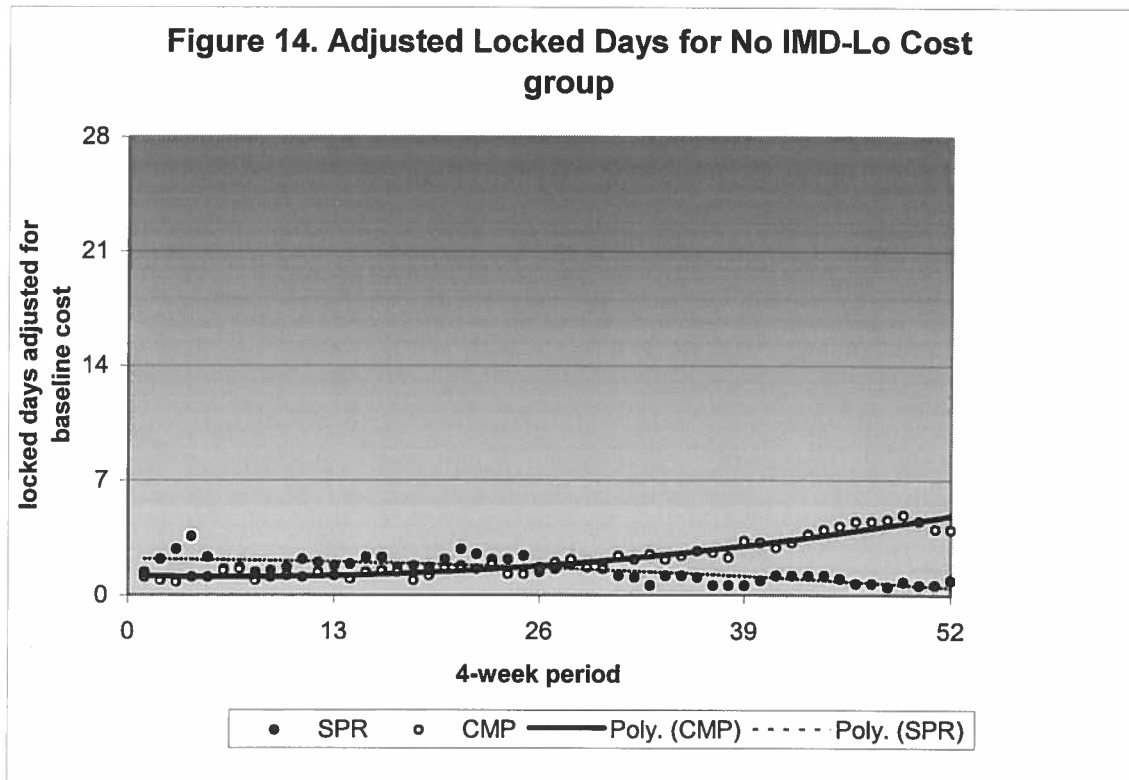
adjustment limit the utility of this graph in elucidating the effect of ACT on ER use in this subgroup.

**9.6 Group 4: No IMD days during baseline and below-median baseline costs**

This subgroup represents the lowest cost tier. Mean costs never rise above twice the capitation rate for either ACT clients or comparisons (Figure 13). In the first two years of the study period, costs between the two groups remain comparable. However, during the third and fourth study years the cost of the ACT clients continues to drop towards the capitation rate while cost for the comparison clients rise. Cumulative net cost by the 4<sup>th</sup> year reflect this. In the fourth study year net costs not only break even but also reach  $-\$5,000/\text{client}$ , indicating cost savings. This is a very surprising finding given that past studies have only demonstrated cost savings for the most costly clients and for those requiring repeated acute hospitalizations. The time by treatment assignment by baseline cost interaction was not suppressed in the RM ANOVA of this subgroup (Table 14). Thus, the significant effect of treatment assignment on the cost trend cannot be interpreted without considering how baseline costs concurrently influence this effect.



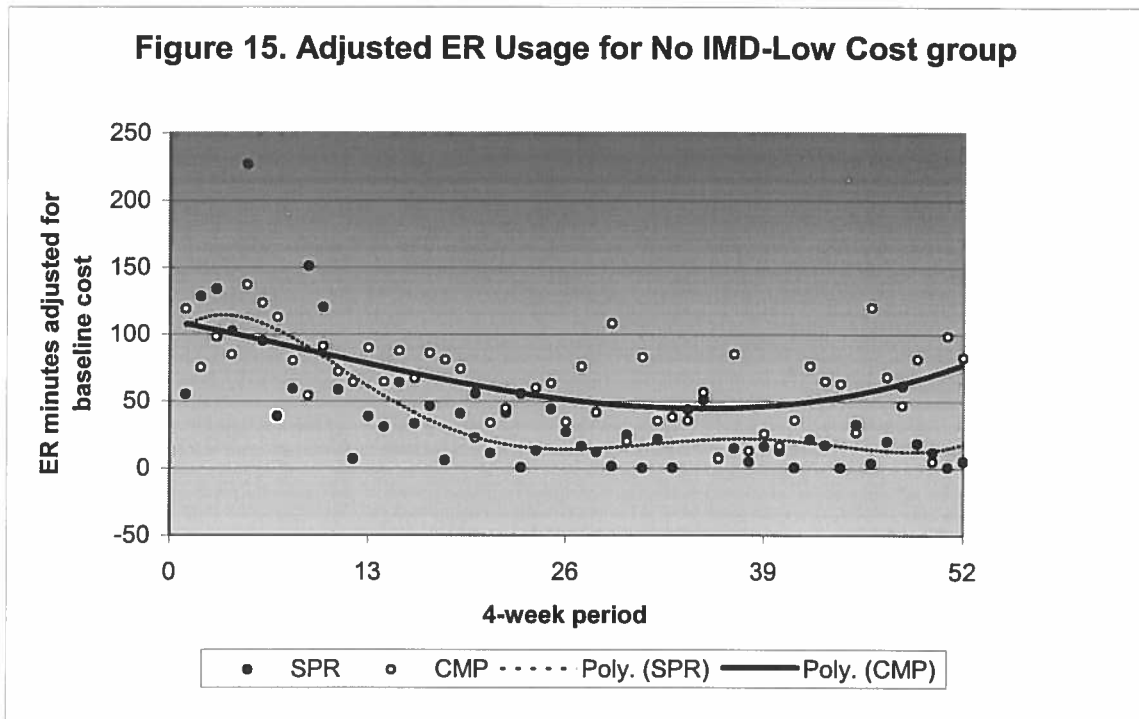
<b>Table 14 – RM ANOVA of cost for No IMD/Low Cost group – Tests of significance for within subjects effects</b>			
<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	0.65	0.9753
<i>Time* treatment assignment</i>	51	2.34	<0.0001
<i>Time* baseline cost</i>	51	0.52	0.9981
<i>Time* baseline cost* treatment assignment</i>	51	1.58	0.0055



The graph depicting the use of locked days in this subgroup (Figure 14) helps to explain the cost savings observed. The two groups begin to show differences in the use of locked days at the beginning of the third year. The mean number of locked days per 4-week period dropped slightly for the ACT group. However, the comparison group rose from 1 locked day per 4-week period at the beginning of the study period up towards 5 days of locked care by the end of 4 years of services. This is a very interesting, unprecedented finding as it suggests that ACT services confer a protective effect for those clients that do not start out with a clinical history marked by repeated or long term use of acute hospitalizations, IMD care, or state hospitalizations. Further

analyses on the particular type of locked care the comparison clients were receiving in the 4<sup>th</sup> year may shed light on the mechanism of this protective effect.

Figure 15 shows the adjusted ER use in this subgroup. It seems that the ACT group uses less psychiatric emergency care for most of the study period. In fact it also seems that the comparison clients show an increase in ER use in the fourth year of standard mental health services, which would parallel the cost and locked days findings. However, the statistical analyses on the trend of ER use could not find a difference between the two trends (Table 15). The large variances make it uncertain whether there truly is a trend that complements the other two outcomes or whether there is actually no difference between the groups in terms of emergency care.



<b>Table 15 - RM ANOVA of ER use for No IMD/Low Cost group – Tests of significance for within subjects effects</b>			
<i>variable</i>	<i>df</i>	<i>F value</i>	<i>p-value</i>
<i>Time</i>	51	0.84	0.7878
<i>Time* treatment assignment</i>	51	0.62	0.9847
<i>Time* baseline cost</i>	51	0.93	0.6073
<i>Time* baseline cost* treatment assignment</i>	51	0.72	0.9307

## **10.0 Discussion**

San Francisco is doing well with the IMD-High cost group, especially keeping in mind the 20 disenrolled comparison clients with high baseline cost. We predict that if these clients had continued as comparison clients, the analysis would have shown a cost savings in this group. Thus, for the county to continue to draw from this pool of public mental health clients is appropriate, as these high cost/high use clients stand to benefit from increase community support through ACT services, while the county can expect costs to drop by three years of ACT intervention.

A more informed policy decision involving the IMD-Low cost group would be served by resolving two issues. First, if the time by treatment assignment by baseline cost interaction were suppressed, the effects of ACT on cost and emergency services use would be more explicit. Second, an analysis of patterns of use may shed light into why there has been a dramatic drop in locked days, but still a net loss to the county in this subgroup after 4 years. With this knowledge, services can be directed to better serve any needs specific to this subgroup. Since this subgroup has low levels of emergency and crisis interventions, it may be very likely that a significant share of costs were coming from supplements to residential care. In such a case, the major issue with these clients is establishing stable housing. Vocational goals would naturally accompany these housing goals as they both pertain to preparation for increased self-sufficiency.

Costs for the No IMD-High cost ACT group (group 3) is just above the capitation rate suggesting that almost all of the services received by these clients were from the SPR program. One way to achieve cost neutrality, if that is the prime goal, would be to lower the capitation rate for this group. However, this strategy would have broad consequences since restricting funding to the SPR programs will likely affect service delivery. In addition, further characterization of the type of locked care that is preferentially decreased would help to shed light into the mechanism of ACT services. This would be helpful to policy makers in prioritizing the type of locked care that should be emphasized over the others in terms of availability. Again, more clarity is needed before policy makers can be confident about changing availability in services, since the time by



treatment assignment by baseline cost interaction was not suppressed in the RM ANOVA of cost and emergency services use this subgroup.

It is fascinating that the No IMD-Low cost tier demonstrated cost savings since all other studies have documented that ACT yields the most dramatic results in the costliest patients with repeated use of locked care. Though this is still a relatively high cost, high service use group, it is less so than the other three tiers. One would expect that if any group were to incur net costs, this would be the one. However, this cost saving group is offsetting some of the costs of the other groups. It appears that ACT services achieve this through prevention of the need for locked care, even after four years. As originally intended, ACT short-circuits the revolving door phenomenon, yet how ACT does this seems to be broader than originally thought. These findings are very interesting since it suggests that large-scale ACT programs may have an adequately sized patient population such that cost saving clients compensate for the high cost ones. In other words, capitation of assertive community treatment can work.

### **10.1 Limitations**

Several limitations of this study decrease the generalizability and utility of the findings for other public mental health entities. All costs pertaining to the mental health care of these clients were not collected. The data set lacked Medicare-paid services, including hospitalizations, and medication costs. These are potentially substantial costs that may have affected the ACT cohort differently than the comparison cohort. In terms of scope, chart reviews did reveal hospitalizations of Medicare-eligible ACT clients that were missing in the BIS data set. Chart reviews were not done on comparison clients, so whether there was a similarity in terms of missing data is unknown. Also, this study lacked data on cost shifting into other public resources. Utilization data on general medical treatment, social services, criminal justice services, time and productivity costs, and family burden were not collected. Thus, if the ACT intervention prevented or contributed to costs in other domains of public services is largely unknown. In the chart reviews, there were only 3 ACT subjects with an episode of incarceration during the study period. Again, use of the justice system by comparison clients is unknown.

Since this study is a quasi-experimental analysis and not a randomized trial, internal validity is compromised. The ACT group was a more costly and more severely ill group during baseline. Though this created a conservative bias, confounding is a potential problem. This was evident in the adjustment for baseline values, which was not always adequate. This also manifested as the three-way interactions discussed above, which were still incompletely suppressed. As a trade-off, however, greater generalizability was gained over the previous randomized trials since mental health clients are less likely to give consent to be subjects in a controlled randomized trial. Generalizability also improves in this case since implementing a larger ACT program will perturb a mental health system more dramatically than a very small sample. This aspect will be especially helpful to policy makers.

Finally, the results could have been more useful to policy makers had clinical and functional outcomes been correlated to the cost and service utilization findings. In this way, there could have been a more objective measure of program efficacy with a cost-effectiveness or cost-benefit analysis. In fact, there was some outcome data for ACT clients, but these outcomes were not collected for comparison clients. This has greater import in mental health systems that are clamping down on psychiatric hospitalization for mental health clients. Since accessibility of psychiatric hospitals and other forms of locked care influences the ability of ACT to decrease costs, other benefits of ACT services should be explored to justify the implementation and continuation of ACT programs in a policy environment that makes cost savings more difficult.

### **11.0 Conclusion**

This is the first utilization and cost analysis of a large-scale capitated ACT program. It is unique in that it has a 4-year follow-up of "ordinary" ACT services vs. non-ACT services in a modern mental health system with widely available case management services. It is also unique in studying multiple ACT teams under capitation contracts with funder-screening of eligible clients. Unlike the LA PARTNERS experience, the county screened and enrolled clients into SPR services while the SPR programs had little authority to disenroll clients. This strategy was successful in retaining high cost public mental health clients. SPR enrollees had a baseline cost

of \$58,636 versus \$21,410 in LA. Unlike the STRIDES experience, the SPR program did not demonstrate clear cost savings. However, the trends for cost are encouraging as two of the four subgroups analyzed demonstrated cost neutrality (IMD-High cost group) or cost savings (NO IMD-Low cost group). Though future trends are unpredictable, the IMD-Low Cost group could potentially reach cost neutrality in a year or so if the net costs continue to progress in the same trend. These findings have a local policy import, providing feedback to the SPR program in terms of successful progress and future directions. Overall the San Francisco SPR program essentially shows what other ACT studies have shown, that days in the community is dramatically increased for ACT clients without a corresponding increase in costs. In sum, it appears that San Francisco has a well-devised capitated ACT program such that it may serve as a national model for the implementation of subsequent ACT programs with a capitated funding scheme. Furthermore, this study proved to be quite helpful to the San Francisco county mental health agency in terms of planning for steps beyond implementation. Thus, this study may also serve as a model as a mechanism to provide ACT programs with feedback and evaluation.

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