Abstract

This review examines the impact of assertive community treatment (ACT) and case management models on the use of inpatient hospitalization and other community mental health services, costs, and other clinical and social outcomes. ACT programs have been found to reduce hospitalization and increase use of community mental health services at an equivalent or reduced cost. Greater fidelity to the ACT model produced better outcomes. The impact of case management models is less consistent, but intensive case management programs also have been found to reduce hospitalization. We discuss limitations in past research and recommend future directions. 


Many individuals with schizophrenia require a variety of treatment, rehabilitation, and support services to function in the community. This article reviews two evolving approaches for the organization and delivery of these services: assertive community treatment (ACT) and case management. ACT provides a comprehensive range of treatment, rehabilitation, and support services through a multidisciplinary team based in the community. Basic characteristics of ACT programs include assertive engagement, in vivo delivery of services, a multidisciplinary team approach, continuous responsibility and staff continuity over time, caseloads with high staff-to-client ratios, and brief but frequent contacts (high service intensity). ACT teams also provide a close liaison with the client's support system and a treatment focus on alternate activities (Taube et al. 1990).

Case management generally is more narrowly focused. Although there are many models of case management, its essence is a relationship between a client and a case manager that is designed to enhance continuity and coordination of care. Through this relationship, the client receives expanded access to services, whether these are provided directly or brokered through outside agencies.

The ACT model was first developed and evaluated by Stein and Test (1980) in Madison, Wisconsin, where it was called the Training in Community Living (TCL) program. The TCL model, which was subsequently replicated in Australia, Michigan, and London, has been modified and adapted for different settings. One specific adaptation of this model, known as assertive outreach (AO), was developed and evaluated at Thresholds, a large psychosocial rehabilitation agency in Chicago. This model has subsequently been implemented, adapted, and evaluated at several sites in Indiana, Illinois, and Pennsylvania. Despite some differences in their structure and operation, the TCL and the AO models embody the key elements of the ACT approach. Moreover, there is a broad consensus among experts concerning the nature of these critical elements, which has led to the recent development of several approaches.

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for assessing the fidelity of implementation of ACT models (Brekke and Test 1992; McGrew et al. 1994; McGrew and Bond 1995; Teague et al., submitted for publication).

Whereas ACT programs trace their lineage to a single model program in Wisconsin, case management programs have no such singular origin. As a result, these models tend to be highly diverse, with different traditions and governing principles. Case management models have traditionally included at least five core functions—assessment, planning, advocacy, linkage, and monitoring (Chamberlain and Rapp 1991)—but have combined them in different ways. These models range from generalist models in which case managers work with large caseloads, brokering services from other providers and agencies, to personal strengths or rehabilitative models, where some types of services may be provided or brokered and the caseloads may be smaller in size. ACT and case management approaches can be viewed as opposite ends of a continuum. ACT directly and intensively provides all or nearly all of the treatment, rehabilitation, and support services needed by individuals with schizophrenia; case management models offer a limited array of direct services delivered with less intensity than ACT programs. The distinction between ACT and case management models blurs with the consideration of intensive case management models. Many of these are modeled on the TCL approach but lack some of the critical program elements (e.g., the use of a multidisciplinary team) and are therefore not considered ACT.

This review addresses the following questions:

1. Do ACT and case management community care models reduce the use of psychiatric inpatient care?
2. Do ACT and case management models increase the use of other nonpatient mental health services?
3. Do ACT and case management models reduce the overall costs of care?
4. Do ACT and case management models affect other outcome domains?

Methods

To identify previous literature reviews and research studies for this review, we conducted computerized searches of the PSYCLIT and MEDLINE bibliographic data bases for the years 1966 to 1993. These searches used the following keywords: social support or social adjustment, community support, case management, managed care, rehabilitation, social support, environment, or income support. This search yielded 1,256 citations, including six reviews of high quality based on Beaman’s (1991) criteria (Olsson 1990; Chamberlain and Rapp 1991; Rubin 1992; Solomon 1992; Test 1992; and Bond et al. 1995). Also, a quantitative review by McGrew et al. (1994) examined the effect of implementation fidelity on rehospitalization by using an analysis of 18 programs. In addition, three recent studies that evaluated ACT programs and nine studies that investigated different models of case management were identified and reviewed. These studies used either a randomized controlled design or a quasi-experimental design with one or more comparison groups.

Classifying research reports into categories of ACT and case management can be complicated by the lack of detail provided about the intervention. In addition, as noted, the boundary between ACT and some intensive case management programs is unclear. This was particularly true of intensive case management programs that were described as being modeled on the TCL program. We have opted to include these ACT-like intensive case management programs with case management models and restrict our classification of ACT studies to the original Stein and Test (1980) evaluation; the subsequent replications in Michigan (Mulder 1982, 1985), Sydney, Australia (Houl et al. 1983; Houl and Reynolds 1984), and London, England (Marks et al. 1994); and the nine studies on AO reviewed by Bond et al. (1995).

Findings

Table 1 presents the characteristics of the seven previous reviews. These reviews discuss a total of 22 studies spanning the years 1973 to 1991. Table 2 shows the design and sample criteria of the three additional ACT studies and the nine additional case management studies.

Do ACT and Case Management Community Care Models Reduce the Use of Psychiatric Inpatient Care?

ACT. Strong and consistent evidence from the previous reviews and additional studies supports the claim that ACT reduces the rate and duration of psychiatric hospitalization. In a meta-analysis on
nine studies involving the AO approach, Bond et al. (1995) concluded that "as a rule of thumb, providing assertive outreach programs for frequent users of hospitals can be expected to reduce inpatient days by about 50 percent" (p. 12). Three points should be noted, however. First, the reduction in the use of psychiatric hospitalization may be at least partially offset by an increased use of other community-based alternative services, such as 24-hour crisis intervention and residential services. Therefore, reductions in the use of inpatient services may not be as pronounced where these other services are unavailable. Second, the effectiveness of ACT models in reducing rehospitalization may be a function of their capacity to control hospital admissions, length of stay, and discharge. As an illustration, in the evaluation of the Daily Living Programme (DLP; Marks et al. 1994) the DLP team initially had control over the length of hospital stays for patients assigned

Table 1. Characteristics of primary literature reviews

<table>
<thead>
<tr>
<th>Review</th>
<th>Years covered</th>
<th>Number of studies</th>
<th>Models reviewed</th>
<th>Numbers and types of designs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olfson (1990)—narrative review</td>
<td>1973–89</td>
<td>11</td>
<td>ACT (TCL, AO)</td>
<td>8 RCT 3 NONEX</td>
</tr>
<tr>
<td>Chamberlain and Rapp (1991)—narrative review</td>
<td>1987–89</td>
<td>6</td>
<td>ACT (TCL, AO)</td>
<td>3 RCT 2 QUASI 1 NONEX</td>
</tr>
<tr>
<td>Rubin (1992)—narrative review</td>
<td>1987–91</td>
<td>8</td>
<td>ACT (TCL, AO)</td>
<td>3 RCT 5 NONEX</td>
</tr>
<tr>
<td>Solomon (1992)—narrative review</td>
<td>1980–90</td>
<td>20</td>
<td>ACT (TCL, AO)</td>
<td>11 RCT 9 NONEX</td>
</tr>
<tr>
<td>Test (1992)—narrative review</td>
<td>1973–92</td>
<td>8</td>
<td>ACT (TCL, AO)</td>
<td>7 RCT 1 NONEX</td>
</tr>
<tr>
<td>McGrew et al. (1994)—quantitative analysis</td>
<td>1982–94</td>
<td>9</td>
<td>ACT (AO)</td>
<td>Research designs not described</td>
</tr>
<tr>
<td>Bond et al. (1995)—meta-analysis</td>
<td>1982–93</td>
<td>9</td>
<td>ACT (AO)</td>
<td>2 RCT 7 NONEX</td>
</tr>
</tbody>
</table>

Note.—ACT = assertive community treatment; TCL = Training in Community Living (Madison), AO = assertive outreach, CM = case management services; GEN = generalist model; REH = rehabilitation model; STR = personal strengths model; RCT = randomized controlled trials; QUASI = quasi-experimental design; NONEX = nonexperimental design

Table 2. Research design and sample criteria for additional studies

<table>
<thead>
<tr>
<th>Author and year</th>
<th>Research design</th>
<th>Comparison/control groups</th>
<th>Sample criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test et al. (1991)</td>
<td>RCT</td>
<td>Madison Co. (TCL) (n = 75)</td>
<td>High-quality standard care that included case management (n = 47) SCZ = 74%</td>
</tr>
<tr>
<td>Muijen et al. (1992a, 1992b); Knapp et al. (1994); Marks et al. (1994)</td>
<td>RCT</td>
<td>Replication of TCL model called DLP (n = 92)</td>
<td>RDC diagnosis of schizophrenia or schizoaffective disorder or DSM-III diagnosis of schizotypal personality; less than 12 mo total accumulated prior treatment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Severe inpatient/outpatient care in inner-city London (n = 97) SCZ = 49%</td>
<td>Severe mentally ill residents from catchment area presenting with urgent need for hospital admission</td>
</tr>
</tbody>
</table>
Table 2. Research design and sample criteria for additional studies—Continued

<table>
<thead>
<tr>
<th>Author and year</th>
<th>Research design</th>
<th>Comparison/control groups</th>
<th>Sample criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audini et al. (1994)</td>
<td>RCT</td>
<td>Continuation of DLP model (n = 33) Withdraw DLP and substitute standard care (n = 33) Remaining control group from Marks et al. (1994) (n = 90) SCZ = 30%</td>
<td>Severely mentally ill patients who had completed at least 18 mo of DLP treatment (Marks et al. 1994)</td>
</tr>
<tr>
<td><strong>Intensive case management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curtis et al. (1992)</td>
<td>QUASI</td>
<td>Intensive outreach case management intervention (n = 147) CSS case management program (n = 143) Routine aftercare (n = 145) SCZ = 45%</td>
<td>Discharged patients from a public general hospital who met State eligibility criteria for CSS services</td>
</tr>
<tr>
<td>Morse et al. (1992)</td>
<td>RCT</td>
<td>Continuous treatment team (n = 52) Outpatient mental health clinic (n = 64) Drop-in center (n = 62) SCZ = 30%</td>
<td>Indications of a severe psychiatric disorder; current homelessness; remain in area for 1 year; no violent behavior</td>
</tr>
<tr>
<td>Burns et al. (1993a, 1993b)</td>
<td>RCT</td>
<td>Assertive treatment (n = 94) Standard case management (n = 78) SCZ = 33% (% psychotic)</td>
<td>Consecutive entry into care and not under treatment during past 12 mo</td>
</tr>
<tr>
<td>Hornstra et al. (1993)</td>
<td>QUASI</td>
<td>Intensive case management (n = 112) Minimal CM and CMHC services (n = 112) SCZ = 100%</td>
<td>Diagnosis of schizophrenia and now receiving either intensive CM or minimal CM and CMHC services</td>
</tr>
<tr>
<td>Lehman et al. (1993)</td>
<td>RCT</td>
<td>Intensive CM, PSR, and CMHC services (n = 29) PSR and CMHC services only (n = 25) SCZ = 67%</td>
<td>DSM-III-R diagnosis of bipolar or major depressive disorder or schizophrenia and a diagnosis of a lifetime substance use disorder</td>
</tr>
<tr>
<td>Macias et al. (1994)</td>
<td>RCT</td>
<td>PSR and personal strengths CM (n = 20) PSR only (n = 21) SCZ = 46%</td>
<td>All patients met Utah’s criteria for severe and persistent mental illness</td>
</tr>
<tr>
<td>McCrone et al. (1994); Mujien et al. (1994)</td>
<td>RCT</td>
<td>Intensive case management with teams of CPN (n = 41) Usual CPN care (n = 41) SCZ = 83%</td>
<td>Any psychotic disorder and at least two hospitalizations in past 24 mo</td>
</tr>
<tr>
<td>Solomon and Draine (1995)</td>
<td>RCT</td>
<td>Intensive CM from consumer-staffed team (n = 48) Case management from professional case manager-staffed team (n = 48) SCZ = 57%</td>
<td>Diagnosis of a major mental illness, a significant treatment history, and evidence of disability as assessed by GAS score</td>
</tr>
<tr>
<td>Quinlaven et al. (1995)</td>
<td>RCT</td>
<td>Intensive case management (n = 30) Conventional case management (n = 30) SCZ = 57%</td>
<td>Major DSM-III-R diagnosis and three or more hospitalizations in the past 30 mo</td>
</tr>
</tbody>
</table>

*Note.*—CM = case management, CMHC = community mental health center; CPN = community psychiatric nurse; CSS = community support system; DLP = Daily Living Programme; DSM-III = Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association 1980); DSM-III-R = Diagnostic and Statistical Manual of Mental Disorders—Revised (American Psychiatric Association 1987); GAS = Global Assessment Scale (Endicott et al. 1976); PSR = psychosocial rehabilitation; QUASI = quasi-experimental design; RCT = randomized controlled trial; RDC = Research Diagnostic Criteria (Spitzer et al. 1978); SCZ = schizophrenia; TCL = Training in Community Living.
to this condition. During this period, hospitalizations for DLP patients occurred at about the same rate as for control patients but were approximately 80 percent shorter in duration. Later, control over discharge decisions was assumed by non-DLP staff, and the average lengths of stay increased markedly. Third, reductions in hospital use have tended to cease after ACT treatment is discontinued (Stein and Test 1980; Test 1992; Audini et al. 1994).

Fidelity to the original ACT program model appears to be an important determinant of reductions in psychiatric inpatient utilization. Evidence for reduced psychiatric hospitalization is stronger in the original TCL study (Stein and Test 1980) and its direct replications (with the exception of Marks et al. 1994) and in those studies that target recent heavy users of mental health services. The evidence is less compelling in studies in which the original model was modified. McGrew et al. (1994) assessed the impact of program fidelity for AO on reductions in psychiatric hospital days in a sample of 18 programs using this model. They found a significant association between the total fidelity index score and two fidelity index subscale scores (staffing and organization) and reductions in hospital days.

Case management models. Several problems undercut our ability to draw conclusions from the current literature on case management models. A chief problem is the lack of replication studies of clearly defined and well-implemented program models. There are too few studies using the same program model to permit a firm conclusion about its effects. The recent evaluation by Macias et al. (1994) is important for just this reason; it represents an independent replication of the personal strengths program model initially evaluated by Modrcin et al. (1988). However, this experimental study is limited by its very small sample size.

Evidence for the impact of different case management models on reductions in the use of psychiatric inpatient care suggests that intensive case management programs reduce utilization of inpatient care. However, many of the results cited by reviewers were not statistically significant. Several studies have demonstrated significant reductions in the mean number of rehospitalizations (Borland et al. 1989; Bigelow and Young 1991; Curtis et al. 1992) and in the average number of days hospitalized (Borland et al. 1989; Wright et al. 1989; Bush et al. 1990; Burns et al. 1993b; Quinlaven et al. 1995). Other studies have reported no difference in the average number of readmissions (Bush et al. 1990; Hornstra et al. 1993; Muijen et al. 1994) or in the average number of days hospitalized (Bigelow and Young 1991; Hornstra et al. 1993; Lehman et al. 1993; Muijen et al. 1994).

Another problem is the wide variability in program characteristics within the general category of intensive case management. In most of these reports, the extent to which the case management intervention explicitly targeted reductions in hospital utilization and the degree of control exercised by the program over hospital admission and discharge decisions could not be determined. Caseload size and composition also varied across these reports. Thus, we could not determine whether the intensive case management programs that did reduce hospital use achieved these results because of an explicit focus on reducing hospitalization and intensity of services provided or because of an ability to control the hospitalization process. Conversely, we could not determine whether programs that did not significantly reduce hospital use failed because they lacked one or more of these elements.

The evidence is equally unclear for other case management models. For example, in two evaluations of the personal strengths model, Modrcin et al. (1988) found no effect on rehospitalization rates and Macias et al. (1994) reported no reduction in subsequent inpatient utilization. In an evaluation of the generalist model, Franklin et al. (1987) reported a significant increase in hospital use among individuals who received case management. An evaluation of the rehabilitation model (Goering et al. 1988) failed to significantly reduce rehospitalization. In short, none of these other models reduced psychiatric inpatient utilization.

Do ACT and Case Management Models Increase the Use of Other Noninpatient Mental Health Services?

ACT. Use of other noninpatient mental health services has not been widely assessed in studies of ACT programs. In the few studies that included this outcome, results have been mixed. Stein and Test (1980) found no increase in the use of supervised residential settings. Bond et al. (1988) found no significant differences in the type and amount of mental health services used by subjects receiving AO through a psychosocial rehabilitation program versus controls re-
ceiving traditional aftercare services. In a different study with the AO model, Bond et al. (1989) did find a significant increase in the amount of other mental health services used by dually diagnosed subjects relative to a comparison group. No studies to date have found that ACT programs resulted in a reduction in the use of community-based services.

One indicator of service use is retention of patients in the program. Bond et al. (1995) noted an average program retention rate of 83 percent across nine studies of AO, significantly higher than the 51.5 percent found in comparison conditions. By assuming that retention in a treatment program will lead to greater exposure to services, it could be argued that AO programs do increase the use of community-based mental health services. However, this evidence is less direct than are comparisons of service utilization rates across different types of community-based services.

Case management models. There is clear evidence that intensive case management models increase the use of other mental health services. Six of the seven studies of these models that explicitly examined this outcome reported positive and significant effects (Morse et al. 1988, 1992; Borland et al. 1989; Jerrell and Hu 1989; Hornstra et al. 1993; Quinlaven et al. 1995). A seventh study (Burns et al. 1993b) found no significant increase in the use of general practitioner and social services contacts within a British sample.

Case management models such as the generalist or rehabilitation models also produce an increase in the use of other mental health services (Franklin et al. 1987; Goering et al. 1988). Both models target linkage with other community-based services. In considering this outcome, however, note several points. First, an important limiting factor is the degree to which the surrounding services environment may be characterized as rich or poor in services. For example, Franklin et al. (1987) described the control condition in their study as an aggressive aftercare program that included some features of case management activity. They argued that, in this type of service environment, a program such as their experimental intervention may have been unnecessary given the easy access to services exemplified by their control program. Second, as case management in various forms becomes more widespread, the potential for finding significant differences in service utilization between experimental case management interventions and traditional care conditions diminishes. Finally, Chamberlain and Rapp (1991) have argued that the emphasis on increased use of other community services may be misleading. They suggest that this may be a more appropriate process measure that assesses the implementation of a case management program. They note the weak linkage between the use of community services and client outcomes. We suggest that future research investigating the impact of case management on the use of other community services should move beyond previous emphases on simple linkage or volume of services used and consider other dimensions of service utilization such as coordination and continuity of care as well as met and unmet service needs.

Do ACT and Case Management Models Reduce the Overall Costs of Care?

ACT. The impact of ACT programs on the costs of treatment has been addressed in several economic analyses. Several studies have examined the costs of the TCL program. A comprehensive cost-benefit analysis of the original TCL program (Weisbrod et al. 1980) found that the average direct treatment costs per client for the 1 year after admission to the study were higher for TCL subjects than for controls. These increased direct treatment costs were offset by a higher level of benefits (including a doubling of work productivity) for the experimental subjects, resulting in a small but significant positive cost-benefit ratio that favored the TCL program. Hoult et al. (1983; Hoult and Reynolds 1984) found that the average annual direct and indirect treatment costs were substantially less for the experimental subjects than for the control subjects ($4,489 vs. $5,669 per patient). In addition, the sources of these costs were very different for the two groups: for the experimental subjects, 81 percent of the costs were incurred in the community; for the control subjects, 79 percent of the costs resulted from inpatient treatment. In the London replication study, Knapp et al. (1994) concluded that DLP treatment was significantly less costly in the short and medium term than was standard hospital-based inpatient and outpatient care at Bethlem-Maudsley Hospital. Cost-effectiveness was achieved without shifting the costs of care from the National Health Service to other agencies or to families.

Evidence for cost savings from
AO programs is less consistent. The original evaluation at Thresholds and a subsequent replication showed that costs for service recipients were significantly reduced (Bond 1984). In a third study involving three separate replications of the AO model in community mental health centers in Indiana (Bond et al. 1988), the findings were highly inconsistent (i.e., in one case, AO costs were higher than standard community mental health center care, in another they were equivalent, and in a third they were less costly). Bond et al. (1988) suggested that program fidelity may be an important factor in the realization of any potential savings.

Several factors complicate comparisons of the results of these studies, including variation in adherence to the program model, the ways in which the cost analyses were conducted, and differences in study design (e.g., random assignment vs. pre-post designs). Nevertheless, the evidence for cost savings from TCL-type programs appears stronger and more consistent than for the AO adaptation. Past studies have shown that TCL programs are either less costly than comparison conditions or, when more costly, the higher costs may be offset by an increased earning capacity on the part of service recipients. In addition, several studies have shown that the sources of treatment costs change as a result of TCL programming, with a reduction in costs attributable to inpatient care and an increase in structured residential and/or outpatient costs. These shifts are compatible with the program theory underlying the TCL model. Evidence for the cost impact of the AO model has been more conflicting, and a rigorous economic evaluation of this model should be undertaken.

Case management models. Three studies that examined intensive case management approaches found evidence that these approaches were less costly than comparison conditions (Burns et al. 1993b; Muijen et al. 1994; Quinlaven et al. 1995). Jerrell and Hu (1989) concluded that total costs of treatment over 2 years for experimental subjects exceeded those for controls by about $1,700, but this difference was not statistically significant. This study also found evidence that the source of the costs had shifted, with experimental subjects incurring slightly higher costs for outpatient services and somewhat lower costs for inpatient and skilled nursing facility services. Borland et al. (1989) reviewed the patterns of costs over 5 years of intensive case management for 72 patients. They found that there was a significant reduction in each year in the costs of hospitalization and precommitment evaluations. Simultaneously, the costs of structured residential care increased significantly throughout the period. Borland et al. (1989) found that when the costs of case management itself were added, there was no significant savings in total treatment costs. Wright et al. (1989) found that total costs (based on billing for services across the system of care) decreased significantly for each of 4 years of intensive case management.

In a subsequent 2-year follow-up of the patients studied by Borland et al. (1989), McRae et al. (1990) examined the costs of care after intensive case management ceased (i.e., the 72 study patients had returned to standard community mental health center care). One important finding was that total treatment costs during the 2-year followup period under standard treatment decreased by 12 percent compared with the costs under intensive case management. Hospitalization did not significantly increase when compared with prior rates during intensive case management. McRae and colleagues (1990) suggested that 5 years of intensive case management may have long-lasting stabilizing effects that persist beyond the termination of treatment. An alternative explanation is that important elements of intensive case management were integrated into the standard care.

Given the paucity of economic analyses using case management models other than those above, it is not possible to draw conclusions about their costs or cost-effectiveness.

Do ACT and Case Management Models Affect Other Outcome Domains?

ACT. Evidence from past reviews and studies supports the conclusion that ACT programs reduce psychiatric symptomatology, improve social functioning, and promote residential stability and independent living. The evidence for these effects is somewhat stronger for programs modeled on the TCL program than for AO (Olffson 1990; Test 1992; Bond et al. 1995). ACT also appears to improve compliance with treatment and is well accepted by patients. We are unable to draw conclusions about such effects on quality of life, family well-being, and involvement with police and the criminal justice system in part because these outcomes have been
less studied and also because the few studies that have examined these domains have produced conflicting results.

In considering these conclusions, keep in mind two important points. First, improvements in areas such as psychiatric symptomatology and social functioning may require more exposure to ACT than do outcomes such as reduced readmission rates. Several studies have shown reductions in hospital use at assessments conducted as early as 6 months after the initiation of treatment (e.g., Test et al. 1985; Bond et al. 1988), whereas symptom improvement may require 1 year or more (Mulder 1982). Future research should explore the timing of positive effects in more detail.

Second, it is generally believed that treatment gains from ACT are lost after treatment is either discontinued or withdrawn (Stein and Test 1980; Mulder 1985; Audini et al. 1994). Test et al. (1991) note that a similar tendency is apparent across a variety of models of community treatment. The TCL program was designed to provide ongoing, open-ended treatment specifically to support treatment gains. The study by Audini et al. (1994) is one of the few controlled studies to date to explore the effects of a “step-down” from an intensive TCL model of care to conventional case management services. Patients who had participated for at least 18 months in the DLP were randomly assigned to either continued participation in DLP or to regular community-based care. These two groups were compared to the original control group (which never received DLP) from the Marks et al. (1994) phase I evaluation of DLP.

For the vast majority of measures, former DLP patients in the community care condition lost the clinical and social gains they had attained during the DLP treatment.

Case management models. In summarizing results from this literature, Chamberlain and Rapp (1991) note that case management models show poor (or at best uneven) results on outcomes such as reduced symptoms and treatment compliance but more promising results on instrumental role functioning in specific life domains such as vocational functioning as well as residential stability and independence. They also conclude that “regardless of intervention or particular focus of the intervention (e.g., hospitalization, functional abilities, service usage), the primary focus [of the model] will be achieved (except with the generalist model). In other words, defining a principal focus seems sufficient to assure achievement on that dimension” (p. 185).

Discussion

ACT consistently reduces the rate and duration of psychiatric patient care, increases program retention, and may be less costly over the short- and mid-range compared with other approaches to organizing and delivering services (e.g., community mental health centers or hospital-based aftercare). Intensive case management can also reduce inpatient utilization and increase the use of community-based services. Here it is worth recalling that the border between intensive case management programs and ACT may be difficult to discern. One way to approach this problem may be to build on the quantitative review by McGrew et al. (1994) and examine treatment effect sizes weighted by some type of ACT implementation index.

Enhanced program fidelity has been linked to effectiveness for ACT (e.g., McGrew et al. 1994). Although some modification of the elements of any program model is usually necessary to adapt an innovation to local conditions, it would be helpful to know which elements of the original ACT model can be safely modified and which should not be changed. Further work with indices of program fidelity could clarify this question. This issue is likely to assume increasing importance for analyses of case management models as well.

An important problem that cuts across most of the research is the extent of its generalizability to people with schizophrenia. Although persons with schizophrenia are represented in substantial numbers in most of these studies, issues of specific importance for schizophrenia are largely missing from consideration (e.g., the effects of different program models on positive vs. negative symptoms and the types and dosages of medication regimens patients receive). Exceptions include the studies by Test et al. (1985, 1991) and Hornstra et al. (1993), which are limited to subjects with schizophrenia, and the report by Marks et al. (1994), which includes specific subgroup analyses on subjects with schizophrenia. Thus, much of the research reviewed here actually focuses on the broader category of individuals with severe and chronic mental illnesses.

The continued use of randomized controlled trials to examine the efficacy of different program models should be strongly en-
couraged, particularly for specific case management models. These trials should include carefully diagnosed patient samples in adequate numbers to provide sufficient statistical power to conduct analyses on meaningful subgroups. These trials should be conducted using well-specified models of case management and should include careful attention to implementation fidelity.

Additional research with ACT and case management models is needed to examine outcome domains, which have received less emphasis in past research. These include family well-being, quality of life, and involvement with police and the criminal justice system. There is a need to incorporate measures of psychiatric symptomatology and social functioning that address specific aspects of schizophrenia (e.g., positive and negative symptoms). Also, outcome assessments should include the perspectives of patient, family, and provider.

Economic analyses of ACT and case management models should continue to be an important focus of research. Cost analyses should consider costs and benefits from multiple perspectives and should seek to identify important subgroups of patients for whom services are especially effective (or patients for whom such services are not effective). These analyses should explore the various patient, environmental, and organizational characteristics that shape the cost-effectiveness of specific program models. Additional economic analyses should examine the costs and benefits of well-defined and implemented case management models.

The timing and persistence of treatment effects produced by ACT programs are important areas for future research. Do patients who engage in ACT require this level of service intensity for the remainder of their lives, or can some patients successfully step down to lower levels of intensity? Is there a "minimum dose" of ACT after which patients might make a transition to less intensive care? Could older individuals with schizophrenia function adequately with less service intensity?

As we have noted in other articles in this issue of Schizophrenia Bulletin (e.g., Scott and Dixon 1995), there is a current trend toward combining psychosocial interventions into larger "service packages." In the case of ACT, ongoing studies are evaluating the efficacy of combining ACT with social skills training (Vaccaro et al. 1992) and with family psycho-educational approaches (McFarlane et al. 1992). It is hoped that there will be similar activity in future evaluations of case management models as well.

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**Announcement of Available Research Funds**

The Theodore and Vada Stanley Foundation, in collaboration with the National Alliance for the Mentally Ill, welcomes applications for the 1996 Stanley Foundation Research Awards Program. The purpose of the awards is to support research directly related to the causes or treatment of schizophrenia and bipolar disorder. The research awards are intended to attract established scientists from other areas of biology and medicine (e.g., biochemistry, immunology, virology, and neurology) into research on schizophrenia and bipolar disorder as well as to provide support for innovative research by scientists already in the field whose funding sources are limited. Applicants are invited from all stages of career development. Awards are for 1 or 2 years. They may be up to $75,000 per year for studies involving human subjects and up to $50,000 per year for other studies. Funds may be used for salaries, supplies, and equipment, but it is the policy of the Stanley Foundation not to pay indirect costs for administration of the award. In 1995, 49 applications were funded out of a total of 220 received.

The deadline for receipt of applications is March 1, 1996. The four-page application consists of a brief outline of the proposed project, a budget, and a list of current and pending sources of funding. Notification of awards is made in June and funding to award recipients begins in August. The research award applications are reviewed by a professional selection committee.

Requests for applications and questions should be directed to:

**Research Awards Coordinator**

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