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HARBINGER I: THE DEVELOPMENT AND EVALUATION OF THE FIRST PACT REPLICATION

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ABSTRACT: While Assertive Community Treatment (originally known as the PACT program) is now recognized around the world as an effective model for rehabilitation of persons with severe mental illness, this was not the case 20 years ago. Harbinger of Grand Rapids, in Kent County, Michigan, was the first replication of the PACT model which sought fidelity and included an experimental design for assessing effectiveness. The design and results are presented from an initial 30-month and a follow-up 66-month evaluation of Harbinger. The 30-month evaluation showed significant differences favoring Harbinger vs. the control group on independent living, employment, and client functioning. At 66-months, there were fewer experimental-control group differences. The differences in results are analyzed in terms of design and data collection problems, changes in the treatment environment for the control group, and the longitudinal course of mental illness. The discussion focuses on next steps in ACT research, utilizing program theory to better establish the mechanisms for successful intervention models.

By the late 1970s, many states were no longer experiencing dramatic decreases in census reduction at state psychiatric hospitals, as in the early days of deinstitutionalization. The population that was easier to place (i.e., into nursing homes) or to return to family homes had been discharged (Johnson, 1990). The population that remained represented clients with more difficult to treat problems. Also, states were faced with escalating numbers of young clients from the baby-boomer generation who were markedly less compliant than their older counterparts as well as being vic-

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tims of a world-wide epidemic of drug use (Humphreys & Rappaport, 1993). Concurrently, media exposes and mental health professionals decried the "dumping" of mental patients from state hospitals "into the streets" without adequate care or housing, or their being warehoused into board and care homes or other "supervised" residences. Family members began their protests that mental health programs were placing undue burden on them to care for ill relatives, extruded or ignored by the public programs mandated to serve them. Litigation by advocates also forced attention on the need to protect the rights of those with mental disabilities. A return to institutionalization could not be a solution; neither was inhumane treatment in the community to be tolerated. While community mental health agencies enjoyed expansion through federal and state support starting in the 1960s, many of their programs focused on outpatient and less intensive care for psychological and/or emotional problems and less serious disturbances. It was clear that community-based mental health programs (CMH) needed to vastly revise their services to address the needs of a deinstitutionalized population and of those individuals with severe and persistent mental illnesses who would have been long-term hospital residents, in days past.

These forces were buoyed by the fact that some models of community treatment had demonstrated effectiveness at costs equal to or less than hospitalization (Kiesler, 1982). One such program recognized in the mid-1970s was Training in Community Living from Madison, Wisconsin (Drake & Burns, 1995; Olfson, 1990; Taube, Morlock, Burns, & Santos, 1995; Thompson, Griffith, & Leaf, 1990)—later renamed the Program in Assertive Community Treatment, or PACT. The efforts of the Michigan mental health system to demonstrate and evaluate the first assertive community treatment (ACT) replication are the subject of this report.

BACKGROUND

Through 1979, Michigan experienced a booming economy (with average disposable personal income higher than the U. S. average). State government experienced expansion and exerted efforts to make government work and to restore control to the state level. In the mental health arena, a new Mental Health Code was passed, with expanded emphasis on rights protection and advocacy and on legal mechanisms and fiscal incentives to increase the use of community-based care and treatment. The Michigan Department of Mental Health (MDMH; now renamed the Michigan Department of Community Health) was reorganized away from an institutional focus to a programmatically-driven organizational structure which emphasized planning, development, and management based on rational

principles. Many young professionals with advanced degrees were attracted to and hired into this structure. One result was the development of a systematic strategy for developing and adopting innovative program models (Tableman, 1989). This involved state office staff identifying, from the literature, models that promised to be effective in improving services to a specified target population and the state providing resources to systematically evaluate demonstrations of these models. State DMH staff wrote requests for proposals, solicited applications from qualified and appropriate community mental health (CMH) providers, selected program sites on a competitive basis, negotiated contracts, designed evaluation components for the sites to carry out, collected and analyzed data, and prepared reports on program operations and outcomes. Following establishment of initial program effectiveness, models were to be replicated in additional sites, with further evaluations conducted. Results would then be analyzed and used to make necessary adaptations in the model for statewide implementation.

The expansion of alternatives to hospitalization for persons with mental illness was designed to follow this strategy. Consequently, in 1978, the Michigan Department of Mental Health issued a request for proposals (RFP) to its county-based community mental health boards to solicit demonstration and evaluation projects in this area. Three sites were eventually selected and funded. One rural residential program disbanded in less than a year. A second suburban program showed equivocal results in terms of its program fidelity and impact. The third program, Harbinger of Grand Rapids, operated by the Kent County Community Mental Health Services Board, showed significant effects on the population served. These results initiated major changes in the services delivered to persons with long-term mental illness at the Kent County level and statewide in Michigan.

This article presents the evaluation of this demonstration project. Results from two longitudinal evaluation studies are reported. The first is a follow-up at 30 months of the original sample that participated in an experimental design, using random assignment and examining the effectiveness of Harbinger versus control conditions (hospitalization and usual aftercare case management). The second study is a follow-up of the original Harbinger and control groups at 66 months.

THE HARBINGER SERVICE MODEL

The Kent County Community Mental Health Services Board is the management authority for all public mental health services in the county. As such, in the 1970s, it was concerned with minimizing hospital utilization of citizens with psychiatric disabilities as well as maximizing these individuals'

community tenure, level of functioning, and quality of life. In response to the Department of Mental Health's RFP, the Harbinger Alternative Treatment program (ATP) was proposed and begun in late 1979, based on the Training in Community Living alternative from Madison, Wisconsin (later renamed PACT). In establishing the program, Harbinger staff visited and received consultation from PACT's program developers and implementers.

Following the PACT model, Harbinger was founded on the premise that conventional community aftercare programs failed to meet certain essential needs of individuals clinically disabled with psychiatric problems. These individuals were seen as aggressively dependent on family or institutions and engaged in behaviors designed to have others provide protection. A first principal of the program was to reduce unnecessary hospitalization to avoid rewarding and, thus, increasing the frequency of maladaptive behaviors. To achieve this, the intervention required intensive community support during periods of crisis and continuing access to community treatment programs. Staff worked as a collaborative team, serving clients "in vivo"—that is, in the natural community where they live, work and play. The staff was also available or on-call during evening and weekend hours when traditional services are usually unavailable. The Harbinger ATP team consisted of a master's level mental health professional as the team leader, an occupational or recreational therapist, a nurse, and five bachelor's level or paraprofessional staff advocates. Psychiatric support and services were available when needed.

Clients were considered for enrollment in the Harbinger ATP when they presented for psychiatric hospital admission. Once hospital staff determined eligibility, Harbinger was contacted and team members went to the hospital immediately to meet with the client and relevant others to determine if hospitalization could be avoided. Based on the client interview, hospitalization occurred only in the most extreme cases of need (anticipated suicidal or homicidal behaviors). For those who enrolled in Harbinger, the client (identified as a member) and his/her significant others returned with Harbinger staff to the program office where additional assessments were made of the member's status and immediate needs, and arrangements made to accommodate those needs through the program. Within 48 hours of enrollment, a comprehensive assessment was made. Within the first week, an individual plan was developed by the staff and the member. During members' first days in the program, they usually required concentrated attention from the staff, who may have spent as many as 12 hours a day with them. Members were assisted in regaining self-care skills and coping in the community. The individual plan was reviewed and updated at least quarterly.

Members were encouraged toward as much independence as possible, always within the framework of the Harbinger program being available for

support when needed. The emphasis was on teaching appropriate behavior and skills with encouragement for the member to assume responsibility for the consequences of inappropriate behavior. Harbinger staff worked intensively not only with the member, but with the family of the member and his/her landlord and neighbors, work associates, and the community in general with respect to what could and must be expected. Harbinger team staff were available to these significant others on a demand basis to assist them in dealing with the member appropriately.

The Harbinger team provided a wide range of services, such as assuring that basic needs and medical care were available to individuals living independently. Members were assisted in obtaining appropriate housing, making use of community services and recreational opportunities, and securing or returning to competitive employment, volunteer activities, or some other form of meaningful daytime activity. Services were provided in vivo, in as natural a fashion as possible, and targeted on concrete needs. Harbinger staff would take members out for coffee to talk, help them buy groceries, and sometimes teach them cleaning and maintenance skills. The team assumed primary responsibility for assuring that members' needs were met, for as long as necessary; most required long-term treatment. However, in frequent reviews of client service plans, the team constantly assessed the degree to which the individual should be weaned away from the program and encouraged toward further independence.

The objectives of the Harbinger ATP demonstration (Mulder, 1982) were to:

1. Significantly reduce the number of hospitalizations for Harbinger clients
2. Make available a 24-hour intervention system to clients
3. Operate a team style of treatment
4. Increase the number of clients involved in community employment
5. Increase the life satisfaction of clients
6. Increase the social contacts of clients

Of all these, the primary objective was reduction of hospital days; the others were secondary, but a welcome addition (R. Mulder, personal communication, March 25, 1996).

During the operation of the demonstration project, Harbinger staff identified several principles that were critical to success: Staff must be with members in their own environment and help them understand their condition; staff must not discount the reality of the condition and subsequent behavior; care is personal and staff must truly like the members; staff must be strong advocates in order to reduce stress when members confront the various human service systems; members should see staff during good pe-

riods as well as the confusing ones; staff should ensure that members take medication when appropriate; staff need to teach members how to manage symptoms; and staff must help members build strong social networks (including friends, appropriate use of mental health and other system resources, and leisure time activities). The importance of Harbinger staff working with family members and significant others also became very clear during the demonstration. Family members needed some of the pressure taken off them, which Harbinger did. Harbinger staff taught members and their families to be more aware of warning signs of impending problems. They provided information about the nature and management of schizophrenia, major affective disorders, and bipolar disorders. They showed how to provide a caring, supportive milieu and to insist on adherence to treatment plans, and they taught problem solving skills and encouraged expression of emotions.

EVALUATION DESIGN AND METHODS—STUDY I

Research Design for Harbinger's 30-Month Evaluation

Clients who presented for admission to the Kent Oaks Community Hospital psychiatric unit, over about a 2-year period, and who were determined eligible for hospital diversion, were randomly assigned to Harbinger or to the control group (which went through the usual hospital admissions procedure and at discharge was provided with the usual aftercare case management services). Random assignment occurred through the intake person at the Crisis Unit pulling sealed cards which determined condition assignment. All Harbinger and control group clients came from hospital diversion with the exception of a group of clients who were long-term residents of the state psychiatric hospital and were discharged during the last year of the demonstration to either Harbinger ($N=10$) or usual aftercare ($N=11$). This group was assigned on a matching basis, not randomly. Thus, altogether, there were 59 clients in the Harbinger ATP and 62 controls.

Data Collection

Attempts were made to interview at baseline and at the 30-month follow-up every research participant (experimentals and controls). Interview data included questions on drug and alcohol problems, employment, criminal justice contacts, moving, satisfaction with mental health services, and a self-rating of symptoms and functioning. Other data on client functioning, i.e., for the interviewer-generated Global Assessment Scale (GAS) score, were obtained through records and/or interviews with CMH staff; in many cases, family members were asked to verify data. Of the original Harbinger

group, 52 were located (2 were out of state and 1 had disappeared) or 88.1%. For the control group, 35 were located (3 were out of state, 3 were deceased—2 accidentally and 1 of natural causes, 4 were in the state psychiatric hospital, and 17 had disappeared), for a completion rate of 59% of all those who could be interviewed. Attempts to locate clients utilized reported addresses, telephone directories, asking neighbors for forwarding addresses and contacting relatives. Hospitalization data was available on all research participants from the county's management information system (MIS). Demographic data was obtained from facesheets used in clinical records and the MIS.

Participants

The participants were about evenly divided between females and males, and typically were in their mid- to late 20s (Table 1). About a quarter were African-American or other minority race/ethnicity. About 70% were high school graduates or beyond. The vast majority were separated/divorced or never married. More than half lived with family or friends; the remainder were about evenly divided between living alone and living in supervised care (foster care or group homes). Less than one fifth were competitively employed; more than half reported disability or public assistance as their income source. For the remainder, the typical income was under $10,000.

Data on baseline clinical characteristics revealed, on average, poor functioning at intake, according to GAS scores (Table 2). Participants were also characterized by an average age of early 20s for their first hospitalization, with about five total previous hospitalizations, spending a lifetime average of more than 12 months in psychiatric hospitals. In the year before the index hospitalization, participants had been hospitalized for nearly 2 months, on average. Thus, participants should be described as highly distressed and high hospital users. As reported in the tables, results of statistical tests revealed few significant differences between experimental and control group participants. What differences there were suggested that the Harbinger group had slightly higher functioning.

RESULTS OF STUDY I: THE ORIGINAL HARBINGER EVALUATION—30-MONTH FOLLOW-UP

Variables that showed significant differences between Harbinger and control group clients at follow-up are presented in Table 3, along with each group's value on the variables, significance test results, and group size. Group sizes differed since some data were obtained from records/MIS, while others were obtained via interviewing located clients face-to-face.

Several community adjustment variables were examined; living situation

TABLE 1
Baseline Demographic Characteristics

	Harbinger (N= 59)	*Control (N= 62)*	χ^2
Gender			
% female	49%	50%	NS
Ethnicity			
% white	71%	74%	NS
Education (# years)			
0–10	21%	31%	9.26**
11–12	59%	66%	
13 or more	21%	3%	
Marital Status			
Married	31%	20%	NS
Divorced/separated	31%	38%	
Never married	39%	42%	
Living Arrangements			
Alone	17%	32%	6.39*
Family/friends	68%	45%	
Supervised care	15%	23%	
Age (in years)			
18–27	36%	42%	NS
28–37	42%	32%	
38–47	10%	11%	
48+	12%	15%	
Employment Status			
% unemployed	77%	66%	NS
Income			
Disability	47%	71%	7.83*
Less than $5000	22%	8%	
$5000–$9999	10%	6%	
$10000+	20%	15%	

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

and employment status at follow-up demonstrated significant differences between the two groups. Compared to the control group, a larger percentage of Harbinger clients lived alone, with family, and with friends. On the other hand, only 6% of Harbinger clients were living in "other" (i.e., foster care or group home) circumstances compared to 34% of controls. A significantly larger percentage of control group clients than Harbinger clients

TABLE 2
Baseline Clinical Characteristics

	Harbinger (*N*= 59)	*Control* (*N*= 62)	*Statistic*
Diagnosis			
% Schizophrenic	79.66%	79.0%	NS
Hospitalizations			
Mean age, first hospitalization	21.10	23.58	NS
Mean number previous hospitalizations	4.93	5.15	NS
Mean total time hospitalized (in mos.)	12.98	10.46	NS
Mean time previous year in hospital (mos.)	1.68	2.06	NS
Mean longest episode (in weeks)	15.64	15.62	NS
Global Assessment Scale Score			
Mean at intake	35.00 *SD*=8.68 (*n*=57)	29.41 *SD*=12.48 (*n*=51)	t=2.39*

*p<.01.

were living in supervised care. In terms of employment, 79% of Harbinger clients were unemployed, compared to 93% of control group clients.

Significant differences were also found on two measures of client functioning. A client self-rating scale (1–10, in which 10 = optimal functioning) demonstrated that Harbinger clients were functioning at a higher level (6.82) compared to control group clients (5.45). On the Global Assessment Scale, Harbinger clients scored a mean of 55.27 compared to 46.29 for control clients.

Finally, in terms of days of inpatient care, the mean number of days of inpatient care was less for Harbinger clients (mean = 30.52), compared with the control group clients (mean = 178.39). Similarly, the average number of days of care per episode was far lower for the Harbinger group (0.84) compared to the control group (4.93)—also a significant difference.

Other indicators of community adjustment that were tested, but failed to reach significance were: percentage of clients in drug or alcohol treatment, number of moves in the past year, percentage of clients with police contact, frequency of alcohol use, and frequency of marijuana use.

Limitations of Study I

It should be acknowledged that some variations from random assignment mean that the experimental design was flawed; equivalence of exper-

TABLE 3
Results from 30-Month Evaluation

	Harbinger	*Control*	*Statistic*
Living situation			$\chi^2 = 13.90$*
Alone	36%	26%	
W/family	44%	40%	
W/friends	14%	3%	
Other	34%	6%	
% in supervised care	34%	6%	$\chi^2 = 12.08$**
	(n=52)	(n=35)	
% unemployed	79%	93%	$\chi^2 = 7.89$*
	(n=52)	(n=35)	
Client self-rating	6.82	5.45	t=2.80*
	SD=2.04	*SD*=2.45	
	(n=52)	(n=35)	
GAS	55.27	46.29	t=2.56*
	SD=15.85	*SD*=16.86	
	(n=55)	(n=35)	
Total # days of inpatient care	30.52	178.39	t= −12.68**
	SD=22.55	*SD*=60.92	
	(n=59)	(n=62)	
Mean # days of inpatient care	.84	4.93	t= −8.30**
	SD=.93	*SD*=2.57	
	(n=59)	(n=62)	

*p<.01. **p<.001.

imental and control groups cannot be assumed. Reliability/validity data on interview measures was not available, although many of the variables are behavioral and therefore fairly straight-forward (e.g., living arrangements). Also, failure to locate 41% of the control group is a significant flaw. However, these limitations are minimized by the fact that experimental-control group participant differences seem to favor the Harbinger group being more functional initially. Also, one might assume that the participants from the control group who were not interviewed (hospitalized, deceased, or disappeared) were those who would have had lower, not higher functioning. Thus, any Harbinger-control group nonequivalence at follow-up should work to amplify the between group differences identified. Finally, the fact that hospitalization data was available on *all* participants, irregardless of their interview status, is a significant strength.

EVALUATION DESIGN AND METHODS—STUDY II

The goal of this second study was to examine the long-term impact of Harbinger involvement on participants, in comparison to usual case management. Thus, the original group of 121 research participants were followed up at a time point about 5½ years (66 months) after their initial enrollment. The evaluation was designed to answer questions important to the significant system-level changes that were occurring in the public mental health system in Kent County, other Michigan locations, and service systems around the nation. State and local officials were interested in the functioning of the research participants and whether or not the original positive outcomes of alternatives to hospital care could be maintained over time, versus being the result of a "Hawthorne Effect" due to the newness of the Harbinger program. Questions to be answered also concerned whether Harbinger clients suffered any detrimental effects from their lower use of hospitalization, or whether as a group they were able to maintain the higher level of functioning that they demonstrated in the 1982 evaluation.

The data collection began in mid-1985 for a 6-month period. Attempts were made to locate and interview all control group clients, resulting in 34 interviews being completed. A comparable size group was then randomly selected from the original Harbinger research participants. The decision to interview a limited sample of Harbinger members was based on costs and time constraints. Data collection paralleled that from the 30-month evaluation, being taken from the MIS (hospitalization data), clinical records and staff ratings, and client interviews.

RESULTS OF STUDY II—66-MONTH FOLLOW-UP EVALUATION

Status of Participants

Of the original control group, 28 could not be interviewed: 5 had died since 1982 (3 had died previously), 7 moved out of the area, 7 were in the state psychiatric hospital, 3 became Harbinger members, and 3 could not be located. This produced a sample of 34 individuals for whom community adjustment data was available (e.g., interviews and GAS ratings), or 63% (of those alive).

Of the original Harbinger members randomly selected for interview, one had died, 3 had moved, and 8 were emancipated from the program; of the remainder contacted, one refused to be interviewed. This resulted in a Harbinger sample of 31 members for whom interview and GAS data were collected. Hospital utilization data was collected and analyzed for all

121 of the original experimental and control group members, as this was obtained from the MIS.

Limitations of the 66-Month Study

It should be pointed out that the sample studied on the community functioning measures was heavily biased toward higher functioning clients being over-represented in the control group; that is, lower functioning clients were more likely to have been excluded—for example, those in the state hospital, those who died, and the 3 individuals transferred to Harbinger because of their high level of dysfunctional behavior. On the other hand, from the Harbinger group, the higher functioning clients were more likely to have been excluded, since 8 individuals who had emancipated from Harbinger because of their recovery were not interviewed. Lower functioning clients were included since none were hospitalized, only one had died, and none were able to be transferred elsewhere.

Study results are also limited by the fact that over the 3½ year follow-up period, significant changes had occurred in the public mental health system in Kent County. The positive results of Harbinger's earlier evaluation were widely publicized and had spurred the development of a whole continuum of care between the prior options of hospitals and independent living. The CMH Board had become a full management authority, able to redirect any expenditures not spent on inpatient psychiatric care (state or local) into other program alternatives. Thus, due to county budget support, as well as some competition among agencies, more service alternatives were now available to control group clients (crisis homes, behavioral treatment homes, specialized foster care homes, and the like). An assertive community treatment team was also added to a traditional case management agency. In fact, principles of assertive community treatment had become infused into the "usual" aftercare case management programs. Thus, the experimental versus control group distinction was certainly weakened.

Additionally, at the point of this 66-month follow-up, Harbinger itself was experiencing significant changes. Harbinger had more than doubled in size. The addition of a second team was accomplished by assigning half of the existing staff and clients to the new team. This was done with the intent of minimizing the time for the new team to be trained and fully operational. However, it had the unintended effect of disrupting client and staff functioning' by terminating positive working and therapeutic relationships. It seems likely that clients' ratings of themselves and of the program would reflect these experiences. All these factors reduced the likelihood of finding continuing differences between experimental and control group clients.

Outcomes for Harbinger vs. Control Participants at 66 Months

In analyzing self-report interview data ($N=31$ Harbinger clients and 34 control group clients), two variables were found to be significant after 66 months: self-report of current symptomatology versus at program entry, and satisfaction with mental health treatment in the past 12 months. Regarding symptomatology, 37% of Harbinger clients reported no symptoms, 40% reported rarely experiencing symptoms, and only 23% reported half as many symptoms as before the program or the same level of symptoms. Of the control group clients, 24% reported no symptoms, 18% reported rarely experiencing symptoms, and 57% reported symptoms occurring at least half as much or more ($\chi^2=8.99$, $p<.05$). In terms of satisfaction with mental health agencies in the past 12 months, 77% of Harbinger clients reported they were very satisfied, 23% reported that they were moderately satisfied, and no Harbinger clients reported being either poorly satisfied or not at all satisfied. Among control group clients, 45% reported being very satisfied with mental health agencies, 24% reported being moderately satisfied, and 31% reported being either poorly satisfied or not at all satisfied. These differences were statistically significant ($\chi^2=13.03$, $p<.01$).

Harbinger and control group clients were also compared on number of days in hospital and proportion of days in hospital at six time points: 36 months, 42 months, 48 months, 53 months, 60 months, and 66 months. At each time point, both the number of days and the proportion of days in the hospital were far less for the Harbinger clients than for the control group clients (Table 4).

From other interview data, relationships that were tested but were not found to be significant at 66 months were: number of moves in the last year, living arrangements, percent of clients in supervised care, percent of clients jailed in the last 3 years, percent of clients who had a court appearance in the last 6 months, percent having received alcohol/drug treat-

TABLE 4
Differences in Hospital Days—66-Month Evaluation

	Number of hospital days		Proportion of days in hospital	
	Harbinger	*Control*	*Harbinger*	*Control*
36 months	202	1399	.019	.127
42 months	285	1671	.027	.162
48 months	252	1577	.023	.150
54 months	386	1141	.037	.117
60 months	231	1076	.022	.108
66 months	318	971	.030	.099

ment, percent in school in the last year, employment status, frequency of alcohol use, and frequency of drug use. Global Assessment Scores, as assessed by the interviewer, were no longer significantly different between the Harbinger and control groups. While the Harbinger group mean appeared similar to that reported in 1982, the mean for the control group had risen considerably.

DISCUSSION

Summary and Explanation of 30- and 66-Month Evaluation Results

The results from the 30-month evaluation comparing Harbinger and a control group were quite impressive, particularly in terms of days of inpatient care, with highly significant differences for lower hospital utilization by the Harbinger group. Significant differences were also found in client level of functioning measures obtained from client self-assessment and from an independent assessment of the GAS. In terms of other outcomes, Harbinger clients were significantly less likely to be unemployed and less likely to be living in supervised or dependent care situations.

At the 66-month evaluation, fewer behavioral outcome differences were found and those that were significant involved self-report (symptomatology and treatment satisfaction). In terms of inpatient days, the number and proportion of days was still lower for Harbinger; however, the gap between Harbinger and the control group had narrowed.

The lack of differences at 66 months might reflect the significant design and attrition problems experienced in this follow-up study. As noted, there were also some major treatment system changes that occurred in Kent County, following Harbinger's initial demonstration period. All clients in the community mental health system now had access to a wider range of hospitalization and aftercare alternatives, including an ACT model at another case management agency. These differences in ongoing treatment options would certainly be expected to water-down the experimental/control group differences originally noted.

The lack of differences between Harbinger and controls at 66 months might also reflect a treatment plateau effect. That is, other longitudinal studies of individuals with severe mental illness have found that over a period of time, the progressively negative effects of severe mental illness, which have often been noted, may no longer be seen, and the individual's functioning stabilizes or recovers to pre-illness levels. The effects of treatment, it can be hypothesized, are to expedite this stabilization and recovery process; or to minimize the functioning losses that occur (Harding, Zubin, & Strauss, 1987). Thus, it could be hypothesized that Harbinger clients, because of the intensive nature of the treatment they received,

experienced less deterioration, and started sooner on their path to recovery. Over time, then, one would naturally expect that the differences between control group and Harbinger clients would diminish (providing that the former had any treatment assistance at all).

Statewide Dissemination and Further Replication

Starting with the 30-month evaluation and through the present, the ACT model has been increasingly adopted in Kent County and throughout the state of Michigan. The dissemination and implementation process, and the political and funding bases supporting it, are described elsewhere (Mowbray, Plum, & Masterton, 1997). At present, in Michigan, there are now more than 100 replications of ACT operating, and judged to be successful.

NEXT STEPS FOR ACT RESEARCH AND EVALUATION

The Harbinger demonstration and evaluation project was initiated nearly 20 years ago. Its service components, as well as its evaluation were financed totally with state and local) resources. Compared to much federally funded treatment effectiveness research, Harbinger's evaluation was done on a shoe-string. For example, resource constraints precluded follow-up of all experimental participants in the 66-month study, so a random sample was selected. Being fully state funded, this Harbinger evaluation also experienced many contaminations that amply-funded federally-based research probably could have avoided; for example, inclusion of the state hospital dischargees, assigned on a matching basis (not randomly) to Harbinger or to the usual treatment. By today's standards, the evaluation of Harbinger may appear unsophisticated, or even crude. Yet despite its many limitations, the evaluation did result in program continuation and replication beyond the wildest dreams of many program evaluators. We probably do not need to remind many researchers of the significant number of federally-funded research demonstrations that fail to even capture state or local funds for their own continuance—this, despite sophisticated and extensive evaluation designs and results perhaps more impressive and scientifically sound than Harbinger's. There may be implications here as to the need to enhance state and local commitments and involvement in federally-funded demonstration/evaluation projects in a more substantial way than is usually the case.

At any rate, the simple approach utilized for the Harbinger evaluation is clearly not appropriate now. Of course, our knowledge base of methods and measures appropriate for mental health services research has expanded greatly. Perhaps, as significant is the diversity of ACT adaptations

that now exist. When Harbinger started, its concern was replicating PACT with fidelity by training staff adequately and through receiving frequent consultation visits from and to Madison. Now, 100 ACT replications in Michigan could not possibly be operationalized under such a model. Also, as incentives to achieve funding redirections, communities need to be allowed flexibility in adapting the model to meet local needs, providing that a core staffing and service delivery structure is maintained and that the program philosophy is preserved (Bachrach, 1988). A major challenge for future ACT research is how to measure program variations and how to meaningfully utilize such measurements in outcome evaluations.

Nationally, even with research demonstrations *designed* to faithfully replicate PACT, marked variations among programs have been noted (Burns & Santos, 1995; Olfson, 1990). What accounts for differences in the output and/or effectiveness of an intervention that has training materials developed and technical assistance available, and is based on a model whose principles and practices are highly explicated? The variations might result from differences in target populations, organizational climates of the agencies doing the implementation, characteristics of the staff, overall resources in the geographical area, and the like. Variations might also result from lack of fidelity to one or more of ACT's model elements. Thus, it would be helpful to know empirically which ACT components are most crucial for success.

McGrew and Bond (1995) have researched the critical components of ACT and found that experts agree on the following being necessary for ACT fidelity: (1) staffing based on a small client-to staff ratio, the team's composition, and a manageable team size; (2) the organizational structure using a team-based approach, where the team is the primary therapist and there is 24-hour availability, daily team meetings, and unlimited duration of services; and (3) service delivery approaches focused on in vivo contacts and intensive treatment provision. Having this information would better inform program managers as to the aspects of ACT most important for training and monitoring if future success is to be continually assured.

Other aspects of ACT actual implementation may also have a significant impact on success. Using the framework suggested by Chen (1990) may assist in researching the differential effects on outcomes from contextual variables, for instance: *implementers*—staff attributes (special qualifications, skills, attitudes) as well as their relationships with participants (rapport, interactions, contact); *delivery mode*—structural and administrative arrangements for delivering services; *implementing organization*—the authority structure, resources, personnel composition of the organization in charge; *interorganizational relationships*—that is, between the implementing organization and others critical for participant success, e.g., housing, substance abuse, income support, etc.; *micro-context*—other (non program) en-

vironments with which clients interact, e.g., their immediate social units—like families and peer groups; and *macro-context*—the social, political, economic and cultural structures within which a program exists, such as the support or resistance provided to mental health in the local community.

Another set of questions concerning what makes ACT work involves identifying the causal mediating processes through which we believe ACT produces positive client outcomes. For example, ACT may work by providing more intensive contacts with clients and serving as an early warning system to assure interventions are provided before situations get out of control and then require emergency treatment, hospitalization, or jail, with all the concomitant negative and iatrogenic effects these institutions have on clients' self-perceptions. Or, possibly ACT may work by providing clients with a support system or by enhancing the helpfulness and accessibility of supports that clients already have. Mulder (personal communication, March 25, 1996) reports that when he asked ACT clients why they were spending fewer days in the hospital, they uniformly reported that it was because they knew the team well and they had a telephone number that they could call 24 hours a day. As a result, they felt much less panic and stress and could put up with more symptoms because they knew that Harbinger was always there and would help them through the crisis. Mulder interprets this to mean that for the first time, they had confidence that the system would work for them.

Another causal mechanism responsible for ACT success may be that it gives clients concrete assistance in problems of daily living which then decreases stress, maintains stability, and enhances functioning. Or, illustrative of a final possibility—ACT may provide clients with more normalized experiences which then increases subjective well-being, self-image, self-perceived effectiveness, and thus improves behavioral outcomes. These are but a few examples. A program theory based on empirical studies and on clinical experience needs to be developed for ACT and tested in applied situations. This information would also be useful to future replications and to existing services by providing more short-term variables to use as checks on program operations and effectiveness. These assessments are less costly than long-term studies examining ultimate outcomes like independence, employment, or emancipation from the mental health system.

McGrew and colleagues (1994, 1995) have suggested a variety of different mechanisms that may be useful tools for the next generation of ACT effectiveness studies, for example, in determining causal mediating processes or implementation issues important for ACT outcomes. In *dismantling studies,* new ACT demonstrations systematically manipulate critical components; for example, what happens to client outcomes if team composition is significantly altered, but all other ACT components remain the same? *Meta-analyses* involve researchers systematically collecting and analyz-

ing existing ACT outcome data to empirically determine over a large number of sites and studies what variables differentially relate to success; for example, across all the replications, what is the overall effect of varying team composition? Dismantling studies and meta-analyses are probably most appropriately funded through federal research dollars, as they go beyond the immediate evaluation needs of state and local management authorities. However, these authorities could invest in *re*-analysis of data from existing ACT programs or additional data collection to better determine the mediating causal pathways that may predict client change and positive outcomes; such as using path analyses, structural equation modeling, among others. Finally, the development of normative standards based on existing programs and/or *gathering the judgments of experts, clinicians and/or clients* could also contribute to our knowledge base of what makes ACT work, particularly if such criteria are subsequently applied and measured.

SUMMARY AND CONCLUSIONS

Assertive community treatment is clearly a successful and robust model for providing community-based services to individuals with psychiatric disabilities. Starting with the original PACT research, the subsequent Harbinger replication, and many other demonstrations and research, a credible and impressive body of literature has now been established. However, the existence of this knowledge base should just be a start for continued study of ACT and its replications. Much can be learned through systematic study deconstructing ACT components and/or examining micro and macro environment features that are most predictive of client success. Further long-term research on cohorts of ACT clients could also illuminate the course of severe mental illness, under current and more optimal service and funding conditions (in comparison to the Vermont longitudinal study's setting of the 1950s; Harding et al., 1987). This is an area with exciting possibilities for creative evaluators and researchers to expand their designs toward systematic study of implementation environments and the process and funding of service provision. This research should require more effective collaborations with those versed in the study of micro and macro organizational factors and health economists. Federal, state, and local administrators should all have interests in such research approaches and invest funds accordingly.

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