**Background:** The assertive community treatment (ACT) model for people with severe mental illness was originally designed to be provided continuously without termination. This study evaluated postdischarge changes in health status and service use associated with the time-limited provision of ACT to homeless people with severe mental illness.

**Methods:** Clients in the fourth annual cohort of the Access to Community Care and Effective Services and Supports (ACCESS) program (N=1617) were assessed at entry into ACT and 3, 12, and 18 months later. Random effects models were used to compare outcomes and service use among clients who terminated ACT and clients who remained in ACT, controlling for potentially confounding factors.

**Results:** Altogether, of clients who participated in follow-up, 8.7% participated for less than 3 months; 40.6%, for 3 to 10 months; 15.3%, for 11-13 months; and 35.3%, for 14 months or more. Controlling for potentially confounding factors, mental health, substance abuse, and housing outcomes did not significantly differ between clients who had been discharged at the time of follow-up as compared with those who had not. Those who had been discharged had worked significantly more days than those who had not (t_{1794} = 3.24, P < .001), and they reported significantly less outpatient health service use though there was no decline in hospital days or receipt of public support payments.

**Conclusion:** Homeless clients who have severe mental illness can be selectively discharged or transferred from ACT to other services without subsequent loss of gains in mental health status, substance abuse, housing, or employment.

**Abbreviation:** ACT, Assertive Community Treatment

**Source:** Arch Gen Psychiatry. 2001;58:1073-1080
PARTICIPANTS AND METHODS

THE ACCESS PROGRAM

Through ACCESS, 9 states were awarded cooperative agreement funds for 18 communities (2 in each state) to test strategies intended to foster cooperation among agencies and reduce service system fragmentation. One site in each state was designated by flip of a coin to implement strategies designed to improve the level of systems integration. In addition, to allow for uniform recruitment of client samples and to provide similar clinical services, each site received approximately $500,000 annually to conduct assertive outreach to homeless persons in the community and to provide services to 100 clients per year.

CLIENT ELIGIBILITY CRITERIA AND SOURCES OF DATA

Participants were eligible for case management if they were homeless, suffered from severe mental illness (diagnosis of psychotic or major affective disorder with recent hospitalization or causing impaired functioning), and were not involved in ongoing community treatment. Operational entry criteria for homelessness and mental illness have been described elsewhere, along with validating data. Clients who met program eligibility criteria were invited by their outreach worker to participate in case management. Those who gave written informed consent were evaluated with a comprehensive baseline interview and were reinterviewed 3, 12, and, in the final cohort, 18 months after baseline. Each site agreed to recruit 100 enrollees per year into the case management study, and all initiated recruitment during the same 3-month period. The fourth cohort, the focus of this study, was recruited between May 1997 and July 1998, and gave further consent to participate in the 18-month follow-up interview.

CLIENT CHARACTERISTICS, OUTCOMES, AND SERVICE USE

Documented personal characteristics include age, sex, race, days employed, income, receipt of public support payments, duration of the current episode of homelessness, housing status during the 30 days prior to each interview, and social support. Participants were considered to be stably housed if they had been living in their own apartment, room, or house (either alone or with someone else) for 30 consecutive days.

A history of conduct disorder was measured by reports of 11 behaviors occurring before age 13 years. Family instability in childhood was measured with an 11-item scale that addressed experiences before age 18 years, such as parental separation, divorce, death, or poverty. Diagnoses were based on the working clinical diagnoses of the admitting clinicians on the case management teams. Psychiatric status was assessed through standardized scales measuring self-reported symptoms of depression, psychosis, and, at baseline, by interviewer ratings of psychotic behavior. Psychiatric problems and alcohol and other drug use were further assessed using the composite problem scores from the Addiction Severity Index (ASI).

Overall quality of life was evaluated with a summary question (“Overall, how do you feel about your life right now?”) that was scored on a 1 to 7 scale from “delighted” to “terrible.”

A composite mental health outcome index was created by averaging standardized scores on 3 mental health outcome measures: the ASI psychiatric composite problem index, the depression scale derived from the Diagnostic Interview Schedule, and the psychotic symptom scale derived from the Psychiatric Epidemiology Research Interview (Cronbach α = .75). These scores were constructed by dividing the value of each observation by the baseline standard deviation of each measure and averaging the results. Test-retest reliability of this measure was assessed in 50 ACCESS clients during a 2-week period at one of the sites and was found to be acceptable (intraclass correlation = 0.85). Service use was assessed with a series of 23 questions concerning use of various types of health and social services during the 60 days prior to the interview. Another series of questions addressed receipt of public support payments and housing subsidies.

In contrast to “systems integration,” which reflects the cooperation of diverse agencies at the macrosystem level, “services integration” is a client-level measure reflecting the extent to which individual clients have access to a diverse array of services appropriate to a wide range of potential needs. To create this measure, dichotomous (0-1) variables were created that reflected use of each of 6 types of services: (1) housing assistance or support from a housing charged from ACT-like Veterans Administration programs showed no evidence of increased rehospitalization after transfer, and transfer of 107 stable clients from ACT to lower-intensity care was found to have no effect on community adjustment or hospital use.

The current study uses client outcome data from the Access to Community Care and Effective Services and Supports (ACCESS) program to evaluate service use and outcomes among homeless persons with severe mental illness after discharge or transfer from ACT. Access to Community Care and Effective Services and Supports was a 5-year, 18-site demonstration program designed to evaluate the effect of efforts to improve service systems integration on the clients they serve. As part of this project, 18 communities were provided with funds to establish ACT teams to serve 4 annual cohorts of 100 homeless clients with severe mental illness for up to 1 year.
DESCRIPTION OF SAMPLE 
AND RATES OF FOLLOW-UP

Altogether, 1617 clients agreed to participate in the fourth year of the follow-up study. On average (± SD), enrollees were 38.6±9.7 years of age; 61.1% were males; 48.3% were African American; and 4.0% were Hispanic. All of them received at least 1 clinical psychiatric diagnosis. In order of frequency, nonmutually exclusive diagnoses were major depression (49%), schizophrenia (33%), other psychoses (31%), personality disorder (23%), bipolar disorder (22%), and/or anxiety disorder (17%). Sixty-six percent were diagnosed with a psychotic disorder (schizophrenia, other psychoses, and/or bipolar disorder). Substance abuse was also frequently diagnosed: 42% had alcohol abuse or dependence and 39% had drug abuse or dependence.

Average (±SD) level of social support (total number of types of people who would help with a loan, ride, or emotional crisis) was 1.7±1.9 of a possible 18. At baseline, participants had spent an average of 36.1±21.3 of the past 60 days homeless, worked an average of 2.2±5.4 of the past 30 days, and reported an average monthly income of $323±$539, with $191±$401 in public support income.

RESULTS
At baseline, 64% of participants were receiving mental health services, 42% received medical services, 15% received substance abuse services, 44% received public support payments, 7% had sought help from a public housing agency, and 11% had received employment services. They received and average of 1.8±1.0 of the 6 types of services.

Altogether, 1524 clients (94.2%) completed the 3-month follow-up interview; 1306 (80.8%) completed the 12-month interview; and 1165 (72.0%) completed the 18-month interview. Logistic regression showed that clients who completed follow-up interviews were more likely to be African American (χ² = 5.02, P < .03), to have had more social support at baseline (χ² = 7.01, P < .008), used more different types of services (χ² = 6.92, P < .009), and were less likely to be Hispanic (χ² = 5.41, P < .02). There were no significant differences in psychiatric symptoms, substance use, housing, or employment between those who were followed up and those who were not.

**OVERALL OUTCOMES**

Client improvement was observed from baseline to follow-up across all time points on all measures of health status and community adjustment, as demonstrated by the highly significant linear trend for all measures (Table 1). Measures of service utilization increased during the first 3 months and then declined, though they remained higher than at baseline. The rate of improvement in these measures, however, significantly declined, as evidenced by the significant quadratic terms with signs opposite to those of the linear term and coefficients of much smaller magnitude.

**POSTDISCHARGE OUTCOMES**

At the scheduled 3-month follow-up interview, 12.9% of those interviewed had been discharged, with 52.4% discharged at the 12-month interview, and 78.7% at the 18-month interview. As one would expect, these interviews did not take place exactly on the scheduled dates, so these figures do not precisely represent program participation at 3, 12, and 18 months, which is presented in the following subsection.

Mental health, substance abuse, and housing outcomes were not significantly different among those who had been discharged, at the time of follow-up as compared with those who had not been discharged, after controlling for overall effects of time and admission characteristics (Table 2). Those who had been discharged worked significantly more days than those who had not (t 794 = 3.24, P < .001). Not surprisingly, clients who had been discharged from ACT showed significantly less health service use on all measures with the exception of hospital days. There was also no decline in receipt of public support payments.

Because maintenance of clinical gains after discharge may be affected by the local availability of appropriate services, these analyses were repeated separately for each site for each of the 4 primary outcomes: psychiatric symptoms, alcohol abuse, and other drug abuse, and housing.
Of the 72 resultant individual site analyses (18 × 4), only 1 analysis at 1 site showed less improvement among discharged clients, while 8 outcomes at 8 different sites revealed significantly greater improvement on one or another of these measures. There was thus little variability in the difference between predischarge and postdischarge outcomes across sites. These analyses indicate that there were virtually no adverse effects associated with termination at particular sites, as well in the program as a whole.

DURATION OF PARTICIPATION

The next series of analyses considered service use and outcomes for all clients using only the 18-month inter-
view in relation to the duration of their involvement in ACT. Altogether, 8.7% of followed-up clients participated for less than 3 months; 40.6% for 3 to 10 months; 15.3% for 11 to 13 months, the originally targeted duration; and 35.3% for 14 months or more. These analyses showed few significant relationships between duration and outcome. Clients with longer duration had superior outcomes on measures of drug use and housing outcomes, but somewhat less natural social support. As one would expect, clients who participated for longer periods of time showed significantly greater levels of service use of many kinds at 18 months.

**DISCHARGE AND TRANSFER STATUS**

Altogether, only 3% of patients were discharged after having successfully completed treatment by their case manager’s judgment (eg, they did not leave prematurely, nor were they asked to leave involuntarily), while 6% were referred to high-intensity case management; 26%, to low-intensity case management; 8%, to substance abuse treatment or treatment for dually diagnosed clients; 11%, to supported housing; 19% continued treatment with the ACCESS ACT team; and 0.3% were discharged in the course of an inpatient hospitalization. Clients could be referred to more than one service.

Clients who were discharged as having successfully completed ACT had better outcomes on all measures than other clients, but did not receive significantly fewer services (Table 3).

Clients who were to have been transferred to either high or low intensity case management services had superior outcomes on several clinical measures and greater levels of service use than other clients (Table 3).

In contrast, clients who were referred to substance abuse or dual-diagnosis treatment programs had poorer alcohol and other drug outcomes, perhaps reflecting their special problems in that area.

Referral to supported housing was associated with greater reduction in psychiatric symptoms, alcohol and other drug problems, and, as one might expect, better housing outcomes and quality of life.

Clients who continued the ACCESS program showed greater reductions in alcohol problems and greater service use at 18 months, while those who were discharged to a psychiatric inpatient unit had fewer alcohol-related problems but more inpatient and outpatient service use than other clients (Table 4).

This study examined longitudinal data from a large sample of homeless persons with severe mental illness who received ACT through the ACCESS program. Continued improvement in outcomes was observed throughout the follow-up period, and most importantly, no decline in outcome status was observed after discharge. Relationships between the total duration of involvement in ACT and outcome status at 18 months was observed on only 2 of 7 outcome measures, suggesting that discharge decisions and referral processes facilitated needed treatment, regardless of the particular time of the transfer. Finally, we found evidence that the small number of clients who were discharged by their clinicians for having suc-

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**Table 4. Discharge Status From ACCESS-Based ACT and Service Referrals in Relation to Service Use and Outcome at 18 Months**

<table>
<thead>
<tr>
<th>Successful Discharge</th>
<th>Health status</th>
<th>Coefficient</th>
<th>t</th>
<th>p Value</th>
<th>High-Intensity Case Management</th>
<th>Coefficient</th>
<th>t</th>
<th>p Value</th>
<th>Low-Intensity Case Management</th>
<th>Coefficient</th>
<th>t</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite mental health outcomes</td>
<td>-0.16</td>
<td>-3.29</td>
<td>&lt;.001</td>
<td>0.05</td>
<td>1.21</td>
<td>.23</td>
<td>-0.04</td>
<td>-1.12</td>
<td>.260</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI alcohol index (scale range, 0-1)</td>
<td>-0.02</td>
<td>-2.03</td>
<td>.04</td>
<td>-0.02</td>
<td>-2.25</td>
<td>.02</td>
<td>-0.03</td>
<td>-4.02</td>
<td>&lt;.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASI drug index (scale range, 0-1)</td>
<td>-0.01</td>
<td>-2.05</td>
<td>.04</td>
<td>-0.01</td>
<td>-2.09</td>
<td>.04</td>
<td>-0.02</td>
<td>-3.15</td>
<td>.002</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not homeless past 30 d</td>
<td>0.17</td>
<td>5.83</td>
<td>&lt;.001</td>
<td>0.09</td>
<td>3.57</td>
<td>&lt;.001</td>
<td>0.12</td>
<td>5.98</td>
<td>&lt;.001</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time worked in past 30 d</td>
<td>1.54</td>
<td>6.26</td>
<td>&lt;.001</td>
<td>-0.96</td>
<td>-2.37</td>
<td>.02</td>
<td>-0.04</td>
<td>-0.15</td>
<td>.88</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social support</td>
<td>0.34</td>
<td>2.57</td>
<td>.01</td>
<td>-0.25</td>
<td>-2.23</td>
<td>.03</td>
<td>0.13</td>
<td>1.42</td>
<td>.16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lehman Quality of Life21 (scale range, 1-7)</td>
<td>0.37</td>
<td>3.67</td>
<td>&lt;.001</td>
<td>0.001</td>
<td>0.10</td>
<td>.91</td>
<td>0.31</td>
<td>4.48</td>
<td>&lt;.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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It is notable, however, that clients who continued in case management or supported housing after transfer, including those who stayed in ACT, had better outcomes than those who did not receive such referrals. Making a link with services of at least modest intensity seems to be advantageous in the long run.

This study has 2 primary implications for the development of case management services for persons with severe mental illness, whether homeless or not. First, it suggests that the advantages of ACT can be sustained after transfer to other services, at least when clinicians have flexibility to decide who is ready for transfer and who is not.

Second, systems serving homeless people with severe mental illness should develop links with mainstream mental health services to facilitate transfer of clients when it becomes appropriate so that outreach services can be made available to still untreated homeless clients. Although virtually all of the ACCESS ACT teams were based in mainstream mental health agencies, the transfer process was often difficult because of limited treatment capacity in the sponsoring agencies.

Several methodological limitations of this study require comment. First, since decisions about discharge and transfer were based on clinical grounds, discharged patients are likely to have been different from others in ways that may affect their outcomes. Although we made statistical adjustments for these differences, we cannot rule out the possibility that some of our results reflect unmeasured selection biases. The goal of this study was not to compare different discharge strategies, but rather to examine how long clients participate in ACT.

Possibly, patients who were retained in ACT for the entire 18 months were based in mainstream mental health agencies, the transfer process was often difficult because of limited treatment capacity in the sponsoring agencies.

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Possibly, patients who were retained in ACT for the entire 18 months were likely to have better outcomes than those who were discharged earlier. It is important to note that this was a naturalistic study in which ACT teams were tasked with providing services for each of these clients.

<table>
<thead>
<tr>
<th>Substance Abuse Treatment</th>
<th>Supportive Housing</th>
<th>Continued in ACCESS</th>
<th>Hospitalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>t Value</td>
<td>Coefficient</td>
<td>t Value</td>
</tr>
<tr>
<td>0.004</td>
<td>0.09</td>
<td>.92</td>
<td>-0.17</td>
</tr>
<tr>
<td>0.03</td>
<td>3.06</td>
<td>.002</td>
<td>-0.01</td>
</tr>
<tr>
<td>0.02</td>
<td>3.14</td>
<td>.002</td>
<td>-0.01</td>
</tr>
<tr>
<td>-0.02</td>
<td>-0.89</td>
<td>.37</td>
<td>0.20</td>
</tr>
<tr>
<td>0.09</td>
<td>0.19</td>
<td>.84</td>
<td>-0.37</td>
</tr>
<tr>
<td>-0.004</td>
<td>-0.03</td>
<td>.97</td>
<td>0.14</td>
</tr>
<tr>
<td>-0.07</td>
<td>-0.81</td>
<td>.41</td>
<td>0.28</td>
</tr>
<tr>
<td>2.63</td>
<td>3.90</td>
<td>&lt;.001</td>
<td>0.66</td>
</tr>
<tr>
<td>0.13</td>
<td>0.23</td>
<td>.77</td>
<td>-0.75</td>
</tr>
<tr>
<td>25.53</td>
<td>1.20</td>
<td>.23</td>
<td>-11.80</td>
</tr>
<tr>
<td>0.05</td>
<td>1.94</td>
<td>.06</td>
<td>0.09</td>
</tr>
<tr>
<td>0.22</td>
<td>3.25</td>
<td>&lt;.001</td>
<td>0.28</td>
</tr>
</tbody>
</table>
charge when clinicians were allowed to tailor the processes to the individual needs of each client. Second, follow-up rates declined from 94% at 3 months to 72% at 18 months, and those who were followed up had used more services at baseline than those who were not. It is possible that clients without successful follow-up used fewer services, had poorer outcomes than those who were, and that our results may be biased by this attrition.

Third, our documentation of services to which clients were referred after ACT was based on a simple checklist of possible services, and actual entry into those services was not documented. The validity and reliability of referral information is thus undocumented.

Finally, our analyses of postdischarge outcomes, duration of involvement, and placement of referral involved 7 dependent outcome variables, 11 different independent treatment-related variables, and therefore 77 different comparisons. Because this analysis was exploratory, we did not select a limited set of primary outcome measures or specific hypotheses. Since our main finding was that there was no adverse effect of postdischarge status at $P<.05$, the presence of multiple comparisons does not bias our results. Other outcomes on which we have commented were significant at $P<.001$ and thus were not likely to have resulted from multiple comparisons.

While this is one of the largest follow-up studies of any ACT program, it was specifically targeted to homeless people with severe mental illness. Caution should be exercised in applying these results to clients who are not homeless and/or who have made extensive use of inpatient services.

This study was implemented in a programmatic context that encouraged systems integration at half the sites. However, the final results of the ACCESS program suggest that special efforts to integrate service systems did not affect client outcomes, minimizing concerns about confounding due to these systems interventions. 24

This study suggests that homeless clients who have severe mental illness can be selectively discharged or transferred from ACT to other services without subsequent loss of gains, though successful transition may require careful judgment as to the appropriate timing and place of referral for further care.

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REFERENCES

1. Stein LI, Test MA. Alternative to mental hospital treatment, I. Arch Gen Psychiatry. 1980;37:392-397.