Housing Costs for Adults Who Are Mentally Ill and Formerly Homeless

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Abstract

The goal of this study was to evaluate the costs, under two different housing conditions, to the state mental health agency of caring for adults who are homeless and mentally ill. One hundred and twelve clients of the Massachusetts Department of Mental Health, living in psychiatric shelters, were randomly assigned to one of two housing types: Evolving Consumer Households or Independent Living apartments. For the next 18 months each client was followed so that the cost of treatment, case management, and housing could be collected and compared. The authors found that treatment and case management costs did not vary by housing type, but housing costs were significantly higher for those assigned to Evolving Consumer Households. Regardless of original housing assignment, treatment costs were lower for clients who remained where they were originally placed. The authors conclude that providing support for clients that increases housing stability reduces their need for treatment and that independent living arrangements may be a more cost-effective policy choice.

Reports of special programs for those who are homeless and mentally ill have been silent about the relative costs of different types of treatment and housing options for this high-risk group. In the Boston McKinney Research Demonstration Project, an innovative housing model called the Evolving Consumer Household (ECH) was compared to independent apartment living for clients who were at high risk of homelessness and psychiatric hospitalization. The investigators evaluated treatment and housing outcomes for this group but did not carry out a cost evaluation of housing options or treatment programs.[1-4] This article describes average costs of housing, case management, and treatment for participants and links these cost findings with data on housing stability, mental health, and functional status.

Linking mental health program effectiveness to costs dates back to Weisbrod's seminal work[5] on the cost evaluation of the Assertive Community Treatment program in Madison, Wisconsin (1983).

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Weisbrod's study compared the costs of services for clients in this program with those receiving traditional public-hospital-centered care. Since then, a small but growing volume of literature has described methods for measuring client-level service costs and reporting the relationship between these costs and client outcomes. A decade ago, Dickey, Cannon, and McGuire[6] reviewed cost-effectiveness studies of mental health programs and concluded that a number of problems plagued this research field. The authors urged researchers to specify service inputs more comprehensively and to adjust treatment costs using client case-mix data. Today, those doing mental health cost studies[7,8] offer models of increasing sophistication to explore the relation between costs and outcomes but continue to stop short of producing a single cost-effectiveness or cost-benefit ratio. The argument against reducing cost evaluations to a single cost-effectiveness ratio is that this fails to recognize the complexity of multiple outcomes (and multiple perspectives) inherent in most policy studies.

The Boston McKinney Research Demonstration Project

In response to the widely reported desire on the part of those with psychiatric disabilities for greater personal autonomy,[9-11] the Boston McKinney Project offered a new housing model, the ECH, to homeless adults who were mentally ill. To evaluate its effectiveness, a comparable group of adults was housed in Independent Living (IL) apartments. Altogether, the Massachusetts Department of Mental Health made a total of 120 units of housing available to the project.

The ECH was a shared housing arrangement intended to maximize independence and minimize the presumed risks of independent living. Unlike traditional group homes, the ECH model offered residents permanent secure housing without the requirement of treatment compliance. ECH staff were trained to promote resident independence, and it was expected that staff time would gradually be reduced as the residents learned how to manage their house themselves. ECH residents were encouraged to take the lead in establishing their own house rules. House staff offered advice and support in this process. The only prohibitions imposed by the Department of Mental Health were possession of weapons, smoking in bed, and illegal activities on the premises. In addition to fostering consumer independence, other goals were to reduce isolation, to provide paraprofessional monitoring of the residents' clinical condition, and to offer skills training in managing the house (e.g., paying the bills, negotiating with the landlord).

Apartments in this demonstration project were one- or two-room single apartments in public housing subsidized by the Boston Housing Authority (BHA). The residents assigned to IL apartments received a variety of support services from the Department of Mental Health (DMH).

In both housing types, residents were required to maintain behavior that met landlord or coresident agreements. All tenants paid rent, which they had not had to do in the homeless shelter. All had some form of income support, and rents (including utilities) were set as a proportion (about one-third) of that benefit amount. Each client, regardless of housing assignment, had a project-funded case manager. Each case manager had a caseload of 15 clients. The case manager provided individualized community adaptation skills training, counseling on personal issues, and help in solving day-to-day living problems. Case managers followed all of their clients over the entire 18-month study period, even if the clients left their assigned housing.

Group living designed to be less onerous to residents was expected to produce two interrelated positive results: First, residents of ECHs would have improved mental health status and longer community tenure because of their supportive environment and the opportunity to improve their community living skills. Second, although start-up costs in the ECHs were expected to be high, gradual reduction in house staff and the offset in lower treatment and case management time would balance overall costs of care for those assigned to the ECHs compared to those assigned to their own (IL) apartments.

Method

Design

The cost evaluation is based on the Boston McKinney Project's prospective experimental design. Subjects, drawn from homeless shelters, were randomly assigned to one of the two housing types. Study participation was contingent on passing a safety screen, designed to eliminate persons who were considered to be imminently dangerous to themselves or others. Subjects entered the study over a 9-month period, as housing became available, and were followed for the next 18 months. The cost evaluation included publicly funded treatment, case management, and housing—including the housing support staff. The central purpose of the analysis was to estimate the difference in costs incurred by a state or local government between the two housing models. Accordingly, two rules were followed in measuring costs: (1) Where costs were inherent in the housing model itself, those costs were measured as precisely as possible; and (2) in cases where unit costs (such as hospital per diems) were influenced by the catchment area location of the house or apartment, an average (across Boston catchment areas) cost per unit, independent of the housing assignment, was used. The location of the house or apartment was random, but it influenced unit costs for inpatient stays, outpatient services, and community support services. Finally, actual costs, rather than charges, were measured on the presumption that such estimates would be more generalizable; in a few cases, however, actual costs were not available and charges had to be used as proxies for costs.

Sample

The study began with 118 subjects: Three died of medical ailments, 1 left the state, and 2 failed to pass a BHA housing regulation excluding prospective tenants with prior convictions for violence. This study is based on the remaining 112 clients. The sample had a mean age of 36.9 years and a current diagnosis of severe mental illness (70% schizophrenia). Diagnoses were determined by research staff interviews using the Structured Clinical Interview for *DSM-III*[12] (SCID). The SCID results also indicated a high level of substance abuse (over 70%) concomitant with their psychiatric disorder. Seventy percent of the subjects had experienced homelessness for four or more years. About 54% were racial or ethnic minorities, and 71% were males. All subjects consented to participate in the study and were offered a cash payment for participating in interviews on a regular basis. The ECH and IL groups were similar with respect to sociodemographic characteristics, diagnosis, and prior homelessness history. Additional information on the sample has been reported elsewhere.[1]

Cost Estimation Methods: Housing

Calculating Costs per Unit of Evolving Consumer Households. The vendors who managed the houses under contract with DMH provided audit reports documenting the annual program expenditures from the opening of each house in fiscal year 1992 (FY92) until the end of fiscal year 1994 (FY94) (June 1994).* These expenditures included (1) personnel (house staff, etc.) costs, including fringe benefits and payroll taxes; (2) costs of utilities, supplies, client transportation, and so forth; and (3) overhead cost, about 10% of ECH costs.

Vendors also provided descriptions of month-by-month staffing levels (by type of staff) at each house. Staffing levels at the outset of the demonstration project were prescribed by DMH, consistent with DMH staffing policies in other group homes, and were allocated according to the expected occupancy. The provider's annual staffing costs were then distributed to each month in proportion

* One Evolving Consumer Household (ECH) house started in May 1991, two months prior to the beginning of fiscal year 1992 (FY92). No data were available for these two months and so these months were assigned the average costs for FY92.

to the level of staffing. In addition, the costs for each house included a share of two demonstration project staff who contributed directly to the functioning of the houses. One served in two roles: as a clinical program director/case manager supervisor and as an on-call clinician during the night to respond to client-related emergencies (for ECH as well as IL clients). The bulk of his compensation was for his supervisory role and considered part of the case management costs. The remainder, about $15,000 per year, was treated as compensation for his on-call role. Because two out of three emergency calls were to ECH clients, $10,000 of this segment of his compensation were allocated to the ECHs. The second staff person (funded by the demonstration project) served as an intermediary between the McKinney project staff, the ECH house staff, and the ECH clients, with the objective of helping the houses to implement the ECH design as completely as possible. Ninety percent of the entire compensation of the intermediary, including fringe benefits, was distributed among the houses and months in proportion to each house's occupancy each month. About 10% of the intermediary's time was spent on research activities and therefore was not included in the calculation of the cost per unit of each type of housing.

ECHs were located in very different physical facilities. Two houses were built from the ground up (with somewhat institutional characteristics), and four were renovated private homes, all using Department of Housing and Urban Development (HUD) funds set aside through the McKinney Act for housing homeless people. The seventh house was rental property made available through a vendor. Three local real estate agents provided estimates of the rent (excluding utilities) that each house would command on the open market. The real estate agents were provided complete descriptions of the overall size of each house and its lot, details of the interior including the number of bedrooms and baths, and location of the house. The cost of the seventh unit, which the provider rented, was included in the provider's audit report.

Costs of utilities, supplies, and repair or replacement of furnishings (those normal occupancy costs not included in rent) were obtained from the providers' audit reports and were allocated in equal amounts to each month of the fiscal year. In addition, to be able to express costs on a per person and per month basis, actual monthly occupancies of the houses were obtained. For a few early months at some houses these data could not be obtained from the providers. The field notes of a team of anthropologists who visited the houses regularly were used instead.

Start-up costs were incurred in implementing the ECH model: staff placed on payroll before the houses were occupied, and new furnishings. Ideally, the preoccupancy start-up costs should have been allocated separately from the staffing costs in the first year of the study, but the data on staffing were not sufficiently disaggregated to allow this. We then had two choices for treating start-up costs: (1) They could be allocated in full to the initial year or (2) they could be annualized over the expected duration of the program. We chose to assign all start-up costs to the period in which they were incurred.

Calculating the Costs per Unit of Independent Living Apartments. Apartments are normally rented individually, and the rent is set so as to compensate the landlord for vacancies. Because all the assigned apartments in our study were single occupancy, the occupancy costs per person could therefore be simply estimated from the monthly rent. This resulted in occupancy costs per person that were much more stable than those derived for the ECHs (i.e. in which occupancy costs did not vary with the number of house residents).

IL apartment expenditures consisted mainly of the occupancy costs. Personnel costs were, by design, much lower than at the ECHs. The apartments were distributed among a dozen buildings in Boston, virtually all under the control of the BHA. Actual market rents for these units were unavailable. Because of the number of buildings involved, real estate agents' estimates of fair market rents for each unit were not obtained. Instead, the HUD fair market rents for section 8 housing were used. These are set at the 45th percentile of rents (including utilities) in the city. About 80% of clients

were assigned to efficiencies, according to availability, and the remainder to one-bedroom apartments. These proportions were used to weight the HUD ceilings for efficiencies and one bedrooms for 1994, yielding an average monthly rent of $580. The basic findings of this study are not very sensitive to this figure, as will become apparent below. Three clients were housed in a rooming house, for which the rent, as reported by the vendor, was also $580 per person.

A part-time housing liaison for the BHA apartments was assigned to maintain contact with the BHA on-site manager, met with residents on a monthly basis for education, crisis resolution, and other individualized help; and was available 24 hours a day to property management staff. In addition, a housing specialist furnished and set up the individual apartments and cleaned them when vacated. The salaries of these two individuals, including fringe benefits and payroll taxes, were added to the cost of the ILs. In addition, in one building, staff were hired in January 1993 to reduce problems of drug dealing and prostitution. Salaries were prorated to the study participants at that site. The same McKinney project staff person who was on call during the nights for the ECHs was also on call for IL clients. His total compensation for this responsibility was estimated at about $5,000 per year. This amount was distributed among IL clients in proportion to the number of IL client-months each year.

The only start-up expenditure associated with the IL apartment was new furniture, lamps, and a television, costing about $2,600. To increase cost comparability between the two housing models, IL apartment furnishing costs were assigned to the first month of occupancy of each apartment.

The ECH cost ranged widely across houses, but the weighted average was $3,600 per month/per participant. Table 1 summarizes the types of housing costs, the sources of data used to make the estimations, and the weighted mean cost per month. A month in a BHA apartment, as part of the IL program, was calculated at $715, an amount that remained steady over the study period. This did not include the onetime furnishing expenditure of $2,600.

Comparing ECH and IL Apartment Costs per Unit. Figure 1 summarizes the changing costs per unit for each type of housing. The single largest component of the ECH costs was staff. Because of the shared housing arrangement in the ECHs, the housing cost was lower, on average, than in the apartments. Staff and other program costs contributed about 90% of the total costs per unit in the ECHs compared with 19% in the BHA apartments. The staggered entry into housing meant that clients entering the ECHs earlier in the study period had higher costs per person because when a house first opened, both higher staff costs and program start-up costs were concentrated in the early months. Those who entered later, when staffing levels and program costs were lower, had lower annual housing costs. Those assigned to IL apartments, in contrast, had higher costs the month they moved in (because of onetime cost of furnishings), but after that, average mean housing costs stayed the same, regardless of when the subject entered the study.

Calculating Nonproject Housing Costs per Unit. Not all study participants remained in their assigned housing. A few found housing elsewhere, such as in DMH shelters, other DMH housing, the homes of friends or relatives, or jail. The costs per unit of DMH shelters and other DMH residential housing were calculated from annual DMH expenditure reports. Total annual expenditures for each DMH shelter or housing type were divided by the number of actual bed days reported to DMH. Other costs per unit of living situations, such as jail or a specialized substance abuse recovery house, were obtained directly from the provider. These costs per unit are probably less precise than those calculated for this study, but the small number of nights in question (about 3% of the total number of nights for which housing estimates are reported) did not justify a major costing effort. Living on the streets or in the home of a friend or relative was costed at zero, although the true cost of such stays is probably higher; for example, those living on the streets may, in fact, incur some local government expenditure, such as police contact.

Table 1

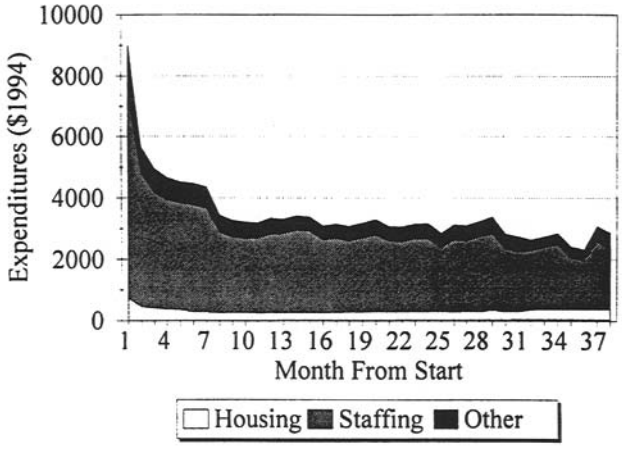
Estimated ECH[a] and IL[b] Apartment Housing Costs per Month

Type of Cost	Source	Weighted Mean Cost per Month	Range[c]
ECH			
On-site staff	Vendor[d] and project	$2,731	$1,602-6,751
Occupancy	Market rents from real estate agents or vendor, utilities from vendor	$ 297	$280-729
Other costs[e]	Vendor	$572	$353-1,538
Total cost per month		$3,600[f]	
BHA[g] apartments[h]			
Occupancy	HUD[i] rent ceilings	$580	
Off-site staff	Vendor and project	$114	
Other	Vendor and project	$18	
Total cost per month		$715	

a. ECH = Evolving Consumer Household.
b. IL = Independent Living.
c. The range represents the highest and lowest cost estimates over the three-year project span.
d. Two human service vendors provided occupancy rates and actual expenditure ledgers, by house.
e. Other ECH costs include transportation, furniture replacement, maintenance services, and supplies. Other IL costs include cleaning, replacement furniture costs.
f. This represents the mean monthly costs, but house-specific expenditures were used to calculate each subject's actual housing costs in Table 3 and in other analyses.
g. BHA = Boston Housing Authority.
h. Figures do not include a onetime initial cost of furnishing the apartment of $2,600.
i. HUD = Department of Housing and Urban Development.

Figure 1

ECH[a] Over Time



a. ECH = Evolving Consumer Household.

Cost Estimation Methods: Acute Treatment, Community Support Services, and Forensic Commitment

A computerized record of state hospital admissions during the study period was made available to the investigators by DMH to ensure that all such admissions were included in the treatment database. These files included dates of admission and discharge, length of stay, facility site, and discharge status. Admissions to general hospitals or freestanding facilities for psychiatric or substance abuse treatment or detoxification came from case management logs. For acute outpatient, crisis, or emergency treatment, and community support services, we visited each vendor agency and the DMH community mental health centers on a regular basis to collect encounter and billing data. A more complete account of the collection of service use data and of the services, used by these clients is reported elsewhere.[4] Costs reported are in 1994 dollars.

The first step in determining treatment costs per person was to calculate a cost per unit of service. Then, using methods already developed,[7,13-15] our approach was to use average costs. The average cost, when adjusted by appropriate capital and overhead, "is close to the likely long-run marginal cost for most services we would encounter in the research area" (p. 897).[7] The general approach taken is consistent with earlier work by one author (Barbara Dickey).

Calculating Acute Treatment Costs per Unit. The per diem cost of acute psychiatric inpatient stays was calculated from Medicare Cost Reports obtained from the Massachusetts Rate Setting Commission. These reports provided sufficient detail to allow recalculation of actual per diem costs. This recalculation avoided most (but not all) of the problems associated with the substitution of charges for costs. Total expenditures (including stepped-in overhead and capital) for the psychiatric unit were divided by the total number of bed days actually used (not the total possible number of bed days). This yields room and board costs of each admission, to which were added 7% to estimate the cost of ancillaries and physician fees associated with each inpatient stay. This adjustment figure comes from Medicaid administrative data for hospitals in the Boston area treating patients who were mentally ill and disabled during 1993.[16] State hospital per diems were calculated (separately for each facility) using the state records of annual operating and capital expenditures for these facilities as the numerator and dividing it by the number of total inpatient days for the year. The facility records were aggregated at the inpatient level, so it was not possible to determine inpatient-level-of-care-specific daily rates. Thus, long-term care and acute treatment had the same cost per unit in this study.

After the per diems were calculated for each hospital, the per diem costs by private psychiatric hospitals, general hospitals, and state hospitals were aggregated to yield the average per diem cost for each type of institution. (Before aggregating hospitals into these three categories, the per diems for individual hospitals ranged from $432 to $1,007.) This cost averaging was done because clients were assigned randomly to houses within different catchment areas. The particular hospital a client went to was determined, at least in part, by the catchment area. If hospital-specific per diems had been used, treatment cost for a client would be significantly influenced by the catchment area of the house to which the client happened to be assigned. This could have biased the comparison of costs between ECHs and IL apartments. Each episode length of stay was then multiplied by the appropriate hospital-type average per diem.

For ambulatory acute treatment, FY94 payment rates for specific procedures were obtained from Medicaid instead of individual agency billing records. Audited expenditure accounts of the 11 different agencies providing acute treatment were not available, and charges (or payments) may have varied between agencies. Because clients could not choose their outpatient provider and were directed to go to agencies in their catchment area, Medicaid payment rates were used as proxies for costs, regardless of the agency providing the service. For example, the cost per unit of individual outpatient therapy was estimated as the Medicaid payment for this procedure code delivered in clinical settings.

Calculating DMH Community Support Services Costs per Unit. Other service costs per unit for Community Support Services (CSS) programs came from the Department of Mental Health. DMH vendor computerized contract files provided the total amount of each contract, the unit of service and the program codes of the services provided, and the total number of units of each service to be provided under the contract. DMH figures were used to develop program-specific unit costs, which varied considerably according to the CSS day program model (e.g., clubhouse or day treatment). Because the program a client attended was influenced by his or her housing location, these program-specific unit costs were averaged across all similiar programs in the city.

The per diem costs for the state forensic hospital were provided by the state. The forensic facility per diem costs may underestimate the actual cost of treatment because the facility houses several locked treatment programs, some of them using more resources than others. The one client committed to the facility was probably in one of the more resource-intensive units and the per diem may underestimate his true treatment cost.

Calculating Case Management Costs per Unit. The cost per unit of case management time was calculated first by summing the total number of hours spent working directly or indirectly for all clients in the study, as recorded in the case management logs. The total number of hours was then divided into the total expenditures associated with project-funded case management: salaries, fringe benefits, payroll tax, administration/supervision, and agency overhead. Ten percent of the cost per unit, based on these calculations, was deducted to account for the time the case managers spent on research-related tasks, such as completing a weekly log of their activities. The cost per hour for case management was $78.50. The treatment costs per unit and the sources used to derive the cost per unit are summarized in Table 2.

Mental Health Status and Functional Outcomes

The authors selected two measures (from those collected by the project) that had the strongest psychometric properties and that represented treatment outcomes from the perspective of clients and clinicians: the client self-reported mental health status from the SF-36[17] and a case manager assessment of community functioning, the Life Skills Profile.[18] Details about the data collection of these and other outcome measures are reported elsewhere.[1]

Housing Outcomes: Time Housed and Housing Stability

Two measures of housing outcome were used in the analyses:

- Percentage time housed was defined as the proportion of days homeless (for each person, as recorded in a log kept by each case manager), relative to the total number of days in the study, not including days institutionalized.*
- Housing stability was defined as a joint function of the number of days in any type of housing in the community and the number of moves made during the study period.† Housing stability was calculated so that if an individual was hospitalized but returned to his or her original housing assignment, that hospitalization was not counted as a move. However, if the individual was hospitalized, then moved to

* The formula for calculating percentage time housed is $H = (b - a)/b$ where H is percentage time housed, a is number of days homeless, b is number of days in the study when not institutionalized.

† The Herfindahl index (in economics) measures the extent to which the market for a product during a given time period is divided among different firms. For the Housing Stability Index (HSI), individuals were substituted for product and different housing types for different firms. The HSI is calculated as follows:

$$HI = (a_1/b)^2 + (a_2/b)^2 + \ldots + (a_n/b)^2,$$

where a is the number of days in a living site, b is the number of days at risk of a move during the study period.

Table 2

Treatment Costs per Unit (in FY94 dollars)

Cost Variable	Source	Cost per Unit
Inpatient	Rate Setting Commission and ancillary and physician fees from Medicaid paid claims.	
	Mean private psychiatric hospitals per diem.	$579.00
	Mean general hospital per diem.	$734.00
	Mean state hospital per diem.	$605.00
Detox	Rate Setting Commission and ancillary and physician fees from Medicaid paid claims.	
	Mean detox center per diem.	$554.00
Forensic facility	Massachusetts Department of Corrections. Cost per night includes personnel, fringe, overhead, and capital.	$110.00
Individual therapy	Medicaid cost per hour for individual psychotherapy/clinic.	$63.16
Group therapy	Medicaid cost per half hour for group psychotherapy/clinic.	$6.68
Medication	Medicaid cost per half hour for medication visits/clinic.	$23.59
Day treatment	Department of Mental Health cost per hour for day treatment programs.	$10.00
Evaluation	Medicaid cost per half hour for evaluation sessions.	$33.95
Case consultation	Department of Mental Health cost per hour for case consultation sessions.	$59.00
Clubhouse	Department of Mental Health cost per day divided by six hours.	$9.65
Emergency room	Medicaid paid claims: mean emergency room cost per visit.	$98.00

another location after discharge, the move to the hospital was counted as one move, and the move from the hospital to another location as a second move. The conceptional foundation of the housing stability index is similar to that for the Herfindahl index in economics.[19]

Analyses

Costs per unit were used to calculate mean-per-person costs during the study period. The amount of each type of housing or the amount of each treatment used was multiplied by the appropriate cost per unit to arrive at the total cost of treatment and housing for each person. These costs were summed for each person, so that total housing costs, total treatment costs, and total case management costs provided a complete picture of the annual costs per person. The denominator used to calculate mean costs was the number of individuals assigned to each housing type: 61 for expenditures in the ECH column and 51 for expenditures in the IL column. This approach, which took into account the amount of use within each group, allowed costs to be summarized across specific types of housing and treatment, regardless of the number of users. Statistical tests comparing housing and treatment costs (two-tailed *t* tests) were limited to total annual mean housing, treatment, and case management costs per person to avoid comparisons within treatment and housing categories that included a high proportion of individuals with zero values. All cost data were transformed into logarithms. Finally, FY92 and FY93 costs (for housing, case management, and treatment) were inflated to FY94 dollars using the July-through-June increase in the Consumer Price Index (CPI) as reported by the U.S. Bureau of Labor Statistics.

Data were available to provide a subject-specific denominator in calculating the mean costs: Total cost for each client was divided by the number of months in the study to produce a mean monthly cost. This was done to avoid losing data on three clients who left the state after being in the study for more than one year but less than 18 months. The per person mean monthly use was then multiplied by 12 to arrive at an estimated annual figure. Such an annualization is justified as housing and treatment costs showed no significant increases or decreases over the study period, controlling for early entries into ECH houses.

To examine the cost consequences of percentage time housed and housing stability, annual mean treatment and housing costs were tested for differences and Pearson correlations were used to test the associations of annual costs, housing outcomes, and changes in functional and mental health status. Change in level of functioning scores between baseline and follow-up were transformed into residual gain scores. This was accomplished by regressing follow-up scores on baseline scores. Residual gain scores represent the difference between an individual's actual follow-up score and the follow-up score predicted from the individual's baseline score. Clients who had better-than-expected outcomes had gain scores lying above the regression line and were positive. Clients who improved less than expected had negative scores and fell below the regression line. This method results in a set of scores that are normally distributed, with the high correlation between the admission and discharge score removed. Simultaneously, it avoids the accumulation in error that accompanies raw gain scores. The size of the standard error of the gain score is a function of the size of the error in each of the raw scores used to calculate the gain score.

Findings

Housing Costs: Annual Expenditures per Person

Individuals assigned to ECHs had mean annual housing expenditures of $42,829, more than three times the mean of $13,042 for individuals assigned to IL apartments. The total annual housing costs per person included not just the time spent in the assigned housing but also other housing used by the subjects during the study period, as described in Table 3. Forty-four clients spent time in other housing, such as local shelters or DMH group homes.

Treatment and Case Management Costs: Annual Expenditures per Person

Annual mean treatment costs of ECH ($11,293) and IL ($14,541) clients were not statistically different. Reduced hospitalization was expected to offset higher ECH staff expenditures; however, this did not occur. The likelihood of being admitted to an institution was slightly greater for the apartment group (66% compared to 59% for the ECHs), but mean annual number of days institutionalized was about the same (22.2 for the IL group and 19.9 for the ECH group).[5] Annual case management costs per person were $2,312 for ECH residents and $2,255 for those living in IL apartments. Although the presence of ECH staff was expected to gradually reduce case management time, this did not occur and the mean annual case management costs were about the same for each group. Clubhouse costs per person were the third highest category of costs. More than 50% of the subjects participated in the clubhouse program at some time.

Total Expenditures

When all per person expenditures for treatment, case management, and housing were summed (see Table 3), the mean annual cost per person for those who were assigned to an IL apartment, $29,838, was significantly less than the mean of $56,434 for those assigned to ECHs. Of the total costs, housing represented about 44% for those assigned to apartments and 76% for those assigned to ECHs, a difference accounted for largely by the ECH staffing costs.

Table 3

Comparison of Mean Annual Treatment, Case Management, and Housing Costs by Original Housing Assignment

Expenditure Type	ECH[a] ($N = 61$)		IL[b] ($N = 51$)		p-Value[c]
	M	*SD*	*M*	*SD*	
Treatment					
Institution					
Psychiatric	$6,959	$11,109	$11,409	$16,184	
Substance abuse	$1,574	$4,512	$1,110	$5,424	
Forensic	$458	$3,579	$0		
Medication	$229	$176	$162	$127	
Individual therapy	$399	$481	$367	$607	
Group therapy	$24	$88	$19	$62	
Clubhouse	$1,244	$2,321	$1,038	$1,614	
Day treatment	$331	$1,645	$344	$1,995	
Crisis visits	$75	$145	$91	$161	
Total treatment costs	$11,293	$14,050	$14,541	$17,027	.86
Case management	$2,312	$1,093	$2,255	$1,023	.78
Housing					
McKinney project	$39,718	$15,667	$9,221	$5,013	
Shelter	$1,306	$3,989	$2,682	$5,456	
DMH[d] group residence	$1,167	$3,526	$428	$2,213	
Domiciliary care	$201	$1,572	$0		
Jail	$231	$1,308	$155	$769	
SA[e] rehabs	$0		$556	$3,392	
Other[f]	$206	$1,109	$0		
Total housing costs	$42,829	$12,106	$13,042	$6,535	.0001
Total annual expenditures	$56,434	$15,834	$29,838	$21,111	.0001

a. ECH = Evolving Consumer Household.
b. IL = Independent Living.
c. *T* tests on logged data.
d. DMH = Department of Mental Health.
e. SA = substance abuse.
f. Other housing includes the YMCA, the Salvation Army, and dormitories.

Start-Up ECH Costs and Minimum Downstream Annual Costs

New programs always have higher expenditures at the outset, and in this study, the analytic problems presented by these high start-up costs were compounded by the nature of consumer-managed households that were supposed to lead to reduced staffing (and thus reduced expenditures) over time. It is therefore useful to estimate the minimum costs per person in a mature well-functioning ECH. Figure 1 illustrates how such costs in ECHs fell gradually over three years. Because the follow-up period ended before a steady state of expenditures could be observed in all the ECH houses, expenditures were assumed to have reached the lowest monthly expenditure from the most "successful" house, $1,835 per person. (The most successful house was the one that, in the judgment of project anthropologists, most faithfully implemented the ECH model. It is also the one that

Table 4

Housing and Treatment Outcomes

	ECH[a]		IL[b]	
Housing outcomes				
Percentage time housed	.92		.83	
Housing Stability Index	.84		.77	
Mean days in assigned housing	419		385	
Treatment outcomes	Baseline	Follow-up	Baseline	Follow-up
SF-36 Mental Health[c]	61.6	64.0	57.0	61.3
Life Skills Profile[d]	61.5	62.6	62.9	66.2

a. ECH = Evolving Consumer Household.

b. IL = Independent Living.

c. Scores range from 0 to 100; higher scores indicate better mental health.

d. Scores range from 39 to 156; lower scores indicate better functioning. Baseline data were collected three months after the study started.

achieved the lowest staffing and expenditures.) Substituting this figure for the actual monthly housing costs when calculating the mean housing expenditures per person during the study period (see Table 3), annual housing costs per person for ECH residents dropped to $17,748 annually (from $39,718). Thus, the long-run average cost in ECHs may be far less than in this study, reducing the difference between ECH and IL mean annual expenditures (housing, treatment, and case management) to less than $5,000 a year instead of more than $26,000. But even under this most favorable scenario, ECHs remained more expensive than IL apartments by about one-third.

Housing and Treatment Outcomes

Treatment and housing outcomes, as reported by clients and case managers, showed no differences between those assigned to ECHs or ILs (see Table 4). The Housing Stability Index (HSI) and proportion of time spent housed in the community were the primary measures of housing outcome and have been reported elsewhere. The provision of permanent housing did not prevent future spells of homelessness for some of these individuals. About one in four of the clients became homeless again sometime during the study period ($n = 29$). However, most of these spent only a few days on the streets or in homeless shelters (mean percentage time housed = 81%).

Relation Between Expenditures and Outcomes

Comparison of Expenditures: Those Who Left Assigned Housing and Those Who Did Not. There were large differences in treatment costs between those who remained in assigned housing ($n = 68$) and those who moved out ($n = 44$). Remaining where placed (regardless of the assignment) was associated with much lower annual treatment expenditures per person ($x = \$8,773$, $SD = \$12,333$ vs. $x = \$18,952$, $SD = \$17,832$, $p = .000$). Higher treatment costs were almost entirely due to more days institutionalized for those who left their assigned housing. Case management costs, housing costs, and total annual expenditures per person were not significantly different between those who stayed and those who left. Many of those who moved out of their ECH or IL home had trouble finding equivalent housing, and some became homeless again. Even those few who moved to "better" living situations had higher treatment costs.

Table 5

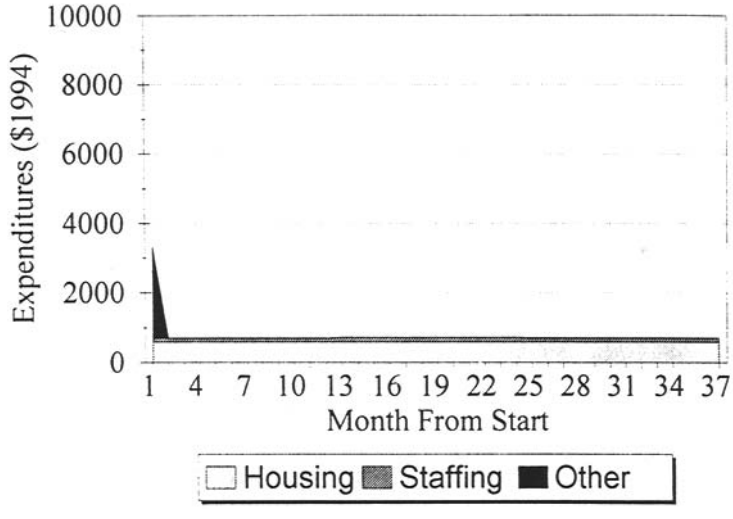
Pearson Correlations Between Housing and Treatment Outcomes and Expenditures

	Percentage Time Housed	HSI[a]	Mental Health Index Residual	Life Skills Profile Residual
Mean annual treatment costs	−.2966†	−.3772†s	−.0632	.1621
Mean annual case manager costs	.2423***	−.0004	−.0544	.0614
Mean annual housing costs	.2388**	.1598*	−.0005	−.2086**
Mean annual total costs	−.0106	−.1241	−.0474	−.1046

a. HSI = Housing Stability Index.
*p = .10; **p = .05; ***p = .01; †p = .001.

Figure 2

IL[a] Costs Over Time



a. IL = Independent Living.

The Relation between Expenditures and Outcomes. Modest negative associations were found between mean annual treatment expenditures and percentage time housed and housing stability: Greater housing stability was associated with lower treatment costs. Mean annual case manager expenditures were positively correlated with percentage time housed, but not corrrelated with housing stability. No relationship was found between changes in mental health status (measured as the residual gain score) and treatment or case management costs. Those whose functional gains were less than expected (i.e., negative residual scores) had higher annual housing costs. Table 5 summarizes housing and treatment outcomes.

Discussion

Adults who were homeless and mentally ill and randomly assigned to ECHs had annual housing costs per person about $25,000 higher than for those assigned to IL apartments. This large difference

was due to the high cost of ECH housing per unit. Treatment and case management costs were about the same, regardless of housing assignment. Those who remained in the assigned housing throughout the study period had significantly lower treatment costs than those who left, and among those who left, higher stability index scores were associated with lower treatment costs.

These conclusions must be tentative, given the small sample size and short follow-up period, but our confidence in the findings is increased because of the experimental design of the demonstration project that rules out selection bias. Furthermore, only 6 of the 118 adults who began the study were lost to follow-up. The sample size becomes a problem in the analyses of treatment use and costs, an area of study that is better carried out on larger samples. Distributions of treatment costs are always skewed, requiring transformation, but even transformations cannot entirely remove the effects of an outlier, more problematic in smaller data sets. The small sample also limits our ability to detect cost differences because of the large standard deviations. One only has to review Tables 3 and 4 to see that the small differences between ECH and IL treatment costs and outcomes consistently favor the ECH but are not statistically significant.

Other limitations may be noted. The division of staff personnel into research, clinical, or administrative roles is somewhat arbitrary. It is important to be able to adequately account for staff time in the construction of the figures for cost per unit; however, in fact, roles are sometimes imprecisely defined or overlapping, especially among mid-level project staff. In addition, the demonstration project was designed for some redundancy in staffing, a common practice when setting up new programs involving high-risk clients, but a practice that may increase the program costs in ways that are not obvious.

The cost evaluation would have been enriched by information about less obvious social costs. For example, reports by project anthropologists indicate that police were called to ECHs on more than one occasion, but data on police contacts were not kept systematically. In one house, police resolved several tenant disputes, responded repeatedly to calls from one tenant who did not feel safe, and intervened to control the behavior of another individual who regularly became disruptive after consuming large amounts of alcohol. There is no evidence, however, that these police contacts were higher for those in ECHs than for those in apartments. Data on cost of police interventions (and other social costs) would probably not have changed the findings but suggests that our annual cost estimates per person are probably low.

Implications for Mental Health Policy

The findings should not lead to hasty conclusions about the relative value of ECHs and IL apartments. However, they do help to define the trade-offs between the two housing types. For clients who have difficulty balancing short-term benefits against long-term disadvantages, the appeal of living in an apartment that is less stigmatizing and that offers greater independence may be stronger than the risk of eventual housing loss and hospitalization. For public mental health agencies, the lure of cheaper housing units may overshadow the longer term risks of increased homelessness or hospitalization. This study suggests that the risks may be lower than many observers believe, but policymakers should not assume (at least on the basis of this study) that all clients are better served (at lower cost) by placing them in their own apartments.

The design of future cost studies of client housing should test the effectiveness of different housing types using larger secondary databases on client housing. These might provide information about patterns of housing (are the patterns seen here typical of all disabled clients, or just those who have been homeless?) and about the relation between treatment and housing stability. What is the effect of substance abuse treatment in housing stability and the use of mental health services? Research is also needed on whether substance-free ECHs would be cost-effective, on how staffing patterns can be reduced in ECHs, and on how ECH house residents might be "empowered" to manage the houses more quickly.

The cost of housing and treating adults who are mentally ill and very disabled is high, and the findings of this cost study do not provide a quick solution to managing those high costs. Given the pernicious nature of serious mental illness, and the prevalence of substance abuse comorbidity, federal and state mental health agencies must continue to support research that evaluates promising housing models and their relation to treatment costs and clinical outcomes. As managed care places pressure on providers to integrate levels of care, safe and affordable housing must be available as a part of a larger comprehensive system. Identifying cost-effective models will become not only desirable but necessary if adequate public resources are to be available for all those in need.

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