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Assisted Living and Use of Health Services among Medicaid Beneficiaries with Schizophrenia

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Abstract

Background: Considerable attention has been given to the appropriateness of mental and medical health care provided to residents of certain assisted living facilities specialized for the severely mentally ill. However, there exists little objective evidence regarding the level of services provided by these facilities in general.
Aims of the Study: To compare the use of mental and medical health services among persons with schizophrenia who were residing in assisted living facilities compared to those received by patients living independently and those who were homeless.
Methods: Medicaid claims were combined with person level data on living situation and psychological and social functioning for 1998-2000. Regression models were used to analyze whether living in a board-and-care facility was related to use of outpatient mental health services including case management, therapy, crisis stabilization, medication supervision, day treatment, and drug treatment, the probability of acute psychiatric hospitalization, the probability of hospitalization for physical health, and costs.
Results: Residents of board-and-care facilities had greater use of outpatient mental health services and lower rates of psychiatric and medical hospitalization. Pharmacy costs and total health care costs were highest in assisted living.
Discussion: Our data was observational, and selection processes related to illness severity likely affect living arrangement. Our analysis suggests that assisted living was related to greater use of outpatient mental health services and lower rates of hospitalization.
Implications for Health Policies: Assisted living facilities may provide a suitable environment though which to provide outpatient mental health services. Policy makers interested in reducing homelessness through interventions might consider subsidizing these facilities.
Implications for Further Research: Research studies should be designed to evaluate characteristics of assisted living facilities that lead to improved function and outcomes among residents.

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Background

Assisted living facilities are an important component of the network of residential and psychiatric services available to persons with schizophrenia. Known in California as board-and-care homes (B&Cs), these facilities, intermediate between independent living and nursing homes, are privately run businesses of varying sizes that provide lodging and meals, supervise patients, and dispense medications. Recently, there has been considerable criticism of assisted living facilities providing substandard care for the severely mentally ill in New York State.[1,2] However, there has been no rigorous comparison of the health services received by residents of these facilities with those received by persons in residing in what might be viewed as alternative living situations for persons with schizophrenia: living independently in the community (in a house or an apartment, but not with family members or relatives, in a non-supervised setting) or being homeless (including those without a residence living on the street or in shelters and those in transit between residences living in a nightly hotel or in their car). Such an analysis is necessary to determine whether recent reports of low quality assisted living facilities are isolated

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incidences or if they are indicative of more widespread problems in residential care for the mentally ill persons.

Researchers examining assisted living facilities for the elderly have found them to be diverse in terms of the populations enrolled and the services provided.[3] The main alternative to assisted living for elderly persons who require assistance is typically a nursing home, and a main difference between residents of each type of facility is extent of their need for assistance with activities of daily living (ADLs).[4] In contrast, persons with schizophrenia may reside in assisted living for a majority of their adult lives, during which they require ongoing care for disabling mental illness. Homelessness is a common problem among persons with schizophrenia,[5] and assisted living might be a viable intermediate between living independently and homelessness. There is ongoing debate in California about the role of assisted living facilities, but little information about the quality of care received by residents of these facilities with serious mental illness.[6]

Although there exists a considerable literature on health services use related to both schizophrenia and homelessness,[7-13] only a few studies have examined the relationship between living situation and health services use among persons with schizophrenia. One such investigation is by Rosenheck and Seibyl,[11] who analyzed health care costs for a nationwide sample of homeless and housed veterans admitted to psychiatric and substance abuse units of hospitals and found that homeless veterans had a 17% higher annual costs than those who were housed.

Other studies to examine health care use by living situation have tended to focus on selected samples of low-income adults and children.[10,12,13] Furthermore, while community based health programs have repeatedly been shown to be cost-effective in terms of reducing hospital admissions, many practitioners do not use these approaches.[14,15] Little, if any, attention has been paid to how living situation is related to access to these programs, or more generally, to community-based treatment. The following is, to our knowledge, the first large-scale study to examine how service use varies by living situation among persons with schizophrenia living in different settings within the catchment area of a single mental health service system.

In this paper, we analyzed how health services use varied by living situation for Medi-Cal (California's Medicaid program) beneficiaries with schizophrenia living in the community in a large metropolitan area (San Diego County, California). An implicit assumption is that certain patterns of service use (notably greater outpatient use and lower rates of hospitalization) are more favorable than others (lower outpatient use and greater rates of hospitalization). We focus on patterns of services use and cost as indicators of quality, rather than other measures such as processes of care or clinical outcomes, because they provide important information on the resources provided for community-based treatment that are readily available from administrative data. Our analysis controlled for factors that other studies have shown to be related to services use among persons with schizophrenia – i.e., age, race and ethnicity, and co-morbid substance use disorder.[7,16,17] We also controlled for a measure of illness severity: an assessment of psychological and social functioning. For each living situation, we estimated the use and overall cost of community-based health services paid by Medi-Cal standardized for demographic characteristics and illness severity, and provided estimates separately for (i) outpatient mental health utilization, (ii) the probability of admission to an acute psychiatric hospital, (iii) outpatient mental health care cost, (iv) probability of hospital admission related to physical health, (v) outpatient physical health care cost, (vi) pharmacy cost, and (vii) total cost for acute mental health and medical services.

We hypothesized that persons living in a B&C would have higher use of specialty mental health outpatient care compared to those who were living independently or those who were homeless. Studies of use of health care services among homeless persons with schizophrenia have found an inverse relationship between outpatient and inpatient mental health care.[9,11,18] It is likely that the higher hospitalization rates among the homeless are partly due to selection bias – individuals with worse psychological functioning are more likely to become homeless and are more likely to be hospitalized – and partly the direct result factors related to homelessness including environmental factors and low levels of outpatient care. Thus, while one might expect that improving the situation of homeless persons such that they receive more outpatient specialty care would reduce their rate of hospitalization, it is unlikely that this rate would then be similar to that among those who were housed. Similarly, to the extent that residents of B&Cs are more severely ill than those living independently, one might expect that they would have higher rates of both inpatient and outpatient care, while a finding of lower rates of hospitalization would be suggestive of a protective effect.

Board and Cares

There are approximately 150 B&Cs in San Diego County specialized for the severely mentally ill, with bed sizes usually ranging from 6 to 10, although a few facilities have as many as 144 residents. Licensed B&Cs must provide a basic set of services at a standard rate for recipients of Supplemental Security Income (SSI), comply with administrator and personnel requirements and staffing ratios, and provide night supervision and transportation to attend community programs. A Needs and Services Plan (NSP) is developed which provides an evaluation of each resident's physical, mental, and social functioning including objectives and specific plans for maintenance or improvement of functioning. Each facility must either provide services to meet each client's needs as described in the NSP or involve certified consultants. Typically, these outside consultations include monthly (or more frequent) medication management consultations by a psychiatrist.[19] Previous research has shown that compared to patients with schizophrenia living independently, residents of B&Cs in San Diego have an earlier age of onset of illness, more severe negative symptoms, worse cognitive impairment and poorer health-related quality of well being, but have similar levels of positive and depressive symptoms and take similar doses of antipsychotic medication.[20]

Methods

Data

Public mental health services in California are organized by county agencies that either directly provide or subcontract with local providers for mental health care. Services are financed in part by a state-level vehicle tax supplemented by county funding. Services provided to Medi-Cal beneficiaries are billed to the state Department of Mental Health, and data on these services are forwarded to California's Department of Health Services (DHS). Physical health services for Medi-Cal beneficiaries are provided by local health care providers and billed directly to DHS. Prescription medications are available without co-payment to Medi-Cal beneficiaries at all local pharmacies and are billed directly to DHS.

San Diego County's Adult Mental Health Services (AMHS) retains data on all users of public mental health services in the County. We used AMHS data to identify persons receiving a primary diagnosis of schizophrenia from a specialty mental health provider and to determine their living situation, age and ethnicity, co-morbid substance use disorder, psychosocial functioning as measured by the Global Assessment of Functioning (GAF),[21,22] and conservatorship status. We limited our analyses to persons not dually eligible for Medicare, as much of their utilization and cost information does not appear in Medicaid claims. We were unable to determine if a beneficiary was additionally receiving services from VA hospitals.

Living situation is recorded at each time of service, and is coded as living independently (in a house or an apartment, but not with family members or relatives, in a non-supervised setting); in a B&C; and homeless (including those without a residence living on the street or in shelters and those in transit between residences living in a nightly hotel or in their car). We used modal living situation (defined as the most common living situation at time of service) to define residential status. We calculated modal living situation by enumerating the corresponding codes at each time of service. Residential instability is common in this population. Thus, we expected that some number of individuals would transition from one living situation to another, and we provide evidence on residential instability below. Because the living situation assigned was the most common recorded, the pattern of care associated with a given living situation will reflect some time spent in other living situations.

Those who were institutionalized for medical or legal reasons (those in correctional facilities or medical institutions such as psychiatric hospitals, long-term care, and skilled nursing facilities) or who received long-term care services were excluded because they did not receive all of their care in the community. We also excluded patients placed on public conservatorship, a legal status assigned to some persons after an involuntary psychiatric hospitalization when those individuals are determined by a court of law to be gravely disabled, because their costs were considerably higher than others (due to severe disability) and because they were generally required to reside in supervised settings.

Substance use disorder was defined using diagnostic codes for alcohol or drug dependence or abuse. We measured illness severity using the GAF, a rating scale used to evaluate the overall psychosocial functioning of a patient. The scale ranges from 1-100 with a score of 1 assigned to the sickest possible individual and 100 to the healthiest. The scale is anchored at ten-point intervals, and each interval has a description of pathology. In rating a patient, the clinician selects the lowest interval that describes the patient's functioning, and then assigns a score within that interval based on the relationship between the patient's functioning and the defining characteristics of the adjoining categories. These ratings have been shown to be reliable and to have high sensitivity to variations in illness severity and specific symptom dimensions.[21] We used a person's average GAF score as his or her measure of psychosocial functioning.

We measured health services utilization and costs by merging AMHS data to Medi-Cal (Medicaid) claims data provided by DHS. Outpatient mental health utilization was identified using procedure codes to count the number of visits for case management, therapy, crisis stabilization, medication supervision, day treatment, and drug treatment. Psychiatric and medical admissions were identified by hospital admission dates. Costs were calculated as the amount paid by Medi-Cal for outpatient mental health care, outpatient physical health care, and pharmacy. Total costs were computed as costs for all acute mental health and medical care including inpatient, outpatient, and pharmacy services. Each utilization and cost measure was annualized and all analyses were weighted by months with Medi-Cal eligibility. We have previously used the county database to examine the differential use of services by age, gender and ethnicity,[23-25] and the combined database to analyze adherence to antispychotic medication.[26] This is the first study using this data to examine costs by living situation.

Analysis Methods

Multivariate analyses were used to estimate the relationship between each service or cost category and living situation, controlling for age, ethnicity, co-morbid substance abuse, and GAF score. Negative binomial regression was used to model the number of visits for each outpatient service. This type model is often used to estimate the number of occurrences of an event when the event has extra-Poisson variation, also known as overdispersion.[27] Logistic regression models were used to estimate the probability of acute psychiatric hospitalization and the probability of physical health hospitalization.[28] We modeled the probability of hospitalization, but not hospital costs, because most of the variation in costs was attributable to whether on not a person was hospitalized, rather than differences in costs once hospitalized.

Due to the heavy-tailed distribution of the cost variables, two-part non-linear models were used to analyze the relationships between living situation and costs.[29,30] A logistic regression model was used to estimate the probability of positive use; a generalized linear model with a gamma distribution and log link function was used to estimate costs conditional on use. This specification was chosen over the

potentially more efficient log-linear model because costs were heteroscedastic in several variables including the continuous GAF score variable.[31,32] Total cost was estimated using a gamma regression model only, since persons had to have some use of services in order to identify living situation. The fit for each model was evaluated using a modified version of the test proposed by Hosmer and Lemeshow for logistic regression.[28]

Standardized estimates of visits, hospitalization, and costs by living situation were calculated by evaluating the mean expected value across individuals for a given characteristic. For example, the standardized number of visits for case management for persons living independently was calculated by evaluating the mean expected visits for case management as if everyone lived independently in the community. Similarly, the standardized outpatient mental health cost for persons living in B&Cs was calculated by evaluating the mean expected cost for outpatient mental health as if everyone lived in a B&C. Ninety-five percent confidence intervals were estimated using the non-parametric bootstrap method with 1000 replications.[33] Data for the bootstrap analysis were sampled by the individual, rather than by observation, to account for potential individual correlated errors. The means of the bootstrapped estimates were nearly identical to the standardized estimates. Thus, bias-correction was not required.

Results

We identified 1,981 unique Medi-Cal beneficiaries with schizophrenia who were living in the community during 1998-2000 (AMHS). Merging these data with Medi-Cal eligibility files and claims from 1998–2000 provided data on 4,471 person-years. **Table 1** provides demographic characteristics by living situation for Medi-Cal beneficiaries with schizophrenia in San Diego County. The county has a high proportion of Latino residents compared to the national average, which was reflected among users of public mental health services. As expected, substance use disorder was relatively common in this population at 38%. The study population experienced a moderate amount of residential instability. Those who had a modal living situation of living independently experienced, on average, 80% of their encounters in this living situation. The corresponding numbers for residents of B&C and those were homeless were 72% and 59%, respectively (data not shown). Approximately 15% of the study subjects resided in B&Cs. Compared with persons living independently, those in B&Cs were more likely to be male ($p<.001$) and non-Latino white ($p<.001$). Compared with those who were homeless, they were less likely to be African American ($p<.01$). Residents of B&Cs were less likely than either group to be diagnosed with a substance use disorder ($p<.001$).

Table 1. Demographics by Living Situation for Medi-Cal Beneficiaries with Schizophrenia in San Diego County

	Overall	Living Independently	Living in a Board and Care	Homeless
N	1,981	1,482	297	202
Age	40.4	39.9	41.6	41.7
(SD)	(10.7)	(10.9)	(10.8)	(9.4)
% Female	46.1	49.9	34.3	35.1
Medi-Cal eligible months	10.5	10.3	11.5	9.7
(SD)	(2.9)	(3.0)	(1.7)	(3.3)
Ethnicity (%)				
Non-Latino White	53.2	49.9	64.3	60.9
African American	20.2	20.3	15.8	25.7
Latino	17.8	19.5	13.1	11.9
Asian	5.2	5.9	4.7	1.0
Other non-White	3.6	4.4	2.0	0.5
GAF score	36.5	36.9	35.4	35.1
(SD)	(12.6)	(12.9)	(11.1)	(12.1)
Substance use disorder (%)	37.9	37.1	25.6	61.9

Note: Data include Medi-Cal beneficiaries diagnosed with schizophrenia not dually-eligible for Medicare or enrolled in an HMO, and identified by San Diego County Adult Mental Health Services as living independently, residing in a board and care facility, or homeless.

Table 2 shows standardized estimates of annual visits for six types of outpatient mental health services. Estimated visits for residents of B&Cs were significantly different from that for patients living independently and those who were homeless at $p<.001$ for all categories except for drug treatment where visits were not significantly different. Residents of B&Cs received substantially more case management, therapy, and medication supervision and over three times the amount of day treatment than persons living independently. Persons who were homeless received a lower amount of most services, and notably received very little case management or drug treatment.

Table 3 shows standardized estimates of hospitalization, outpatient costs, pharmacy costs, and total costs by living situation standardized to the underlying population characteristics including age, gender, ethnicity, GAF score, and substance use disorder. Compared to those living independently and those who were homeless, persons living in B&Cs were less likely to be admitted to an acute psychiatric facility over the course of a year ($p<.001$). As evidenced by the previous analysis of outpatient utilization, mental health outpatient costs were higher ($p<.001$). These patients were also less likely to be hospitalized for reasons related to physical health ($p<.01$), although physical health outpatient costs were similar. Pharmacy costs ($p<.001$) and total costs ($p<.001$) were highest for residents of B&Cs.

Discussion

We found that among Medi-Cal beneficiaries with schizophrenia in San Diego County, residing in an assisted living facility was associated with a favorable profile of health resources use. Compared to persons living independently and those who were homeless, those living in B&Cs had higher expenditures for outpatient mental health services – which were driven by greater utilization of case management, therapy, medication supervision, and day treatment – and higher pharmacy expenditures, indicating more pharmacological management of psychiatric and physical diseases. Conversely, their probability of hospitalization was lower for both acute psychiatric and medical care.

Further research is needed to determine both the causality and the implications of these findings. It may be the characteristics of the patients themselves, rather than their living situations that lead to a higher use of some services. Persons who live independently are different in ways we have not measured from those who reside in B&Cs and those who are homeless, and it may be that these personal characteristics related to selection of living situation are driving our results. For example, persons placed in a B&C may require a level of supervision not available to those living independently, and for similar reasons may also have a greater demand for outpatient care. Although, to the extent that residents of B&Cs are sicker than persons living independently, one would expect their rate of psychiatric hospitalization to be greater.

A limitation of this study was the lack of exact information on a person's living status. While AMHS collected information at each mental health service, we did not know living status at any given point in time. Our analysis might have been more precise if we had been able to model how outpatient visits and hospitalizations were affected by changes in living arrangements over time. Another limitation was our lack of information on service use outside of Medi-Cal. Given the generous nature of Medi-Cal coverage for persons with disabilities – full acute care and pharmacy coverage without co-payments or coinsurance – it is unlikely that beneficiaries with schizophrenia would have been using non-Medi-Cal reimbursed services to any measurable degree. However, we did not have data related to the use of other public programs (such as the VA) that could serve to reduce hospitalization.

For both psychiatric and medical hospitalizations, it may be that their likelihood is reduced through the supervisory nature of B&Cs (on site staff and support with self-medication), rather increased use of outpatient mental health care among residents. This has two important implications. First, it reduces the likelihood of improving outcomes among persons living independently and those who are homeless though increased use of outpatient mental health care. Second, it suggests that B&Cs might be promoting overuse of outpatient mental health services. Even if living in a B&C facilitates use services which lower the risk of hospitalization, we still do not know which types of services are most responsible (for example, whether it is case management, medication supervision, or day treatment), or if a different mix of services might achieve this outcome more efficiently.

These issues may be addressed in a larger sample though analyses of service use across B&Cs. If enough heterogeneity exists among B&Cs with respect to levels and types of services use, it may be possible to identify which characteristics are associated with differential rates of hospitalization. However, the possibility would remain that people select a particular B&C based on illness severity. Thus, a complementary analysis might examine exogenous factors that affect provision of services, for example, the financing and organization of care at the county level.

As expected, homelessness was associated with a higher likelihood of acute psychiatric hospitalization. Persons who were homeless receive less case management, therapy, day treatment, and drug treatment, and have lower medication costs than either those who live independently or those who live in B&Cs. These findings are consistent with prior investigations that have reported that homeless persons were more likely to use emergency medical care, and less likely to receive outpatient medical treatment, compared to those who were housed.[9,11] Interventions aimed at reducing homelessness have found that homeless persons assigned to community housing, group homes, and residences providing a higher level of services were more likely to remain stably housed than homeless persons attempting to live independently.[32-36] To the extent that B&Cs provide a residence with access to outpatient mental health services, they could be viewed as a preferred alternative to homelessness. Policy makers interested in reducing

Table 2. Standardized Estimates of Annual Utilization (Visits) of Outpatient Mental Health Services with 95% Confidence Intervals

	Case Management	Therapy	Crisis Stabilization	Medication Supervision	Day Treatment	Drug Treatment
Living Situation						
Independently	3.6 (3.0, 4.2)	7.1 (6.2, 7.9)	0.9 (0.8, 1.1)	11.2 (10.6, 11.8)	7.4 (5.9, 9.3)	3.6 (2.4, 8.5)
Board and Care*	6.1 (5.0, 7.9)	13.8 (11.6, 16.5)	0.5 (0.3, 0.6)	14.8 (13.5, 16.2)	25.5 (18.6, 40.1)	5.3 (2.1, 21.5)
Homeless	1.9 (1.2, 2.7)	3.9 (2.9, 5.2)	1.2 (0.9, 1.5)	10.0 (8.3, 11.7)	3.5 (0.4, 8.1)	1.0 (0.3, 4.0)

Note: Each utilization measure is estimated using negative binomial regression controlling for age, ethnicity, co-morbid substance abuse, and GAF score, and standardized to the underlying population characteristics. Confidence intervals are estimated using the nonparamteric bootstrap with 1000 replications.

* *Note:* Estimated visits for residents of B&Cs is significantly different from that for patients living independently and those who are homeless at $p<.001$ for all categories except for drug treatment where it is not significant.

Table 3. Standardized Estimates of Annual Hospitalization with Cost and 95% Confidence Intervals

	Psychiatric Hospitalization (%)	Outpatient Mental Health Cost	Physical Health Hospitalization (%)	Outpatient Physical Health Cost	Pharmacy Cost	Total Cost
Living Situation						
Independently	29.3 (27.4, 31.0)	2389 (2218, 2570)	12.6 (11.1, 14.0)	1347 (1260, 1442)	2743 (2582, 2900)	8662 (8234, 9098)
Board and Care*	22.7 (19.5, 26.3)	3873 (3353, 4466)	8.5 (6.3, 11.0)	1450 (1242, 1672)	4721 (4309, 5142)	11732 (10791, 12705)
Homeless	32.1 (27.8, 36.7)	1760 (1441, 2111)	13.9 (10.0, 18.4)	1828 (1481, 2190)	1592 (1252, 1930)	7577 (6583, 8739)

Note: Total cost is estimated using a gamma regression model with a log link function, the probabilities of mental health and physical health hospitalization are estimated using a logistic regression model, and outpatient mental health, outpatient physical health, and pharmacy costs are estimated using two-part models, where the probability of use is modeled by logistic regression and conditional use is modeled using a gamma regression. Total costs are estimated using one part only since all persons use some services. We model the probability of hospitalization, but not hospital costs, because most of the variation in utilization can be attributed to differences in the probability of being hospitalized. All regression analyses control for age, ethnicity, GAF score, and comorbid substance use disorder and costs are standardized to the underlying population characteristics. Confidence intervals are estimated using the nonparametric bootstrap with 1000 replications.

* *Note:* Estimated hospitalization/cost for residents of B&Cs is statistically significantly different from those living independently and those who are homeless at $p<.001$ for all categories except physical health hospitalization, where it is significant at $p<.01$ and outpatient physical health where it is not significant.

homelessness might consider subsidizing these facilities for certain subgroups of homeless persons and evaluating whether these subsidies improve long term residential and treatment outcomes.

Overall, we found that severely mentally ill residents of assisted living facilities in San Diego County receive as many or more outpatient mental health services than patients living independently in the community. B&Cs receive limited resources and consequently the living environments they provide will appear to many to be suboptimal. However, they also appear to allow ready access to outpatient services, and it may be the case that reports of substandard care referred to in the introduction apply only to certain types of such facilities. Future studies might provide a more detailed evaluation of different types of assisted living facilities in terms of the quality of environment and level of care provided.

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