


An Examination of the Likelihood of Home Discharge After General Hospitalizations Among Medicaid Recipients

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Abstract

Ability to predict discharge destination would be a useful way of optimizing posthospital care. We conducted a cross-sectional, multiple state study of inpatient services to assess the likelihood of home discharges in 2009 among Medicaid enrollees who were discharged following general hospitalizations. Analyses were conducted using hospitalization data from the states of California, Georgia, Michigan, and Mississippi. A total of 33 160 patients were included in the study among which 13 948 (42%) were discharged to their own homes and 19 212 (58%) were discharged to continue with institutional-based treatment. A multiple logistic regression model showed that gender, age, race, and having ambulatory care-sensitive conditions upon admission were significant predictors of home-based discharges. Females were at higher odds of home discharges in the sample (odds ratio [OR] = 1.631; 95% confidence interval [CI], 1.520-1.751), while patients with ambulatory care-sensitive conditions were less likely to get home discharges (OR = 0.739; 95% CI, 0.684-0.798). As the nation engages in the continued effort to improve the effectiveness of the health care system, cost savings are possible if providers and systems of care are able to identify admission factors with greater prospects for in-home services after discharge.

Keywords

home discharges, home-based discharges, discharge destination, cost savings, Medicaid hospitalizations

Introduction

In recent years, home health care has been increasingly regarded as the strategic alternative to postacute care with the potential of addressing both quality and cost concerns in the health care system. Patients with recent discharges from hospital or those receiving provider referral typically qualify for home health care.^{1,2} In many ways, home discharges should be reflective of the patient's or family's involvement in the discharge plan and capable of providing less expensive and more convenient alternative to facility-based postacute care.

Several scholars have examined the value of home discharges with respect to different aspects of postacute care. These scholars have found disparate findings. For example, discharges to home health care were determined to be less expensive compared with inpatient rehabilitation facility or skilled nursing facility among Medicare beneficiaries.^{3,4} A study of outcomes among home-based care patients showed that both clinical outcomes and quality of life improved at the end of the follow-up period with quality of life levels being comparable to national averages.⁵ Experience of care is an important aspect of care quality and has to be assessed

at all care settings. In an examination of patient satisfaction with home health care, Leff et al⁶ found patients receiving care at home had high levels of satisfaction with better scores in most domains used for comparisons with a comparable hospital cohort. Cost savings have also been reported to emanate from the use of home health care. Shapiro et al⁷ reported significant Medicaid cost savings that were made in home health care vis-à-vis nursing home costs.

The growing value placed on home discharges as the future for quality improvement and cost savings in

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postacute care is reflected in different policy measures taken to control cost and resource utilization. For this reason, a better understanding of factors leading to home discharges will benefit health care providers and policy makers in supporting efforts for implementation of delivery mechanisms with the greatest potential for increasing home discharges. In this study, we examined factors associated with the likelihood of home discharges among Medicaid beneficiaries receiving services from primary care plans in a geographically dispersed sample that represents 3 of the 4 geographic regions of the United States.

Methods

Study Population

We conducted a retrospective cross-sectional study of Medicaid beneficiaries who were hospitalized in 4 states located in each of the West, South, and Midwest regions of the United States. In our analyses, de-identified Centers for Medicare and Medicaid Services (CMS) Medicaid Analytic eXtract (MAX) data system containing information for these patients was used to examine discharge destinations. MAX data contain detailed clinical and nonclinical information on beneficiaries including patient status on discharge in any given year of service.

Patients in the Sample

The data used in our analysis consisted of Medicaid enrollees who received primary care services in the states of California, Georgia, Michigan, and Mississippi in 2009. Overall, there were 33 160 adult patients (aged 18 and above) who were included in the analyses. These patients were either discharged to their own homes ($n = 13\,948$) or to other hospitals and other facilities, including skilled nursing facilities for further treatment ($n = 19\,212$). We excluded from the analysis patients who left the hospital against medical advice, patients who died during hospitalization, and patients who were referred to palliative care. Patients in the final sample were examined to determine the total cost of hospitalization prior to discharge. Total cost of hospitalization for each discharge destination from a defined cohort of patients could set the basis for future evaluation of patterns of care and final cost of care when all discharge alternatives are compared.

Variables and Definitions

We examined patients according to the type of discharge destination. In this way, in our analyses, the primary dependent variable was classified as patients with home-based discharges (ie, those who received the needed posthospitalization care at home) and those with facility-based discharges (ie, those who received the needed posthospitalization care at other established facilities) in the year of study. In

our sample, patients who needed facility-based care after hospitalization were those who were (1) discharged and referred for outpatient care, (2) discharged to nursing facilities, and (3) discharged to intermediate care facilities. Independent variables represented clinical and demographic characteristics among the patients. Demographic variables included gender, race, location, and age, while clinical variables included length of stay (LOS, in days, and as a proxy for cost of care in the regression model), procedure (whether or not the patient had procedure on admission), and primary diagnosis involving ambulatory care-sensitive condition (ACSC) upon admission. By definition, ACSC are conditions that lead to a hospital admission of which the onset could have been prevented through a more easily accessible ambulatory sector or one that provides better quality of care at primary care level.⁸⁻¹⁰ This variable was treated as a dichotomous variable, measuring the occurrence of ACSC-related hospitalization in the target population. The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) was used to assess ACSC. Last, Medicare/Medicaid dual eligibility status was included in the study to examine its impact on discharge destination.

Statistical Analysis

To examine the likelihood of home discharges, we first conduct univariate analysis of discharges and other factors to establish their distribution in the sample of the hospitalized patients. Bivariate associations are also examined and reported between the dependent variable and relevant independent variables as well as among independent variables. Then, we examine total cost of hospitalization prior to discharge to determine how cost was distributed based on discharge destination. We use multiple logistic regression to assess the likelihood of home discharges in the Medicaid population. This model is used to identify independent factors associated with home discharges.

Results

Table 1 presents distribution of the patients' demographic and clinical characteristics as identified by discharge destination. Women made about two-thirds of discharges in each category of discharge destination. The data showed patients who were discharged to their homes were, on the average, younger than those discharged to other facilities for continued care (52.2 vs 68.6 years). In terms of race, whites and blacks had somewhat similar proportions among those who were discharged to their homes (42.8% vs 40.6%), but white patients had higher rates of facility-based discharges than blacks (48.2% vs 35.1%). At the point of discharge, patients with home discharges had higher average cost of hospitalization than those getting facility-based discharges. While patients did not have differences in the proportions of ACSC

Table 1. Clinical and Demographic Characteristics of the Sample.

Sample characteristics	Home discharges (n = 13 948)	Facility discharges (n = 19 212)
Women, n (%) [*]	9410 (67.8)	11 821 (61.7)
Age, mean (SD) ^{**}	52.2 (0.22)	68.6 (0.13)
Race of the patient, n (%)		
White ^{**}	5976 (42.8)	9253 (48.2)
Black ^{**}	5669 (40.6)	6741 (35.1)
Hispanic	530 (3.8)	811 (4.2)
Expenditure, mean (SD) ^{**}	\$7691 (177.55)	\$5896 (120.59)
Having ACSC upon admission	3207 (23.0)	4432 (23.1)
Inpatient procedure on admission ^{**}	8496 (60.9)	6841 (35.6)
LOS, mean (SD)	3.69 (0.01)	3.86 (0.01)
Dual eligible, n (%) ^{**}	10 407 (54.2)	4744 (34.0)
State of residence, n (%)		
California ^{**}	1663 (11.9)	9227 (48.3)
Georgia ^{**}	4589 (32.9)	5038 (26.3)
Michigan ^{**}	4620 (33.1)	2220 (11.6)
Mississippi ^{**}	3076 (22.1)	2677 (14.0)

Note. ACSC = ambulatory care-sensitive condition; LOS = length of stay, expenditure in US\$.

* $P < .05$. ** $P < .01$.

Table 2. Total Cost of Hospitalization by Discharge Destination.

Discharge destination	Expenditure prior to discharge, Mean (SD) in US\$
Nursing facility	\$5581.60 (122.24)
Intermediate care facility	\$5953.45 (284.36)
Facility for outpatient services	\$11 502.00 (979.64)
Home health services	\$7692.01 (177.58)

and average LOS in the 2 discharge categories, patients with home discharges had greater proportion of having procedures on admission than those with facility-based discharges (60.9% vs 35.6%). Patients with Medicare/Medicaid dual eligibility had higher proportion of home discharges compared with those with Medicaid-only coverage (54.2% vs 34.0%). With the exception of California (11%), all other states in the study had patients with greater proportions of home-based discharges (between 11% and 22% higher).

Table 2 displays the breakdown of total cost of hospitalization prior to discharge. It is shown that, on one hand, patients with discharges to institutional discharge destinations—nursing facility (US\$5581.60) and intermediate care facility (US\$5953.45)—had lower average total cost of hospitalization compared with patients discharged to outpatient care, who had nearly twice the cost (US\$11 502.00). On the other hand, patients with home-based discharges had higher cost of hospitalization than institutionally discharged patients but lower than that of patients discharged to outpatient settings.

We used multiple logistic regression model to assess the likelihood of home discharges in Medicaid patients with hospitalizations in the study states. Table 3 shows the results of

Table 3. Results of the Logistic Regression on the Prediction of Home Discharges.

Demographic and clinical factors	OR	95% CI
Female ^{**}	1.631	1.520-1.751
Age [*]	0.970	0.968-0.972
Race of the patient		
White ^{**}	1.624	1.413-1.866
Black ^{**}	1.375	1.191-1.587
Hispanic [*]	0.820	0.660-1.019
Procedure on admission ^{**}	1.737	1.621-1.862
Length of stay [*]	0.988	0.986-0.990
Admitted with ACSC ^{**}	0.739	0.684-0.798
Dual eligible ^{**}	1.646	1.512-1.791
State of residence		
Michigan ^{**}	1.207	1.084-1.343
California [*]	0.165	0.148-0.184
Georgia [*]	0.829	0.760-0.908

Note. OR = odds ratio; CI = confidence interval; ACSC = ambulatory care-sensitive condition.

* $P < .05$. ** $P < .01$.

the logistic regression model in terms of odds ratios (ORs) and corresponding 95% confidence intervals (CIs).

According to the results of the logistic regression for the prediction of home discharges, we found that female patients were more likely than males to be discharged to their own homes (Table 3). Specifically, women were 63% more likely than men to get home discharges (OR = 1.631, 95% CI, 1.520-1.751). The data also showed that age was a predictor for home discharges with higher age being associated with lower odds of home discharges (OR = 0.970, 95% CI, 0.968-0.972). Compared with white and black patients, Hispanic

patients had lower odds of getting home discharges (OR = 1.624, 95% CI, 1.413-1.866 and OR = 1.375, 95% CI, 1.191-1.587, respectively, vs OR = 0.820, 95% CI, 0.660-1.019). The results showed that longer hospital stays were associated with decreased odds of home discharge (OR = 0.988, 95% CI, 0.986-0.990). Furthermore, having a procedure on admission increased the odds of home-based discharges (OR = 1.737, 95% CI, 1.621-1.862), while being admitted with ACSC decreased the odds of home-based discharges among Medicaid patients (OR = 0.739, 95% CI, 0.684-0.798). Patients with dual eligibility were about 65% more likely than those with Medicaid-only coverage to get home-based discharges (OR = 1.646, 95% CI, 1.512-1.791). Last, we found that compared with patients residing in the state of Mississippi, patients in California and Georgia were associated with, respectively, 83% (OR = 0.165, 95% CI, 0.148-0.184) and 17% (OR = 0.829, 95% CI, 0.760-0.908) lower odds, while those in Michigan had 21% (OR = 1.207, 95% CI, 1.084-1.343) higher odds of home discharges.

Discussion

The current study attempts to create more insights into the patient factors related to home-based discharges from hospital. Effective assessment of the factors at the point admission could increase the potential for achieving the objectives of posthospital care needed at the home settings. In addition to the prospects of increasing the number of patients with discharges to comfortable and familiar home environment, from policy and quality perspectives, knowledge of the profile of patients with the likelihood of home discharges would complement the national efforts in cost containment and management of resource utilization by establishing the right strategy for successful home-based care.^{11,12}

We found that women were more likely than men to get home discharges following hospitalizations. With about 58% of Medicaid enrollees in the nation being female,¹³ this finding suggests that there is a greater potential for women making the larger proportion of patients receiving home-based care after hospital discharge, consequently leading to significant cost savings. Providers and caregivers have to adapt to gender-specific, home-based approaches to care that will meet the needs of patients in home settings. Community factors such as rural or urban setting and neighborhood resources should be incorporated in the process of care to improve compliance and enhance patient's perception of familiarity with the environment of care.

Another important predictor for home discharges was patient's age. The data showed that older patients in the sample were significantly less likely to be discharged to their homes. In spite of this finding, however, in instances where patient preference might be sought in choosing a discharge destination, older patients might be more inclined to prefer home-based discharges due to expectations in care that could vary with age. Previous studies have established that age is

associated with increased use of health care resources,¹⁴ which could be explained in part by the fact that age is highly correlated with morbid chronic conditions leading to high inpatient utilization. Combined with our findings, this suggests that in the times when the nation is experiencing increased proportion of aging population, cost savings are possible if home settings are promoted to become the regular place for care provided to the traditionally high-utilization group of older aged adults. Furthermore, in absence of any clear evidence from the current study on the role of race in encouraging high rates and volumes of home discharges among Hispanic patients, strategies based on the previously discussed influence of gender and age could be used to ensure patients of all races understand and value (the importance of) home health services.

As concluded from earlier research, ACSC are conditions that may be treated effectively in outpatient care settings and thus with great potential for reducing the need for inpatient care.^{15,16} We found out patients hospitalized with primary diagnoses of ACSC were less likely to be discharged to their homes. Although this study could not clarify the reason for this trend, one possible explanation is that persons admitted with ACSC might be admitted when in very severe state with these conditions due to delays in seeking care or other reasons related to their use of primary care services. As a quality perspective, the health care system should continue to find means to promoting effective use of primary care services to reduce the volume of preventable inpatient care that is commonly costly and more complex. At the least, primary care providers should be able to assist patients having chronic cases of ACSC with information on how to receive case management and/or disease management services to reduce hospitalizations.

The increased potential for home discharges among patients who undergo medical procedures during hospital admissions could be partly reflective of the level of sophistication attained in health care services. Same-day discharges or short-stay hospitalizations are possible for increasing numbers of patients with various types of medical procedures. While initial charges of having a procedure could be high, cost savings are possible over the entire episode of care if the longer duration of care is organized and delivered at home. Investment in medical technologies that have the potential to reduce the intensity of hospital care should be encouraged at the design stage as part of the policy adopted for cost containment and quality improvement. Such technological interventions would be widely adopted if they are capable of producing outcomes reflecting true efficiencies of providers and systems of care, for example, when it becomes possible to reduce hospital stays without necessarily increasing readmission rates.¹⁷

Intuitively, prolonged lengths of hospital stay should resonate genuine need for inpatient services, and, as a result, those requiring the services might stay for relatively extended periods of time followed by facility-based discharges. In our

analyses, increased LOS was associated with decreased likelihood of home discharges, perhaps suggesting high intensity of care required for Medicaid enrollees, especially those with ACSC, even after hospitalizations. Such patients might be responsible for excessive cost among patients with home discharges as observed at the bivariate level (Tables 1 and 2). Effective primary care services together with enhanced health promotion and preventive health capacities should be regarded as key to the continuing effort to reduce the volume of inpatient care. Eventually, the relationships of LOS and expenditure with discharge destination would be more meaningful if examined based on specific types of conditions or subpopulations of Medicaid enrollees.

Previous studies have found that dual eligibility is associated with high utilization of health services.^{18,19} Our findings that individuals with dual eligibility have higher likelihood of home discharges suggest further examination is required to determine any possible factors contributing to this association. Both patient factors and system factors such as Medicare provisions for home health services need to be investigated to determine whether they could be responsible for increasing the likelihood of delivering resource-friendly, cost-effective home-based care to dually eligible patients.

Market forces and specific state provisions on Medicaid coverage could be responsible in state variations seen in the likelihood of home-based discharges. For example, pay freezes and rate cuts exercised in different states might have created aggressive approaches in hospital services in some states where large volumes of patients were able to be discharged to their homes compared with other states.

Several limitations are acknowledged in this study. First, although we computed the likelihood of home discharges that were meant for continued care, it is possible that in our analyses we included some patients who were discharged to their homes after the completion of treatment routines. Second, it is important to note that our data consist of information on discharges from general hospitalizations. A study involving discharges from specific health conditions or other defined patient groups could have provided a more concise estimation of the home-based discharges. Last, the cross-sectional design used in this study limits the ability to determine any causality in the observed relationships used to assess the likelihood of home-based discharges in the studied Medicaid population. Despite the limitations, however, this study drew its strength from the large size of the data involved and the analyses that produced findings critical for understanding factors impacting discharge destination in Medicaid population.

In conclusion, our findings suggest that there is a potential for successful cost-containment strategies in utilization of resources associated with inpatient care if careful plans are made to identify patients who can be successfully discharged to their home settings to continue with posthospital care. Hospitals and systems of care should invest in understanding and supporting design, management, and operations of care delivered at home. They should have the interest of making

home-based settings a preferred destination for patients receiving posthospital care if meaningful cost savings are to be achieved.

Declaration of Conflicting Interests

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