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Hospital Readmission Rates and Emergency Department Visits for Mental Health and Substance Abuse Conditions

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Abstract Community hospital stays in 12 states during 2008–2009 were analyzed to determine predictors of 12-month hospital readmission and emergency department (EDs) revisits among persons with a mental health or substance abuse diagnosis. Probabilities of hospital readmission and of ED revisits were modeled as functions of patient demographics, insurance type, number of prior-year hospital stays, diagnoses and other characteristics of the initial stay, and hospital characteristics. Alcohol or drug dependence, dementias, psychotic disorders, autism, impulse control disorders, and personality disorders were most strongly associated with future inpatient admission or ED revisits within 12 months of initial encounter. Insurance type, including uninsured status, were highly significant ($p < .01$) predictors of both readmission and ED revisits.

Keywords Alcohol-related disorders · Drug-related disorders · Mental disorders · Anxiety disorders · Emergency service · Hospital readmissions

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Introduction

An estimated 45.6 million adults in the US, approximately 1 of 5 individuals, were diagnosed with some type of mental illness in 2011 (SAMHSA 2012b). Of these, 17.5 % (8 million) also met criteria for a substance abuse condition (alcohol or illicit drug abuse or dependence). An additional 5.8 % (10.9 million) of adults without mental illness met criteria for a substance abuse condition. The most recent national expenditures for mental health services and substance abuse treatment from all public and private sources totaled $172 billion in 2009 (SAMHSA 2013). Of this amount, treatment spending for mental health services was $147 billion, and public payers accounted for 60 % of mental health spending. Substance abuse treatment spending totaled $24 billion with public payers being responsible for 69 % of substance abuse spending.

Inpatient treatment for mental health and substance abuse (MHSA) conditions has steadily shifted over the past three decades from free-standing private or government facilities to short-term, general community hospitals. Although the number of community hospitals with dedicated psychiatric units has declined (from 1,571 in 1990 to 1,292 in 2008), community hospitals are the primary setting for inpatient MHSA treatment (SAMHSA 2012a).

Hospital admission and readmissions of individuals with MHSA conditions are prevalent and costly occurrences. There were 1.8 million inpatient stays at community hospitals for MHSA conditions in 2009, costing an estimated $9.7 billion (Stranges et al. 2011). An additional $1.5 billion was spent on MHSA inpatient stays at Veterans Affairs Hospitals in 2007 (Wagner et al. 2011). Identifying knowledge gaps of what determines repeat hospitalizations for those with MHSA conditions will be an essential priority in preventing readmissions and reducing costs.

Emergency Departments (EDs) are common entry points for hospital admission and it is not unusual to find that those with MHSA conditions are frequent users of EDs (Doupe et al. 2012; Crane et al. 2012; Owens et al. 2012; Pines et al. 2011; Larkin et al. 2005). ED visits within 30 days of hospital discharge have been shown to be common among adults, accounting for 40 % of all hospital-based acute care during the post-discharge period, with the highest rate of ED visits for MHSA conditions (Vashi et al. 2013).

Additional research is needed to better understand how and why EDs are utilized by those with MHSA conditions. Discerning the factors that contribute to repeat ED visits and readmissions could predict which patients with MHSA conditions would be more frequent users of hospital services. High readmission rates and ED visits after discharge may reflect shortcomings in access to outpatient care. Addressing these knowledge gaps would guide recommendations for outpatient coordination efforts to match the specific treatment needs of those with MHSA conditions that would improve patient outcomes and reduce costly readmissions and ED visits.

The purpose of this study is to examine and present data on the readmission rates and ED visits of individuals diagnosed with MHSA conditions in the first 12 months following hospital discharge to determine: (1) which individuals with specific MHSA conditions are more likely to return to the ED or be readmitted; and (2) whether type of insurance is a significant predictor of readmission.

Methods

Analytic Data File

Our primary data source was the Healthcare Cost and Utilization Project (HCUP) sponsored by the Agency for Healthcare Research and Quality (AHRQ). We analyzed data from the State Inpatient Databases (SID) and State Emergency Department Databases (SEDD) for the years 2007–2009. Twelve states were selected, all those for which person-level identifiers could be used to track hospital readmissions and ED visits over time. The states were California, Florida, Hawaii, Massachusetts, Missouri, North Carolina, Nebraska, New Hampshire, New York, South Carolina, Tennessee and Utah. HCUP Central Distributor (2008) details the process of creating person-level identifiers.

We searched 2008 HCUP data to identify hospital discharge records containing one or more diagnoses of MHSA conditions. We defined mental health conditions using ICD-9-CM coding in the HCUP data as principal or secondary codes 295–298, 300, 306–309, 311, 312, E950–E959, and V62.84. Substance abuse conditions were defined by codes 291, 292, 303–305.0, and 305.2–305.9. A record with any MHSA diagnosis (whether principal or secondary) constituted a *qualifying stay*. Readmissions within a 12 month time period was utilized (as opposed to a 30-day period) to account for the chronic nature of most MHSA conditions and for increased detection of variation across diagnoses and payer characteristics. Looking across all qualifying stays for each person, we selected the earliest one for which there was no qualifying stay in the previous 90 days. This *index stay* was the basis for our analyses. After an index stay was identified, we extracted all inpatient and ED records in 2008 and 2009 that fell within 12 months of the index stay. Individuals who died during the initial stay were excluded because our focus was on readmission. Records with ED dispositions of AMA and transfer to other facilities were included because these individuals were also potential readmissions within the 12-month period.

Variables

The analytic file contained information pertaining to the initial stay plus outcome variables for hospital readmission and ED visits during the 12-month period after discharge. The primary outcome variable was an indicator (1/0) for hospital readmission and a similar indicator for ED visits. Similar to earlier models of readmission or time until readmission (Ilgen et al. 2008; Klinkenberg et al. 1998; Cherpitel and Ye 2008), we included demographics, diagnostic indicators for MHSA conditions, and insurance status.

Patient demographics included age, gender, race/ethnicity, and health insurance status (Medicare, Medicaid, private, other, or uninsured). Medicare records were split by age group (<65, ≥ 65) to help distinguish those with chronic disability from the elderly. Hospital characteristics included teaching status and bed size, a proxy for hospital volume. The 2007 average admission rate for ambulatory care sensitive conditions (ACSCs) in the hospital's referral region (from the Dartmouth Atlas) served as a proxy for community access to primary care. Greater access to outpatient care and higher quality of care should be associated with a lower population rate of hospitalizations for ACSCs. Some medical conditions are seasonal in nature, such as influenza; therefore, we included indicators representing the calendar quarter of discharge. Co-occurring MHSA diagnoses (as recorded in the initial stay) were represented by a separate indicator.

We used the primary and secondary diagnoses recorded on the index stay as signs of pre-existing disease. As a broad form of casemix control we used clinical variables for the first-listed (primary) diagnosis corresponding to

each of the diagnostic chapters in the 2008 ICD-9-CM codebook (Hart and Stegman 2007). A separate set of indicator variables represented secondary diagnoses. The indicators were coded as "1" if the index stay recorded a diagnostic code in the relevant range, and "0" if not. Each index stay had exactly one primary diagnosis and zero, one, or multiple secondary diagnoses. This approach had several benefits for our purpose. It covered the entire spectrum of medical and psychiatric conditions; it allowed primary and secondary diagnoses to have different coefficients; and the groupings followed clinical divisions familiar to the medical community. It avoided the black box of previously developed index models by revealing the coefficients, and unlike hierarchical models it did not assume *a priori* which categories would be most important to the outcome.

Because our interest was in MHSA conditions, we split the psychiatric conditions (ICD-9-CM codes 290–316) into major subcategories. There were four substance abuse conditions: alcohol abuse, alcohol dependence, drug abuse, and drug dependence. There were 14 psychiatric conditions: 1 for mood (depression), 2 for dementias (Alzheimer's-type, other), 2 for psychotic disorders (schizophrenia, other), and 8 other conditions (anxiety disorders, stress disorders, attention-deficit/hyperactivity disorder (ADHD), impulse control disorder, personality disorders, autism-spectrum disorders, developmental disorders, and all other). Two conditions were dropped from the final models due to very low sample sizes: disorders of gender and sexuality, and smoking. The final number of variables was 44, half for primary diagnoses and half for secondary.

AHRQ Comorbidity Software, designed for prediction of inpatient length of stay and mortality, was used as an alternative grouper for comparison (Elixhauser et al. 1998). The Comorbidity Software variables are based on primary and secondary diagnostic codes. The AHRQ system includes the following categories for MHSA conditions: alcohol disorders, drug use disorders, depression, and other psychiatric disorders. AHRQ updates the definitions each year; the definitions for years 2007–2009 were used here as appropriate.

We expect moderate or high collinearity between certain pairs of regressors, such as the indicators for Medicare and for age >65. Collinearity above a moderate level reduces precision of the estimated coefficients of the collinear variables. Given the very large sample sizes, however, we feel that the risk of inflated p values is small relative to the conceptual difficulty that would result from dropping variables such as age categories or payer types.

Analyses

The analyses began with descriptive statistics on variables in the analytic database. We next employed probit regression to analyze the probability of readmission to a community hospital in the same 12-month period, and then the probability of ED use. ED use that led directly to a hospitalization counted as an admission only. Probit models usually yield results quite similar to those of logit models, and the results can be expressed as marginal effects rather than odds ratios. As a sensitivity analysis, we performed the same regressions using the AHRQ Comorbidity Software. We present marginal effects rather than the probit coefficients. Goodness of fit was judged by McFadden's R^2 value (UCLA 2011) and Akaike's Information Criterion (AIC).

Results

Using HCUPNet (http://hcupnet.ahrq.gov/) we determined the relative size of our state sample. The 12 states together had 13,943,373 inpatient discharges in 2009, 37.0 % of the estimated national total. These represent all inpatient stays, not just those having a mental health or substance abuse diagnosis.

Descriptive statistics from initial (index) inpatient hospital stays appear in Table 1. The analytic file consisted of 164,544 individuals with approximately even distribution across ages 0–44, 45–64, and 65 and older. A total of 47,938 individuals (29.1 %) had any SA condition, while 138,285 (84.0 %) had any MH condition (figures not shown). The overlap between those groups (13.1 %) represents people diagnosed with both MH and SA conditions. The most frequently recorded conditions were: depression (37.9 %), anxiety disorders (27.3 %), psychosis other than schizophrenia (21.0 %), and alcohol dependence (12.8 %). Table 1 also shows similar figures for the AHRQ comorbidity indicators pertaining to MHSA conditions.

In the 12 months after discharge, 30.0 % of individuals with any MHSA diagnosis had another inpatient stay and 16.4 % had an ED visit. Because some individuals had both an inpatient stay and an ED visit, the total number with either event was 37.5 %.

Table 2 presents results of a probit model of inpatient readmission within 12 months. Model fit was fair (0.077) by McFadden's adjusted R^2. Most categories of age, gender, and race/ethnicity were significant relative to the omitted categories but had relatively small marginal effects. The primary payer (insurance) categories were all highly significant ($p < .01$). The positive coefficients imply that people with private insurance had the lowest probability of being readmitted, all else equal. Self-harm was associated with a lower likelihood of future inpatient use, while AMA discharges and the number of unique diagnoses had a positive marginal effect. Hospital teaching status and the regional ACSC rate were both positively associated with readmission, but hospital bed size was not.

Table 1 Characteristics of hospital patients, hospital stays, and hospitals (N = 164,544)

Characteristic	Mean	SD
Age (%)		
0–17	2.9	–
8–44	27.7	–
45–64	34.1	–
65+	35.3	–
Gender (%)		
Male	43.3	–
Female	56.7	–
Race/ethnicity (%)		
Non-Hispanic White	70.5	–
Non-Hispanic Black	11.7	–
Hispanic	9.4	–
Asian	1.9	–
Other	3.3	–
Health insurance (%)		
Medicare and age < 65	11.2	–
Medicare and age ≥ 65	32.1	–
Medicaid	16.9	–
Private	26.9	–
Other	4.5	–
Uninsured	8.3	–
Initial stay characteristics		
Self-harm (%)	5.6	–
Discharge AMA (%)	1.9	–
Number of diagnoses	9.5	–
Discharged Jan–Mar (%)	27.4	–
Discharged Apr–Jun (%)	25.8	–
Discharged Jul–Sep (%)	24.2	–
Discharged Oct–Dec (%)	22.6	–
Characteristics of initial-stay hospital		
Teaching hospital (%)	46.6	–
2007 total beds[a]	405.2	349.6
Characteristic of the hospital market area		
2007 ACSC rate × 100 (%)	69.3	18.2
Selected primary or secondary diagnoses in initial stays (%)		
Alcohol abuse	8.0	–
Alcohol dependence	12.8	–
Drug abuse	9.6	–
Drug dependence	8.2	–
Alzheimer's dementia	6.9	–
Other dementia	9.6	–
Schizophrenia	6.5	–
Other psychosis	21.0	–
Depression	37.9	–
Anxiety	27.3	–
Stress	4.4	–
ADHD	2.5	–
Impulse control	0.5	–
Personality disorders	2.3	–
Autism	0.2	–
Developmental disorders	1.1	–
Other MH disorders	7.8	–
Co-occurring MH+SA disorders in initial stays (%)		
	12.9	–
AHRQ Comorbidity Indicators for MH+SA Disorders in initial stays[b] (%)		
Alcohol disorders	15.1	–
Drug disorders	12.3	–
Depression	32.3	–
Other psychiatric disorders	12.8	–
Utilization by Patients		
Hospital readmission (%)	30.0	–
ED visits (%)	16.4	–
Hospital or ED encounter (%)	37.5	–
2007 MHSA inpatient stays	0.6	1.5

SD is not defined for percentage figures because the data represent the entire population of hospital stays in the 12 states

Source 2007–2009 HCUP State Inpatient Database (SID) and State Emergency Department Database (SEDD)

ADHD attention-deficit/hyperactivity disorder, *AMA* against medical advice, *MHSA* mental health or substance abuse, *SD* standard deviation

[a] In regression models this variable is divided by 100

[b] The 24 AHRQ Comorbidity Indicators pertaining to medical disorders are not shown but enter into the regression model

Eight of 17 primary MHSA diagnoses were significant ($p < .05$) relative to the omitted category, including alcohol or drug dependence, Alzheimer's and other dementias, schizophrenia and other psychotic disorders, impulse control disorders, and "other" mental health disorders. Coefficients were moderately high (.05–.10) in general, and very high for schizophrenia (.199).

The results were largely similar for MHSA secondary diagnoses. Eleven of 17 were significant for the likelihood of inpatient hospitalization, including three substance abuse conditions (alcohol abuse, alcohol dependence and drug dependence), Alzheimer's and other dementias, schizophrenia and other psychotic disorders, depression, anxiety, personality disorders, and "other" mental health disorders. There is no omitted category for secondary diagnoses, and so each marginal effect is relative to the absence of the condition.

Table 3 presents the probit model of ED use within 12 months of index inpatient hospital stay. Model fit was moderately good (McFadden's adjusted $R^2 = 0.133$). The highest probability of ED use following inpatient hospitalization was for people ages 18–44 (omitted category),

Table 2 Inpatient readmission: marginal effects from multivariate probit model of predictors of readmission within 12 months of discharge from a community hospital stay with a MHSA diagnosis

Characteristic	Coefficient	SE	*p* value
Age (reference: 18–44)			
0–17	−.015	.009	.126
45–64	.020	.004	<.001
65+	.035	.008	<.001
Gender			
Female	.001	.003	.671
Health insurance (reference: non-Hispanic White)			
Non-Hispanic Black	.009	.004	.026
Hispanic	.001	.004	.864
Asian	−.023	.008	.007
Other	−.029	.007	<.001
Health insurance (reference: private insurance)			
Medicare and age <65	.118	.005	<.001
Medicare and age ≥65	.053	.007	<.001
Medicaid	.092	.004	<.001
Other	.032	.007	<.001
Uninsured	.014	.005	.008
2007 MHSA inpatient stays			
Number of encounters (10s)	.032	.005	<.001
Initial stay characteristics			
Self-harm	−.031	.006	<.001
Discharged AMA	.064	.008	<.001
Number of diagnoses (10s)	.033	.005	<.001
Discharged Apr–Jun	−.001	.003	.950
Discharged Jul–Sep	−.008	.003	.020
Discharged Oct–Dec	−.008	.003	.012
Characteristics of initial-stay hospital			
Teaching hospital	.009	.004	.009
2007 total beds (1,000s)	<.001	.004	.981
2007 ACSC rate (100s)	.074	.008	<.001
MHSA primary diagnoses (reference: signs and symptoms)			
Alcohol abuse	.032	.026	.201
Alcohol dependence	.086	.010	.027
Drug abuse	−.016	.034	.645
Drug dependence	.078	.013	<.001
Alzheimer's dementia	.056	.016	<.001
Other dementia	.097	.019	<.001
Schizophrenia	.199	.010	<.001
Other psychosis	.103	.008	<.001
Depression	.010	.007	.115
Anxiety	−.009	.017	.619
Stress	−.020	.015	.208
ADHD	.046	.029	.103
Impulse control	.086	.034	.007
Personality disorders	.090	.051	.064
Autism	.111	.092	.202
Developmental disorders	.031	.244	.897
Other MH disorders	.050	.022	.018
MHSA secondary diagnoses			
Alcohol abuse	−.019	.005	<.001
Alcohol dependence	.062	.005	<.001
Drug abuse	−.001	.005	.885
Drug dependence	.020	.006	.001
Alzheimer's dementia	.032	.007	<.001
Other dementia	.024	.007	<.001
Schizophrenia	.096	.007	<.001
Other psychosis	.058	.004	<.001
Depression	.029	.003	<.001
Anxiety	.010	.003	<.001
Stress	−.002	.006	.757
ADHD	−.015	.009	.097
Impulse control	.017	.022	.441
Personality disorders	.034	.009	<.001
Autism	.016	.029	.580
Developmental disorders	−.014	.012	.250
Other MH disorders	−.012	.005	.011
Co-occurring MH+SA diagnoses	.019	.005	<.001
Number of observations	164,544		
McFadden's R^2	.078		

Results for primary and secondary diagnoses of non-MHSA conditions are omitted

Source 2007–2009 HCUP State Inpatient Database (SID) and State Emergency Department Database (SEDD)

ACSC ambulatory care sensitive conditions, *ADHD* attention-deficit/hyperactivity disorder, *AMA* against medical advice, *MH* mental health, *MHSD* mental health substance abuse, *SE* absolute value of standard error

females, non-Hispanic Whites (omitted category), and persons with Medicaid as the primary payer. As a sensitivity analysis, we performed the same probit regressions using the AHRQ Comorbidity Indicators. The categories relating to alcohol disorders, drug disorders, depression, and other psychiatric conditions were all highly significant ($p < .01$) predictors of the individual and composite outcomes. The marginal effects had the same signs as in the baseline models. For both models, the baseline approach provided higher McFadden's R^2 values (.135 vs. 121 for ED use, .078 vs. .066 for readmission) and better (lower) AIC values for both models (.773 vs. .785 for ED use, 1.129 vs. 1.144 for readmission).

Discussion

Our findings show that in the year following discharge from an inpatient stay with a MHSA diagnosis, 30 % of

Table 3 Emergency department visits: marginal effects from multivariate probit model of predictors of ED visits within 12 months of discharge from a community hospital stay with a mental health or substance abuse diagnosis

Characteristic	Coefficient	S.E.	*p* value
Age (reference: 18–44)			
0–17	−.019	.006	.003
45–64	−.031	.002	<.001
65+	−.058	.005	<.001
Gender (reference: male)			
Female	.010	.002	<.001
Race-ethnicity (reference: non-Hispanic White)			
Non-Hispanic Black	−.006	.003	.063
Hispanic	−.004	.004	.326
Asian	−.033	.006	<.001
Other	−.024	.004	<.001
Health insurance (reference: private insurance)			
Medicare and age <65	.075	.004	<.001
Medicare and age ≥65	.023	.006	<.001
Medicaid	.095	.004	<.001
Other	.066	.007	<.001
Uninsured	.072	.005	<.001
2007 MHSA inpatient stays			
Number of encounters	.040	.001	<.001
Initial stay characteristics			
Self-harm	.030	.005	<.001
Discharged AMA	.049	.007	<.001
Number of diagnoses (10s)	−.015	.004	<.001
Discharged Apr–Jun	.003	.002	.234
Discharged Jul–Sep	.004	.002	.139
Discharged Oct–Dec	.002	.003	.369
Characteristics of initial-stay hospital			
Teaching hospital	−.007	.004	.018
2007 total beds (100s)	−.002	.001	<.001
2007 ACSC rate (100s)	−.032	.008	<.001
MHSA primary diagnoses (reference: signs and symptoms)			
Alcohol abuse	.062	.022	.002
Alcohol dependence	.060	.008	<.001
Drug abuse	.020	.023	.378
Drug dependence	.003	.008	.675
Alzheimer's dementia	.071	.017	<.001
Other dementia	.034	.016	.022
Schizophrenia	.072	.007	<.001
Other psychosis	.057	.006	<.001
Depression	−.007	.004	.145
Anxiety	.023	.012	.051
Stress	−.005	.009	.628
ADHD	.044	.022	.030
Impulse control	.045	.025	.048
Personality disorders	.069	.043	.071
Autism	.084	.079	.218
Developmental disorders	.049	.203	.792
Other MH disorders	−.011	.015	.486
MHSA secondary diagnoses			
Alcohol abuse	.000	.004	.976
Alcohol dependence	.036	.004	<.001
Drug abuse	.016	.004	<.001
Drug dependence	.007	.004	.072
Alzheimer's dementia	.043	.007	<.001
Other dementia	.015	.006	.006
Schizophrenia	.067	.006	<.001
Other psychosis	.052	.003	<.001
Depression	−.007	.003	.005
Anxiety	.020	.003	<.001
Stress	.009	.005	.057
ADHD	.006	.006	.365
Impulse control	.021	.016	.167
Personality disorders	.031	.006	<.001
Autism	.008	.020	.699
Developmental disorders	.005	.008	.559
Other MH disorders	.004	.004	.316
Co-occurring MH+SA diagnoses	.037	.004	<.001
Number of observations	164,544		
McFadden's R^2	.135		

Results for primary and secondary diagnoses of non-MHSA conditions are omitted

Source 2007–2009 HCUP State Inpatient Database (SID) and State Emergency Department Database (SEDD)

ACSC ambulatory care sensitive conditions, *ADHD* attention-deficit/hyperactivity disorder, *AMA* against medical advice, *MH* mental health *MHSD* mental health substance abuse, *SE* standard error

individuals were readmitted, 16.4 % had an ED visit only, and an additional 7.5 % had both an ED visit and were readmitted. Overall, a greater likelihood of readmission was found for those with alcohol dependence or schizophrenia. Individuals with a primary diagnosis of drug dependence, Alzheimer's or other dementias, other psychotic disorders, or impulse control disorders were also likely to be readmitted.

Similar to the significant primary MHSA diagnoses, all significant secondary MHSA diagnoses, including depression, anxiety and personality disorders, were also associated with a greater likelihood of readmission (with the exception of drug dependence). The readmission rate in our study is similar to the 35 % MHSA readmission rate within 18 months reported by Klinkenberg and Calsyn in the early 1990s (Klinkenberg and Calsyn 1998).

Although not tested here, there could be meaningful interactions of factors such as primary payer and the

number of prior stays with the diagnostic categories. For example, persons with private insurance may have an easier time obtaining outpatient mental health care than those with Medicaid or no insurance; in turn, more outpatient care would be expected to reduce the likelihood of readmission. Similarly, the relation of prior inpatient stays to the probability of readmission may differ across mental health and substance abuse conditions.

A recent literature review concluded that length of stay for behavioral health admissions in community hospitals was significantly associated with gender, hospital size, psychiatric diagnoses, discharge against medical advice, and age younger than 65 years (Raven et al. 2010). In our study, these same factors were associated with the likelihood of future inpatient readmissions and ED use within 12 months of the index stay. Mark and Tomic (2012) found that psychiatric readmissions among Medicaid recipients were most common among those with psychosis, substance use disorders, a history of psychiatric hospitalizations, and comorbid medical conditions. This is consistent with our findings in a more general population.

We found that privately insured individuals were the least likely to have readmission and ED use, less likely even than those without insurance. This could reflect unobserved better health among people with private insurance, better access to outpatient care, more assertive care management, or limitations on coverage of hospital care for MHSA conditions. Our research showed that the highest probability of ED use was found among females, aged 18–44 years with Medicaid as the primary payer.

Many clinicians and policymakers view high 30-day readmission rates as a result of inadequate care coordination and transitional efforts to appropriate outpatient care (Jencks et al. 2009). If more than one-third of patients with a MHSA diagnosis are readmitted in the year following discharge, can these findings be used to focus clinical priorities on better care coordination and transitional planning to outpatient treatment settings? Persuasive research on interventions to improve transitions from hospital to outpatient care has been shown to reduce readmissions from 30 to 50% (Jack et al. 2009; Coleman et al. 2006; Naylor et al. 2004). Improving the hospital discharge planning process, as exemplified by training programs such as Project RED (Re-Engineered Discharge), has resulted in reduced readmissions and emergency department visits (Jack et al. 2009). Furthermore, new outpatient treatment models, such as the Health Homes state option, are targeted to address shortcomings in access to outpatient care. The Health Homes option was designed specifically for the outpatient treatment of Medicaid beneficiaries with chronic health conditions such as mental health and substance use disorders to reduce hospital readmissions and ED revisits (Kaiser Commission 2012).

We acknowledge several limitations of our approach. The data are from 2008 to 2009, which is prior to the legal mandate of parity between behavioral and non-behavioral health care in most private health plans. Implementation of parity could increase access to behavioral health care and affect the rates of inpatient readmissions and ED revisits. A second limitation comes from drawing data from a relatively small number of states. Although our sample size is very large, the results may not apply to all areas of the country. There could be differences across states from unobserved factors such as state policies, environmental issues, and others. Addressing these falls outside the scope of this analysis. Our results could be affected by inaccurate documentation in the medical record that leads to inaccurate coding of that information in claims. We were also unable to quantify the impact of factors such as homelessness, social support, and aftercare—factors that are known to relate to the probability of hospital readmissions and ED visits (Tulloch et al. 2011).

Conclusion

A high rate (37.5 %) of hospital readmissions and ED revisits took place within 1 year of the index hospital admission. The readmissions and ED revisits were significantly more likely to occur when there were certain conditions on the index visit, namely, alcohol or drug dependence, dementia, psychotic disorders, autism, impulse control disorders, and personality disorders. Initiatives to reduce these rates should be focused on care coordination and transitional efforts to gain appropriate outpatient care for those with these specific MHSA conditions.

It remains to be seen whether new outpatient treatment models, such as Health Homes, will reduce readmissions and ED revisits for those with these conditions. It is also unknown what the effect of increased access to health insurance could have on rates of MHSA hospital readmissions and ED use. Offering insurance to the uninsured increases access to outpatient treatment and could lower their rates of inpatient stays and ED use, an effect that could be similar to what is seen in the privately insured population. On the contrary, increased health insurance coverage could raise hospital readmission rates and ED use when payment for services becomes less of a barrier. Estimating the impact will require further investigation of the relationship between health insurance, hospital admission rates, and ED use. Considering the high rate of readmissions and ED use in this population, and the concomitant spending by payers for treatment, such efforts to address these knowledge gaps could improve patient outcomes and reduce health care costs.

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