

Factors Associated With Timely Follow-Up Care After Psychiatric Hospitalization for Youths With Mood Disorders

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Objectives: This study identified patient-, hospital-, and community-level factors associated with timely follow-up care following psychiatric hospitalization for children and adolescents with mood disorders.

Methods: The patients were 7,826 youths (ages six to 17) admitted to psychiatric hospitals with a primary diagnosis of mood disorder (July 2009–November 2010). Outcome variables were defined as one or more mental health visits within seven days and 30 days of psychiatric hospitalization. Predictor variables included patient-, hospital-, and community-level factors obtained from Medicaid claim files from four states (California, Florida, Maryland, and Ohio), the American Hospital Association annual survey, and the Area Resource File. Multilevel modeling was used to assess the association between patient-, hospital-, and community-level factors and receipt of follow-up care.

Results: Following discharge, an outpatient mental health visit was obtained by 48.9% of children and adolescents

within seven days and by 69.2% of children and adolescents within 30 days. Positive predictors of follow-up at both seven and 30 days included prior outpatient mental health care, foster care, psychiatric comorbidity, care in teaching hospitals and psychiatric hospitals, and residence in counties with more child and adolescent psychiatrists. Negative predictors included older age, black race, care in hospitals with higher levels of Medicaid penetration, and substance use disorders.

Conclusions: One in three youths did not receive mental health follow-up in the 30 days after psychiatric hospitalization. Linkage to follow-up care appears to be complex and multi-determined. Study findings underscored the need for quality improvement interventions targeting vulnerable populations and promoting successful transitions from inpatient to outpatient care.

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Continuity of care following psychiatric hospitalization is crucial to successful outcomes for children and adolescents. Studies of both adult and pediatric populations have demonstrated the benefits of timely aftercare, including decreased suicidal ideation (1), reduced readmissions (2,3), and improved medication adherence (4). As the length of hospital stays has markedly decreased, discharge planning and linkage to timely and appropriate aftercare are increasingly necessary to monitor treatment response, ensure continued stabilization, maintain and extend health gains, and prevent relapse or readmission after psychiatric hospitalization.

Despite the importance of aftercare, little is known about rates and predictors of follow-up within seven and 30 days of discharge after psychiatric hospitalization, which is considered an indicator of quality of care and which states employ as a performance measure (5). Most studies of follow-up after psychiatric hospitalization have focused on

follow-up periods ranging from two months to six years rather than the week or month immediately following hospitalization (6). Moreover, existing studies are difficult to compare and do not provide definitive conclusions because of varying definitions of aftercare, study populations, and predictor variables. Previous studies have also been limited by the fact that the study samples were often diagnostically heterogeneous and were derived from a single psychiatric hospital and the studies focused solely on individual demographic and clinical variables rather than on system and community characteristics.

Methodological challenges aside, existing studies found several factors to be associated with receipt of aftercare, including younger age, higher socioeconomic status, presence of a biological parent or grandparent in the home, prior outpatient service use before hospitalization, and psychiatric comorbidity (6–8). In contrast, youths who are members of specific racial and ethnic minority groups, who live in

rural areas, and who have a history of self-harm, suicide attempts, substance use disorders, and multiple previous hospitalizations are less likely to receive care after psychiatric hospitalization (6,7,9).

This study examined factors associated with timely aftercare services for Medicaid-enrolled children and adolescents with mood disorders in order to identify patient subgroups at high risk of discontinuity of care and inform quality improvement initiatives. Mood disorders, such as depressive and bipolar disorders, are prominently associated with pediatric psychiatric admissions, particularly in community hospital settings (10). Admission of children with mood disorders is often associated with suicide risk, which is especially high in the period immediately after hospitalization (11). To our knowledge, no studies have examined predictors of timely follow-up after inpatient psychiatric hospitalization for a Medicaid-enrolled pediatric population, and most prior studies have focused solely on the demographic and clinical characteristics of individual patients as predictors of aftercare. Because associations have been observed among hospital- and community-level factors, access to care, and mental health outcomes (12–14), we examined multiple patient-, hospital-, and community-level factors by using population-based data that have been merged from multiple sources to enhance validity.

METHODS

Study Design and Data Sources

A retrospective, longitudinal cohort design was used to examine associations between patient-, hospital-, and community-level factors and timely follow-up care. Data were drawn from three sources: Medicaid Analytic eXtract (MAX) data (15), the American Hospital Association (AHA) annual survey (16), and the Area Resource File (ARF) (17). Medicaid data obtained from the Centers for Medicare and Medicaid Services were the primary source of patient-level data, including demographic characteristics, diagnoses, dates of services, procedures, and providers (15). The AHA annual survey provided information on hospital-level data, including organizational structure, facilities and services, and utilization (16). The Medicaid national provider identifier on the hospital discharge claims was used to link the Medicaid patient-level data with the hospital data. The 2010 ARF provided information on county-level data, including sociodemographic, economic, and health care system characteristics (17). County of residence was used to link the Medicaid patient-level data with community-level data from the ARF. All study procedures were approved by the Ohio State Institutional Review Board.

Study Population

We identified youths (ages six to 17) from four states (California, Florida, Maryland, and Ohio) who were admitted to psychiatric hospitals with a primary diagnosis of mood disorder (*ICD-9-CM* codes 296xx and 311) between July 2009

and November 2010 and who were continuously enrolled in Medicaid for the 30-day period after hospitalization and the 180-day period prior to hospitalization ($N=10,095$). Youths who were readmitted within the 30-day follow-up period ($N=984$) or those who had a hospital stay of greater than 30 days ($N=35$) were excluded. Also excluded were youths with missing hospital- ($N=1,243$) and county-level data ($N=7$). The final analytic sample was 7,826 youths.

Outcome Variables

The study outcome measures of one or more mental health visits within seven days and 30 days of hospital discharge were based on the Health Plan Employer Data and Information Set quality-of-care guidelines for follow-up after psychiatric hospitalization (5). An outpatient follow-up visit was defined as any Medicaid-reimbursed behavioral health visit with a primary mental health diagnosis (*ICD-9-CM* codes 290–319), including visits for psychotherapy or pharmacotherapy, partial hospitalization, rehabilitation, and other community-based services, such as case management.

Predictor Variables

Patient-level factors included age at hospital discharge (six to 11 versus 12–17), sex, race-ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, and other), Medicaid-eligibility category (poverty, disability, and foster care), length of stay (one to seven versus more than seven days), and primary diagnosis (depressive disorder, bipolar disorder, and other mood disorder). The following variables were abstracted from Medicaid claims from the six months prior to hospital admission: presence or absence of prior mental health visits, substance use disorders (*ICD-9-CM* codes 291–292 and 303–305), chronic medical conditions, and number of psychiatric comorbidities (zero, one, and two or more).

Hospital-level factors included the total number of beds (small, <200; medium, 200–399; and large, ≥ 400), ownership (public, private nonprofit, and private for profit), percentage of the total annual discharges involving patients enrolled in Medicaid (low, 0%–18.9%; medium, 19%–25.9%; and high, $\geq 26\%$), medical resident teaching status (major teaching, minor teaching, and nonteaching), and type of hospital (general and psychiatric).

Community-level factors included health care resources, such as the number of providers per 100,000 youths (child psychiatrists [none; low, 1.0–6.9; and high, ≥ 7.0], psychologists [low, 0.0–29.9; medium, 30.0–84.9; and high, ≥ 85.0], and social workers [none; low, <650; and high, ≥ 650]) and presence or absence of community mental health centers; economic factors, such as the annual per capita income (low, <\$30,000; medium, \$30,000–\$36,999; and high, \geq \$37,000), percentage of county population living in poverty (low, <14.0%; medium, 14.0%–17.9%; and high, $\geq 18.0\%$), percentage of county population unemployed (low, <10%; medium, 10.0%–11.9%; and high, $\geq 12.0\%$); and the area of residence (metropolitan and nonmetropolitan).

TABLE 1. Demographic and clinical characteristics of 7,826 youths admitted to a hospital with a diagnosis of mood disorder

Characteristic	N	%
Age		
6–11	1,190	15.2
12–17	6,636	84.8
Gender		
Female	4,336	55.4
Male	3,490	44.6
Race-ethnicity		
Non-Hispanic white	2,831	36.2
Non-Hispanic black	1,823	23.3
Hispanic	2,408	30.8
Other ^a	764	9.8
Medicaid eligibility		
Poverty	4,360	55.7
Disability	1,758	22.5
Foster care	1,708	21.8
Primary diagnosis		
Depressive disorder	4,379	56.0
Bipolar disorder	1,765	22.6
Other mood disorder ^b	1,682	21.5
Length of stay		
Short (1–7 days)	5,841	74.6
Long (8–30 days)	1,985	25.4
Any substance use disorder diagnosis		
Present	72	.9
Absent	7,754	99.1
Psychiatric comorbidity		
0	3,266	41.7
1	1,441	18.4
≥2	3,119	39.9
Any chronic medical condition ^c		
Present	1,496	19.1
Absent	6,330	80.9
Prior outpatient mental health visits		
Present	5,179	66.2
Absent	2,647	33.8

^a Includes Asian, Native American, and multiple race^b Includes mood disorder not otherwise specified^c Includes diabetes, seizures, asthma, sickle cell anemia, cerebral palsy, congenital heart disease, cancer, major organ disease, congenital anomaly, HIV, autoimmune disease, and immunocompromised disease

Statistical Analyses

Rates of follow-up at seven and 30 days were calculated across all patients and stratified by each independent variable. Multivariable random-effects logistic regression models were used to examine the association between patient-level, hospital-level, and community-level factors and timely follow-up care. Separate models were performed for each outcome measure. Random-effects logistic regression is the appropriate analyses for multilevel or hierarchical data because it takes into account the nesting of individuals within hospitals and generates unbiased estimates as well as correct standard errors. We considered variables to be statistically significant at $p=.05$ (two-tailed) and of clinical and policy significance if odds ratios were above 1.20 or below .80. All analyses were performed using STATA, version 13 (18).

RESULTS

Cohort Description

The demographic and clinical characteristics of the 7,826 youths discharged from an inpatient psychiatric hospital are shown in Table 1. The mean \pm SD age was 14.1 ± 2.5 years; 55.4% were female; 36.2% were white, 23.3% were black, 30.8% were Hispanic, and 9.8% were from other ethnic and racial backgrounds. Over half (56.0%) were diagnosed as having a depressive disorder and roughly equal proportions were diagnosed as having bipolar disorder (22.6%) and other mood disorders (21.5%), including mood disorder not otherwise specified. Over one-third of youths (39.9%) had two or more comorbid psychiatric disorders, and about one-fifth (19.1%) had a chronic general medical condition.

Approximately half of youths ($N=3,828$, 48.9%) received follow-up care within seven days of hospital discharge, and about two-thirds ($N=5,417$, 69.2%) received follow-up within 30 days of discharge. Of youths receiving outpatient mental health care in the 30 days after hospitalization, the most frequent visits were for case management ($N=2,594$, 47.9%), pharmacological management ($N=2,510$, 46.3%), psychotherapy ($N=2,136$, 39.4%), and community rehabilitation ($N=1,789$, 33.0%).

Factors Associated With Timely Follow-Up Care

Patient-level factors. Multivariable logistic regression revealed several patient factors that were independently associated with timely follow-up at both seven and 30 days (Table 2). The odds of receiving timely follow-up care were significantly lower for adolescents (ages 12–17), non-Hispanic blacks, and patients with co-occurring substance use disorders. In contrast, the odds of receiving follow-up at both seven and 30 days were higher for youths in foster care than for those in the poverty eligibility category, those with psychiatric comorbidity (two or more disorders), and those who had received outpatient mental health care in the six months prior to hospital admission. Being male was a negative predictor of timely follow-up at seven days, but not at 30 days, and patients in the disability Medicaid eligibility group were significantly more likely than those in the poverty eligibility category to receive follow-up care within 30 days posthospitalization, but not within seven days.

Hospital-level factors. Treatment in a major teaching hospital compared with a nonteaching hospital and treatment in a psychiatric hospital compared with a general hospital were associated with higher odds of receiving outpatient follow-up care within seven days and 30 days posthospitalization (Table 3). Patients treated in a hospital with a higher percentage of Medicaid patients had lower odds of outpatient follow-up at seven and 30 days. In addition, treatment in large rather than small hospitals predicted lower odds of outpatient visits within 30 days of hospital discharge (Table 3).

TABLE 2. Odds of seven- and 30-day follow-up visits after discharge from psychiatric hospitalization among 7,826 patients with a mood disorder, by patient-level factor^a

Factor	Total N	7-day follow-up (N=3,828)					30-day follow-up (N=5,417)				
		N	%	AOR	95% CI	p	N	%	AOR	95% CI	p
Age											
6–11 (reference)	1,190	678	57.0	1.00			4,460	67.2	1.00		
12–17	6,636	3,150	47.5	.82	.70–.96	.01	957	80.4	.57	.47–.70	<.001
Gender											
Female (reference)	4,336	2,083	48.0	1.00			2,930	67.6	1.00		
Male	3,490	1,745	50.0	.89	.80–1.00	.04	2,487	71.3	.93	.83–1.05	.26
Race-ethnicity											
Non-Hispanic white (reference)	2,831	1,513	53.4	1.00			2,069	73.1	1.00		
Non-Hispanic black	1,823	822	45.1	.82	.71–.95	.01	1,206	66.2	.78	.66–.91	.002
Hispanic	2,408	1,101	45.7	.92	.80–1.06	.25	1,586	65.9	.91	.78–1.07	.24
Other ^b	764	392	51.3	1.03	.85–1.26	.74	556	72.8	1.06	.85–1.32	.60
Medicaid eligibility											
Poverty (reference)	4,360	1,738	39.9	1.00			2,647	60.7	1.00		
Disability	1,758	986	56.1	1.12	.97–1.29	.13	1,388	79.0	1.39	1.17–1.64	<.001
Foster care	1,708	1,104	64.6	1.47	1.28–1.69	<.001	1,382	80.9	1.36	1.16–1.60	<.001
Primary diagnosis											
Depressive disorder (reference)	4,379	1,931	44.1	1.00			2,824	64.5	1.00		
Bipolar disorder	1,765	1,765	58.6	1.08	.94–1.25	.27	1,371	77.7	.99	.84–1.17	.92
Other mood disorder ^c	1,682	1,682	51.3	.93	.80–1.08	.34	1,222	72.7	.88	.74–1.04	.15
Length of stay											
Short (1–7 days) (reference)	5,841	2,731	46.8	1.00			3,909	66.9	1.00		
Long (8–30 days)	1,985	1,097	55.3	.96	.84–1.09	.52	1,508	76.0	1.04	.90–1.20	.61
Any substance use disorder diagnosis											
Present	72	33	48.9	.56	.33–.95	.03	44	61.1	.41	.24–.70	.001
Absent (reference)	7,754	3,795	45.8	1.00			5,373	69.3	1.00		
Psychiatric comorbidity											
0 (reference)	3,266	1,018	31.2	1.00			1,717	52.6	1.00		
1	1,441	788	54.7	1.14	.98–1.34	.09	1,096	76.1	1.08	.90–1.28	.41
≥2	3,119	2,022	64.8	1.51	1.30–1.75	<.001	2,604	83.5	1.36	1.14–1.61	<.001
Any chronic medical condition ^d											
Present	1,496	870	58.2	1.11	.97–1.27	.12	1,161	77.6	1.15	.98–1.34	.09
Absent (reference)	6,330	2,958	46.7	1.00			4,256	67.2	1.00		
Prior outpatient mental health visits											
Present	5,179	3,300	63.7	4.76	4.12–5.51	<.001	4,340	83.8	5.16	4.45–5.98	<.001
Absent (reference)	2,647	528	20.2	1.00			1,077	40.7	1.00		

^a Logistic regression for adjusted odds ratios (AORs) included all patient-, hospital-, and community-level factors presented in Tables 2, 3, and 4.

^b Includes Asian, Native American, and multiple race

^c Includes mood disorder not otherwise specified

^d Includes diabetes, seizures, asthma, sickle cell anemia, cerebral palsy, congenital heart disease, cancer, major organ disease, congenital anomaly, HIV, autoimmune disease, and immunocompromised disease

Community-level factors. Residence in counties with low or high numbers of child psychiatrists, compared with no psychiatrists, was significantly associated with higher odds of receiving timely follow-up care, but number of county psychologists and social workers did not significantly influence the likelihood of follow-up care. Residence in areas with medium or high unemployment rates compared with low rates was associated with lower odds of timely follow-up at 30 days (Table 4).

DISCUSSION

In this multistate study of publicly insured youths, roughly half received any outpatient mental health care during the

first week following discharge from an inpatient psychiatric hospital and about two-thirds received mental health care during the first month. Although these findings mirror national rates of follow-up for Medicaid populations (45.9% for seven days and 65.4% for 30 days) and trends suggest that rates of follow-up have increased (19), there is considerable room for improvement, particularly in light of the increased risk of suicide during the posthospitalization transition period.

Our findings confirm that receipt of timely follow-up care is influenced by multiple patient, hospital, and community characteristics. Consistent with previous research (8,12,20), we found that prior outpatient treatment was the strongest predictor of linkage to timely outpatient care. The odds of

TABLE 3. Odds of seven- and 30-day follow-up visits after discharge from psychiatric hospitalization among 7,826 patients with a mood disorder, by hospital-level factor^a

Factor	Total N	7-day follow-up (N=3,828)					30-day follow-up (N=5,417)				
		N	%	AOR	95% CI	p	N	%	AOR	95% CI	p
Total beds											
Small (≤ 199) (reference)	5,026	2,713	54.0	1.00			3,692	73.4	1.00		
Medium (200–399)	1,448	606	41.9	1.18	.73–1.91	.49	911	62.9	1.02	.64–1.61	.94
Large (≥ 400)	1,349	509	37.7	.79	.45–1.39	.42	814	60.3	.54	.31–.94	.03
Ownership											
Private nonprofit (reference)	3,101	1,431	46.2	1.00			2,100	67.7	1.00		
Public	615	277	45.0	1.31	.85–2.04	.23	402	65.4	1.24	.80–1.92	.33
Private for profit	4,110	2,120	51.6	.89	.60–1.30	.53	2,915	70.9	.84	.58–1.22	.35
Medicaid enrollees among annual discharges (%)											
Low (≤ 18.9) (reference)	1,625	787	48.4	1.00			1,114	68.6	1.00		
Medium (19.0–25.9)	4,508	2,340	51.9	1.03	.73–1.44	.88	3,216	71.3	1.11	.80–1.55	.53
High (≥ 26.0)	1,693	701	41.4	.60	.39–.91	.02	1,087	64.2	.64	.42–.97	.04
Teaching status											
Major teaching	1,230	586	47.6	1.68	1.00–2.82	.05	860	69.9	1.81	1.09–3.00	.02
Minor teaching	1,387	568	41.0	1.26	.83–1.89	.28	863	62.2	1.28	.86–1.90	.22
Nonteaching (reference)	5,209	2,674	51.3	1.00			3,694	70.9	1.00		
Type											
Psychiatric	4,859	2,616	53.8	2.13	1.34–3.38	.001	3,576	73.6	1.79	1.15–2.78	.01
General (reference)	2,967	1,212	40.9	1.00			1,841	62.1	1.00		

^a Logistic regression for adjusted odds ratios (AORs) included all patient-, hospital-, and community-level factors presented in Tables 2, 3, and 4.

receiving outpatient mental health care in the first month following discharge were over five times higher for youths who were previously engaged in treatment. Although not surprising, these findings underscore the importance of having a usual source of care as well as the likely value of established relationships in improving transition from one level of care to another. Patients lacking a previous connection with a mental health provider may require more proactive clinical efforts to explore and address structural and attitudinal barriers to care after a hospitalization, engender hope and positive expectations, and better coordinate the transition from inpatient to outpatient care. The value of personal introductions to providers of the next level of care, peer-support models, and other bridging interventions deserves additional application and study.

Psychiatric comorbidity was positively associated with receipt of timely follow-up care, consistent with studies that associated psychiatric comorbidity with greater use and more persistent use of mental health services (8,21). Psychiatric comorbidity is associated with greater symptom severity, functional impairment, and perceived illness burden, and such markers of clinical need have been shown to be potent predictors of help seeking among both adults and children (22). Notably, although consistent with prior research (7,20), the added morbidity of co-occurring substance use disorders actually decreased the likelihood of timely follow-up care for psychiatrically hospitalized youths with mood disorders. Substance use disorders are among the most common comorbidities among patients with mood disorders, complicate treatment efforts, and are associated with negative outcomes (23), so robust efforts to engage and

retain such patients in active treatment are of particular relevance. Psychoeducation efforts combined with evidence-based methods of patient and family engagement are likely applicable to efforts to engage patients with substance use disorders. Like children classified as disabled, children in foster care are more likely to be perceived as experiencing a greater overall burden of illness. In addition, they are likely to receive better monitoring and supervision by caseworkers.

In terms of demographic characteristics, race and age appeared to influence the receipt of aftercare following psychiatric hospitalization. African-American youths were less likely to receive follow-up care after psychiatric hospitalization compared with other racial or ethnic groups. Racial and ethnic disparities in access to and quality of mental health care are well documented in the research literature, with potential explanatory factors including structural barriers, such as geographic location of treatment resources and the availability of transportation, as well as attitudinal barriers, such as mistrust of the health care system in general, heightened sense of mental health-related stigma, and other cultural beliefs, including a belief that mental health is more related to spiritual health than to biology (24,25). Finally, members of racial-ethnic minority groups may also have more negative perceptions of treatment and believe that mental health treatment is ineffective (26). Consequently, culturally informed educational and engagement efforts deserve consideration in vulnerable populations.

The finding that adolescents had significantly lower rates of follow-up compared with younger children is consistent with the results of Goldston and others (8). In contrast to younger children, who are typically more comfortable being

TABLE 4. Odds of seven- and 30-day follow-up visits after discharge from psychiatric hospitalization among 7,826 patients with a mood disorder, by community-level factor^a

Factor	Total N	7-day follow-up (N=3,828)					30-day follow-up (N=5,417)				
		N	%	AOR	95% CI	p	N	%	AOR	95% CI	p
Providers per 100,000 youths											
Child psychiatrists											
None (reference)	351	163	46.4	1.00			233	66.4	1.00		
Low (1.00–6.99)	2,576	1,018	39.5	1.46	1.01–2.10	.04	1,564	60.7	1.79	1.23–2.62	.003
High (≥ 7.00)	4,899	2,647	54.0	1.36	.92–2.03	.13	3,620	73.9	1.79	1.18–2.71	.01
Psychologists											
Low (≤ 29.99) (reference)	349	146	41.8	1.00			218	62.5	1.00		
Medium (30.00–84.99)	1,943	783	40.3	.98	.70–1.39	.93	1,224	63.0	.98	.68–1.40	.90
High (≥ 85.00)	5,534	2,899	52.4	1.17	.78–1.75	.45	3,975	71.8	.80	.52–1.22	.30
Social workers											
None (reference)	476	233	49.0	1.00			336	70.6	1.00		
Low (1.00–649.99)	2,599	1,078	41.5	.83	.58–1.20	.32	1,587	61.1	.70	.46–1.06	.09
High (≤ 650.00)	4,751	2,517	53.0	1.11	.78–1.59	.55	3,494	73.5	1.09	.72–1.66	.68
Annual income per capita (\$)											
Low ($< 30,000$) (reference)	1,121	465	41.5	1.00			683	60.9	1.00		
Medium (30,000–36,999)	1,424	637	44.7	.78	.60–1.02	.07	934	65.6	.92	.69–1.22	.55
High ($\geq 37,000$)	5,281	2,726	51.6	.77	.56–1.08	.13	3,800	72.0	.90	.63–1.29	.58
Unemployment rate (%)											
Low (< 10.0) (reference)	1,781	882	49.5	1.00			1,280	71.9	1.00		
Medium (10.0–11.9)	1,972	878	44.5	.69	.56–.86	.001	1,272	64.5	.61	.49–.77	<.001
High (≥ 12.0)	4,073	2,068	50.8	.78	.58–1.04	.10	2,865	70.3	.72	.52–.99	.04
Population in poverty (%)											
Low (< 14.0) (reference)	1,688	825	48.9	1.00			1,193	70.7	1.00		
Medium (14.0–17.9)	3,956	2,036	51.5	.93	.72–1.19	.54	2,820	71.3	1.01	.78–1.32	.92
High (≥ 18)	2,182	967	44.3	.99	.78–1.26	.94	1,404	64.3	.92	.70–1.22	.58
Residence											
Metropolitan (reference)	7,523	3,669	48.8	1.00			5,198	69.1	1.00		
Nonmetropolitan	303	159	52.5	1.18	.82–1.71	.37	219	72.3	1.15	.77–1.72	.50
Community mental health centers											
Present	4,941	2,504	50.7	.99	.85–1.16	.93	3,488	70.6	1.07	.90–1.28	.46
Absent (reference)	2,885	1,324	45.9	1.00			1,929	66.9	1.00		

^a Logistic regression for adjusted odds ratios (AORs) included all patient-, hospital-, and community-level factors presented in Tables 2, 3, and 4. All data are reported by county of residence.

reliant on parents, adolescents often strive for greater independence and input into the decision to seek care. Moreover, adolescents tend to have more negative attitudes about treatment compared with younger children and may perceive help seeking as a threat to their autonomy and sense of self-reliance (27).

Treatment in a specialized psychiatric hospital increased the odds of receiving timely follow-up care. Specialized psychiatric hospitals may be more likely to offer outpatient psychiatric services compared with general hospitals, and a subanalysis from the AHA survey suggests that the specialized psychiatric hospitals included in this study were more likely than the general hospitals surveyed to offer outpatient psychiatric services (results not shown). Admission to hospitals with fewer beds was also positively associated with receipt of timely follow-up care, and these findings are consistent with some (12), but not all, previous research (28,29). Smaller hospitals may have more time to devote to discharge planning and cultivate relationships with their patients and families, but small hospital size might also reflect specialty psychiatric status as well.

Consistent with prior medical research that suggests that teaching hospitals are associated with better quality of care (28,30), we found that treatment in a teaching hospital was associated with a higher likelihood of timely follow-up care. This finding may have to do with greater resources and more intensive continuing medical education for physicians, nurses, and social workers at teaching hospitals.

In contrast, treatment in hospitals with a higher percentage of Medicaid patients was negatively associated with receipt of timely follow-up care. Our results generally concur with those of Goldman and others (31), who found that nonteaching hospitals with high percentages of Medicaid patients have lower adherence to quality measures. In comparison with other types of insurance, Medicaid limits the types of outpatient services available to beneficiaries, who often have longer wait times for appointments because of fewer provider options.

Our results with regard to the availability of specialty behavioral health professionals were mixed. Consistent with findings of Hendryx and colleagues (32), we found that youths who lived in counties with more child and adolescent

psychiatrists per capita were more likely to receive outpatient follow-up care in seven and 30 days, but, surprisingly, the number of per capita psychologists and social workers did not appear to be associated with the likelihood of receiving aftercare. This may reflect greater shortages of child and adolescent psychiatrists relative to other behavioral health professionals but may also suggest that psychiatrists play a special role in ensuring appropriate access to and coordination of care.

Areas with high rates of unemployment were also associated with a lower likelihood of receiving timely follow-up care. These areas tend to have high corresponding rates of poverty, homelessness, substance use, and residential turnover and fewer mental health resources (25). In these communities, low-income populations insured through Medicaid often must rely on an inadequate supply of safety-net providers.

This study had several potential limitations. First, analyses were limited to Medicaid-enrolled children and adolescents from four states and may not be generalizable to other state Medicaid programs and privately insured or uninsured populations. However, the rates of follow-up are strikingly similar to rates found in the United States Medicaid population, suggesting that our results may be broadly relevant for youths enrolled in Medicaid anywhere in the United States (19). Second, our use of claims data precluded an examination of other important factors that may affect receipt of follow-up care among children and adolescents, such as use of psychotropic medication, family functioning and support, caretakers' perception of burden of care, and the intervention strategies employed by hospital staff to link patients to outpatient care. Third, diagnoses were based on clinical judgment and were derived from claims, and they were not subject to expert validation through standardized or structured assessment. Fourth, nonresponse on the AHA survey resulted in excluding 13% of youths for missing hospital data, which may potentially lead to selection bias. Finally, the results may not generalize to the 10% of youths who were readmitted within 30 days or had extended lengths of stay.

CONCLUSIONS

Our findings suggest that one in three youths did not receive any mental health follow-up in the 30 days after discharge. Linkage to follow-up care appears to be a complex phenomenon related to multiple patient-, hospital-, and community-level characteristics. Given the high risk of suicide during the early postdischarge period and other adverse outcomes associated with discontinuity of care, there is a need for quality-improvement interventions that promote successful transitions from inpatient to outpatient care and challenge both structural and attitudinal barriers to behavioral health service delivery. Efforts to explore patient and family beliefs and expectations about mental disorders and their treatment are also indicated, and specific psychoeducational interventions designed to educate and challenge

misperceptions and beliefs unduly influenced by stigma should be developed and studied.

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REFERENCES

1. Kaminer Y, Burleson JA, Goldston DB, et al: Suicidal ideation among adolescents with alcohol use disorders during treatment and aftercare. *American Journal on Addictions* 15(suppl 1):43–49, 2006
2. Romansky JB, Lyons JS, Lehner RK, et al: Factors related to psychiatric hospital readmission among children and adolescents in state custody. *Psychiatric Services* 54:356–362, 2003
3. Lin H-C, Lee H-C: The association between timely outpatient visits and the likelihood of rehospitalization for schizophrenia patients. *American Journal of Orthopsychiatry* 78:494–497, 2008
4. Fontanella CA, Bridge JA, Marcus SC, et al: Factors associated with antidepressant adherence for Medicaid-enrolled children and adolescents. *Annals of Pharmacotherapy* 45:898–909, 2011
5. The State of Health Care Quality. Washington, DC, National Committee for Quality Assurance, 2014
6. Daniel SS, Goldston DB, Harris AE, et al: Review of literature on aftercare services among children and adolescents. *Psychological Services* 55:901–912, 2004
7. Carlisle CE, Mamdani M, Schachar R, et al: Predictors of psychiatric aftercare among formerly hospitalized adolescents. *Canadian Journal of Psychiatry* 57:666–676, 2012
8. Goldston DB, Reboussin BA, Kancler C, et al: Rates and predictors of aftercare services among formerly hospitalized adolescents: a prospective naturalistic study. *Journal of the American Academy of Child and Adolescent Psychiatry* 42:49–56, 2003
9. Foster EM: Does the continuum of care improve the timing of follow-up services? *Journal of the American Academy of Child and Adolescent Psychiatry* 37:805–814, 1998
10. Pfuntner A, Wier LM, Stocks C: Most Frequent Conditions in US Hospitals, 2010. HCUP Statistical Brief no 148. Rockville, Md, Agency for Healthcare Research and Quality, Jan 2013. Available at www.hcup-us.ahrq.gov/reports/statbriefs/sb148.pdf
11. Isometsä E, Sund R, Pirkola S: Post-discharge suicides of inpatients with bipolar disorder in Finland. *Bipolar Disorders* 16:867–874, 2014
12. Olfson M, Marcus SC, Doshi JA: Continuity of care after inpatient discharge of patients with schizophrenia in the Medicaid program: a retrospective longitudinal cohort analysis. *Journal of Clinical Psychiatry* 71:831–838, 2010
13. Fontanella CA, Guada J, Phillips G, et al: Individual and contextual-level factors associated with continuity of care for adults with schizophrenia. *Administration and Policy in Mental Health and Mental Health Services Research* 41:572–587, 2014
14. Fontanella CA, Gupta L, Hiance-Steelesmith DL, et al: Continuity of care for youth in foster care with serious emotional disturbances. *Children and Youth Services Review* 50:38–43, 2015
15. Wenzlow AT, Finkelstein D, Cook BL, et al: The Medicaid Analytic eXtract Chartbook. Baltimore, Centers for Medicare and Medicaid Services, 2010
16. Annual Hospital Survey Data Base. Chicago, American Hospital Association, 2010

17. Health Resources and Services Administration: Bureau of Health Professions, Area Resource File (ARF) System. Fairfax, Va, Quality Resource Systems, Inc, 2010
18. Stata Statistical Software, Release 13. College Station, Tex, Stata-Corp LP, 2013
19. Improving Quality and Patient Experience: The State of Health Care Quality 2013. Washington, DC, National Committee for Quality Assurance, 2013
20. Marino L, Wissow LS, Davis M, et al: Predictors of outpatient mental health clinic follow-up after hospitalization among Medicaid-enrolled young adults. *Early Intervention in Psychiatry* (Epub ahead of print, Jan 13, 2015)
21. Bird HR, Gould MS, Staghezza BM: Patterns of diagnostic comorbidity in a community sample of children aged 9 through 16 years. *Journal of the American Academy of Child and Adolescent Psychiatry* 32:361–368, 1993
22. Srebnik D, Cauce AM, Baydar N: Help-seeking pathways for children and adolescents. *Journal of Emotional and Behavioral Disorders* 4:210–220, 1996
23. Hawkins EH: A tale of two systems: co-occurring mental health and substance abuse disorders treatment for adolescents. *Annual Review of Psychology* 60:197–227, 2009
24. Elster A, Jarosik J, VanGeest J, et al: Racial and ethnic disparities in health care for adolescents: a systematic review of the literature. *Archives of Pediatrics and Adolescent Medicine* 157:867–874, 2003
25. Chow JC, Jaffee K, Snowden L: Racial-ethnic disparities in the use of mental health services in poverty areas. *American Journal of Public Health* 93:792–797, 2003
26. Richardson LA: Seeking and obtaining mental health services: what do parents expect? *Archives of Psychiatric Nursing* 15:223–231, 2001
27. Garland AF, Zigler EF: Psychological correlates of help-seeking attitudes among children and adolescents. *American Journal of Orthopsychiatry* 64:586–593, 1994
28. Keeler EB, Rubenstein LV, Kahn KL, et al: Hospital characteristics and quality of care. *JAMA* 268:1709–1714, 1992
29. Fine JM, Fine MJ, Galusha D, et al: Patient and hospital characteristics associated with recommended processes of care for elderly patients hospitalized with pneumonia: results from the Medicare quality indicator system pneumonia module. *Archives of Internal Medicine* 162:827–833, 2002
30. Keeler EB, Rubenstein LV, Kahn KL, et al: Hospital characteristics and quality of care. *JAMA* 268:1709–1714, 1992
31. Goldman LE, Vittinghoff E, Dudley RA: Quality of care in hospitals with a high percent of Medicaid patients. *Medical Care* 45:579–583, 2007
32. Hendryx MS, Urdaneta ME, Borders T: The relationship between supply and hospitalization rates for mental illness and substance use disorders. *Journal of Mental Health Administration* 22:167–176, 1995

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