

Veterans Affairs Health System and Mental Health Treatment Retention among Patients with Serious Mental Illness: Evaluating Accessibility and Availability Barriers

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Objective. We examine the impact of two dimensions of access—geographic accessibility and availability—on VA health system and mental health treatment retention among patients with serious mental illness (SMI).

Methods. Among 156,631 patients in the Veterans Affairs (VA) health care system with schizophrenia or bipolar disorder in fiscal year 1998 (FY98), we used Cox proportional hazards regression to model time to first 12-month gap in health system utilization, and in mental health services utilization, by the end of FY02. Geographic accessibility was operationalized as straight-line distance to nearest VA service site or VA psychiatric service site, respectively. Service availability was assessed using county-level VA hospital beds and non-VA beds per 1,000 county residents. Patients who died without a prior gap in care were censored.

Results. There were 32,943 patients (21 percent) with a 12-month gap in health system utilization; 65,386 (42 percent) had a 12-month gap in mental health services utilization. Gaps in VA health system utilization were more likely if patients were younger, non-white, unmarried, homeless, nonservice-connected, if they had bipolar disorder, less medical morbidity, an inpatient stay in FY98, or if they lived farther from care or in a county with fewer VA inpatient beds. Similar relationships were observed for mental health, however being older, female, and having greater morbidity were associated with increased risks of gaps, and number of VA beds was not significant.

Conclusions. Geographic accessibility and resource availability measures were associated with long-term continuity of care among patients with SMI. Increased distance from providers was associated with greater risks of 12-month gaps in health system and mental health services utilization. Lower VA inpatient bed availability was associated with increased risks of gaps in health system utilization. Study findings may inform efforts to improve treatment retention.

Key Words. Access/demand/utilization of services, mental health, VA health system

Access to health services may be understood in terms of distinct dimensions of the fit between characteristics of potential clients and those of providers (Penchansky and Thomas 1981). The influence of specific dimensions of access may be examined with regard to contact with providers, volume of services, and continuity of care (Aday and Andersen 1974; McCarthy and Blow 2004). This study evaluates the impact of two dimensions of access—geographic accessibility and services availability—on longitudinal patterns of health services utilization by patients diagnosed with serious mental illness (SMI).

Geographic *accessibility* refers to the barriers of time and space that must be traversed in order to receive care; *availability*, to the capacities of providers at a given location to provide care. Studies of geographic accessibility have largely been limited to assessments of effects on contact (receipt of some services), most often inpatient admissions (Joseph and Boeckh 1981; Burgess and DeFiore 1994; Marcus et al. 1997; Fortney et al. 1998; Rosenheck and Stolar 1998; Mooney et al. 2000). Although volume of outpatient care has received more attention over the past decade (Burgess and DeFiore 1994; McCarthy and Blow 2004), few studies have evaluated the impact of accessibility barriers on continuity (Holloway, Vanderbrug, and Bromberg 1990; Piette and Moos 1996; Druss and Rosenheck 1997; Schmitt, Phibbs, and Piette 2003). With few exceptions (Bindman, Keane, and Lurie 1990), availability barriers have been assessed only in terms of volume of institutional care (Ginsburg and Koretz 1983; Brown and Barnett 1992).

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Among an active patient population, which has evidenced some degree of access to providers, continuity of care is a critical dimension of health system services delivery. Continuity has been described in terms of the availability of patient information, clinician availability and constancy, follow-up after discharge, coordination during transitions, and ongoing provider commitment to the patient (Donaldson 2001). Continuity has also been defined as the extent to which services are received as an “uninterrupted succession of events” consistent with patient needs across illness episodes over time (Shortell 1976). For chronically mentally ill patients, the longitudinal nature of services receipt is critical (Bachrach 1981).

Recent studies have operationalized longitudinal measures of continuity of care using administrative data for individuals diagnosed with SMI. Fortney and colleagues found support for the construct validity of duration since last encounter as a continuity measure (Fortney et al. 2003). For outpatient psychiatric and nonpsychiatric services in the Veterans Affairs (VA) health care system, McCarthy examined (1) longest observed gaps in care and (2) percent of annual noninstitutionalized days more than 65 days since previous encounters (McCarthy 2002). These assessments were limited to a 1-year observation period and were specific to either psychiatric or nonpsychiatric services. Few studies have examined long-term gaps over an extended period using measures that encompass both psychiatric and nonpsychiatric care.

Patients with SMI, which encompasses schizophrenia and bipolar disorder, frequently require both mental and physical health services (Blow et al. 2003; Bosworth et al. 2004). The VA operates the nation’s largest integrated health care system. An ongoing VA policy concern is to assure VA health system treatment retention among patients with SMI (Barry et al. 1999). For these patients, long-term VA health system treatment retention offers a high-level measure of services utilization. VA health system treatment retention offers a global indicator of the patient’s continuing engagement with the range of VA services providers.

Appropriate care for patients with SMI requires timely contacts, for ongoing assessments, care planning, and evaluation of treatment response (McEvoy, Scheifler, and Frances 1999; Sachs et al. 2000). For patients with schizophrenia who are mildly impaired and in maintenance treatment, expert consensus guidelines recommend at least three outpatient contacts per year (McEvoy, Scheifler, and Frances 1999). Similar minimum contacts are recommended for patients with bipolar disorder (Sachs et al. 2000). Patients over 50 also need at least annual visits for health maintenance tasks (e.g., blood pressure, colon cancer screening, lipid measurement).

Unfortunately, patients with SMI are difficult to retain in care (Herinckx et al. 1997). Patient-related barriers to health care include poor insight into their illnesses, difficulty describing their conditions (Goldman 1999), high tolerance for physical pain, and a reluctance to see physicians other than their psychiatrist. Health system barriers to care include stigmatization by providers, complexity of care management (Goldman 1999), and a lack of integration of medical and mental health systems (Druss et al. 2001).

Patients, providers, and health care delivery systems face negative consequences from prolonged gaps in care. Patients are at increased risk for negative health outcomes, costly acute care episodes, and mortality. For example, gaps may reduce antipsychotic medication adherence, placing patients with schizophrenia at increased risks of psychiatric hospitalizations (Valenstein et al. 2002). For providers, gaps may disrupt continuity and coordination of care. As a result, providers must perform more comprehensive assessments during patient encounters, and care planning and treatment evaluation become less certain. At the health system level, discontinuities in utilization fragment services delivery, reduce efficiency, and increase the likelihood of costly and preventable acute care episodes.

Although health system factors are recognized as barriers to care for patients with SMI (Goldman 1999), few studies have explicitly evaluated their impact on either health system retention or mental health services treatment retention. Existing studies have focused on specific service delivery interventions, such as assertive community treatment and similar intensive case management models, which appear to improve mental health treatment retention (Herinckx et al. 1997). These comprehensive and intensive programs include elements that are relevant to multiple dimensions of access (Penchansky and Thomas 1981), including geographic accessibility (e.g., driving hundreds of miles to visit clients), acceptability (meeting clients on their "own turf"), and accommodation (meeting with clients at their convenience) (Herinckx et al. 1997). However, it is unclear which elements affect retention risks. Moreover, these programs have been restricted to heavy users of inpatient psychiatric care and emergency services, and they have focused narrowly on retention in mental health treatment, although these patients have substantial medical comorbidities (Jeste et al. 1996; Druss and Rosenheck 1997).

Owing to the nature and consequences of their psychiatric morbidity, individuals with schizophrenia or bipolar disorder may be particularly sensitive to geographic accessibility and availability barriers (Marcus et al. 1997). In order to improve health services delivery for patients with SMI, it is im-

portant to evaluate the influence of health system accessibility and availability on both health system and mental health services treatment retention.

In this study, we examine utilization data for patients in the VA health care system with schizophrenia or bipolar disorder. As compared with other health care systems, the VA is thought to present few barriers to care (Jha et al. 2001) with regard to services acceptability and affordability. As a result, this study is able to focus more narrowly on the two focal dimensions of access—geographic accessibility and availability. We test their influence on two measures of continuity of care—health system treatment retention and specifically mental health services treatment retention. These are operationalized in terms of risks of having a 12-month gap in VA health system utilization, and in VA mental health services utilization, from the patient's last VA (or VA mental health) services utilization of FY98 until the end of FY02. Given current treatment practice guidelines specific to patients with SMI and the substantial medical comorbidity among this patient population, we believe that 12-month gaps constitute substantial breaks in both health system and mental health services utilization.

For both health system and mental health services retention, we hypothesized that:

- H1:** Patients with SMI who live further from VA providers are more likely to experience a 12-month gap.
- H2:** Patients with SMI with greater availability of VA tertiary care are less likely to experience a 12-month gap.
- H3:** Patients with SMI who have greater availability of non-VA tertiary care will be more likely to experience a 12-month gap.

METHOD

Using national VA administrative data in the Patient Treatment Files (PTF), the Outpatient Care (OPC) files, the Beneficiary Identifier Records Locator System, and the Social Security Administration Death Master file, we identified all VA patients who received a diagnosis of schizophrenia or bipolar disorder in fiscal year (FY) 1998 (October 1, 1997–September 30, 1998) and who survived the year, $N = 163,656$.

For each patient, we assessed time to first 12-month gap in VA health services utilization, and time to first 12-month gap in VA mental health

services, by the end of FY02. Mental health services were identified using outpatient clinic and inpatient bedsection location codes (Blow et al. 2003).

In selecting model covariates, we applied the Andersen model of predisposing, enabling, and need factors influencing utilization (Andersen 1968). We characterized patients with regard to age at the start of FY99 (October 1, 1998), gender, marital status, race/ethnicity (categorized as white; African American, Asian, Native American, or Hispanic; or unknown), VA service connection status, and homelessness during FY98, as reflected in the administrative data. Service connection indicates whether the individual had been certified as disabled as a result of disorders incurred during military service. Many patients with SMI are service connected and receive financial compensation from the VA and have priority eligibility for VA health services. They also frequently have more serious psychiatric and physical illnesses. Service connection was identified from the VA FY98 encounter data and the VA's Compensation and Pension File. Homelessness in FY98 was evaluated based on the VA encounter data. Homelessness was indicated by a variable in the VA's outpatient procedure data; by ICD-9 diagnosis code V60.0; and by utilization in specific clinics or bedsections (similar to non-VA inpatient wards or departments) (McCarthy 2002; Blow et al. 2003).

We categorized patients' most prevalent SMI diagnosis type based on the number of inpatient stays and/or outpatient visit days that included a diagnosis of schizophrenia (ICD-9 diagnosis codes 295.x, excluding 295.5) or bipolar disorder (296.0, 296.1, 296.4–296.8).

The Charlson comorbidity score was used as a measure of medical comorbidity (Charlson et al. 1987). We also included an indicator of whether the individual had any VA inpatient care in FY98 (McCarthy et al. 2006). Vital status was determined using the VA's Beneficiary Identifier Records Locator System (BIRLS) and the Social Security Administration (SSA) Death Master File for veterans. The reported sensitivity of these data ranges from 80.0 to 94.5 percent (Cowper et al. 2002), with greater sensitivity among hospitalized patients and those with VA service-connected disabilities (Dominitz, Maynard, and Boyko 2001).

In the Andersen model (Andersen 1968), access to care represents an enabling factor influencing utilization patterns, and access barriers represent negative enabling factors. Using the Penchansky and Thomas conceptualization of access, we examined two specific dimensions of access: geographic accessibility and availability (Penchansky and Thomas 1981; McCarthy and Blow 2004). We assessed health system geographic accessibility, operationalized as straight-line miles from the population centroid of the patient's zip

code of residence to the nearest VA service site. Straight-line distance may be a reasonable proxy for travel time (Phibbs and Luft 1995). In evaluating predictors of mental health treatment retention, we assessed miles to the nearest VA providers of substantial psychiatric services, as many outpatient facilities do not have resources to meet the complex needs of patients with SMI. These were medical centers or community based outpatient clinics serving at least 500 unique patients and where at least 20 percent of visits were mental health visits (McCarthy and Blow 2004).

Similarly, as a proxy for VA and non-VA institutional care resources for this high-need patient population, we evaluated health system availability in terms of VA and non-VA inpatient beds (in 1997) per 1,000 county residents in 1998. Inpatient bed resources provide proxy measures of the concentration of health care resources. These data were derived from the Area Resource File (Department of Health and Human Services, Bureau of Health Professions 2000). We note that in separate analyses, at the regional medical center (or "parent station") level, VA inpatient bed totals were highly correlated with VA inpatient psychiatric bed counts ($r = 0.823$).

We excluded 7,025 patients who had missing data for one or more predictor variables or who resided in Alaska in FY98. Most of these patients (96.5 percent) had missing county-level data. For example, these data were unavailable for patients living in Puerto Rico, Guam, the Philippines, the U.S. Virgin Islands, and some parts of Virginia. We excluded residents of Alaska (267) because there are few VA facilities in that state and, under a special VA program, health care is available from private health care providers. The final analytic data set consisted of 156,631 patients.

Patients who were excluded from the analysis were on average slightly older; with greater medical morbidity; more likely to be African American, Hispanic, or Native American; to be married; and to have schizophrenia as their primary psychiatric diagnosis. They were less likely to be homeless. They were more likely to live nearer to VA medical centers and in counties with more VA hospital beds and fewer non-VA hospital beds per 1,000 residents. They were also less likely to have had 12-month gaps in health system utilization.

For descriptive analyses, we categorized patients in terms of whether or not they had a 12-month gap in VA care prior to death and by the end of FY02. Between-group comparisons for categorical variables were assessed using chi-square analyses; *t*-tests were used for continuous variables. In separate models, we used multivariate Cox proportional hazards regression to assess the influence of geographic accessibility and inpatient bed availability on time to first

12-month gap in VA utilization and in specifically VA mental health services utilization, from last use of FY98 until the end of FY02. For VA health system treatment retention, time to first gap was defined as the number of days from the last VA encounter in FY98 until the first point when the patient had received no VA institutional or ambulatory care for 365 days. VA mental health services treatment retention was constructed similarly, with mental health service locations identified based on clinic or bedsection identifiers. Multivariate models included miles from nearest VA service site (or nearest VA psychiatric service site, for gaps in mental health services) and measures of VA and of non-VA inpatient beds per 1,000 county residents. Additional covariates included age, gender, race/ethnicity, marital status, psychiatric diagnosis type, Charlson score, homelessness in FY98, service connection status, and receipt of inpatient care in FY98. For each measure, data on patients who died before having a gap were censored at the date of death, and those without a gap were right-censored at the end of the observation period. Robust variance estimates were necessary given the nested nature of the data. We adjusted for intracounty correlation using the robust sandwich estimate (Lin and Wei 1989) option (COVSANDWICH) in SAS PROC PHREG. SAS version 8.02 software was used for all statistical analyses. In sensitivity analyses, we included both linear and quadratic distance terms, as the marginal effects of additional miles from providers may be less for remote patients than for those living nearer to providers (McCarthy et al. 2006). We also examined distance using discrete distance categories.

RESULTS

Descriptive characteristics of the study sample are displayed in Tables 1 and 2, overall and with regard to whether patients had a 12-month gap in VA services or VA mental health services, respectively. As of the beginning of FY99, most patients were male (93 percent), with a mean age of 53 years; 29 percent of patients were married; 10 percent were homeless in FY98; and 55 percent had a service-connected disability. For 64 percent of patients, schizophrenia was the primary psychiatric diagnosis. Median distance to the nearest VA service site was 6.1 miles. Median distance to the nearest VA psychiatric service site was 11.3 miles. On average, patients lived in counties with 0.5 VA and 4.1 non-VA hospital beds per 1,000 county residents. Over the following four FYs, a 12-month gap in all VA services utilization was observed for 21.0 percent of patients. Year-long gaps in mental health services utilization were

Table 1: Patient Characteristics, by Health System Treatment Retention Status

	All Patients	Without 12-Month Gap in VA Care	With 12-Month Gap in VA Care	Test, df, p-value
N	156,631	123,688	32,943	
Age, in years				
Mean	52.86	53.80	49.33	$t = 54.92, 50,313, p < .0001$
SD	12.95	12.71	13.23	
Gender, % female	7.01	6.76	7.95	$\chi^2 = 56.55, 1, p < .0001$
Race/ethnicity, %				
White	65.73	68.29	56.11	$\chi^2 = 4,447.62, 2, p < .0001$
African American/ Asian/Hispanic/ Native American	27.09	26.69	28.60	
Unknown	7.18	5.02	15.29	
Marital status, % married	28.75	30.02	24.00	
Homeless in FY98, %	9.81	8.33	15.35	$\chi^2 = 1,446.98, 1, p < .0001$
VA service connected, %	54.92	60.22	35.04	$\chi^2 = 6,661.96, 1, p < .0001$
Primary psychiatric diagnosis, % schizophrenia (versus bipolar)	64.18	65.66	58.66	$\chi^2 = 554.45, 1, p < .0001$
Charlson comorbidity score				
Mean	0.086	0.094	0.056	$t = 16.60, 65,813, p < .0001$
SD	0.434	0.454	0.349	
Had inpatient stay in FY98, %	35.83	35.67	36.41	$\chi^2 = 6.29, 1, p = .0121$
Miles to nearest VA service site				
Mean	11.88	11.90	11.78	$t = 1.33, 50,764, p = .1834$
SD	14.52	14.43	14.84	
Median	6.13	6.22	5.76	
Miles to nearest VA psychiatric service site				
Mean	24.78	24.66	25.24	$t = -2.89, 51,055, p = .0038$
SD	31.84	31.70	32.35	
Median	11.27	11.28	11.21	
VA hospital beds in county, per 1,000 residents				
Mean	0.466	0.487	0.388	$t = 11.06, 65,483, p < .0001$
SD	1.671	1.747	1.348	
Non-VA hospital beds in county, per 1,000 residents				
Mean	4.088	4.085	4.096	$t = -0.62, 156,629, p = .5359$
SD	2.725	2.729	2.711	

VA, Veterans Affairs; FY, fiscal year.

observed among 41.7 percent of patients. By comparison, 11.6 percent died before a gap in all services utilization, and 7.9 percent died before a gap in mental health services was observed.

Table 2: Patient Characteristics, by Mental Health Services Treatment Retention Status

	<i>Without 12-Month Gap in MH Care</i>	<i>With 12-Month Gap in MH Care</i>	<i>Test, df, p-Value</i>
<i>N</i>	91,245	65,386	
Age, in years			
Mean	52.57	53.27	$t = -10.32, 125,637, p < .0001$
SD	11.97	14.20	
Gender, % female	6.69	7.46	$\chi^2 = 34.19, 1, p < .0001$
Race/ethnicity, %			
White	68.53	61.82	$\chi^2 = 1,755.10, 2, p < .0001$
African American/Asian/ Hispanic/Native American	26.49	27.94	
Unknown	4.98	10.24	
Marital status, % married	29.68	27.45	$\chi^2 = 92.97, 1, p < .0001$
Homeless in FY98, %	8.34	11.86	$\chi^2 = 535.01, 1, p < .0001$
VA service connected, %	61.82	45.29	$\chi^2 = 4,206.19, 1, p < .0001$
Primary psychiatric diagnosis, % schizophrenia (versus bipolar)	67.22	59.95	$\chi^2 = 874.32, 1, p < .0001$
Charlson comorbidity score			
Mean	0.064	0.117	$t = -22.90, 113,373; p < .0001$
SD	0.372	0.507	
Had inpatient stay in FY98, %	34.14	38.17	$\chi^2 = 269.43, 1, p < .0001$
Miles to nearest VA service site			
Mean	11.73	12.09	$t = -4.86, 135,065, p < .0001$
SD	14.11	15.08	
Median	6.23	5.94	
Miles to nearest VA psychiatric service site			
Mean	23.81	26.13	$t = -14.07, 133,212, p < .0001$
SD	30.62	33.41	
Median	11.02	11.63	
VA hospital beds in county, per 1,000 residents			
Mean	0.479	0.449	$t = 3.51, 140,237, p = .0005$
SD	1.666	1.678	
Non-VA hospital beds in county, per 1,000 residents			
Mean	4.082	4.096	$t = -1.01, 139,261, p = .3114$
SD	2.704	2.755	

VA, Veterans Affairs; FY, fiscal year.

In bivariate comparisons, patients who had a 12-month gap in VA services utilization were more likely to be younger; female; unmarried; homeless; nonservice connected; to have a primary psychiatric diagnosis of bipolar disorder; and to have had a lower Charlson comorbidity score. They

Table 3: Survival Analysis: Time to 12-Month Gap in VA Services

	<i>Hazard Ratio</i>	<i>95% Confidence Intervals</i>
Distance to nearest VA facility, 5-mile increments	1.010	(1.004, 1.016)
VA beds per 1,000 county residents	0.956	(0.926, 0.986)
Non-VA beds per 1,000 county residents	0.998	(0.991, 1.005)
Age, 5-year increments	0.904	(0.897, 0.911)
Gender, female	0.981	(0.936, 1.027)
Race: African American, Asian, Hispanic, Native American	1.203	(1.164, 1.243)
Race: Unknown	2.958	(2.824, 3.099)
Marital status, married	0.922	(0.897, 0.947)
Homeless in FY98	1.296	(1.223, 1.373)
VA service connected	0.410	(0.399, 0.422)
Psychiatric diagnosis: schizophrenia	0.868	(0.838, 0.899)
Charlson comorbidity score	0.917	(0.891, 0.944)
Had inpatient stay in FY98	1.128	(1.093, 1.164)

VA, Veterans Affairs; FY, fiscal year.

lived somewhat further from the nearest VA psychiatric service site. They also lived in counties with fewer VA hospital beds per 1,000 county residents. Similar differences were observed among patients with 12-month gaps in VA mental health services utilization. However, patients with these gaps had higher Charlson scores and resided further from both the nearest VA service and VA psychiatric service sites.

Tables 3 and 4 display the results of the multivariate survival analysis models of time to first 12-month gap in VA services and VA mental health services utilization, respectively. Results were generally consistent with the bivariate results, however in the multivariate analyses distance to nearest VA service location was associated with increased risks of having a gap in VA services. Distance to VA psychiatric facilities was also associated with increased risks of a 12-month gap in VA mental health services. Greater VA inpatient bed availability was associated with reduced risks of a 12-month gap in VA services, yet it was not associated with gaps in mental health services utilization. We note that, in supplemental analyses, using distance and distance-squared terms, the quadratic distance terms were not significant.

Further, as the distance measures were right-skewed in their distributions, we conducted sensitivity analyses using an indicator of distance of at least 25 from care as the only measure of geographic accessibility (Schmitt, Phibbs, and Piette 2003). These analyses indicated that living at least 25 miles from VA care was associated with a greater likelihood of a gap in VA health

Table 4: Survival Analysis: Time to 12-Month Gap in VA Mental Health Services

	<i>Hazard Ratio</i>	<i>95% Confidence Intervals</i>
Distance to VA psychiatric facility, 5-mile increments	1.011	(1.008, 1.014)
VA beds per 1,000 county residents	0.996	(0.984, 1.009)
Non-VA beds per 1,000 county residents	0.999	(0.994, 1.005)
Age, 5-year increments	1.043	(1.038, 1.048)
Gender, female	1.074	(1.041, 1.108)
Race: African American, Asian, Hispanic, Native American	1.195	(1.164, 1.225)
Race: Unknown	1.870	(1.800, 1.942)
Marital status, married	0.937	(0.918, 0.956)
Homeless in FY98	1.203	(1.171, 1.237)
VA service connected	0.634	(0.620, 0.648)
Psychiatric diagnosis: schizophrenia	0.828	(0.809, 0.847)
Charlson comorbidity score	1.203	(1.182, 1.224)
Had inpatient stay in FY98	1.203	(1.171, 1.237)

VA, Veterans Affairs; FY, fiscal year.

system utilization (odds ratio [OR] = 1.082; 95 percent confidence interval [CI]: 1.037, 1.129). Living at least 25 miles from VA psychiatric services was similarly associated with gaps in VA mental health services use (OR = 1.170; 95 percent CI: 1.126, 1.215).

DISCUSSION

This study evaluated the impact of two dimensions of access—geographic accessibility and services availability—on treatment retention among patients diagnosed with schizophrenia or bipolar disorder. These dimensions have parallels in two maxims of health system planning: Jarvis’s Law of Distance and Roemer’s Law (Jarvis 1850; Roemer 1961). In 1850, Jarvis described a distance–decay relationship whereby the likelihood of utilization diminishes at greater distances from providers. A century later, Roemer showed a positive association between hospital bed supply and bed days per 1,000 people in a community. Both “laws” suggest substantial unmet need for care, as indicated by greater utilization when accessibility and availability increase. The associations of geographic accessibility and services availability with continuity of care have received little research attention. Using national longitudinal data, we evaluated their impact on long-term VA health system and mental health services retention.

By the end of FY98, 12-month gaps in VA service use were observed among 21.0 percent of patients with SMI. We observed gaps in mental health services use among 41.7 percent of patients. The generally continuous nature of utilization among patients with SMI is consistent with findings from previous studies (Ronis et al. 1996).

Study findings provide evidence that geographic accessibility and services availability influence long-term continuity of care. However, the observed effects were small. For overall VA health system retention, the hazard ratio associated with a 5-mile increase in distance to nearest VA service site was 1.010. For VA mental health services retention, the hazard ratio associated with living 5 miles farther from psychiatric services was 1.011. In sensitivity analyses, noted above, hazard ratios for individuals living at least 25 miles from the nearest relevant provider were 1.082 and 1.170 for VA health system and for mental health services retention, respectively. Greater VA inpatient bed availability was associated with increased health system retention.

These results are consistent with those of previous studies examining geographic accessibility and the timeliness of care for psychiatric patients over shorter periods. Greater distance from providers has been associated with lower likelihood of receiving outpatient visits following discharge, and less continuous psychiatric and nonpsychiatric utilization (Druss and Rosenheck 1997; McCarthy 2002). Our findings regarding the impact of VA inpatient bed availability on health system retention are consistent with those of previous studies of availability effects on services utilization (Roemer 1961; Kekki 1980; Bindman, Keane, and Lurie 1990).

In assessing the small magnitude of the observed accessibility and availability effects, compared with those observed in previous studies, several factors should be considered. First, the factors influencing delayed care may be distinct from those affecting loss-to-care. The present study examined long-term gaps in health system and mental health services utilization between last use of FY98 and the end of FY02. For patients with SMI, 12-month gaps may represent loss to care, whereas briefer gaps may represent delayed care.

Second, the relative influence of access barriers may diminish as need increases. Although it was not feasible to include time-varying measures of need for care, need may increase during longer intervals without care. For patients with SMI, guidelines recommend no fewer than three outpatient contacts per year, in order to reduce risks of mental health exacerbations. After longer periods without care, patients may be more motivated to overcome access barriers.

There may also be selection factors affecting which individuals seek any VA care, and thus were eligible for inclusion in this study. Among all eligible veterans, those living further from VA providers and who also seek VA care may have greater unmeasured need for services (and willingness to surmount access barriers) than veterans living in areas with greater access and who become VA patients.

Finally, there may be greater measurement error in longitudinal models predicting long-term gaps in utilization, as compared with assessments over a briefer time period. For example, baseline characteristics—particularly of need for care—may change substantially over time. It is unclear to what extent health system accessibility and availability may have changed during the observation period. In a 1-year period, 15 percent of patients with SMI may change zip codes of residence, with a median travel distance of 13 mile (McCarthy 2002), and patients may be more likely to move closer to VA treatment facilities. Further research is also needed to evaluate our assumption that prolonged periods without health system utilization have clinical importance, separate from their considerable lack of concordance with treatment guidelines.

This study had several limitations. First, this study did not include measures of non-VA health services utilization. As a result, we cannot determine the extent to which patients who have a 12-month gap in VA services received no services at all, or instead received services from non-VA providers. We acknowledge that this is a concern, however we expect that cross-system use among VA users with schizophrenia and bipolar disorder is relatively low (Desai, Rosenheck, and Rothbard 2001; Desai and Rosenheck 2002). More than half of all study patients had service-connected disabilities. Finally, there is conflicting evidence as to whether VA patients living in remote areas are more likely to receive non-VA care (Borowsky and Cowper 1999; Desai and Rosenheck 2002).

Second, it was limited to predominantly male veterans who received care in the VA health system. One may question the generalizability of these findings to veterans and nonveterans receiving care in other settings. However, veterans and nonveterans may be similar in their utilization patterns after controlling for patient predisposing, enabling, and need characteristics (Wolinsky et al. 1985). Moreover, comparisons of VA and non-VA patients with schizophrenia suggest that, although VA patients are older and have higher incomes, they do not differ in terms of clinical status, satisfaction with providers, or community adjustment (Rosenheck et al. 2000).

Third, although we censor patients at their observed dates of death, the BIRLS data may be less sensitive for patients who are not service connected and who receive only outpatient treatment (Dominitz, Maynard, and Boyko 2001). As a result, analyses may overestimate the risk of having a prolonged gap in health system contacts among these patients. However, given the high level of service-connection and rates of hospitalization among VA patients with SMI (Blow et al. 2003), this may not significantly influence study results. Further, although straight-line distance provides a reasonable proxy for travel time (Phibbs and Luft 1995), there may be systematic differences in travel resources between study subjects living at different distances from VA providers.

Health system and mental health services retention, as defined in this study, provide measures of some but certainly not all of the key conceptual dimensions of continuity that have been described in the literature. Retention in care provides a broad indicator of global continuity as “an uninterrupted succession of events” consistent with patient care needs across illness episodes (Shortell 1976). This application is appropriate in studying services utilization by patients with SMI, given their substantial needs for ongoing contacts. However, it is unclear to what extent it may be applied to patient subpopulations with more episodic health services needs.

As discussed by Shortell 30 years ago (Shortell 1976), the interrelationships of continuity of care and access to care remain poorly understood. This study examined whether, among patients with SMI, health system geographic accessibility and services availability influenced long-term gaps in health system and mental health services utilization. Geographic accessibility barriers were associated with increased risks of long-term gaps in health system and mental health services utilization, particularly for individuals living at least 25 miles from providers. VA services availability was also associated with VA health system retention.

Consistent with prior research, patient predisposing (i.e., age, gender, race/ethnicity, marital status, service connection, and homelessness) and need factors (i.e., medical morbidity, primary psychiatric diagnosis, inpatient admission in FY98) were substantial predictors of utilization. To improve continuity of care for patients with SMI, health system clinicians and policy makers should also focus efforts on patient-level factors associated with long-term loss to care. Further research regarding patient and treatment factors associated with these gaps in utilization may inform these efforts.

For patients with schizophrenia and bipolar disorder, accessibility and availability barriers are associated with long-term disruptions in needed

services contacts. Over the past decade, the VA has improved access by expanding the number of health system contact points and has worked to ensure adequate inpatient resources in areas with high concentrations of veterans. The present study underscores the importance of these efforts.

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