Utilization of Primary Care by Veterans with Psychiatric Illness in the National Department of Veterans Affairs Health Care System

Lydia A. Chwastiak, MD, MPH^{1,4}, Robert A. Rosenheck, MD^{1,2}, and Lewis E. Kazis, ScD³

¹Department of Psychiatry, Yale University School of Medicine, New Haven, CT, USA; ²Northeast Program Evaluation Center, VA Connecticut Health Care System, West Haven, CT, USA; ³Center for the Assessment of Pharmaceutical Practices (CAPP), Department of Health Policy and Management, Boston University School of Public Health and the Center for Health Quality, Outcomes and Economic Research (CHQOER), Veterans Administration, Bedford, MA, USA; ⁴Yale New Haven Psychiatric Hospital, New Haven, CT, USA.

BACKGROUND: Psychiatric illness is associated with increased medical morbidity and mortality. Studies of primary care utilization by patients with psychiatric disorders have been limited by nonrepresentative samples and confounding by medical co-morbidity.

OBJECTIVE: To determine whether patients with psychiatric disorders use primary care services differently than patients without these disorders, after controlling for medical co-morbidity.

DESIGN: Data from the 1999 Large Health Survey of Veterans (LHS) (n=559,985) were linked to VA administrative data in order to identify veterans who received primary care. After adjusting for sociodemographic and clinical characteristics, medical co-morbidity, and facility characteristics, multivariate logistic regression was used to evaluate whether seven psychiatric diagnoses were associated with an increased or decreased likelihood of any primary care visit over 12 months.

RESULTS: Veterans with either schizophrenia, bipolar disorder or a drug use disorder were less likely to have had any primary care visit during the study period: [OR 0.61, 95% CI 0.59 to 0.63], [OR 0.63, 95% CI 0.60 to 0.67] and [OR 0.88, 95% CI 0.83 to 0.92], respectively, than veterans without these diagnoses, even after controlling for medical co-morbidity. Among patients with any primary care utilization, those with six of the seven psychiatric diagnoses had fewer visits in the study period.

CONCLUSIONS: Patients with schizophrenia, bipolar disorder or drug use disorders use less primary care than patients without these disorders. Interventions are needed to increase engagement in primary care by these vulnerable groups.

KEY WORDS: primary care; psychiatric illness; Axis I psychiatric disorders; Veterans Affairs Health Care System.

J Gen Intern Med 23(11):1835-40

DOI: 10.1007/s11606-008-0786-7

© Society of General Internal Medicine 2008

The SF-36® and SF-12® are registered trademarks of the Medical Outcomes Trust

Received February 15, 2008

Revised June 27, 2008

Accepted August 29, 2008

Published online September 16, 2008

BACKGROUND

Serious mental illness (SMI), such as schizophrenia or bipolar disorder, has been associated with increased medical morbidity and mortality. Patients with schizophrenia have elevated rates of diabetes and emphysema¹⁻⁴, and are twice as likely to die from cardiovascular disease as the general population⁵. Bipolar disorder is associated with elevated rates of hypertension and cardiovascular disease^{6,7}. Several factors have been proposed to explain this increased morbidity and mortality, including high rates of obesity and tobacco dependence^{8,9}, side effects of psychiatric medications, neglect of physical health because of psychosis, anxiety, depression, or social withdrawal¹⁰, and under-utilization of medical services¹¹.

Several studies have suggested that persons with SMI are less likely to use medical care than individuals without SMI. Over 60% of patients with SMI report difficulty keeping medical appointments¹². In a study of VA outpatients with chronic medical conditions, patients with co-morbid mental disorders were less likely to receive recommended preventive services than patients without such disorders¹³. In another study, only half of patients with SMI and co-morbid chronic hepatitis C infection had a primary care provider¹⁴. There may be disparities in the medical service use across psychiatric diagnoses: older persons with schizophrenia appear to receive fewer primary care and preventive health care services than patients with depression¹⁵. Patients with schizophrenia have very low rates of treatment of hypertension and hyperlipidemia¹⁶, and those with co-morbid diabetes receive less aggressive treatment of cardiovascular risk factors¹⁷.

But other studies suggest that patients with SMI may use as much or more medical services than the general population. Data from the 1994 National Health Interview Survey suggest that persons with a mental disorder are as likely to have a primary care provider as persons without a mental disorder¹⁸. Moreover, a study of 200 outpatients from mental health clinics in Baltimore found that the patients with schizophrenia and affective disorders were more likely to report receiving medical services in the past year than individuals in the general population¹⁹.

The inconsistencies in the existing literature reflect two important methodological limitations of previous studies. First, the samples in the previous studies may not be representative of the SMI population. Second, previous evaluations of disparities in outpatient medical service use have not controlled for potential confounding by medical co-morbidity, which may be a more important contributor to

outpatient medical service utilization than any specific psychiatric diagnosis²⁰.

Whether patients with schizophrenia and bipolar disorder under-utilize primary care in relation to their medical need is a critical question that needs to be answered to improve the quality of medical care for these vulnerable patients. The current study uses data from the 1999 Large Health Survey of Veteran Enrollees (LHS) to evaluate primary care service utilization among veterans with psychiatric illness while addressing the methodologic limitations of previous studies. The specific aims of this study were 1) to determine whether patients with psychiatric illness use primary care services differently than patients without psychiatric illness, after controlling for potential confounding by the presence of medical co-morbidity and facility characteristics; and 2) to quantify the magnitude of this effect, specifically the number of primary care visits once contact has been initiated. Seven psychiatric diagnoses were evaluated in order to determine whether any differential use of primary care services is generally true across a broad range of psychiatric illness.

METHODS

Sample. Analyses were conducted using data from the 1999 Large Health Survey of Veteran Enrollees (LHS), the largest and most detailed survey of users of VA health services ever conducted²¹. The LHS was a structured questionnaire on sociodemographic factors and health status, health behaviors and health care needs. It included a version of the Medical Outcomes Study Short Form 36²² specifically validated among veterans²³, and a medical co-morbidity index which was based on patient self-report of diagnoses²⁴. Patients were sampled from the March 1999–September 1999 enrollment files. A total of 1,406,049 enrollees were sent surveys and 887,775 returned the questionnaire, for a response rate of 63.14%²¹. A total of 559,985 respondents who used VA services in fiscal year 2000 responded to the survey between July 1999–December 1999 and had complete data on survey variables used in this study. The LHS dataset was linked to VA administrative data in order to identify whether the patient had any primary care visit in FY 2000 and the number of primary care visits patients received. The representativeness of the LHS sample was demonstrated by comparison of sociodemographic and clinical characteristics of the LHS sample to data on all patients who used VA health services nationally during FY2000 (n=3,647,334 patients).

DEFINITIONS AND MEASURES

Psychiatric diagnoses. Veterans with psychiatric illness were identified from administrative data by having at least one visit with an ICD-9-CM code²⁵ for any of seven psychiatric diagnoses (as a primary or secondary diagnosis): schizophrenia or schizoaffective disorder (295.xx), bipolar disorder (296.0x, 296.1x, 296.40–296.89), major depressive disorder (296.2–296.39), other depression (300.4x, 296.9x, 311.xx, 301.10–

301.19), posttraumatic stress disorder or PTSD (309.81), alcohol use disorder (303.xx or 305.00), or drug use disorder (292.01–292.99 or 304.xx or 305.20–305.99). The “other depression” category was comprised almost entirely of dysthymia (300.4x) and depressive disorder not otherwise specified (311.xx).

Medical co-morbidity. Medical co-morbidity was evaluated based on patient self-report of medical diagnoses in the LHS survey. Veterans were asked about 12 common medical conditions in the survey, and the count of the diagnoses was used in the analyses.

Physical health status. Physical health status was evaluated by the physical component scale (PCS) of the Short Form-36 for Veterans, an adapted form of the Medical Outcomes Study Short Form 36²² designed specifically for use with veterans²³. It consists of the same 36 items and eight sections as the MOS SF-36: physical functioning, role limitations due to physical problems, bodily pain, general health perceptions, energy/vitality, social functioning, role limitations due to emotional problems, and mental health. Responses in the two role functioning scales are on a five-point ordinal scale, which differs from the dichotomous responses in the MOS SF-36²⁶. The PCS is standardized to the national U.S. population with a mean of 50 and a standard deviation of 10, where higher scores denote better health status.

VA Site characteristics. Characteristics of the VA facilities where subjects obtained their medical care were evaluated to identify differences in patterns of primary care utilization in terms of geographic location, size of the VA facility, and emphasis on mental health care. We used Rural-Urban Commuting Area (RUCA) codes developed in 1998 at the University of Washington (<http://depts.washington.edu/uwrUCA/about.html>) to identify veterans living in settings ranging from large urban locations to isolated rural ones, using the zip code of residence in the first outpatient encounter record. Facility characteristics included the size of the VA hospital (number of employees), and emphasis on mental health care (the percentage of the budget dedicated to mental health treatment, and the percentage of the mental health budget dedicated to research and education).

Primary care utilization. The primary outcome of the study was receipt of any VA outpatient primary care services during FY2000. This was determined using clinic stop codes in the VA Outpatient Care File, a computerized database of all ambulatory care encounters at VA facilities represented by stop codes 301, 322, 323, 348, and 350. Sensitivity analyses expanded the definition of primary care to include all medical specialty clinics and mental health primary care clinics.

Statistical methods. Four separate analyses were conducted. First, the representativeness of the LHS sample in terms of sociodemographic and diagnostic characteristics, and outpatient mental health and medical service utilization was evaluated by comparison to data on all VA health service users in FY 2000 (n=3,647,334).

Second, multivariate logistic regression analyses were conducted to evaluate whether veterans with specific psychiatric diagnoses use primary care services differently than patients without psychiatric illness. Three regression models were evaluated, all with the outcome of any primary care visit in FY 2000. The first model evaluated the odds of any primary care visit across the seven psychiatric diagnoses controlling for sociodemographic characteristics (age, race, gender, education, and service connection). Service connection reflects compensation for a disability connected to military service, and may affect priority for services and motivation to seek services. In the second model, covariates for medical co-morbidity (the count of self-reported diagnoses in the LHS survey) and physical health status (SF-36V PCS) were added. In the third model, VA site characteristics were added: rurality of residence, size of VA facility, the facility's emphasis on mental health care, and the percentage of the mental health budget spent on research and education.

Third, interaction terms between facility characteristics and mental health diagnoses were evaluated. These analyses required the use of general estimation equations (GEE) to adjust the standard errors of the coefficients because observations within facilities are not independent.

Fourth, the number of primary care visits was evaluated across the seven psychiatric diagnoses (among those veterans who had any primary care visit). Negative binomial regression technique was used because the count of the number of primary care encounters did not meet the distributional assumptions of ordinary least squares analysis. Analyses were conducted in Proc Genmod of SAS®.

RESULTS

The sample of 559,985 patients who had complete data on the LHS survey appear to be broadly representative of the 3,647,334 patients who used VA health services in FY 2000 (Table 1). They differed in that patients in the LHS subsample were, on average, older (mean age 64.1 compared to 58.9), used less outpatient mental health care (mean of 2.5 visits compared to 2.7), were more likely to have a primary care visit (85.1% compared to 72.1%), and had more outpatient medical visits (4.8 compared to 3.1 visits). All of these differences were statistically significant at $p < 0.0001$. The percentage of subjects with any primary care visit during the study period varied across the psychiatric diagnoses, from 72.8% of subjects with schizophrenia to 90.1% of subjects with other depression.

Multivariate logistic regression analyses were used to evaluate whether each of the seven psychiatric diagnoses was associated with an increased or decreased likelihood of any primary care visit in FY 2000. Three regression models were evaluated with a baseline model including only sociodemographic variables and psychiatric diagnoses and subsequent models controlling for potential confounding by medical co-morbidity and local VA facility characteristics (Table 2). Patients with either schizophrenia, drug use disorder, or bipolar disorder were less likely to have any primary care visit during the study period than those without a psychiatric diagnosis: [OR 0.61, 95% CI 0.59 to 0.63], [OR 0.63, 95% CI 0.60 to 0.67] and [OR 0.88, 95% CI 0.83 to 0.92], respectively. Patients with major depressive disorder, other depression, or

Table 1. Comparison of Sample from 1999 Large Health Survey of Veterans (LHS) with All Patients using VA Health Services in Fiscal Year 2000: Demographics, Psychiatric Diagnoses, Outpatient Mental Health and Medical Service Utilization

Characteristic	Percentage or Mean (standard deviation)		
	All users of VA services in FY2000 (n=3,647,334)	All users of VA services excluding LHS sample (n=3,087,349)	LHS sample (n=559,985)
Age	58.9 (15.9)	58.0 (15.4)	64.1 (12.9)
Race			
African American	9.6%	9.6%	9.4%
Hispanic	3.5%	3.3%	4.8%
Gender, % male	90.4%	89.3%	95.9%
Schizophrenia diagnosis	3.0%	3.0%	3.1%
Bipolar disorder diagnosis	1.9%	1.9%	1.9%
Major depressive disorder diagnosis	4.4%	4.3%	5.1%
Other depression diagnosis	8.8%	8.6%	10.2%
PTSD diagnosis	5.0%	4.7%	6.2%
Alcohol abuse or dependence diagnosis	5.2%	5.4%	4.0%
Drug abuse or dependence diagnosis	3.2%	3.5%	1.9%
% of subjects with any primary care visit in FY 2000	72.1%	69.7%	85.1%
% of subjects with any primary care or medical specialty clinic visit in FY 2000	76.4%	74.0%	89.7%
Mean number of mental health visits	2.7 (17.4)	2.7 (17.2)	2.5 (16.2)
Mean number of primary care visits	2.2 (2.8)	2.2 (2.6)	3.2 (3.2)
Mean number of outpatient medical visits (primary care or specialty)	3.4 (4.4)	3.1 (4.0)	4.8 (5.4)

PTSD were more likely than veterans without psychiatric illness to have a primary care visit (Table 2).

When logistic regression analyses were repeated with adjustment for medical co-morbidity, patients with schizophrenia or bipolar disorder were even less likely to have a primary care visit: [OR 0.55, 95% CI 0.53 to 0.58 for schizophrenia] and [OR 0.73, 95% CI 0.69 to 0.77 for bipolar disorder]. After adjustment for medical co-morbidity, patients with major depressive disorder, PTSD and alcohol use disorders were less likely to have had a primary care visit during the study period. The "other depression" category was the only diagnostic category that was associated with an increased odds of a primary care visit after adjustment for medical co-morbidity.

This under-utilization of primary care could be explained if veterans with psychiatric diagnoses were receiving primary care through either specialty medical clinics or mental health clinics. Repeat analyses with a broadened definition of primary care to include specialty medical clinics and mental health primary care clinics increased the utilization of services by a negligible amount: the percentage of subjects with schizophrenia who had any primary care visit increased by 0.7%.

Table 2. Multivariate Logistic Regression Analyses of any Outpatient Primary Care Visit in Fiscal Year 2000 by Respondents to 1999 Large Health Survey of Veterans (n=559,985)

	Odds ratio and 95% confidence interval for any primary care visit in fiscal year 2000		
	Baseline model	After adjustment for medical comorbidity	After adjustment for facility characteristics
Age 40–49 ^a	1.37 (1.33, 1.42)	1.34 (1.28, 1.39)	1.33 (1.27, 1.39)
Age 50–64 ^a	2.03 (1.96, 2.09)	1.77 (1.70, 1.84)	1.74 (1.67, 1.81)
Age 65–74 ^a	2.74 (2.65, 2.83)	2.12 (2.03, 2.21)	2.06 (1.97, 2.15)
Age 75–84 ^a	2.17 (2.10, 2.25)	1.68 (1.61, 1.75)	1.65 (1.58, 1.72)
Age >84 ^a	1.35 (1.26, 1.45)	0.95 (0.88, 1.03)	0.92 (0.84, 1.00)
Female gender ^b	0.63 (0.61, 0.66)	0.62 (0.59, 0.65)	0.58 (0.55, 0.62)
Education ^c	0.86 (0.85, 0.87)	0.88 (0.87, 0.89)	0.94 (0.93, 0.95)
African American ^d	0.95 (0.93, 0.97)	0.84 (0.82, 0.87)	0.90 (0.88, 0.92)
Hispanic ^d	1.06 (1.02, 1.09)	1.01 (0.98, 1.05)	1.05 (1.00, 1.10)
Other race ^d	1.06 (1.02, 1.09)	0.99 (0.98, 1.03)	1.03 (0.99, 1.07)
Service connection less than 50% ^e	0.93 (0.91, 0.95)	1.03 (1.00, 1.05)	1.04 (1.02, 1.07)
Service connection greater than 50% ^e	0.95 (0.93, 0.97)	0.86 (0.84, 0.89)	0.86 (0.84, 0.88)
Schizophrenia ^f	0.61 (0.59, 0.63)	0.55 (0.53, 0.58)	0.51 (0.49, 0.53)
Bipolar disorder ^f	0.88 (0.83, 0.92)	0.73 (0.69, 0.77)	0.70 (0.66, 0.74)
Major depressive disorder ^f	1.06 (1.02, 1.11)	0.95 (0.91, 0.99)	1.08 (1.04, 1.13)
Other depression ^f	2.05 (1.98, 2.12)	1.69 (1.63, 1.75)	1.66 (1.60, 1.71)
PTSD ^f	1.08 (1.04, 1.11)	0.96 (0.92, 0.99)	0.94 (0.91, 0.98)
Alcohol use disorder ^f	1.04 (1.00, 1.01)	0.94 (0.91, 1.00)	0.93 (0.89, 1.01)
Drug use disorder ^f	0.63 (0.60, 0.67)	0.69 (0.65, 0.73)	0.69 (0.65, 0.73)
Medical comorbidity ^g		1.17 (1.17, 1.18)	1.17 (1.17, 1.18)
Physical health status ^h		0.98 (0.97, 0.98)	1.0 (1.0, 1.0)
Residence micropolitan (population 10,000–49,000) ⁱ			1.27 (1.23, 1.31)
Residence large rural town ⁱ			1.20 (1.16, 1.24)
Residence isolated small rural area ⁱ			1.16 (1.11, 1.20)
# of employees at VA facility ^j			1.0 (1.0, 1.0)
% of VA facility budget spent on mental health ^j			1.86 (1.53, 2.27)
% of mental health budget spent on research ^j			0.86 (0.73, 1.0)

Reference groups for covariates: ^a age <40; ^b male gender; ^c High school; ^d Caucasian race; ^e no service connection; ^f patients without the specified psychiatric diagnosis; ^g patients with no co-morbid medical diagnoses; ^h population norm for the VSF-36 PCS subscale=50; ⁱ residence in urbanized areas (population >50,000); ^j mean values for national VA medical centers

The addition of VA facility characteristics did not substantially change the findings across the psychiatric diagnoses (Table 2). Patients in rural areas were more likely to have a primary care visit, as were patients treated at facilities with a greater emphasis on mental health treatment. Next, interaction terms were added to further explore utilization among patients with either schizophrenia, bipolar disorder or drug use disorders. Among patients with schizophrenia or bipolar disorder, those treated in large VA hospitals were less likely to receive primary care ($p < 0.0001$ for both interaction terms). These analyses required use of general estimation equations (GEE) to adjust the standard errors of the coefficients for the fact that observations within facilities are not independent.

Finally, the impact of each of the seven psychiatric diagnoses on the number of primary care visits during FY2000 was evaluated using a negative binomial regression analysis, controlling for medical co-morbidity, physical functioning and VA facility characteristics (Table 3). Among LHS subjects who had at least one primary care visit, those with any psychiatric diagnosis except other depression had fewer primary care visits when compared to patients with no psychiatric diagnosis. Subjects with other depression had slightly more visits, as did patients with increased medical co-morbidity (all $p < 0.0001$, Table 3). The addition of interaction terms to these analyses revealed that patients with schizophrenia or bipolar disorder receiving treatment at large VA facilities received fewer primary care visits ($p < 0.0001$).

Table 3. Negative Binomial Analysis of Number of Primary Care Visits among Subjects with Any Visit in FY 2000

Parameter	Estimate	p
Age 40–49 ^a	0.28	<0.0001
Age 50–64 ^a	0.59	<0.0001
Age 65–74 ^a	0.82	<0.0001
Age 75–84 ^a	0.59	<0.0001
Age >84 ^a	–0.00	0.9664
Gender ^b	–0.52	<0.0001
Education ^c	–0.04	<0.0001
Black ^d	–0.09	<0.0001
Hispanic ^d	0.04	0.09
Other race ^d	0.02	0.46
Service connection less than 50% ^e	0.04	0.005
Service connection greater than 50% ^e	–0.19	<0.0001
Drug use disorder ^f	–0.28	<0.0001
Schizophrenia ^f	–0.96	<0.0001
Alcohol use disorder ^f	–0.14	0.003
PTSD ^f	–0.25	0.003
Bipolar disorder ^f	–0.67	<0.0001
Major depressive disorder ^f	–0.14	0.0002
Other depression ^f	0.38	<0.0001
Medical co-morbidity ^g	0.15	<0.0001
Physical health status ^h	0.00	0.006
Residence micropolitan area (population 10,000–49,000) ⁱ	0.22	<0.0001
Residence large rural town ⁱ	0.17	<0.0001
Residence isolated small rural area ⁱ	0.14	<0.0001
Small facility	–0.00	<0.0001
% of budget spent on mental health	0.69	<0.0001
% of mental health budget spent on research	–0.10	0.02

Reference groups for covariates: ^a age <40; ^b male gender; ^c High school; ^d Caucasian race; ^e no service connection; ^f patients without the specified psychiatric diagnosis; ^g patients with no co-morbid medical diagnoses; ^h population norm for the VSF-36 PCS subscale=50; ⁱ residence in urbanized areas (population >50,000); ^j mean values for national VA medical centers

DISCUSSION

This study utilized data from the 1999 Large Veterans Health Survey, the largest and most detailed survey of VA health services users ever conducted, in order to determine whether veterans with psychiatric illness utilize primary care services differently than veterans without psychiatric illness. Seven psychiatric diagnostic categories were examined, evaluating a broad spectrum of Axis I psychiatric disorders. Veterans with schizophrenia, bipolar disorder and drug use disorders were significantly less likely than other veterans to have a primary care visit during the one-year study period. And among those patients with any primary care visits, veterans with these diagnoses also had fewer primary care visits.

A major strength of the LHS dataset is that it provides the opportunity to control for potential confounding of the relationship between psychiatric illness and primary care utilization by medical co-morbidity, as the survey included self-report questions about medical diagnoses. After adjustment for medical co-morbidity, veterans with each of the psychiatric disorders except other depression had decreased odds of any primary care visit during the study period. An apparent increased odds of any primary care visit among patients with major depressive disorder, PTSD, or alcohol use disorders disappeared after adjustment for medical co-morbidity, suggesting either that increased utilization of services is explained by an increased burden of medical illness, or that these findings are less robust than the findings for patients with schizophrenia, bipolar disorder and drug use disorders. The other depression category is less precise than the other diagnostic categories, and may include patients with undiagnosed somatoform disorders.

This study provides clear evidence that veterans with schizophrenia and bipolar disorder have decreased utilization of needed primary care services. The national VA system is the largest integrated health care system in the U.S., and access to primary care could be expected to be easier for patients with serious mental illness (compared to community mental health settings). But in this study, patients with schizophrenia and bipolar disorder were less likely to have any primary care visit and had fewer visits, even after controlling for medical co-morbidity. Previous studies which suggested that patients with schizophrenia have as many (or more) primary care visits as patients without psychiatric illness^{19,20}, did not adjust for medical co-morbidity and likely had less representative samples. Our study supports previous reports of under-utilization of primary care among patients with drug use disorders^{13,27}.

Our study had several limitations. First, psychiatric diagnoses were based on administrative data, and previous literature has demonstrated significant under-diagnosis of psychiatric illness^{28,29}. We attempted to diminish the impact of this under-diagnosis by identifying patients with psychiatric illness as having at least one encounter with either a primary or secondary diagnosis of the disorder. Moreover, any potential to bias our results would likely be to falsely attenuate the differences between the groups, as patients with disorders would have mistakenly been categorized as having no psychiatric illness.

Second, it is possible that some veterans received primary care services outside of the VA, and such visits would not have been captured by VA administrative data. But it is unlikely that veterans with schizophrenia, bipolar disorder or drug abuse would be especially likely to use non-VA services, since

they have lower incomes and are less likely to have private insurance.

Third, in 2005 the VA implemented a Mental Health Strategic Plan³⁰ to enhance the link between medical and mental health services which may be mitigating the disparities we identified. Moreover, veterans returning from the war in Afghanistan and the Iraq War may have different patterns of utilization of medical services. But as these groups comprise <10% of all users of VA mental health services, it is unlikely that their utilization patterns would significantly alter our findings at the current time.

Finally, our findings may have limited generalizability outside of the VA system. Our previous research suggests similar rates of medical service utilization among VA patients and non-VA patients^{31,32}. But since the VA is an integrated system, if these groups do differ in their utilization patterns, our findings likely over-estimate the access of typical patients with schizophrenia, bipolar disorder and drug use disorders to primary care services.

In conclusion, this study suggests that patients diagnosed with schizophrenia, bipolar disorder or drug use disorders receive fewer primary care services than patients without these disorders. These findings are of particular concern because the VA is an integrated system which provides both mental health and medical services and thus may present a "best case" scenario for access to care among these vulnerable patient groups. Interventions are needed to facilitate the utilization of primary care by patients with serious mental illness, especially in light of the increased burden of medical illness in this population.

Acknowledgements: The research reported here was supported by a grant (K23 MH077824) from the National Institute of Mental Health.

Conflict of Interest: None disclosed.

Corresponding Author: Lydia A. Chwastiak, MD, MPH; Yale New Haven Psychiatric Hospital, 184 Liberty Street, LV-119, New Haven, CT 06519, USA (e-mail: lydia.chwastiak@yale.edu).

REFERENCES

1. Dixon L, Weiden P, Delahanty J, et al. Prevalence and correlates of diabetes in national schizophrenia samples. *Schizophr Bull.* 2000;26:903-12.
2. Mukherjee S. High prevalence of type II diabetes in schizophrenic patients. *Schizophr Res.* 1995;15:195.
3. Himelhoch S, Lehman A, Kreyenbuhl J, Daumit G, Brown C, Dixon L. Prevalence of chronic obstructive pulmonary disease among those with serious mental illness. *Am J Psychiatr.* 2004;161(12):2317-9, Dec.
4. Filik R, Sipos A, Kehoe PG, et al. The cardiovascular and respiratory health of people with schizophrenia. *Acta Psychiatr Scand.* 2006;113(4):298-305, Apr.
5. Brown S, Inskip H, Barraclough B. Causes of the excess mortality of schizophrenia. *Br J Psychiatr.* 2000;177:212-7.
6. Beyer JL, Taylor L, Gersing KR, Krishnan KR. Prevalence of HIV infection in a general psychiatric outpatient population. *Psychosomatics.* 2007;48(1):31-7, Jan-Feb.
7. Krishnan KR. Psychiatric and medical comorbidities of bipolar disorder. *Psychosom Med.* 2005;67(1):1-8, R, Jan-Feb.
8. Dickerson FB, Brown CH, Kreyenbuhl JA, et al. Obesity among individuals with serious mental illness. *Acta Psychiatr Scand.* 2006;113(4):306-13, Apr.

9. **Dixon L, Medoff DR, Wohlheiter K, et al.** Correlates of severity of smoking among persons with severe mental illness. *Am J Addict.* 2007;16(2):101–10, Mar–Apr.
10. **Goldman LS.** Medical illness in patients with schizophrenia. *J Clin Psychiatry.* 1999;60(Suppl): 2110–15.
11. **Levinson Miller C, Druss BG, Dombrowski EA, Rosenheck RA.** Barriers to primary medical care among patients at a community mental health center. *Psych Serv.* 2003;54:1158–60.
12. **Skinner EA, Steinwachs DM, Handley K, Lehman A, Fahey M, Lyles CA.** Met and unmet needs for assistance and quality of life for people with severe and persistent mental disorders. *Ment Health Serv Res.* 1999;1:109–18.
13. **Druss BG, Rosenheck RA, Desai MM, Perlin JB.** Quality of preventive medical care for patients with mental disorders. *Med Care.* 2002;40:129–36.
14. **Swartz MS, Swanson JW, Hannon MJ, et al.** Regular sources of medical care among persons with severe mental illness at risk of hepatitis C infection. *Psychiatr Serv.* 2003;54(6):854–9, Jun.
15. **Folsom DP, McCahill M, Bartels SJ, Lindamer LA, Ganiats TG, Jeste DV.** Medical comorbidity and receipt of medical care by older homeless people with schizophrenia or depression. *Psychiatr Serv.* 2002;53(11):1456–60, Nov.
16. **Nasrallah HA, Meyer JM, Goff DC, et al.** Low rates of treatment for hypertension, dyslipidemia and diabetes in schizophrenia: data from the CATIE schizophrenia trial sample at baseline. *Schizophr Res.* 2006;86(1–3):15–22, Sep.
17. **Kreyenbuhl J, Dickerson FB, Medoff DR, et al.** Extent and management of cardiovascular risk factors in patients with type 2 diabetes and serious mental illness. *J Nerv Ment Dis.* 2006;194(6):404–10, Jun.
18. **Druss BG, Rosenheck RA.** Mental disorders and access to medical care in the United States. *Am J Psychiatr.* 1998;155(12):1775–7, Dec.
19. **Dickerson FB, McNary SW, Brown CH, Kreyenbuhl J, Goldberg RW, Dixon LB.** Somatic healthcare utilization among adults with serious mental illness who are receiving community psychiatric services. *Med Care.* 2003;41(4):560–70, Apr.
20. **Hankin CS, Spiro A, Mansell D, Miller DR, Kazis LE.** Mental disorders and medical care utilization of VA ambulatory care patients. *J Ambulatory Care Manag.* 2006;29(1):51–60.
21. **Kazis LE, Selim A, Rogers W, Ren XS, Lee A, Miller DR.** Dissemination of methods and results from the Veterans Health Study: Final comments and implications for future monitoring strategies within and outside the Veterans Health Care System. *J Ambul Care Manage.* 2006;29(4):310–9.
22. **Ware JJ, Sherbourne CD.** The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care.* 1992;30:473–83.
23. **Kazis LE.** The Veterans SF-36 Health Status Questionnaire: Development and application in the Veterans Health Administration. *The Monitor. Medical Outcomes Trust.* 2000;5:1–9.
24. **Selim AJ, Fincke G, Ren XS, et al.** Comorbidity assessments based on patient report. Results from the Veterans Health Study. *J Ambul Care Manage.* 2004;27:281–95.
25. **International Classification of Diseases, Ninth Revision, Clinical Modification. (ICD-9- CM).** US Department of Health and Human Services. Centers for Disease Control and Prevention. National Center for Health Statistics: Hyattsville, MD, 2007.
26. **Kazis LE, Miller DR, Clark JA, et al.** Improving the response choices on the veterans SF-36 health survey role functioning scales: results from the Veterans Health Study. *J Ambul Care Manage.* 2004;27(3):263–80.
27. **Cunningham CO, Sohler NL, Wong MD, et al.** Utilization of health care services in hard-to-reach marginalized HIV-infected individuals. *AIDS Patient Care STDs.* 2007;21(3):177–86.
28. **Kroenke K, Spitzer RL, Williams JB, Monahan PO, Löwe B.** Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Ann Intern Med.* 2007;146(5):317–25, Mar 6.
29. **Goldman LS, Nielsen NH, Champion HC.** Awareness, diagnosis, and treatment of depression. *J Gen Intern Med.* 1999;14(9):569–80, Sep.
30. **Department of Veterans Affairs Office of Inspector General (DVAOIG):** Implementing VHA's Mental Health Strategic Plan Initiatives for Suicide Prevention (Report No 06- 03706-126). Washington DC: DVAIOG. May 10, 2007. Available at <http://www.va.gov/oig/54/reports/VAIOG-06-03706-126.pdf>. Accessed June 23, 2008.
31. **Rosenheck RA, Hoff RA, Steinwachs D, Lehman A.** Benchmarking treatment of schizophrenia: a comparison of service delivery by the national Government and by State and Local Providers. *J of Nerv Ment Dis.* 2000;188(4):209–16.
32. **Desai R, Dausey D, Sernyak MJ, Rosenheck RA.** A comparison of service delivery by the Department of Veterans Affairs and State providers: the Role of Academic Affiliation. *Adm Policy Ment Health.* 2005;32(3):267–84.