

# Personal Characteristics Affecting Veterans' Use of Services for Posttraumatic Stress Disorder

Elizabeth Brooks, Ph.D.

Douglas K. Novins, M.D.

Deborah Thomas, Ph.D.

Luohua Jiang, Ph.D.

Herbert T. Nagamoto, M.D.

Nancy Dailey, M.S.N., R.N.-B.C.

Byron Bair, M.D.

Jay H. Shore, M.D., M.P.H.

**Objective:** Posttraumatic stress disorder (PTSD) is widespread among veterans, but many veterans with PTSD use few health services. This study examined how individual characteristics influenced use of outpatient visits by veterans with PTSD. **Methods:** The study assessed number of annual visits by 414,748 veterans with PTSD who sought care from October 2007 through September 2008 at U.S. Department of Veteran Affairs (VA) facilities. Negative binomial regression and adjusted risk ratios assessed the relationship of number of visits and demographic characteristics as well as place of residence, era of service, extent to which disability was connected to service history, and having comorbid illnesses. **Results:** Veterans from rural or highly rural areas had 19% (confidence interval [CI]=.80–.82) and 25% (CI=.72–.79), respectively, fewer visits than urban-dwelling veterans. Iraq and Afghanistan veterans had 21% fewer visits than veterans of prior eras (CI=.78–.81). Veterans with comorbid conditions had 64% more visits than veterans with only PTSD (CI=1.62–1.66). Veterans from rural or highly rural areas had 22% (CI=.87–.89) and 33% (CI=.64–.71), respectively, fewer visits to PTSD specialty clinics than veterans from urban areas. **Conclusions:** Service use by veterans is lower in rural areas. The VA should build on existing efforts to provide more outreach and care opportunities, including telemental health and specialized PTSD services, in rural areas and for veterans of the current service era. Future research should investigate the impact of fewer visits on aspects of functioning, such as interpersonal factors, and the impact of system-level variables on service utilization. (*Psychiatric Services* 63:862–867, 2012; doi: 10.1176/appi.ps.201100444)

*Dr. Brooks, Dr. Novins, and Dr. Shore are affiliated with the Centers for American Indian and Alaska Native Health, University of Colorado Denver, P.O. Box 6508, Mail Stop F800, Aurora, CO 80045 (elizabeth.brooks@ucdenver.edu). Dr. Brooks and Ms. Dailey, Dr. Bair, and Dr. Shore are also with the Office of Rural Health, U.S. Department of Veterans Affairs (VA) Rural Health Resource Center—Western Region, Salt Lake City, Utah. Dr. Thomas is with the Department of Geography and Environmental Sciences, University of Colorado Denver. Dr. Jiang is with the Department of Epidemiology and Biostatistics, Texas A&M Health Science Center, College Station. Dr. Nagamoto is with the VA Eastern Colorado Health Care System, Denver.*

Posttraumatic stress disorder (PTSD) is a widespread problem among veterans and is often chronic and debilitating. Although the exact prevalence is impossible to determine, PTSD is estimated to affect hundreds of thousands of veterans in the United States and the numbers affected will likely keep growing (1,2). One recent report showed that between 2002 and 2008, nearly 50,000 new cases of PTSD were diagnosed among returning soldiers (3).

Although symptomology is varied, PTSD is associated with impairment in social functioning, sleep, anxiety, and anger and recently has been increasingly linked with cases of suicide by veterans (4–8). Studies show that veterans with PTSD have high rates of physical symptomology and mortality (9,10). Because of the widespread and serious nature of PTSD, the U.S. Department of Veterans Affairs (VA) designated it as one of the “signature injuries” caused by recent conflicts (11,12).

Because of the growing number of PTSD cases, additional services are needed to successfully manage veterans. Yet little is known about factors affecting veterans' use of VA-based outpatient care—the most common avenue for treatment (13). This gap in knowledge is a critical oversight that impedes efforts to plan for additional services.

The behavioral model of health service utilization by Andersen and Newman (14) and Anderson and Bartkus (15) has been widely used to understand help-seeking behavior. According to the model, use of a service is influenced by predisposing, enabling, and need factors. Predisposing variables refer to patient characteristics that exist independent of the illness, such as gender, age, marital status, and other individual demographic characteristics. Enabling variables refer to the means by which individuals can access care, such as proximity of the service and number of services available. Need variables refer to the severity of an individual's illness.

Data examining predisposing among veterans show mixed results, largely depending on the subpopulation of veterans and the type of services studied. For example, research found that men and women use inpatient VA-based care at equal rates but that women used less general outpatient care and more outpatient-based mental health services than men (16,17). Patterns of care among veterans of different marital status and race are more variable and are not well understood. In particular, studies have shown higher levels of mental health utilization among unmarried versus married individuals among the general populace (18), yet this result has not been replicated consistently among veterans (19–21). Studies of the relationship of race and service use have yielded mixed results in both VA and non-VA samples (22–26).

Increasingly, research to understand how utilization is associated with service era is emerging. Soldiers returning from Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) are beginning to show different diagnosis and help-seeking patterns than veterans of prior eras (16,27). Enabling and need variables appear to have a more consistent impact than predisposing factors on use of services by veterans of different service eras. The VA is unique in that health care coverage is partly determined by the extent to which the disability is connected to service history (service connection) and, to a lesser extent, income. Accordingly, service connection and income are often correlated with

service use (28,29). Proximity to care, comorbidity, and condition severity typically also show consistent associations with service use in veteran populations (19,22,30–32).

We conducted a retrospective chart review to understand personal characteristics that affected veterans' use of VA-based outpatient health care for PTSD. We focused our examination on characteristics derived from the Veterans Health Administration (VHA) Medical SAS Datasets, which have been used to examine patient outcomes and service use during the past two decades (33–35). Research on the VA databases has shown them to be a valuable resource for health services exploration (36).

Our objectives were to describe veterans' utilization of outpatient services for PTSD and determine factors associated with patients' use of services. Understanding how veterans access services for PTSD is important in order to assess whether care is adequately and uniformly distributed and used; this is especially important as rates of PTSD among veterans treated by the VA increase (2).

## Methods

### *Data set and model variables*

The VHA Medical SAS Outpatient Datasets consist of medical information for all veterans who presented at the VA from October 1, 2007, through September 30, 2008. We initially extracted data about 415,617 patients who presented for outpatient care and were assigned the *ICD-9* code for PTSD (309.81).

Using the behavioral model of Andersen and Newman (14) and Anderson and Bartkus (15) as a framework, we used as model variables personal characteristics in each of the three dimensions—predisposing, enabling, and need. We included the following variables in our regression model: place of residence (urban, rural, and highly rural), gender, marital status (married or unmarried), race (Caucasian, African American, American Indian, Asian, and Native Hawaiian), combat veteran status, service era (OEF/OIF or prior conflicts), comorbidity, income, and service connection (percentage of disability connected to service history).

Because the patient database does not contain a service era category for OEF/OIF, we used a method formulated by other researchers to create a dichotomous variable that was based on birthday; veterans born after 1973 were coded as OEF/OIF (2). Comorbidity was measured by a dichotomous indicator of the presence or absence of any comorbidity; it was derived from a numeric field in the patient record indicating the number of *ICD-9* diagnoses.

We categorized patients from an urban, rural, or highly rural area by using the Zip Code Crosswalk, developed by West and colleagues (37), to match patients' residential zip codes to a rural designation. After merging patient records with the crosswalk, we found 869 patient zip codes—less than 1% of the data, mostly from U.S. territories—that did not match a zip code in the crosswalk. These patients were dropped from the file, yielding a final total of 414,748 unique veterans. We examined the data for missing information about the model covariates. Race values were missing for about 16% of veterans, and these patients (N=64,778) were not included in the regression analysis. Difficulties with the VA's collection of data about race have been previously discussed, and the problem of missing data was not unexpected (38). Data were not missing for any of the covariates.

The dependent variable for the regression analysis was the total number of patient visits annually. This number was the sum of visits by each patient recorded in the initial visit-level file and represented service use throughout the investigation. To examine outpatient care visits that occurred at specialized PTSD clinics, we merged identifying information from the 2009 *Specialized PTSD Programs Directory* (39). Information in this directory allowed us to identify 109 specialized PTSD clinics by matching the station identification number.

### *Analysis*

We used negative binomial regression to examine the main effects and two-way interactions of the nine covariates on veterans' outpatient utilization of PTSD care. Negative binomial regression has been recommended

**Table 1**

Demographic characteristics of 414,748 veterans with posttraumatic stress disorder

Variable	N	%
Place of residence		
Urban	258,238	62
Rural	150,071	36
Highly rural	6,439	2
Sex		
Male	384,454	93
Female	30,294	7
Marital status		
Not married	183,305	44
Married	231,443	56
Race		
Caucasian	267,622	65
American Indian or Alaska Native	4,714	1
African American	70,318	17
Asian	2,538	1
Native Hawaiian	4,778	1
Combat veteran		
No	348,454	84
Yes	66,294	16
Service era		
Prior to OEF/OIF <sup>a</sup>	360,906	87
OEF/OIF	53,842	13
Comorbid condition		
No	93,063	22
Yes	321,685	78
Income (M±SD \$)	34,209±24,252	
Service connection (M±SD %) <sup>b</sup>	37±50	

<sup>a</sup> Operation Enduring Freedom/Operation Iraqi Freedom

<sup>b</sup> Percentage of disability associated with service history

for use with the VA patient databases, in particular, because the number of annual visits has considerable variability among patients (40). SPSS 17 was used for all analyses. Because of the large number of cases, we defined statistical significance as  $p \leq .001$ . Incidence rate ratios (IRRs) were also used to help interpret the data.

### Study approval

The Colorado Institutional Review Board and the Denver VA Research and Design Committee approved the study. Because the examination was performed on secondary, deidentified data, a waiver of informed patient consent was obtained.

## Results

### Main effects

Table 1 shows the demographic characteristics of the sample. The first component of our analysis looked at the main effects of each covariate on veterans' use of all VA-based outpatient care (Table 2). Three variables—place of residence, service era, and comorbidity—had the most influence on veterans' help-seeking behavior. Specifically, both rural and highly rural patients had fewer visits than urban patients, veterans serving in OEF/OIF utilized fewer services than those who served in prior service eras, and veterans with comorbid conditions utilized more services than veterans with only PTSD.

### Adjusted model

Because of the large number of patients, several alphas in the unadjusted model yielded a significance value of  $\leq .001$  but had very little impact on service use. Therefore, to create the adjusted model, we used only the three variables that most affected service utilization—place of residence, service era, and comorbidity.

Veterans from rural areas had 19% fewer visits (mean=5.11; IRR=.81, 95% confidence interval [CI]=.80–.82) and veterans from highly rural areas had 25% fewer visits (mean=4.78; IRR=.75, CI=.72–.79) than urban veterans (mean=6.34) (Table 3). OEF/OIF veterans had about 21% fewer visits than veterans who served in prior eras (mean=4.78 and 6.03, respectively; IRR=.79, CI=.78–.81). Veterans with comorbid conditions had 64% more visits than those with only PTSD (mean=6.87 and 4.19, respectively; IRR=1.64, CI=1.62–1.66).

### Effect modifiers

The third component of our analysis examined potential two-way interactions between residence and each category of covariate. This procedure allowed us to better understand the association of geography and service use. The results of this analysis yielded interesting utilization patterns by service era and place of residence (data not shown). Specifically, by using negative binomial regression, we found that service era was linked to help-seeking behavior among urban-dwelling veterans but not among rural-dwelling veterans. Specifically, urban-dwelling veterans who served prior to OEF/OIF had an average of 8.34 annual visits, whereas urban-dwelling OEF/OIF veterans had an average of 6.49 annual visits (IRR=.79, CI=.77–.79). On the other hand, rates of service use among rural veterans were similar regardless of patients' service era. As with our prior regression analysis, we examined both statistical significance and clinical significance in this analysis.

### Specialized PTSD services

The fourth component of our analysis compared visits to PTSD specialty clinics by veterans from urban, rural, or highly rural areas while controlling

**Table 2**

Use of outpatient care among veterans with posttraumatic stress disorder (PTSD), by characteristic

Characteristic	IRR <sup>a</sup>	CI
Place of residence (reference: urban)		
Rural	.81	.80–.82
Highly rural	.76	.72–.79
Unmarried (reference: married)	.96	.94–.97
Female (reference: male)	1.15	1.13–1.18
Race (reference: Caucasian)		
American Indian or Alaska Native	1.02	.97–1.08
African American	1.16	1.14–1.17
Asian	1.08	1.00–1.15
Native Hawaiian	1.10	1.04–1.15
Combat duty (reference: none)	.92	.90–.93
OEF/OIF service era (reference: not OEF/OIF) <sup>b</sup>	.82	.81–.84
Comorbid condition (reference: PTSD only)	1.62	1.60–1.65

<sup>a</sup> Unadjusted regression model. IRR, incidence rate ratio

<sup>b</sup> Operation Enduring Freedom/Operation Iraqi Freedom

for total number of visits. Again, we found that veterans in rural and highly rural locations had less service use than veterans in urban areas. Specifically, veterans from rural areas had 22% fewer visits (mean=2.17; IRR=.88, CI=.87–.89) and veterans from highly rural veterans had 33% fewer visits (mean=1.66; IRR=.67, CI=.64–.71) than urban veterans (mean=2.46).

#### Post hoc examination of service era

As a result of our analysis, we wanted to understand the association between period of service and other demographic characteristics in our database. We conducted several post hoc tests by using chi square (Cramér's V) and analysis of variance (eta squared) statistical tests to examine the effect size for each comparison. We found that a higher percentage of OEF/OIF veterans lived in urban versus rural areas (37% and 30%, respectively,  $\chi^2=1,025.13$ ,  $df=2$ ,  $p<.001$ ), although this effect size was small ( $V=.05$ ). The mean rating for service connection was lower among veterans of OEF/OIF than among veterans of prior service eras (23% versus 53%;  $F=15,596.96$ ,  $df=1$  and  $414,746$ ,  $p<.001$ ), but, again, the effect size was small ( $R^2=.04$ ). Approximately 78% of OEF/OIF and non-OEF/OIF veterans were diagnosed with more than one health condition.

#### Discussion

The VA, like most health organizations, locates primary care facilities in more populous areas to serve the largest numbers of patients. The unequal distribution of facilities has an impact on care-seeking behavior. Past research shows that rates of utilization of VA-based care are among the highest for veterans with PTSD compared with veterans with other disorders (41). Yet this investigation showed that service use was highly contingent on veterans' proximity to care. It is clear that veterans in rural areas had less access to outpatient care in general and to specialty PTSD services in particular. We worry, therefore, that veterans living outside metropolitan communities receive less optimal care of PTSD symptomology. Recent treatment guidelines issued jointly by the VA and the U.S.

**Table 3**

Outpatient visits by veterans with posttraumatic stress disorder (PTSD)

Variable	Visits		IRR <sup>a</sup>	CI
	M	SD		
Place of residence				
Urban (reference)	6.34	.02		
Rural	5.11	.02	.81	.80–.82
Highly rural	4.78	.07	.75	.72–.79
Service era				
Prior to OEF/OIF (reference) <sup>b</sup>	6.03	.03		
OEF/OIF	4.78	.03	.79	.78–.81
Comorbid condition				
No (reference)	4.19	.03		
Yes	6.87	.04	1.64	1.62–1.66

<sup>a</sup> Adjusted regression model. IRR, incidence rate ratio

<sup>b</sup> Operation Enduring Freedom/Operation Iraqi Freedom

Department of Defense recommend a variety of tools to help veterans cope with PTSD but do not specify how many annual visits are required for sufficient care (42). On the basis of that omission, it is unclear whether making 19% to 25% fewer visits might hinder treatment of veterans from rural areas.

From the systems perspective, increasing veterans' use of services might have profound consequences on the need for additional service options. In one year alone, over 156,000 veterans in rural and highly rural areas presented to the VA for PTSD care. Using the mean number of visits from our adjusted model, we found that an additional 194,000 visits would have occurred had veterans of rural and highly rural areas and urban-dwelling veterans sought care at equal rates. Projecting out five years, that's nearly a million visits. Research suggests that currently many veterans do not utilize VA services because of the long wait required for appointments (23). If veterans in rural areas utilize additional care for PTSD, the VA will need to respond with more treatment opportunities.

One way to supplement service options in rural areas is through the use of alternative delivery mechanisms. Increasingly, rural areas turn to telemental health as a bridge when access to health care is of concern. As of 2006, the VA offered telemental health services at 290 sites, over half of which were community-based outpatient clinics (43). Research demon-

strates that telemental health is useful for addressing the problems associated with a lack of services in rural areas (31); therefore, the VA should consider adding telemental health services. A special effort to establish telehealth, particularly specialized PTSD clinics, at existing facilities should also be considered.

The results of this study revealed that other factors besides geography influenced care-seeking behavior for PTSD. Urban-dwelling veterans who served during the current service era were less likely than veterans of prior conflicts to seek care. Although research indicates that younger people are more likely to seek care for mental health problems, this pattern does not appear to be true for veterans with PTSD (19,22,44). This finding is somewhat concerning, given the VA's increased attention to PTSD services and multiple efforts to screen for the disorder.

We examined several demographic factors to see if they might explain the difference in use of services by OEF/OIF veterans and veterans of prior service eras. We hypothesized that older veterans were more likely to seek care because they had worse symptomology and more disability. We also speculated that geographical differences influenced care seeking. Compared with younger veterans, older veterans had more service connection, which might explain their greater use of services, but did not differ in comorbidity status. A greater proportion of older veterans than of



younger veterans lived in rural areas; this finding was opposite of what would be expected if place of residence affected help seeking by service era.

Other factors that might explain the difference in service use among OEF/OIF veterans and veterans of prior conflicts could not be tested in this data set. They include the possibilities that younger veterans are more likely to believe they do not need care; are prevented from seeking care by more work or family obligations or other circumstances; or are more likely to seek treatment elsewhere, perhaps under a significant other's health care plan.

Patients with more than one health diagnosis made 64% more outpatient visits to the VA than those with only a diagnosis of PTSD. Poor health has long been cited as a factor influencing help-seeking behavior (19,45–47). Some research shows that need factors, such as poor health, are most predictive of service use; such findings suggest that patients who really need care will seek it despite other obstacles. Our study results supported that conclusion.

This study, while informative, was prone to several limitations. Although the outpatient data sets provide a wealth of information about a large number of individuals, the original databases were created and maintained primarily as a clinical and administrative tool. Our lack of direct control limits the type and complexity of information that we can examine and, to some extent, the conclusions we can draw. Further, patient records are entered by multiple providers, resulting in inconsistent data collection and diagnostic evaluation methods. In addition, the information contained in this database included only veterans enrolled in the VA system. A major limitation was the inability to understand factors influencing veterans who have chosen not to use VA-based services.

Because we could not get specific patient addresses, we relied on the Zip Code Crosswalk to assign urban, rural, and highly rural category labels. A potential problem with this method is that some zip codes represent a mix of urban, rural, or highly rural loca-

tions. Despite this shortcoming, the Crosswalk has been found to be highly reliable and is accepted by the VA as the gold standard for classification of residence (48). Given that OEF/OIF is not yet coded as a categorical option in the medical databases, we created a proxy variable that was based on a variable used by other researchers. Because of the inaccuracy of this method, we urge the VA to quickly include OEF/OIF as a service era coding option.

Our findings indicated that geography influenced the number of visits annually, but they did not tell us whether that association had implications for overall health and interpersonal relationships, such as marital or relationship discord. Given that veterans living in rural and highly rural areas sought fewer outpatient visits for PTSD than those living in urban areas, we might conclude that their illness was more severe. That conclusion is supported by research that provides some evidence that veterans living in rural areas have worse health-related quality-of-life scores than those in urban areas (31,49).

## Conclusions

This study yielded valuable information about service patterns for veterans with PTSD. By investigating veterans' service use over one year, we were able to examine a "snapshot in time" but could not determine long-term patterns. We recommend additional research examining multiyear use of VA services in order to understand patterns of care seeking to inform long-term resource planning.

We also did not explore system-level factors that affect help seeking for PTSD, an area of study suggested by other researchers (50). There are 21 Veterans Integrated Service Networks (VISNs), each of which is responsible for overseeing, organizing, and directing the facilities in their catchment area. Because of the inherent differences in operations, there is ample opportunity for discrepancies among VISNs in care and utilization. For example, one VISN may be better at providing outreach to rural veterans or offer more transportation opportunities, whereas another VISN might provide more ru-

rally based health care facilities. Future research should explore the impact of system-level variables on patients' health service utilization and give particular focus to services provided by specialized PTSD clinics, which vary considerably.

## Acknowledgments and disclosures

This study was funded by the field office of the U.S. Department of Veterans Affairs (VA) Rural Health Resource Center–Western Region in Salt Lake City, Utah. The opinions expressed by the authors do not necessarily reflect those of the VA.

The authors report no competing interests.

## References

1. Seal KH, Metzler TJ, Gima KS, et al: Trends and risk factors for mental health diagnoses among Iraq and Afghanistan veterans using Department of Veterans Affairs health care, 2002–2008. *American Journal of Public Health* 99:1651–1658, 2009
2. Rosenheck R, Fontana A: Recent trends in VA treatment of post-traumatic stress disorder and other mental disorders. *Health Affairs* 26:1720–1727, 2007
3. Kulka RA: Trauma and the Vietnam War Generation: Report of Findings From the National Vietnam Veterans Readjustment Study. New York, Brunner/Mazel, 1990
4. Amir M, Kaplan Z, Efroni R, et al: Suicide risk and coping styles in posttraumatic stress disorder patients. *Psychotherapy and Psychosomatics* 68:76–81, 1999
5. Brent DA, Perper JA, Moritz G, et al: Post-traumatic stress disorder in peers of adolescent suicide victims: predisposing factors and phenomenology. *Journal of the American Academy of Child and Adolescent Psychiatry* 34:209–215, 1995
6. Jakupcak M, Conybeare D, Phelps L, et al: Anger, hostility, and aggression among Iraq and Afghanistan war veterans reporting PTSD and subthreshold PTSD. *Journal of Traumatic Stress* 20:945–954, 2007
7. Schnurr PP, Lunney CA, Sengupta A, et al: A descriptive analysis of PTSD chronicity in Vietnam veterans. *Journal of Traumatic Stress* 16:545–553, 2003
8. Taft CT, Street AE, Marshall AD, et al: Posttraumatic stress disorder, anger, and partner abuse among Vietnam combat veterans. *Journal of Family Psychology* 21:270–277, 2007
9. Boscarino JA: Posttraumatic stress disorder and mortality among US Army veterans 30 years after military service. *Annals of Epidemiology* 16:248–256, 2006
10. Hoge CW, Terhakopian A, Castro CA, et al: Association of posttraumatic stress disorder with somatic symptoms, health care visits, and absenteeism among Iraq war veterans. *American Journal of Psychiatry* 164:150–153, 2007
11. An Achievable Vision. Falls Church, Va,

- Defense Health Board, Task Force on Mental Health. 2007. Available at [dtf.defense.gov/rwtf/dodtmentalhealth2007.pdf](http://dtf.defense.gov/rwtf/dodtmentalhealth2007.pdf)
12. Rebuilding the Trust: Report on Rehabilitative Care and Administrative Processes at Walter Reed Army Medical Center and National Naval Medical Center. Arlington, Va, Independent Review Group, 2007. Available at [www.nvti.ucdenver.edu/research/VETSNET/vol15no2/IRG-Report-Final.pdf](http://www.nvti.ucdenver.edu/research/VETSNET/vol15no2/IRG-Report-Final.pdf)
13. Ashton CM, Petersen NJ, Soucek J, et al: Geographic variations in utilization rates in Veterans Affairs hospitals and clinics. *New England Journal of Medicine* 340:32–39, 1999
14. Andersen R, Newman JF: Societal and individual determinants of medical care utilization in the United States. *Milbank Memorial Fund Quarterly: Health and Society* 51:95–124, 1973
15. Anderson JG, Bartkus DE: Choice of medical care: a behavioral model of health and illness behavior. *Journal of Health and Social Behavior* 14:348–362, 1973
16. Cohen BE, Gima K, Bertenthal D, et al: Mental health diagnoses and utilization of VA non-mental health medical services among returning Iraq and Afghanistan veterans. *Journal of General Internal Medicine* 25:18–24, 2010
17. Hoff RA, Rosenheck RA: The use of VA and non-VA mental health services by female veterans. *Medical Care* 36:1524–1533, 1998
18. Segraves RT: Marriage and mental health. *Journal of Sex and Marital Therapy* 6:187–198, 1980
19. Elhai JD, Don Richardson J, Pedlar DJ: Predictors of general medical and psychological treatment use among a national sample of peacekeeping veterans with health problems. *Journal of Anxiety Disorders* 21:580–589, 2007
20. Elhai JD, Grubaugh AL, Richardson JD, et al: Outpatient medical and mental health-care utilization models among military veterans: results from the 2001 National Survey of Veterans. *Journal of Psychiatric Research* 42:858–867, 2008
21. Sayer NA, Clothier B, Spont M, et al: Use of mental health treatment among veterans filing claims for posttraumatic stress disorder. *Journal of Traumatic Stress* 20:15–25, 2007
22. Hankin CS, Spiro A III, Miller DR, et al: Mental disorders and mental health treatment among US Department of Veterans Affairs outpatients: the Veterans Health Study. *American Journal of Psychiatry* 156:1924–1930, 1999
23. Koenen KC, Goodwin R, Struening E, et al: Posttraumatic stress disorder and treatment seeking in a national screening sample. *Journal of Traumatic Stress* 16:5–16, 2003
24. LaVela SL, Smith B, Weaver FM, et al: Geographical proximity and health care utilization in veterans with SCI&D in the USA. *Social Science and Medicine* 59:2387–2399, 2004
25. Westermeyer J, Canive J, Thuras P, et al: Perceived barriers to VA mental health care among Upper Midwest American Indian veterans: description and associations. *Medical Care* 40:162–171, 2002
26. Washington D, Villa V, Brown A, et al: Racial/ethnic variations in patterns of VA ambulatory care use. *American Journal of Public Health* 95:2231–2237, 2005
27. Burnam MA, Meredith LS, Tanielian T, et al: Mental health care for Iraq and Afghanistan war veterans. *Health Affairs* 28:771–782, 2009
28. Kosloski K, Austin C, Borgatta E: Determinants of VA utilization: the 1983 survey of aging veterans. *Medical Care* 25:830–846, 1987
29. Ouimette P, Wolfe J, Daley J, et al: Use of VA health care services by women veterans: findings from a national sample. *Women and Health* 38:77–91, 2003
30. Fortney JC, Booth BM, Blow FC, et al: The effects of travel barriers and age on the utilization of alcoholism treatment aftercare. *American Journal of Drug and Alcohol Abuse* 21:391–406, 1995
31. Wallace AE, Weeks WB, Wang S, et al: Rural and urban disparities in health-related quality of life among veterans with psychiatric disorders. *Psychiatric Services* 57:851–856, 2006
32. Weeks WB, Wallace AE, West AN, et al: Research on rural veterans: an analysis of the literature. *Journal of Rural Health* 24:337–344, 2008
33. Boyko EJ, Koepsell TD, Gaziano JM, et al: US Department of Veterans Affairs medical care system as a resource to epidemiologists. *American Journal of Epidemiology* 151:307–314, 2000
34. Cowper D, Hynes D, Kubal J, et al: Using administrative databases for outcomes research: select examples from VA Health Services Research and Development. *Journal of Medical Systems* 23:249–259, 1999
35. Gibbons RD, Brown CH, Hur K, et al: Relationship between antidepressants and suicide attempts: an analysis of the Veterans Health Administration data sets. *American Journal of Psychiatry* 164:1044–1049, 2007
36. Maynard C, Chapko MK: Data resources in the Department of Veterans Affairs. *Diabetes Care* 27(suppl 2):B22–B26, 2004
37. West A, Lee R, Shambaugh-Miller M, et al: Defining “rural” for veterans’ health care planning. *Journal of Rural Health* 26:301–309, 2010
38. Sohn MW, Zhang H, Arnold N, et al: Transition to the new race-ethnicity data collection standards in the Department of Veterans Affairs. *Population Health Metrics* 4:7, 2006
39. Specialized PTSD Programs Directory. Westhaven, Conn, Northeast Program Evaluation Center, 2009. Available at [www.nepec.mentalhealth.va.gov/PTSD](http://www.nepec.mentalhealth.va.gov/PTSD)
40. Elhai JD, Calhoun PS, Ford JD: Statistical procedures for analyzing mental health services data. *Psychiatry Research* 160:129–136, 2008
41. Cohen B, Gima K, Bertenthal D, et al: Mental health diagnoses and utilization of VA non-mental health medical services among returning Iraq and Afghanistan veterans. *Journal of General Internal Medicine* 25:18–24, 2010
42. Management of Posttraumatic Stress: VA/DoD Clinical Practice Guidelines. Washington, DC, US Department of Veterans Affairs, 2010. Available at [www.healthquality.va.gov/PTSD-FULL-2010c.pdf](http://www.healthquality.va.gov/PTSD-FULL-2010c.pdf)
43. Buxbaum PA: Telehealth services save time and money. *Military Medical/CBRN Technology* 15:36–40, 2011. Available at [www.knimediagroup.com/files/MMT\\_15-4\\_FINAL\(1\).pdf](http://www.knimediagroup.com/files/MMT_15-4_FINAL(1).pdf)
44. Calhoun PS, Bosworth HB, Grambow SC, et al: Medical service utilization by veterans seeking help for posttraumatic stress disorder. *American Journal of Psychiatry* 159:2081–2086, 2002
45. Deykin EY, Keane TM, Kaloupek D, et al: Posttraumatic stress disorder and the use of health services. *Psychosomatic Medicine* 63:835–841, 2001
46. Liu C-F, Maciejewski ML, Sales AE: Changes in characteristics of veterans using the VHA health care system between 1996 and 1999. *Health Research Policy and Systems* 2:1–7, 2005
47. Marshall RD, Turner JB, Lewis-Fernandez R, et al: Symptom patterns associated with chronic PTSD in male veterans: new findings from the National Vietnam Veterans Readjustment Study. *Journal of Nervous and Mental Disease* 194:275–278, 2006
48. West A: A ZIP Code Crosswalk for Applying Urban, Rural, and Highly Rural Classifications. Washington, DC, US Department of Veterans Affairs, Office of Rural Health, Veterans Rural Health Resource Center–Eastern Region, 2009
49. Weeks WB, Wallace AE, Wang S, et al: Rural-urban disparities in health-related quality of life within disease categories of veterans. *Journal of Rural Health* 22:204–211, 2006
50. Phillips KA, Morrison KR, Andersen R, et al: Understanding the context of health-care utilization: assessing environmental and provider-related variables in the behavioral model of utilization. *Health Services Research* 33:571–596, 1998