Prescribing Trends in Veterans With Posttraumatic Stress Disorder

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ABSTRACT

Objective: The revised Department of Veterans Affairs (VA) and Department of Defense Clinical Practice Guideline for Management of Post-Traumatic Stress recommends against long-term use of benzodiazepines to manage posttraumatic stress disorder (PTSD). An analysis of recent trends among veterans receiving care for PTSD in the VA noted a decreasing proportion receiving benzodiazepines. The authors examined prescribing patterns for other medications to better understand the general context in which the changes in benzodiazepine prescribing have occurred in the VA.

Method: Administrative VA data from fiscal years 1999 through 2009 were used to identify veterans with PTSD using *ICD-9* codes extracted from inpatient discharges and outpatient encounters. Prescribing of antidepressants, antipsychotics, and hypnotics was determined for each fiscal year using prescription drug files.

Results: The proportion of veterans receiving either of the 2 Clinical Practice Guideline–recommended first-line pharmacotherapy treatments for PTSD, selective serotonin reuptake inhibitors and serotonin-norepinephrine reuptake inhibitors, increased from 49.7% in 1999 to 58.9% in 2009. In addition to reduced benzodiazepine prescriptions, the overall frequency of antipsychotic use declined 6.1%, from 20.0% in 1999 to 13.9% in 2009. Nonbenzodiazepine hypnotic prescribing tripled when zolpidem was added to the VA national formulary in 2008. Buspirone prescribing decreased steadily, while prazosin prescribing expanded nearly 7-fold.

Conclusions: This work highlights several clinically important trends in prescribing over the past decade among veterans with PTSD that are generally consistent with the revised VA/Department of Defense Clinical Practice Guideline recommendations. However, the findings illustrate the limitations of administrative data and point to a need to supplement this work with a qualitative examination of PTSD prescribing from interviews with providers to better understand the strategies used to make medication management decisions.

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To address the critical need for appropriate management of posttraumatic stress disorder (PTSD) among veterans, the US Department of Veterans Affairs (VA) and Department of Defense (DoD) issued version 2.0 of the Clinical Practice Guideline for Management of Post-Traumatic Stress in 2010,[1] an update of the original 2004 guideline.[2] The guideline provides evidence-based psychotherapy and pharmacotherapy treatment recommendations, as well as alternative and augmentation treatment strategies that best improve outcomes in patients with PTSD (Table 1).

Both versions of the Clinical Practice Guideline caution providers against the prescribing of benzodiazepines to manage core PTSD symptoms: hyperarousal, avoidance, numbing, and reexperiencing. The little research available on benzodiazepines to treat PTSD has shown that they are not beneficial in managing the syndromal symptoms.[3,4] Additionally, there is suggestion that benzodiazepines may interfere with psychotherapy treatments that are first-line PTSD recommendations.[5] A recent randomized controlled trial noted a beneficial effect on PTSD insomnia from eszopiclone, a GABAergic drug that acts on benzodiazepine receptors.[6] Overall, there is still little support for benzodiazepines for PTSD management.

Cross-sectional psychotropic prescribing frequencies among veterans with PTSD have been previously reported, and the most commonly prescribed medications included antidepressants, sedative-hypnotics, and antipsychotics.[7] While these findings are a valuable snapshot of PTSD prescribing, longitudinal trends remain uncharacterized.

The release of the updated Clinical Practice Guideline[1] highlights the need to investigate prescribing trends among veterans with PTSD to document changes in patterns, identify gaps between recommendations and practice, and determine areas for clinical intervention. We recently conducted an analysis of benzodiazepine prescribing among veterans with PTSD and documented substantial decline in frequency from 36.7% in 1999 to 30.6% in 2009.[8] In addition, the proportion of long-term users (>90 days) decreased from 69.2% to 64.1%, and daily doses decreased approximately 15%. While these results are encouraging, benzodiazepine prescribing rates remain out of line with current VA practice guidelines[1] for veterans with PTSD.

The objective of this study was to characterize prescribing trends among veterans with PTSD over the past decade, focusing on antidepressants, antipsychotics, and hypnotics reviewed in the 2010 Clinical Practice Guideline. A secondary objective was to determine whether the decrease in benzodiazepine prescribing could be attributed to increases in potential therapeutic alternatives.

METHOD

Data Source

We obtained VA administrative pharmacy utilization data for fiscal years 1999 through 2009 from VA Pharmacy Benefits Management Services (Hines, Illinois). Outpatient encounter data and inpatient discharge data were obtained from Austin Information Technology Center (Austin, Texas). Patient-level data were linked between these

Clinical Points

- Several clinically important trends in prescribing among veterans with posttraumatic stress disorder (PTSD) are highlighted and are generally consistent with the revised VA/Department of Defense Clinical Practice Guideline recommendations for management of PTSD.
- The proportion of veterans receiving either of the 2 guideline-concordant pharmacotherapy treatments for PTSD, selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors, increased from 49.7% in 1999 to 58.9% in 2009.
- Our findings suggest that in the later years of our study period, benzodiazepine prescribing decreases tracked best with increases in prazosin use, emphasizing the need to address chronic sleep trouble in veterans with PTSD.

sources using a scrambled patient identification number. This study was approved by the University of Iowa Institutional Review Board and Iowa City Veterans Administration Research and Development Committee.

Patients

Veterans with PTSD were identified for each year on the basis of diagnostic codes extracted from inpatient and outpatient encounter data. These PTSD cohorts were used in prior work examining benzodiazepine use,[8] according to an established algorithm for identifying veterans with PTSD using VA administrative data.[7,9] Patients were considered to have PTSD during a given year if they had 1 encounter coded for PTSD as either primary or secondary diagnosis. PTSD was identified using the *International Classification of Diseases*, *Ninth Revision* (*ICD-9*) code of 309.81. The estimated rate of false-positive cases due to administrative miscoding is infrequent (< 4%) using this methodology.[10,11]

Medication Use

Outpatient prescription records were examined for all PTSD patients for each year from 1999 through 2009. Medication use for each patient was based on having at least 1 outpatient prescription fill of any quantity, days' supply, or dosage from within selected therapeutic classes. Therapeutic classes were created in accordance with the categorization scheme of the 2010 Clinical Practice Guideline[1] (Table 1). Antidepressants were grouped according to the following classes: selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), and monoamine oxidase inhibitors (MAOIs). Utilization frequencies for antidepressants not belonging to these categories, but referenced in the Clinical Practice Guideline, were examined separately; these medications included mirtazapine, nefazodone, and bupropion. Remaining antidepressants were grouped as other antidepressants and included amoxapine, maprotiline, and standard-dose trazodone (≥ 300 mg/d). Low-dose trazodone (< 300 mg/d) was assigned its own classification rather than being classified as an antidepressant, since it is generally prescribed for its sedative-hypnotic properties.[12]

Table 1. Summary of VA/DoD PTSD Clinical Practice Guideline Recommendations[a]

	Recommendation Level of Evidence[b]	
Medication Class	2004 Guideline	2010 Guideline
Antidepressants		
SSRI	A	A
SNRI	C	A
TCA	B	B
MAOI	B	B
Mirtazapine	C	B
Nefazodone	C	B
Bupropion	C	I
Antipsychotics		
Conventional	D	I
Atypical	I	B (as adjunct) I (as monotherapy)
Benzodiazepines	D	D
Nonbenzodiazepine hypnotics	I	I
Buspirone	I	I
Prazosin	C	B (sleep/nightmares) C (for global PTSD)

[a]Based on information from the 2004[2] and 2010[1] Clinical Practice Guidelines for Management of Post-Traumatic Stress.
[b]Level of evidence codes:
A: A strong recommendation that clinicians provide the intervention to eligible patients.
B: A recommendation that clinicians provide the intervention to eligible patients.
C: No recommendation for or against the routine provision of the intervention is made. Intervention may be considered.
I: Insufficient evidence to recommend for or against routinely providing the intervention.
D: A recommendation against routinely providing the intervention to asymptomatic patients.
Abbreviations: DoD = Department of Defense, MAOI = monoamine oxidase inhibitor, PTSD = posttraumatic stress disorder, SNRI = serotonin-norepinephrine reuptake inhibitor, SSRI = selective serotonin reuptake inhibitor, TCA = tricyclic antidepressant, VA = US Department of Veterans Affairs.

Antipsychotics were grouped according to conventional and atypical subclasses; atypical antipsychotics included clozapine, risperidone, olanzapine, ziprasidone, aripiprazole, paliperidone, and standard-dose quetiapine (> 300 mg/d). As was done for trazodone, the frequency of quetiapine use was stratified on the basis of prescribed daily dose. At doses greater than 300 mg/d, quetiapine was classified as an atypical antipsychotic. At prescribed daily doses ≤ 300 mg, quetiapine was categorized as its own class due to common use for nonpsychotic indications.

Benzodiazepines included any of the following: alprazolam, chlordiazepoxide, clonazepam, clorazepate, diazepam, estazolam, flurazepam, halazepam, lorazepam, oxazepam, prazepam, quazepam, temazepam, and triazolam. Nonbenzodiazepine hypnotics included zolpidem, eszopiclone, zaleplon, and ramelteon. Two remaining medications examined were prazosin and buspirone; frequency of use was reported independently for both drugs. Although not typically classified as a psychotropic agent, prazosin was

Table 2. Frequency of Medication Use Among Veterans With PTSD, 1999–2009

Drug Class	Frequency of Medication Use by Fiscal Year (no. of veterans with PTSD), %											Absolute % Change[a]
	1999 (170,685)	2000 (181,745)	2001 (197,544)	2002 (219,141)	2003 (243,767)	2004 (270,025)	2005 (317,644)	2006 (331,674)	2007 (393,815)	2008 (437,861)	2009 (498,081)	
Antidepressants[b]	68.8	70.0	71.7	73.6	73.4	73.6	72.7	72.2	71.6	71.5	71.4	2.7
SSRI or SNRI	49.7	51.8	53.9	57.3	58.7	59.8	59.4	59.0	58.8	58.7	58.9	9.3
SSRI	47.7	49.3	50.7	53.5	54.3	54.8	54.2	53.4	52.9	52.5	52.5	4.8
SNRI	3.5	4.5	5.3	6.5	7.3	7.8	8.0	8.4	8.7	8.9	9.1	5.6
TCA	17.1	14.9	13.3	12.0	10.9	10.0	9.4	8.8	8.0	7.4	7.1	−10.0
MAOI	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	−0.1
Mirtazapine	2.4	4.1	6.1	7.9	8.8	9.3	9.4	9.3	9.4	9.6	9.8	7.4
Nefazodone	12.0	11.5	10.3	7.5	4.0	2.5	1.1	0.7	0.6	0.4	0.3	−11.7
Bupropion	10.4	11.0	12.3	13.3	14.0	14.9	14.9	15.4	15.8	16.0	15.9	5.6
Other[c]	3.8	3.7	3.5	3.4	3.1	2.8	2.4	2.3	2.1	2.0	1.9	−1.9
Trazodone, low-dose	27.0	26.2	25.4	25.0	24.2	24.0	24.1	23.6	23.7	23.5	23.0	−3.9
Antipsychotics[d]	20.0	20.6	20.4	19.7	18.8	17.5	15.8	14.6	13.6	13.4	13.9	−6.1
Conventional	8.8	6.5	4.4	3.0	2.2	1.7	1.4	1.4	1.3	1.3	1.3	−7.5
Atypical	13.8	16.4	17.7	17.8	17.5	16.4	14.9	13.8	12.8	12.6	13.1	−0.7
Quetiapine, low-dose	0.7	1.9	4.0	6.9	10.2	12.3	13.2	12.8	11.8	11.3	10.4	9.7
Benzodiazepines	36.7	36.0	35.4	35.1	33.8	32.9	32.2	32.2	32.1	31.1	30.6	−6.1
Nonbenzodiazepine hypnotics	3.8	4.2	4.9	5.2	4.4	4.3	4.1	4.1	4.4	9.7	12.8	9.1
Buspirone	8.9	8.7	8.2	7.4	6.5	5.8	5.2	5.0	4.8	4.8	4.8	−4.1
Prazosin	1.4	1.4	1.6	1.7	2.6	3.7	4.7	5.4	6.3	7.5	9.1	7.7

[a]Absolute change in frequency of use from fiscal years 1999 through 2009; negative values represent decreased frequency over time.
[b]Excludes low-dose trazodone (< 300 mg/d).
[c]Includes amoxapine, maprotiline, and standard-dose trazodone (≥ 300 mg/d).
[d]Excludes low-dose quetiapine (≤ 300 mg/d).
Abbreviations: MAOI = monoamine oxidase inhibitor, PTSD = posttraumatic stress disorder, SNRI = serotonin-norepinephrine reuptake inhibitor, SSRI = selective serotonin reuptake inhibitor, TCA = tricyclic antidepressant.

considered by the Clinical Practice Guideline to have some benefit for targeting symptoms of sleep/nightmares and was thus included. Anticonvulsants were not included because they are not supported in the Clinical Practice Guideline for use as monotherapy treatment in PTSD and are considered to lack benefit.

Analysis

Annual utilization frequencies for each therapeutic class were reported for fiscal years 1999 through 2009. Overall change in medication use frequency was reported for each therapeutic class according to absolute percentage, where negative values indicated declining frequency. Because our data included the entire population of veterans receiving care within the VA, we did not use inferential statistics in this analysis. However, we discussed the clinical significance of observed changes in medication use across time and between therapeutic classes.

RESULTS

Patients

The number of veterans being treated for PTSD in the Veterans Affairs health care system increased nearly 3-fold during our time frame, from 170,685 in fiscal year 1999 to 498,081 in fiscal year 2009.[8] The proportion of veterans with PTSD that received at least 1 of the medications examined during any given year remained consistent over the 11-year study period, ranging from a minimum of 81.2% to a maximum of 83.7%.

Antidepressants

Antidepressant prescribing frequency increased from 68.8% in 1999 to a peak of 73.6% in 2004 and then slowly declined to 71.4%, yielding a net increase of 2.7% over the study period (Table 2). SSRI use increased 4.8%, and SNRI use increased 5.6%. There were also substantial increases in prescribing frequency seen with mirtazapine (7.4%) and bupropion (5.6%). In contrast, there were substantial decreases in prescribing for TCAs and nefazodone. TCAs declined by 10% from 17.1% in 1999 to 7.1% in 2009. Starting at 12.0% in 1999, nefazodone use declined to nearly zero (0.3% in 2009). The frequency of low-dose trazodone use was 27.0% in 1999 and decreased to 23.0% in 2009.

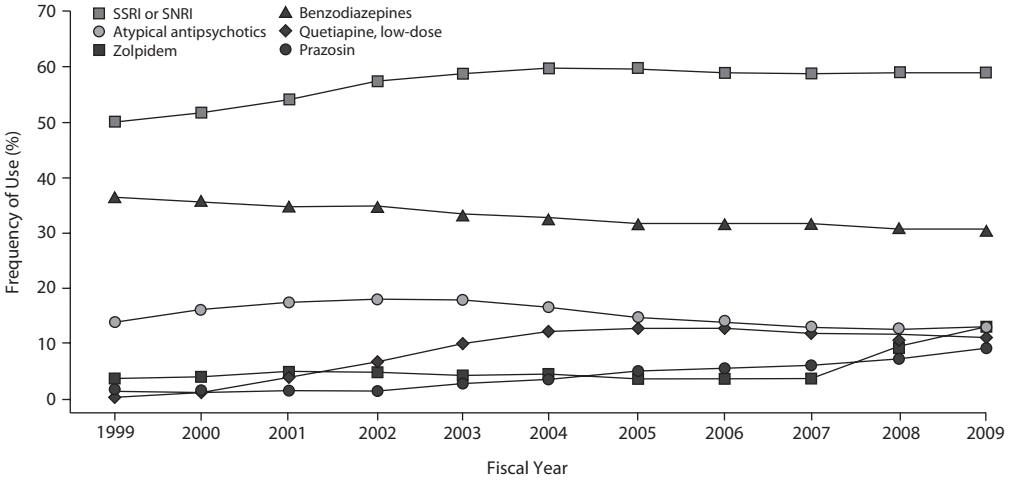
Antipsychotics

When we analyzed low-dose quetiapine separately, we found that the overall frequency of antipsychotic used declined 6.1%, from 20.0% in 1999% to 13.9% in 2009 (Table 2). Atypical antipsychotic use increased over time from 13.8% in 1999 to 17.8% in 2002, but then decreased back to 13.1% in 2009. Low-dose quetiapine use increased from 0.7% in 1999 to peak at 13.2% in 2005. Similar to the trend with other atypical antipsychotics, however, use declined thereafter to 10.4% in 2009.

Other Medications

Nonbenzodiazepine hypnotic prescribing remained stable at around 4% until zolpidem was placed on the national formulary in 2008, which resulted in a tripling of its prescribing rate within 2 years. Buspirone prescribing decreased

Figure 1. Frequency of Medication Use Among Veterans With PTSD by Drug Class and Fiscal Year



Abbreviations: PTSD = posttraumatic stress disorder, SNRI = serotonin-norepinephrine reuptake inhibitor, SSRI = selective serotonin reuptake inhibitor.

steadily from 8.9% to less than 5%, while prazosin prescribing expanded nearly 7-fold to a frequency of 9.1% in 2009.

DISCUSSION

Building on our prior benzodiazepine work,[8] the primary objective of this study was to focus on utilization and characterize other psychopharmacologic prescribing trends among veterans with PTSD (Figure 1). We observed clinically relevant changes in prescribing across nearly every therapeutic class. We observed that most veterans (80%) with an encounter coded for PTSD data received one of the selected medications recommended in the Clinical Practice Guideline in the treatment of this disorder. Importantly, the frequency of any PTSD medication use remained consistent across the study period despite a 3-fold increase in the absolute number of veterans diagnosed with PTSD. Therefore, it is unlikely that changes in approaches to diagnosis or diagnostic coding practices played a role in our findings.

There were substantial changes within the antidepressant class, reflecting a positive shift toward guideline-concordant medications. Most important to PTSD management are the SSRI and SNRI antidepressants, the only medications assigned a Level A evidence rating by the 2010 VA/DoD Clinical Practice Guideline[1] (Table 1). The use of SSRIs or SNRIs increased by 9.3%, from 49.7% in 1999 to 58.9% in 2009. To put these percentages in context and to better convey the potential clinical impact of these changes, with the increasing numbers of veterans with a PTSD diagnosis receiving care in the VA, the percentage increase actually represents more than 46,000 veterans receiving the Level A recommended medications. SSRIs comprised the majority of use, with over 50% of veterans with PTSD receiving one of these medications in each year since 2001. This finding is unsurprising since most guidelines recommend their use,[13] large clinical trial support began to emerge in 2000,[14–18] and SSRIs were the only medications with Level A evidence in the 2004 VA/DoD Clinical Practice Guideline (Table 1). SNRIs were upgraded to Level A in the updated Clinical Practice Guideline on the basis of 2008 venlafaxine research,[19] and prescribing has increased nearly 3-fold.

The use of antidepressants with Level B evidence also changed substantially over the past decade. Antidepressants assigned Level B recommendations include TCAs, MAOIs, mirtazapine, and nefazodone (Table 1). Of these, mirtazapine was the only medication to see expanded use. In contrast, both TCA prescribing and nefazodone prescribing were markedly reduced, quite likely a reflection of well-known safety concerns. Finally, MAOIs were used infrequently across the entire time period. The remaining antidepressant with considerable use was bupropion, which increased from 10.4% to 15.9% over the study period. Bupropion is an evidence-based depression treatment that has yet to be proven effective for PTSD[1] but has support for managing adults with attention-deficit/hyperactivity disorder, a common comorbidity in this population.[20,21] Bupropion uniquely carries an additional indication for smoking cessation, which may account for some of the observed increase in prescribing.[22] Trazodone is commonly prescribed in low doses as a sedative-hypnotic and specifically listed as a treatment option by the Clinical Practice Guideline when pharmacotherapy is required for insomnia management. Classified independently in our analysis, low-dose trazodone prescribing was common, but decreased slightly from 27.0% in 1999 to 23.0% in 2009, perhaps reflecting a move to other medications to manage insomnia.

Antipsychotic prescribing was also common among veterans with PTSD. It is important to note that we categorized use of quetiapine at low doses (≤ 300 mg/d) independently from other antipsychotics to reflect its use as a sedative-hypnotic.[23] Low-dose quetiapine use was extremely common in this population, accounting for 40% to 50% of all atypical antipsychotic use since 2005, and differed from use of the other antipsychotics. Given the recent finding of a 1-year

period prevalence rate of PTSD of 14.3% in participants with episodic migraine,[24] it is possible that some prescribing of quetiapine was done as a rescue medication. With low-dose quetiapine excluded, overall antipsychotic prescribing was maintained at approximately 20% from 1999 through 2002, but decreased steadily to a nadir of 13%–14% after 2007. Low-dose quetiapine followed a somewhat different trend, seeing a rapid expansion in use from 0.7% in 1999, following its market release in late 1997, and peaking at 13.2% in 2005. Like other antipsychotic categories, low-dose quetiapine use declined in recent years, down to 10.4% in 2009. It is interesting that the revised Clinical Practice Guideline upgraded the level of evidence for the atypical antipsychotics to Level B when they are used adjunctively with SSRIs, SNRIs, and other antidepressants, but because there is very little evidence favoring atypical antipsychotics as monotherapy for PTSD, such usage is rated as Level I. There is a positive monotherapy study of quetiapine versus placebo conducted with 77 combat veterans.[25] New research, however, that found adjunctive risperidone treatment for antidepressant-resistant symptoms of chronic military-service–related PTSD ineffective in a large trial may impact future atypical prescribing.[26]

Perhaps the most novel pharmacotherapy option for PTSD to emerge over the past decade is prazosin, an inexpensive α_1 blocker used to treat hypertension.[27] The 2010 Clinical Practice Guideline assigned prazosin a Level B recommendation for management of sleep/nightmares and assigned it a Level C recommendation for global PTSD symptoms because of inconsistent results from randomized clinical trials.[28] Prazosin use increased more than 6-fold, from 1.4% in 1999 to 9.1% in 2009. However, prior research demonstrated that diffusion of use of this innovative treatment was not nationally uniform and was centered in the Seattle, Washington, area, where the original studies were conducted.[9] The observed increasing rates suggest that prazosin is now being more widely prescribed to veterans with PTSD across the country.

The secondary goal of this study was to use these prescribing trends to explain our prior observation concerning decreased benzodiazepine use among veterans with PTSD. There are many potential reasons why the tendency for VA providers to prescribe benzodiazepine to veterans with PTSD has recently declined. But rather than understanding *why* benzodiazepine prescribing decreased, the focus of this study was to understand *how* benzodiazepine prescribing decreased. We wanted to identify what treatment strategies prescribers were shifting toward as alternatives to benzodiazepines. It is possible that expanded use of Clinical Practice Guideline recommendations may have led to better management of core PTSD symptoms and decreased need for agents like benzodiazepines. While overall prescribing of antidepressant medication remained relatively consistent, the use of Level A recommendation medications (SSRIs and SNRIs) increased from just fewer than 50% to nearly 60% of a much greater number of veterans with PTSD. So it is possible that expanded use of SSRI and SNRI antidepressants may have contributed to the decline in benzodiazepine prescribing.

The second proposed change in prescribing behavior was substitution in lieu of benzodiazepines for specific target symptoms, such as insomnia or anxiety. Sleep disturbances present a difficult therapeutic challenge among individuals with PTSD and can be exacerbated by first-line treatment options, particularly SSRIs and SNRIs.[23] Potential alternatives include low-dose trazodone and nonbenzodiazepine hypnotics, but prescribing trends for these medications suggested little impact. Rather than increasing, low-dose trazodone use actually decreased during the study period. Nonbenzodiazepine hypnotic use remained relatively stable until zolpidem, which is similar in properties and actions to benzodiazepines, was added to the national VA formulary and its use nearly tripled. While the impact of this rapid shift in zolpidem prescribing may warrant further study, it does not fully explain the gradual decline in benzodiazepine use over the entire study period. Other potential options for the management of sleep disturbances included prazosin and atypical antipsychotics, with low-dose quetiapine as a particular focal point.

In addition to insomnia management, these medications may have been prescribed to address other PTSD symptoms for which benzodiazepines are sometimes used, including agitation and anxiety. Atypical antipsychotic prescribing increased during the first half of the study period but then steadily decreased, to the extent that 2009 prescribing rates were slightly less than in 1999. This pattern of escalating and then declining use was also true for low-dose quetiapine. Thus, prescribing of atypical antipsychotics in general or low-dose quetiapine specifically did not seem to be an explanation for decreased benzodiazepine prescribing, at least during later years. Prazosin was also of particular interest as a benzodiazepine alternative, since it has been used for PTSD-related sleep disturbances, as well as for global PTSD symptom management. In fact, prazosin prescribing increased from 1.4% in 1999 to 9.1% in 2009. This absolute increase of 7.7% was very similar in magnitude to the 6.1% absolute decrease in benzodiazepine prescribing. However, prazosin rates did not begin to increase until 2003, whereas benzodiazepine use had already decreased during this period, from 36.7% to 33.8%. While we are unable to extract an obvious answer, our trends suggest some potential focal points. During the early half of the study period, our findings suggest that transitions from evidence Level B antidepressants to the preferred evidence Level A drugs, and in particular, the expanded use of atypical antipsychotics, were most consistent with declining benzodiazepine rates. But in later years, benzodiazepine decreases tracked best with increases in prazosin use, emphasizing the need to address chronic sleep trouble in veterans with PTSD.

There are several limitations to our findings. While we were able to describe prescribing trends among veterans *with* PTSD, we cannot know whether these agents were used *for* PTSD. Almost 80% of individuals with PTSD have at least 1 additional psychiatric disorder.[29] Although knowing precisely which medications were being prescribed for PTSD would be ideal, this information cannot be distilled from

administrative data. Even with access to medical records, it would be difficult to determine which medications were prescribed for PTSD, as individual target symptoms overlap between comorbid disorders and a single medication may be used for dual purposes. A second limitation is that we could not document changes in use of evidence-based psychotherapy options for PTSD. While some information regarding psychotherapy use can be gleaned from administrative data, the mode of psychotherapy is not coded. Selected forms of cognitive-behavior psychotherapy rank highly among the treatment options for PTSD in the Clinical Practice Guideline[2] and are now commonly available to veterans with PTSD.[30] In addition, cognitive-behavioral therapy has increasing promise in the management of insomnia,[31] and the VA is actively training providers in this modality. Thus, expanded use of high-quality, evidence-based psychotherapy for PTSD, insomnia, and other comorbidities could have contributed to declining reliance on benzodiazepine prescribing.

Our findings highlight the need for work in several areas. It was clear that many veterans with PTSD were receiving multiple medications, including 2 antidepressants at once, and cataloging the frequency of various combination strategies would be helpful. It would also be informative to examine longitudinal prescribing histories of individual patients over several years. Perhaps most important, it is essential to address comorbid diagnoses in order to determine which medications were prescribed for PTSD, for co-occurring disorders, and for both and to see if this information helps explain observed prescribing trends over time. Rates of comorbid disorders would yield more information about the sequence of potential treatment alternatives prescribers use in the face of intolerability or inadequate response and is planned for future work. These data would be particularly valuable for newly returning veterans who are early in their course of treatment. Prescribing practices in this population may differ markedly from those seen in other-era veterans with long-standing PTSD and treatments extending back for decades. Finally, the VA is a diverse national organization, and an examination of facility-level variation in PTSD prescribing frequencies, including patient-, provider-, and facility-level predictors of variation, is warranted. Our findings highlight the limitations of administrative data and the need to supplement this work with a qualitative examination of PTSD prescribing from interviews with providers. This includes a specific examination of the factors driving declines in benzodiazepine prescribing and opportunities to achieve further reduction in the use of these agents.

Drug names: alprazolam (Xanax, Niravam, and others), aripiprazole (Abilify), bupropion (Wellbutrin, Aplenzin, and others), buspirone (BuSpar and others), chlordiazepoxide (Librium and others), clonazepam (Klonopin and others), clorazepate (Gen-Xene, Tranxene, and others), clozapine (Clozaril, FazaClo, and others), diazepam (Diastat, Valium, and others), eszopiclone (Lunesta), flurazepam (Dalmane and others), lorazepam (Ativan and others), mirtazapine (Remeron and others), olanzapine (Zyprexa), paliperidone (Invega), prazosin (Minipress and others), quazepam (Doral), quetiapine (Seroquel), ramelteon (Rozerem), risperidone (Risperdal and others), temazepam (Restoril and others), trazodone (Oleptro and others), triazolam (Halcion and others), venlafaxine (Effexor and others), zaleplon (Sonata and others), ziprasidone (Geodon), zolpidem (Ambien, Edluar, and others).

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