<ATL>Predictors of PTSD Symptom Change Among Outpatients in the U.S. Department of Veterans Affairs Health Care System<zaq;4></ATL>

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<ABS>Although the U.S. Department of Veterans Affairs (VA) has prioritized care for posttraumatic stress disorder (PTSD), many patients with PTSD remain symptomatic. Patterns of PTSD symptom change are not well understood. Thus, the current study was designed to categorize and investigate potential predictors of symptom trajectories in patients with PTSD. The sample comprised 2,237 VA patients who were diagnosed with PTSD in 2013 and completed at least 4 PTSD Checklist (PCL) assessments over 12 weeks. Latent trajectory analysis was used to identify latent classes of patients based on PCL scores. Based on model fit indices, 3 trajectories were identified. Compared to patients in the mild-improving trajectory (21.9&percnt;), those in the severe-stable trajectory (34.3&percnt;) were more likely to be male, relative risk ratio (RRR) &equals; 1.48, 95&percnt; confidence interval (CI) [1.08, 2.02]; non-White, RRR &equals; 1.77, 95&percnt; CI [1.33, 2.35]; Hispanic, RRR &equals; 2.07, 95&percnt; CI [1.40, 3.04]; and have comorbid depression, RRR &equals; 1.58, 95&percnt; CI [1.25, 1.99]. Compared to patients in the moderate-improving trajectory (43.8&percnt;), those in the severe-stable trajectory were more likely to have sleep disorders, RRR &equals; 1.25, 95&percnt; CI [1.01, 1.55]. Our findings suggest that male veterans, minority veterans, and veterans with certain comorbid conditions may be less likely to achieve improved PTSD symptoms. Targeted efforts are needed to improve outcomes for PTSD patients on nonremitting trajectories and to improve the consistency of PTSD assessment across the VA health care system.</ABS>

<P>Posttraumatic stress disorder (PTSD) is a debilitating disorder that currently affects approximately 9&percnt; of the veterans who receive care from the U.S. Department of Veterans

Affairs (VA; U.S. Department of Veterans Affairs, 2012). The number of veterans seeking care for PTSD from the VA is steadily increasing (VA, 2012); accordingly, the annual cost of specialized PTSD care has risen to over $250 million (VA, 2012). Due to the high prevalence and costly nature of PTSD, optimizing care for this disorder is a priority for the VA.</P>

<P>Although several evidence-based treatments for PTSD have demonstrated efficacy in veteran populations (U.S. Department of Veterans Affairs and U.S. Department of Defense, 2010), estimates suggest that fewer than 10&percnt; of veterans receive a minimally adequate amount of any psychotherapy (Mott, Hundt, Sansgiry, Mignogna, &amp; Cully, 2014). Furthermore, 30 to 50&percnt; of veterans with PTSD who engage in trauma-focused treatment fail to respond adequately (Steenkamp, Litz, Hoge, &amp; Marmar, 2015). Data from trauma survivors suggest that individuals with similar initial severity levels may have heterogeneous responses to treatment, and that latent symptom classes may be better predictors of treatment response than baseline symptoms (Galatzer-Levy et al., 2013). Currently, however, patterns of symptom change for veterans with PTSD across the VA are not well understood, nor are the factors that predict these patterns (Schneider, Arch, &amp; Wolitzky-Taylor, 2015). Previous studies suggest that potential predictors of persistent symptoms include higher pretreatment PTSD severity (Elliott, Biddle, Hawthorne, Forbes, &amp; Creamer, 2005; Taylor, 2004; van Minnen, Arntz, &amp; Keijsers, 2002), male gender (Hamner, Robert, &amp; Frueh, 2004), minority race/ethnicity (Schumm, Walter, &amp; Chard, 2013; Walter, Varkovitzky, Owens, Lewis, &amp; Chard, 2014), younger age (Elliott et al., 2005), comorbid depression (Galatzer-Levy et al., 2013; Stein, Dickstein, Schuster, Litz, &amp; Resick, 2012), other psychiatric (Feeny, Zoellner, &amp; Foa, 2002; Tarrier, Sommerfield, Pilgrim, &amp; Faragher, 2000) and medical (Currier, Holland, &amp; Drescher, 2014; Iosifescu et al., 2003) comorbidities, as well as delays in treatment initiation (Macdonald, Monson, Doron-Lamarca, Resick, &amp; Palfai, 2011). Whereas the majority of these studies are based on secondary analyses of randomized trials, a few have examined naturalistic data at single sites (Currier et al., 2014; Schumm et al., 2013; van

Minnen et al., 2002; Walter et al., 2014), and one examined outcomes across several inpatient PTSD programs in Australia (Elliott et al., 2005). Findings from randomized treatment trials may not map onto the complex population of patients with comorbid conditions receiving care for PTSD at the VA. Furthermore, single-site studies and residential treatment studies may not generalize across the broader health care system. Thus, the current study was designed to categorize patterns of PTSD symptom change in a national sample across VA facilities and to investigate potential predictors of those symptom trajectories. Moreover, this study capitalized on VA data systems to capture "real world" outcomes. Better characterization of symptom trajectories may enable providers to improve the symptom outcomes and functioning of veterans with a high burden of illness and may help to identify those who need additional services. Based on previous reports, we hypothesized that racial/ethnic minority veterans, male veterans, and veterans with a higher burden of comorbidity would be more likely to experience less-favorable symptom trajectories.</P>

<H1>Method</H1>

<H2>Data Source</H2>

<P>The VA Corporate Data Warehouse provided data on patient demographic characteristics, mental health symptoms, and diagnoses. The Veterans Affairs Ann Arbor Healthcare System Institutional Review Board approved this study and granted a waiver of informed consent for access to protected health information.</P>

<H2>Participants</H2>

<P>The sample consisted of 2,237 patients who received a new PTSD diagnosis in fiscal year 2013 (after at least 180 days without a diagnosis of PTSD) and completed at least four (and up to six) PTSD Checklist assessments (PCL; Weathers, Huska, &amp; Keane, 1991) over 12 weeks. The first PCL was required to be completed within 1 year of initial diagnosis. Each patient contributed to the model one PCL assessment per 14-day window following the initial assessment. A 14-day window

was chosen to capture the typical weekly or biweekly frequency at which psychotherapy is delivered, given that the PCL is most often administered during the course of mental health treatment (Maguen et al., 2014). For patients who completed more than one PCL per 14-day window, only the first PCL for that 14-day window was included. To identify new episodes of care, the analysis only included patients who had a 180-day dormant period without a diagnosis of PTSD prior to their index diagnosis. We also limited our analysis to the 41 (out of 141) facilities where at least 5&percnt; of PTSD-diagnosed patients met the above criteria for regular assessment (at least four PCLs in 12 weeks).</P>

<H2>Outcome Measure</H2>

<P>PTSD symptoms were measured using the PCL (Weathers et al., 1991), a 17-item self-report measure of PTSD symptoms based on criteria according to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., *DSM-IV*; American Psychiatric Association, 1994). Scores range from 17 to 85. A score of 50 or above has often been used to indicate a high probability of a clinical diagnosis of PTSD (Weathers, Litz, Herman, Huska, &amp; Keane, 1993). Scores were included from the PCL-civilian, the PCL-military, and the PCL-specific versions. The PCL has excellent psychometric properties, including high internal consistency, good test–retest reliability, and strong convergent and divergent validity (Blanchard, Jones-Alexander, Buckley, &amp; Forneris, 1996; Ruggiero, Del Ben, Scotti, &amp; Rabalais, 2003). Since 2010, PCL administration has been mandated upon initial contact with patients who have a PTSD diagnosis and are seeking mental health treatment (Harpaz-Rotem, Tsai, Pietrzak, &amp; Hoff, 2014).</P>

<H2>Demographic Characteristics and Measures of Service Utilization</H2>

<P>Measures of demographic characteristics included sex, age (&lt; 35, 35&ndash;64, &ge; 65 years), race (White, non-White, unknown/missing), ethnicity (Hispanic/Latino, non-Hispanic/Latino), and marital status (married, not married). We then counted the number of outpatient

mental health encounters in the past year (denoted by standardized codes in the electronic medical record), the time from initial PTSD diagnosis until first PCL administration, and the number of psychotherapy visits during the 12-week trajectory period. We also calculated average initial and final scores for each trajectory.</P>

<H2>Psychiatric and Medical Comorbidities</H2>

<P>Past-year psychiatric comorbidities were identified using International Classification of Diseases, 9th Edition, Clinical Management (ICD-9-CM<zaq;2>) data in primary or secondary positions from inpatient and ambulatory care visits for the following disorders: unipolar depressive disorders, bipolar or psychotic disorders, alcohol or substance use disorders, and other anxiety disorders. The medical comorbidities of interest included sleep disorders and traumatic brain injury. We also calculated each individual's Elixhauser comorbidity score, an index that classifies comorbidity according to severity (van Walraven, Austin, Jennings, Quan, &amp; Forster, 2009). Following Zivin and colleagues (2013), due the high rate of comorbidity between PTSD and depression, we excluded from the Elixhauser calculation all ICD-9 codes associated with depression (300.4, 301.12, 309.0, 309.1, and 311).</P>

<H2>Data Analysis</H2>

<P>Analyses were conducted in two phases. First, latent trajectory analysis was used to identify latent groups of patients based on their PCL scores over the course of the 12 weeks following initial assessment. Latent trajectory analysis is a method that identifies clusters of individuals following a similar progression of an outcome over time (Nagin &amp; Odgers, 2010). This method assumes that the population is composed of a finite mixture of distinct groups defined by their developmental trajectories (Nagin &amp; Odgers, 2010). Analyses were conducted using PROC TRAJ in SAS version 9.2 (SAS Institute, 2009<zaq;3>) using maximum likelihood estimation. The outcome variable for the trajectory analysis was the PCL score, and the independent variable was time

in weeks. A censored normal (CNORM) distribution was used to fit the continuous data provided by the PCL scores. Both linear and quadratic terms were estimated during model fitting, following Nagin (2005), and up to six classes were specified. Fit indices, entropy (average posterior probability), interpretability of classes, and comparability to prior studies were used to determine the number of trajectories in the final model. Invariance testing was used to compare the slopes of the trajectories. Patients were assigned to the trajectory to which they had the highest posterior probability of membership.</P>

<P>Second, bivariate analyses (Wilcoxon-Mann-Whitney and &khgr;<SUP>2</SUP> tests) were used to examine the relationship between trajectory membership and demographic characteristics, psychiatric comorbidities, and medical comorbidities. There were 15 individuals in the final sample who were missing data on marital status. No other variables were missing. Multinomial logistic regression was then used to model relationships between the covariates that were significant in bivariate analyses and the group membership variable. For the primary analysis, the least severe symptom trajectory was used as the reference group. Relative risk ratios (RRRs) with 95&percnt; confidence intervals (CIs) were used to compare covariates between the groups.</P>

<H1>Results</H1>

<P>The final sample consisted of 10,505 PCL measurements from 2,237 patients (see Figure 1{FIG1} for a flow diagram of sample selection). These patients were drawn from 41 facilities meeting our criteria of regular assessment for at least 5&percnt; of patients (mean compliance &equals; 9.2&percnt;; range &equals; 5.0&percnt; to 23.1&percnt;). The remaining 100 facilities (treating 265,516 patients) were excluded from the analysis because fewer than 5&percnt; of patients at these facilities received regular assessments. Demographic characteristics of the final sample and of the broader population of PTSD-diagnosed patients are presented in Table 1{TBL 1}. Compared to the broader population of PTSD-diagnosed VA patients, the selected sample was more likely to be

non-White and Hispanic and to have comorbid anxiety or a comorbid sleep disorder. They were less likely to be over the age of 65, male, or have comorbid bipolar disorder. They had slightly less medical comorbidity and more mental health visits in the past year. The goodness-of-fit indices for the 1- to 6-group models are presented in Table 2{TBL 2}. Based on fit indices, parsimony, interpretability of classes, and comparability to prior studies, a 3-group model was judged to be the optimal solution. Although model fit statistics were marginally superior for the 4-group model as compared to the 3-group model, the 3-group model exhibited higher entropy, was most interpretable, and provided the best comparison to previous studies. Furthermore, a visual inspection of the models with larger numbers of groups suggested that these models did not provide additional trajectories that were qualitatively different from those of the 3-group model. The three trajectories of patients were classified as follows: mild-improving (Group 1; comprising 21.8&percnt; of the sample), moderate-improving (Group 2; 43.8&percnt;), and severe-stable (Group 3; 34.3&percnt;; see Figure 2{FIG2}). The final model included linear and quadratic effects (see Supplementary Table 1). The slope of the mild-improving trajectory (Group 1) was significantly greater than the slope of the moderate-improving trajectory (Group 2), which in turn was significantly greater than the slope of the severe-stable trajectory (Group 3; all $p$ &lt; .001). The average posterior probability was .94 for patients assigned to Group 1, .92 for patients assigned to Group 2, and .94 for patients assigned to Group 3.</P>

<H2>Bivariate Results</H2>

<P>Bivariate results are presented in Table 3{TBL 3}. There was a significant difference by age group such that patients aged 35&ndash;64 were more likely to be members of the severe-stable trajectory. Race and ethnicity also varied by group; namely, non-White and Hispanic/Latino patients were more likely to be in the severe-stable trajectory. Patients with comorbid depression or comorbid sleep disorders were more likely to be in the severe-stable trajectory. The time from initial diagnosis to initial PCL was greater in the severe-stable trajectory. There was a significant group difference by

the PCL score change; the average PCL score decreased by 16.23 points in the mild-improving trajectory, 8.35 points in the moderate-improving trajectory, and 2.06 points in the severe-stable trajectory. There were 61&percnt; of patients (81.9&percnt; of the mild-improving trajectory, 66.8&percnt; of the moderate-improving trajectory, and 40.4&percnt; of the severe-stable trajectory) who exhibited a PCL score reduction of 10 points or more from the first assessment to the last assessment (not shown in the table).</P>

<H2>Multinomial Regression Results</H2>

<P>Results that were significant in the adjusted multinomial regression model are presented in Table 4{TBL 4}. Compared to patients in the mild-improving trajectory (Group 1), those in the severe-stable trajectory (Group 3) were more likely to be male. Patients in the moderate-improving (Group 2) and severe-stable (Group 3) trajectories were more likely to be non-White, Hispanic, and have comorbid depression. As a supplementary analysis, we changed the reference group to be the moderate-improving trajectory so that we could directly compare the severe-stable group to the moderate-improving trajectory. Compared to patients in the moderate-improving trajectory, patients in the severe-stable trajectory were more likely to have a sleep disorder.</P>

<H1>Discussion</H1>

<P>We analyzed trajectories of PTSD symptom change among 2,237 VA patients with a new PTSD diagnosis in fiscal year 2013. Based on model fit indices, three distinct symptom trajectories were identified: mild-improving (21.9&percnt;), moderate-improving (43.8&percnt;), and severe-stable (34.3&percnt;). These results are consistent with four previous investigations, all of which have identified three trajectories of PTSD symptoms over time (Currier et al., 2014; Elliott et al., 2005; Galatzer-Levy et al., 2013; Schumm et al., 2013). Predictors of membership in the severe-stable trajectory as compared to the mild-improving trajectory included male gender, non-White race, Hispanic ethnicity, and depression. These results suggest that veterans with PTSD experience

different patterns of symptom change and that these patterns may be predicted by sociodemographic characteristics. However, the extremely small percentage of VA patients who had adequate data for this analysis (0.6&percnt; of VA patients with a new PTSD diagnosis in 2013) suggests that more regular assessments in the VA are needed. A move toward measurement-based care may help improve individual treatment delivery and quality measurement efforts across the system (Trivedi et al., 2004).</P>

<P>Our first notable finding was that greater severity at the initial visit was associated with greater severity at the final visit. Previous research suggests that higher pretreatment PTSD severity is associated with higher posttreatment severity (Currier et al., 2014; Elliott et al., 2005; Hamner et al., 2004; Taylor, 2004; van Minnen et al., 2002). In this dataset, 61&percnt; of the patients (81.9&percnt; of the mild-improving trajectory; 66.8&percnt; of the moderate-improving trajectory; and 40.4&percnt; of the severe-stable trajectory) exhibited clinically significant reductions in PTSD symptoms, as defined by a PCL score reduction of at least 10 points (see Monson et al., 2008). Targeted efforts are needed to improve outcomes for the patients who do not experience such improvement. Although the number of mental health visits during the 12-week trajectory period was not associated with trajectory membership, the overall low number of average psychotherapy sessions received (*M* &equals; five visits) suggests that greater efforts are needed to provide minimally adequate doses of psychotherapy to VA patients with PTSD.</P>

<P>In our sample, male patients were more likely to be on the severe-stable trajectory than on the mild-improving trajectory. Previous findings suggest that men experience less improvement than do women over the course of residential PTSD treatment (Walter et al., 2014). Furthermore, a nationwide study of all veterans of the U.S. military conflicts in Iraq and Afghanistan with a PTSD diagnosis treated in the VA system from 2007&ndash;2011 found that male patients were less likely than female patients to be remitted one year after the PTSD diagnosis (Maguen et al., 2014). However, this study combined data from the PCL with data from a brief screener for PTSD, the

Primary Care PTSD Screen (Prins et al., 2003), which may have lower sensitivity to change. Our results extend these findings by demonstrating that, across eras and over the course of four assessments, male gender predicted less reduction in PTSD symptoms. Female service members experience greater rates of military sexual trauma than male service members (Barth et al., 2016); thus, trauma type and subsequently the degree of PTSD symptoms may vary by gender. Further research is needed to determine whether male VA patients respond differently to PTSD treatment than female VA patients.</P>

<P>In addition to gender differences, we also found that Hispanic and non-White veterans were more likely to be in the moderate-improving and severe-stable trajectories than on the mild-improving trajectory. Recent reports indicate that African American and Latino veterans are less likely to receive a minimal trial of pharmacotherapy for PTSD in the VA system (Spoont et al., 2015). Furthermore, African American veterans are less likely to receive a minimal trial of any PTSD treatment, even after controlling for factors related to access (Spoont et al., 2015). In terms of treatment response, one study demonstrated that Black veterans of the military conflicts in Iraq and Afghanistan were less likely to remit over the course of one year (Maguen et al., 2014), and two studies found that non-White ethnicity predicted poorer response to cognitive processing therapy (CPT; Schumm et al., 2013; Walter et al., 2014). Similar to the current study, Schumm and colleagues (2013) found that non-White veterans were more likely to be in a severe symptom trajectory than a mild symptom trajectory over time. However, another study found that CPT effects did not differ by race (Alvarez et al., 2011), and one study reported that African American veterans undergoing prolonged exposure therapy demonstrated a greater improvement of PTSD symptoms than veterans of other races (Jeffreys et al., 2014). Therefore, further research is needed to determine ways to improve engagement and retention in PTSD services and potentially increase treatment efficacy for minority veterans.</P>

<P>In terms of psychiatric comorbidity, we found that the presence of comorbid depression predicted membership in the severe-stable trajectory. Depression symptoms predicted membership in the moderate or severe trajectories as compared to the mild trajectory in four previous latent growth models of PTSD symptoms (Elliott et al., 2005; Galatzer-Levy et al., 2013; Schumm et al., 2013; Stein et al., 2012). However, the association between higher PCL score and greater illness burden may reflect a measurement issue; namely, that the PCL is tapping into generalized distress rather than specific aspects of PTSD (Arbisi et al., 2012). Using a combination of standardized assessment instruments may provide more insight into the association between comorbid depression and the course of PTSD.</P>

<P>Finally, we found that comorbid sleep disorders were associated with membership in the severe-stable trajectory as compared to the moderate-improving trajectory. This finding is consistent with growing evidence that PTSD and sleep disorders exhibit significant overlap and may exacerbate each other. For example, veterans with PTSD and obstructive sleep apnea report worse quality of life than those with PTSD alone (Lettieri, Williams, &amp; Collen, 2016) and in veterans with TBI and PTSD, the presence of insomnia is associated with greater PTSD severity (Lang, Veazey-Morris, &amp; Andrasik, 2014). In a study of 659 soldiers returning from deployment in Iraq, greater insomnia at 4 months postdeployment was a significant predictor of increased PTSD symptoms at 12 months postdeployment (Wright et al., 2011). Furthermore, accumulating evidence suggests that poor sleep may reduce the efficacy of evidence-based psychotherapy for PTSD (Gilbert, Kark, Gehrman, &amp; Bogdanova, 2015). Conversely, treating obstructive sleep apnea with medical interventions (such as continuous positive airway pressure) reduces symptoms of PTSD (Krakow et al., 2000; Tamanna, Parker, Lyons, &amp; Ullah, 2014). Thus, sleep disorders are an important area of assessment for veterans receiving PTSD treatment and may be associated with PTSD treatment response as well as PTSD severity. No other clinical variables in our sample were associated with trajectory membership. Few studies have examined the association between psychiatric comorbidity

and PTSD treatment response, although one study reported that baseline alcohol use was associated with poorer response to inpatient PTSD treatment (Elliott et al., 2005). Further work in broad, naturalistic samples is needed to better understand how psychiatric comorbidity may influence PTSD treatment response.</P>

<P>Our findings should be interpreted within the context of several limitations. First, we only included individuals who received regular PCL assessments, and we further limited our analysis to individuals at the 41 facilities where at least 5&percnt; of PTSD-diagnosed patients received regular assessment. These 41 facilities treated 32.4&percnt; of VA patients with a PTSD diagnosis in 2013. Our final sample consisted of 0.6&percnt; of VA patients who received a new PTSD diagnosis in 2013. Thus, our results represent only a very small portion of individuals with PTSD seen by the VA. Our analyses resulted in findings that were more representative of the patients at the selected facilities. Nonetheless, patients in the final sample differed slightly from the overall PTSD patient population with respect to sociodemographic characteristics of interest; thus, the exact percentage of patients in each trajectory should be interpreted with caution. Second, we were unable to account for potential clustering by facility in this study. Future research may benefit by incorporation of facility and facility-level information in analyses. Third, by assigning patients to their most likely class, the uncertainty of classification was not accounted for. Fourth, our sample was not necessarily treatment seeking; thus, we were unable to determine whether the modeled trajectories represented a response to treatment or rather the naturalistic course of the disorder. Many patients are not actively engaged in mental health treatment at any given time; hence, some participants might not have been engaged in treatment during the 12-week assessment window. Unfortunately, given the nature of administrative data, we were unable to determine the type of psychotherapy received by different groups. Future work might use natural language processing of progress note text to specifically identify psychotherapy types as potential predictors of response. Nonetheless, all patients in the sample were receiving VA health care services. Finally, our sample was not necessarily receiving evidence-based

treatment for PTSD. Although the availability of evidence-based treatment is mandated, recent work has shown that a majority of the psychotherapy provided for PTSD in the VA is not evidence-based treatment (Finley et al., 2015; Shiner et al., 2013). For example, a recent national survey of 128 PTSD clinic therapists revealed that the therapists provided significantly more supportive care than evidence-based treatment (Finley et al., 2015). Future work using data captured by the new prolonged exposure therapy and CPT templates available in the electronic health record will enable a more accurate assessment of whether treatment is evidence-based.</P>

<P>In conclusion, this is the first national study to examine trajectories of PTSD symptoms among those receiving VA services, and we identified three distinct patterns of symptom change in VA patients with PTSD over the course of 12 weeks. The severe-stable trajectory included a greater proportion of minority veterans and veterans with comorbid depression and sleep disorders. The exploration of the biopsychosocial factors associated with PTSD symptom trajectories could identify novel predictors compared to traditional methods that consider treatment response as a dichotomous outcome or as occurring at a discrete time point.  Moreover, identifying predictors of trajectory membership will allow the future construction of classification models to help predict treatment response from preexisting variables. However, the small percentage of veterans with available data underscores the need for the systematic collection of PTSD symptom measures. Reliable assessment will help improve the monitoring of outcomes on a national scale and improve the quality of care that is offered to our nation's veterans.</P>

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{FIG1}<LEG>*Figure 1*. Sample selection flow diagram.</LEG>

```
┌─────────────────────────────────┐
│   VA patients with a new PTSD    │
│  diagnosis in 2013 (N = 392,726) │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│  VA patients with PTSD and at least │
│   1 PCL assessment (n = 66,587)  │
│                                  │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│  VA patients with at least 4 PCLs in │
│      12 weeks (n = 3,260)        │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│  Patients with at least 4 PCLs in 12 │
│   weeks, within the 41 facilities │
│    administering PCLs regularly  │
│          (n = 2,237)             │
└─────────────────────────────────┘
```
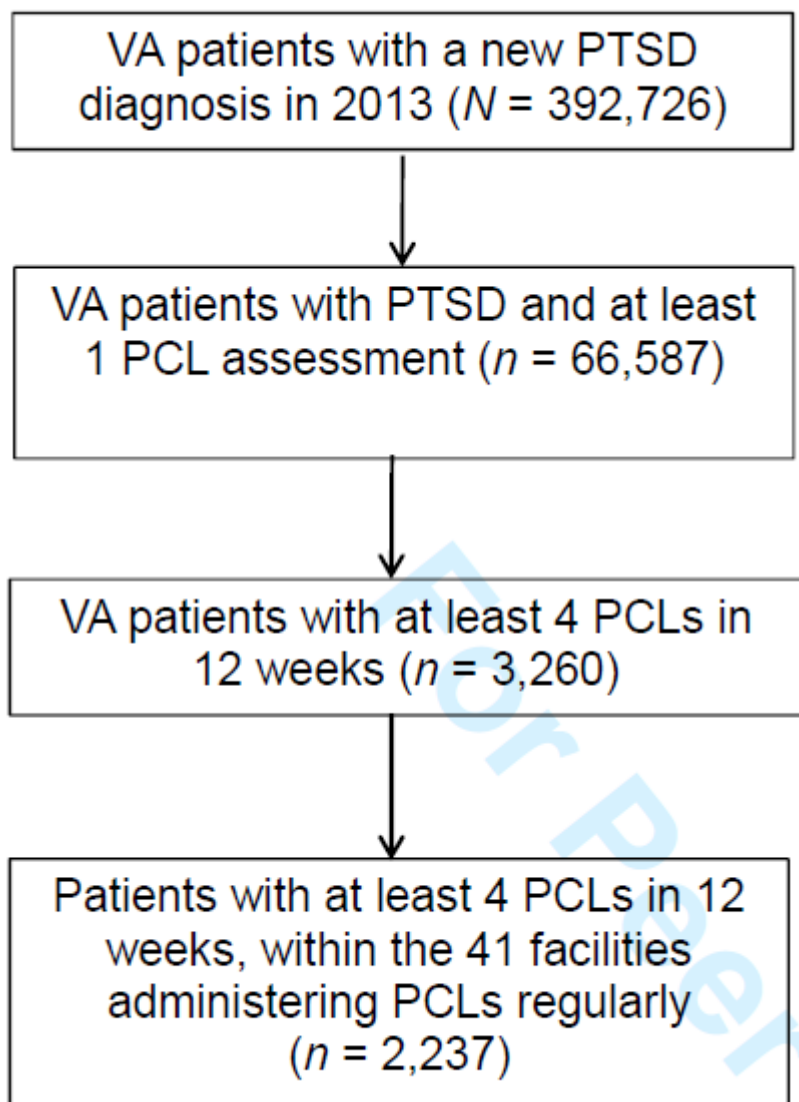
{FIG2}<LEG>*Figure 2.* Latent trajectories of PTSD Checklist scores over time in outpatients with posttraumatic stress disorder (*n* = 2,237) receiving Veterans Affairs health care services. Dashed lines represent trajectories based on estimated means. Solid lines represent trajectories based on actual means in the sample.</LEG>

PTSD Checklist (PCL) scores over time

Group 1: Mild-improving    Group 2: Moderate-improving    Group 3: Severe-stable
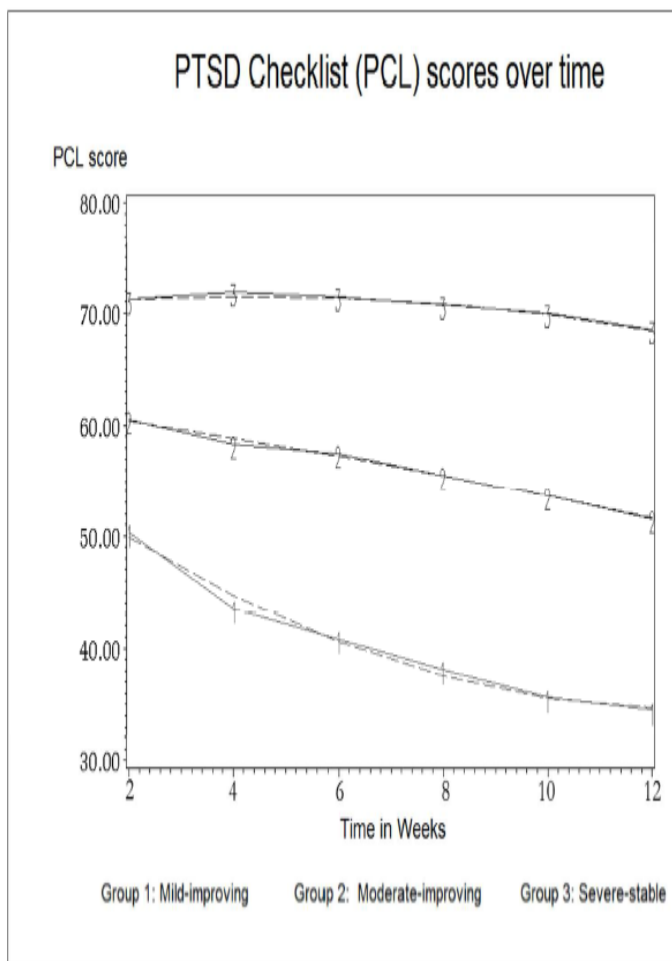
<<enote>>AQ1:  AU: Should this be "The study was funded ..."?

<<enote>>AQ2:  AU: Please provide a reference for the ICD-9-CM

<<enote>>AQ3:  AU: Please include the SAS, 2009 ref in the Reference List

<<enote>>AQ4:  AU/ED: Change in title OK?

Table 1. Characteristics of All VA Patients With a PTSD Diagnosis in 2013 and in the Final Sample

| | All VA patients with PTSD ($n$ = 390,457) | Final sample ($n$ = 2,237) | | | |
|---|---|---|---|---|---|
| Characteristic | $n$ or $M$ | % or $SD$ | $n$ or $M$ | % or $SD$ | $\chi^2$/$Z$ |

| | | | | | |
|---|---|---|---|---|---|
| Age | | | | | 360.14*** |
| < 35 years | 82,042 | 21.0 | 720 | 32.2 | |
| 35–64 years | 186,205 | 47.7 | 1,202 | 53.7 | |
| 65+ years | 122,210 | 31.3 | 315 | 14.1 | |
| Male gender | 355,535 | 91.1 | 1,851 | 82.7 | 187.29*** |
| Race | | | | | 17.24*** |
| Non-White | 92,741 | 23.8 | 615 | 27.5 | |
| Unknown | 29,966 | 7.7 | 166 | 7.4 | |
| Hispanic/Latino ethnicity | 28,083 | 7.2 | 265 | 11.9 | 71.95*** |
| Married | 210,376 | 53.9 | 1,196 | 53.5 | 4.57 |
| Comorbid depression | 185,779 | 47.6 | 1,278 | 57.1 | 81.40*** |
| Comorbid bipolar disorder or psychosis | 29,760 | 7.6 | 107 | 4.8 | 25.50*** |
| Comorbid substance use disorder | 79,315 | 20.3 | 478 | 21.4 | 1.53 |
| Comorbid anxiety disorder | 80,831 | 20.7 | 788 | 35.2 | 285.07*** |
| Comorbid sleep disorder | 88,885 | 22.8 | 568 | 25.4 | 8.74** |
| Traumatic brain injury | 8,494 | 2.2 | 61 | 2.7 | 3.18 |
| Medical comorbidity (Elixhauser score) | 0.89 | 5.11 | −0.12 | 3.79 | −8.99*** |
| Total mental health visits in past year | 4.03 | 10.37 | 6.09 | 13.01 | 15.33*** |

<TFN>Note. VA = U.S. Department of Veterans Affairs; PTSD = posttraumatic stress disorder. *$p < .05$. **$p < .01$. ***$p < .001$

Table 2. Trajectory Fit Statistics

| Number of trajectories | BIC | SSBIC | AIC | L | Entropy |
|---|---|---|---|---|---|
| 1 | −42455.55 | −42452.46 | −42441.03 | −42437.03 | 1.00 |
| 2 | −39910.38 | −39904.2 | −39881.34 | −39873.34 | .96 |
| 3 | −38984.31 | −38975.03 | −38940.75 | −38928.75 | .93 |
| 4 | −38635.96 | −38623.59 | −38577.89 | −38561.89 | .90 |
| 5 | −38517.84 | −38502.37 | −38445.24 | −38425.24 | .86 |
| 6 | −38351.37 | −38332.81 | −38264.25 | −38240.25 | .85 |

Table 3. Patient Characteristics by Trajectory Membership

| | Group 1 Mild-improving | Group 2 Moderate–improving | Group 3 Severe-stable | | | | |
|---|---|---|---|---|---|---|---|
| Characteristic | *n* or *M* | % or *SD* | *n* or *M* | % or *SD* | *n* or *M* | % or *SD* | $\chi^2/Z$ |
| Age | | | | | | | 17.03** |
| < 35 years | 167 | 34.3 | 323 | 32.7 | 230 | 30.1 | |
| 35–64 years | 233 | 47.8 | 523 | 53.0 | 446 | 58.5 | |
| 65+ years | 87 | 17.9 | 141 | 14.3 | 87 | 11.4 | |
| Male Gender | 397 | 81.5 | 811 | 82.2 | 643 | 84.3 | 1.99 |
| Race | | | | | | | 17.47** |
| Non-White | 102 | 20.9 | 273 | 27.7 | 240 | 31.5 | |
| Unknown | 35 | 7.2 | 78 | 7.9 | 53 | 7.0 | |
| Hispanic/Latino ethnicity | 41 | 8.4 | 116 | 11.8 | 108 | 14.2 | 9.38** |
| Married | 264 | 54.2 | 508 | 51.5 | 424 | 55.6 | 3.40 |
| Comorbid depression | 238 | 48.9 | 576 | 58.4 | 464 | 60.8 | 18.40*** |
| Comorbid psychosis | 20 | 4.1 | 39 | 4.0 | 48 | 6.3 | 5.80 |
| Comorbid substance use | 94 | 19.3 | 215 | 21.8 | 169 | 22.2 | 1.62 |
| Comorbid anxiety disorder | 179 | 36.8 | 334 | 33.8 | 275 | 36.0 | 1.55 |
| Comorbid sleep disorder | 109 | 22.4 | 237 | 24.0 | 222 | 29.1 | 8.85* |
| Traumatic brain injury | 13 | 2.7 | 29 | 2.9 | 19 | 2.5 | 0.33 |
| Elixhauser score | 0.12 | 3.60 | −0.08 | 3.82 | −0.33 | 3.86 | 5.77 |
| Mental health visits in past year | 5.95 | 13.80 | 6.28 | 13.54 | 5.93 | 11.75 | 1.15 |
| Psychotherapy visits during 12-week trajectory period | 4.51 | 8.27 | 4.93 | 8.89 | 5.05 | 8.75 | 4.05 |
| Time to PCL | 112.30 | 101.44 | 110.61 | 101.36 | 122.14 | 103.23 | 6.70* |

| | | | | | | |
|---|---|---|---|---|---|---|
| Initial PCL score | 50.18 | 10.33 | 60.43 | 8.57 | 71.41 | 7.21 | 1058.22*** |
| Final PCL score | 33.95 | 8.71 | 52.08 | 8.93 | 69.35 | 7.84 | 1594.99*** |

*Note.* PCL = PTSD Checklist. *p* < .05.  **p* < .01. ****p* < .001.

Table 4. Summary of Adjusted Multinomial Regression Results Predicting Trajectory Membership

| | Group 2 (44.1%) | Group 3 (34.1%) | | | | |
|---|---|---|---|---|---|---|
| | Moderate-improving | Severe-stable | | | | |
| | Reference: Group 1 | Reference: Group 1 | Reference: Group 2 | | | |
| Characteristic | RRR | 95% CI | RRR | 95% CI | RRR | 95% CI |
| Gender (male vs. female) | 1.21 | [0.90, 1.62] | 1.48 | [1.08, 2.02]* | 1.22 | [0.94, 1.59] |
| Race (non-White vs. White) | 1.51 | [1.15, 1.98]** | 1.77 | [1.33, 2.35]*** | 1.17 | [0.94, 1.47] |
| Ethnicity (Hispanic vs. not) | 1.58 | [1.08, 2.30]* | 2.07 | [1.40, 3.04]*** | 1.31 | [0.98, 1.75] |
| Depression (yes vs. no) | 1.45 | [1.16, 1.81]** | 1.58 | [1.25, 1.99]*** | 1.09 | [0.89, 1.32] |
| Sleep disorder (yes vs. no) | 1.02 | [0.79, 1.33] | 1.28 | [0.99, 1.68] | 1.25 | [1.01, 1.55]* |

*Note.* CI = confidence interval; RRR = relative risk ratio. *p* < .05 **p* < .01 ****p* < .001.