Longitudinal Assessment of Mental Health Problems Among Active and Reserve Component Soldiers Returning From the Iraq War

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Context To promote early identification of mental health problems among combat veterans, the Department of Defense initiated population-wide screening at 2 time points, immediately on return from deployment and 3 to 6 months later. A previous article focusing only on the initial screening is likely to have underestimated the mental health burden.

Objective To measure the mental health needs among soldiers returning from Iraq and the association of screening with mental health care utilization.

Design, Setting, and Participants Population-based, longitudinal descriptive study of the initial large cohort of 88,235 US soldiers returning from Iraq who completed both a Post-Deployment Health Assessment (PDHA) and a Post-Deployment Health Re-Assessment (PDHRA) with a median of 6 months between the 2 assessments.

Main Outcome Measures Screening positive for posttraumatic stress disorder (PTSD), major depression, alcohol misuse, or other mental health problems; referral and use of mental health services.

Results Soldiers reported more mental health concerns and were referred at significantly higher rates from the PDHRA than from the PDHA. Based on the combined screening, clinicians identified 20.3% of active and 42.4% of reserve component soldiers as requiring mental health treatment. Concerns about interpersonal conflict increased 4-fold. Soldiers frequently reported alcohol concerns, yet very few were referred to alcohol treatment. Most soldiers who used mental health services had not been referred, even though the majority accessed care within 30 days following the screening. Although soldiers were much more likely to report PTSD symptoms on the PDHRA than on the PDHA, 49% to 59% of those who had PTSD symptoms identified on the PDHA improved by the time they took the PDHRA. There was no direct relationship of referral or treatment with symptom improvement.

Conclusions Rescreening soldiers several months after their return from Iraq identified a large cohort missed on initial screening. The large clinical burden recently reported among veterans presenting to Veterans Affairs facilities seems to exist within months of returning home, highlighting the need to enhance military mental health care during this period. Increased relationship problems underscore shortcomings in services for family members. Reserve component soldiers who had returned to civilian status were referred at higher rates on the PDHRA, which could reflect their concerns about their ongoing health coverage. Lack of confidentiality may deter soldiers with alcohol problems from accessing treatment. In the context of an overburdened system of care, the effectiveness of population mental health screening was difficult to ascertain.

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gests, are there differences in health concerns between soldiers still on active duty (active component) and reserve component veterans (National Guard and Army Reserve) who have returned to civilian life? (3) Are soldiers endorsing and being referred for alcohol problems? (4) What percentage of soldiers referred for mental health problems get care? (5) What percentage who indicate mental health problems on the PDHA improve by the time of the PDHRA, and is improvement associated with referral and receiving care?

**METHODS**

**Source of Data**

The PDHRA is very similar to the PDHA previously described. Soldiers complete a self-report questionnaire and then undergo a brief interview with a primary care physician, physician assistant, or nurse practitioner.

The soldier's portion of the form includes demographic, general health, physical symptoms, and mental health items that may be deployment related. The clinician reviews the answers, asks standardized questions pertaining to aggression and suicide, conducts a brief interview, discusses options for care, and annotates any referrals. Clinicians are directed to use clinical judgment in determining who needs referral rather than relying on cutoff criteria that may not have sufficient predictive validity at a population level. Both the PDHA and PDHRA (DoD forms DD2796 and DD2900, respectively) become part of the soldier's permanent medical record, and an electronic copy is integrated into the Defense Medical Surveillance System (DMSS) database. For active component soldiers, all health care that they receive in military treatment facilities is reported to DMSS including clinic type and diagnoses. The DMSS is the source of data for this study.

**Study Population**

Between June 1, 2005, and December 31, 2006, 118,484 PDHRA forms were completed by Army soldiers and 12,686 by Marines from any deployment. Marine records were excluded because the PDHRA had not been widely implemented among Marine units during the study period and may not be representative.1 The 118,484 Army forms included forms from 100,881 soldiers who had served in the Iraq war, 16,298 forms from soldiers who had deployed to other locations, 1302 duplicate records, and 3 who had no date of departure from theater recorded. Post-Deployment Health Re-Assessment forms from the 100,881 individuals who served in the Iraq war were matched to their respective PDHA forms. A total of 88,235 soldiers were identified who had completed both forms from the same deployment. This difference resulted from not having a record of a prior PDHA or uncertainty about whether the 2 forms were from the same deployment (defined as the departure date on the PDHRA matching within 2 months of the departure date on the PDHA). The soldiers completed the PDHRA a median of 6 (interquartile range [IQR], 4-10) months after return home. Active component soldiers were followed up for 90 days after PDHA and PDHRA completion to determine their health care use; these data were not available for National Guard and Army Reserve soldiers.

**Survey and Outcome Measures**

Analysis of the PDHA and PDHRA were performed as closely as possible to that described for the PDHA in our previous article. Both assessments include a 2-item depression instrument from the Patient Health Questionnaire (PHQ) and the Primary Care 4-item posttraumatic stress disorder screen (PC-PTSD). A question on suicidal ideation from the PHQ and a question on interpersonal aggressive ideation were included on the self-administered section of the PDHA and on the clinician section of the PDHRA. The aggression question asks if the soldier is “having thoughts or concerns that you might hurt or lose control with someone.” Interpersonal conflict is measured with 1 question on the PDHA that asks if the soldier is “having thoughts or concerns that you may have serious conflicts with your spouse, family members, or close friends.” On the PDHRA, the wording of this question is, “Since return from deployment have you had serious conflicts with your spouse, family members, close friends, or at work that continue to cause you worry or concern?” Soldiers were considered to be at mental health risk if they screened positive for any of these above domains. Interpersonal aggression and conflict were included in this category of mental health risk both to maintain continuity with our previous report and because rates of referral for these concerns were comparable with or higher than referral rates for depression and PTSD. A clinician-identified mental health problem was defined as already being under mental health care at the time of the PDHRA or any referral for care of a mental health problem on the PDHA or PDHRA. Note that both the PDHA and PDHRA forms were updated in September 2007, and this study pertains to the original versions.

The PDHRA added a 2-item alcohol screen validated in both civilian and military populations. The PDHA (but not the PDHRA) contains 3 questions on combat experiences and asks about hospitalization during deployment. Both assessments ask soldiers to rate their overall health; a response of “fair” or “poor” was considered indicative of general health concerns. The PDHRA added categories for referrals to the Army’s substance abuse program and to employee assistance program counseling (called Military One Source). One Source counseling is available for V-code conditions (eg, marital problems) through off-post civilian counselors.

**Analysis and Institutional Review**

This study, based on existing medical surveillance data, was conducted under a protocol approved by the Walter Reed Army Institute of Research Hu...
The demographics for the 88 235 soldiers in the study were consistent between the PDHA and PDHRA time points and were representative of all soldiers deployed to Iraq.\textsuperscript{1,12} Of the 88 235 soldiers, 90.8% were men, 58.2% were married, and the mean (SD) age was 30.4 (8.0) years. The study included 56 350 active component soldiers and 31 885 National Guard and Reserve soldiers.

 Soldiers indicated more mental health distress on the PDHRA than on the PDHA and were referred at higher rates (Table 1). Concerns about interpersonal conflict increased the most (active, 3.5% to 14.0%; reserve, 4.2% to 21.1%); other mental health concerns also increased substantially, including PTSD (active, 11.8% to 16.7%; reserve, 4.7% to 10.3%; reserve, 3.8% to 13.0%), and overall mental health risk (active, 17.0% to 27.1%; reserve, 17.5% to 35.5%).

 Reserve and active soldiers reported similar rates of potentially traumatic combat experiences (69.6% vs 66.5%), hospitalization during deployment (6.0% vs 5.3%), and overall mental health concerns on the PDHA (17.5% vs 17.0%). However, by the time of the PDHRA, National Guard and Army Reserve soldiers reported substantially higher rates of interpersonal conflict, PTSD, depression, and overall mental health risk (32.5% vs 27.1%; OR, 1.48; 95% CI, 1.44-1.53; P < .001; Table 1). Guard and reserve soldiers were also referred for mental health concerns at substantially higher rates on the PDHRA than active soldiers, especially when employee assistance referrals were included (36.2% vs 14.7%; OR, 3.29; 95% CI, 3.19-3.40; P < .001). They also reported more general health concerns (20.8% vs 16.5%; OR, 1.33; 95% CI, 1.28-1.37; P < .001) and were referred at higher rates for any health concern, including physical (55.1% vs 27.0%; OR, 3.32; 95% CI, 3.22-3.41; P < .001). Among 26 597 active and reserve soldiers who had a mental health risk on the PDHRA, 1963 (7.4%) left military service within the next 5 months compared with 3505 (5.7%) of 61 638 with no mental health risk (OR, 1.32; 95% CI, 1.25-1.40; P < .001; data not shown). Because active component soldiers are on a more accelerated deployment rotation than reserve soldiers, we looked at whether PDHRA responses would correlate with the expectation of another deployment among these soldiers. Among the 56 350 active component soldiers, 16 478 (29.2%) had another deployment (25.1%) compared with soldiers who did not deploy again (27.9%).

 Of the 88 235 soldiers, 3925 (4.4%) were referred for mental health care on the PDHRA and 10 288 (11.7%) were referred on the PDHRA. Only 1013 (1.1%) were referred during both assessments. Combined data from both screenings, including employee assistance referrals, showed that clinicians identified 20.3% of active and 42.4% of reserve soldiers as needing referral or already being under care for mental health problems.

 Among active component soldiers, use of mental health services increased substantially following the PDHRA, especially within 30 days of the assessment (Table 2); 9074 of 12 265 soldiers (74%) who accessed mental health care had not been identified as needing referral. Of active soldiers referred for mental health problems on the PDHA, 41.8% were seen within 90 days; for those referred on the PDHRA, 61.0% were seen within 90 days. Among soldiers who were not referred, those with a mental health risk identified on the PDHRA were nearly 3 times more likely to use services within 90 days than those without a mental health risk (35.9% vs 12.7%; data not shown).

 Although soldiers were willing to endorse alcohol problems at rates similar to other mental health concerns (Table 1), referral to alcohol services and use of these services were dramatically lower than for other mental health-related concerns. Of 56 350 active soldiers, 6669 (11.8%) endorsed alcohol misuse (Table 1), 134 (0.2%) were referred, and of these only 29 were seen within 90 days (Table 2).

 Of soldiers who reported a high rate of PTSD symptoms on the PDHA (PC-PTSD score ≥ 3), 49.4% of National Guard and Army Reserve soldiers and 59.2% of active soldiers reported symptomatic improvement by the time of the PDHRA (Table 3). However, more than twice as many new cases were identified among soldiers who did not have a high PTSD score initially on the PDHRA. An analysis of soldiers with PDHA depressive symptoms showed similar findings; 56.0% of guard and reserve soldiers and 62.2% of active soldiers who reported at least 1 depressive symptom on the PDHA had resolution by the time of the PDHRA (data not shown).

 For the active component cohort with high PTSD symptoms reported on the PDHA, an inverse relationship existed between receiving mental health services and improvement in symptoms by the time of the PDHRA (Table 4). The median (IQR) time between the PDHA and PDHRA was similar for those who received treatment (5 months, IQR 4-11 months) and those who did not (5 months, IQR 4-8 months). Among treated soldiers the median time between the first mental health visit and the PDHRA was 4 months (2.5-7 months). Among soldiers with a high
Table 1. Mental Health–Related Outcomes Reported by Soldiers Returning From Iraq War on the Post-Deployment Health Assessment and the Post-Deployment Health Re-Assessment by Service Componenta

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Active (n = 56 350)</th>
<th>National Guard and Reserve (n = 31 885)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHQ-2 depression screen, No. of positive responsesc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2003 (3.5)</td>
<td>940 (2.9)</td>
</tr>
<tr>
<td>2</td>
<td>671 (1.2)</td>
<td>270 (0.9)</td>
</tr>
<tr>
<td>≥1</td>
<td>2674 (4.7)</td>
<td>1210 (3.8)</td>
</tr>
<tr>
<td>Primary care–PTSD screen, No. of positive responsesd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5769 (10.2)</td>
<td>3614 (11.3)</td>
</tr>
<tr>
<td>2</td>
<td>3160 (5.6)</td>
<td>1933 (6.1)</td>
</tr>
<tr>
<td>3</td>
<td>1986 (3.5)</td>
<td>1176 (3.7)</td>
</tr>
<tr>
<td>4</td>
<td>1488 (2.6)</td>
<td>943 (3.0)</td>
</tr>
<tr>
<td>≥2</td>
<td>6634 (11.8)</td>
<td>4052 (12.7)</td>
</tr>
<tr>
<td>≥3</td>
<td>3474 (6.2)</td>
<td>2119 (6.6)</td>
</tr>
<tr>
<td>Suicidal ideation</td>
<td>651 (1.2)</td>
<td>283 (0.9)</td>
</tr>
<tr>
<td>Interpersonal conflict</td>
<td>1975 (3.5)</td>
<td>1342 (4.2)</td>
</tr>
<tr>
<td>Interpersonal aggressive ideation</td>
<td>1204 (2.1)</td>
<td>672 (2.1)</td>
</tr>
<tr>
<td>Mental health risk</td>
<td>9581 (17.0)</td>
<td>5588 (17.5)</td>
</tr>
<tr>
<td>Combat experiences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Witness someone wounded or killed</td>
<td>30 183 (53.6)</td>
<td>17 198 (53.9)</td>
</tr>
<tr>
<td>Discharged weapon</td>
<td>14 224 (25.2)</td>
<td>7686 (24.1)</td>
</tr>
<tr>
<td>Felt in danger of being killed</td>
<td>27 626 (49.0)</td>
<td>17 644 (55.3)</td>
</tr>
<tr>
<td>≥1</td>
<td>37 472 (66.5)</td>
<td>22 190 (69.6)</td>
</tr>
<tr>
<td>Fair or poor overall health assessment</td>
<td>4341 (7.7)</td>
<td>3097 (9.7)</td>
</tr>
<tr>
<td>Hospitalized during deployment</td>
<td>2986 (5.3)</td>
<td>1901 (6.0)</td>
</tr>
<tr>
<td>Alcohol, No. of positive responses to 2-item screen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>3910 (6.9)</td>
<td>2423 (7.6)</td>
</tr>
<tr>
<td>2</td>
<td>2759 (4.9)</td>
<td>2364 (7.4)</td>
</tr>
<tr>
<td>≥1</td>
<td>6669 (11.8)</td>
<td>4787 (15.0)</td>
</tr>
<tr>
<td>Referrals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Referral for any problem, including physical health</td>
<td>13 455 (23.9)</td>
<td>10 981 (34.4)</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>134 (0.2)</td>
<td>179 (0.6)</td>
</tr>
<tr>
<td>Mental health problems including EAPh</td>
<td>2453 (4.4)</td>
<td>1472 (4.6)</td>
</tr>
<tr>
<td>Already under care for mental health concerni</td>
<td>2635 (4.7)</td>
<td>2771 (8.7)</td>
</tr>
<tr>
<td>Referred for mental health concern, EAP, or already under mental health care</td>
<td></td>
<td>9993 (17.7)</td>
</tr>
<tr>
<td>Any PDHA or PDHRA clinician–identified mental health problemj</td>
<td></td>
<td>12 973 (40.7)</td>
</tr>
</tbody>
</table>

Abbreviations: EAP, employee assistance program; PDHA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment; PHQ-2, 2-item depression Patient Health Questionnaire; PTSD, posttraumatic stress disorder.

The PDHA form DD2796 was completed from September 15, 2004, through October 30, 2006, and the PDHRA form DD2900 was completed from June 1, 2005, through December 31, 2006. Blank cells indicate that the item was not addressed on the screening assessment.

Respondents were considered at mental health risk if their answers included 1 or more of the following: a positive response to 1 of the PHQ-2 depression items, endorsement of 2 or more PC-PTSD items, suicidal ideation, interpersonal conflict, or aggressive ideation.
PTSD score on the PDHA who were not referred, those who sought and received treatment were more likely to have other comorbid mental health concerns on the PHDA (≥1 of 2 depression symptoms, suicidal ideation, interpersonal conflict, or aggression) than those who did not receive treatment (depression: 23.8% vs 16.5%; OR, 1.69; 95% CI, 1.31-2.16; P < .001; any of the 4 concerns: 40.1% vs 26.1%; OR, 1.90; 95% CI, 1.60-2.26; P < .001). However, for those referred for mental health treatment, the rate of reporting 1 of these comorbid mental health concerns was not significantly different on the PHDA between those who received treatment and those who did not (depression: 40.4% vs 36.1%; OR, 1.20, 95% CI, 0.89-1.62; P = .21; any of the 4 concerns: 60.0% vs 55.0%; OR, 1.23; 95% CI, 0.92-1.64; P = .16).

**COMMENT**

This is the first study, to our knowledge, to look at mental health concerns longitudinally among soldiers returning from Iraq using the DoD’s screening programs. The study shows that the rates that we previously reported based on surveys taken immediately on return from deployment substantially underestimate the mental health burden. In contrast to the rates of mental health concerns recorded immediately on return, soldiers reported increased mental health concerns and were referred at much higher rates several months later at the time of the PDHRA. Reporting mental health concerns was also associated with attrition from military service.

A recent congressionally mandated task force found the existing DoD mental health system to be overburdened, understaffed, and underresourced. This study suggests that the mental health problems identified by Veterans Affairs clinicians in more than a quarter of recent combat veterans may have already been present within months of returning from war. The combined DoD screening identified 20.3% to 42.4% of soldiers as requiring mental health treatment, consistent with rates reported among recent veterans seeking care at Veterans Affairs facilities. This emphasizes the enormous opportunity for a better-resourced DoD mental health system to intervene early before soldiers leave active duty. The literature on comorbidity and treatment of early PTSD symptoms argues for the desirability of intervening before work or relationships are compromised, before symptoms become chronically entrenched, or before comorbid conditions develop.

The same task force also found that DoD is failing to provide adequate mental health care to military family members. Although soldiers’ rates of PTSD and depression increased substantially between the 2 assessments, the 4-fold increase in concerns about interpersonal conflict highlights the potential impact of this war on family relationships.

### Table 2. Post-Deployment Health Assessment and Post-Deployment Health Re-Assessment Referral for Mental Health Problems or Substance Abuse and Subsequent Mental Health Care Utilization Within 90 Days of Form Completion

<table>
<thead>
<tr>
<th>Referral Status for Active Component</th>
<th>No. (%) of Soldiers Accessing Health Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDHA</td>
<td>PDHRA</td>
</tr>
<tr>
<td>Total evaluated in active component, No.</td>
<td>56,350</td>
</tr>
<tr>
<td>Referred for mental health problem, No.</td>
<td>2453</td>
</tr>
<tr>
<td>No. of days between assessment and first mental health visit</td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>522 (21.3)</td>
</tr>
<tr>
<td>30–&lt;60</td>
<td>280 (11.4)</td>
</tr>
<tr>
<td>60–&lt;90</td>
<td>223 (9.1)</td>
</tr>
<tr>
<td>Total</td>
<td>1025 (41.8)</td>
</tr>
<tr>
<td>Not referred for mental health problem, No.</td>
<td>53,897</td>
</tr>
<tr>
<td>No. of days between assessment and first mental health visit</td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>336 (6.3)</td>
</tr>
<tr>
<td>30–&lt;60</td>
<td>2182 (4.0)</td>
</tr>
<tr>
<td>60–&lt;90</td>
<td>2328 (4.3)</td>
</tr>
<tr>
<td>Total</td>
<td>7879 (14.8)</td>
</tr>
<tr>
<td>Referred for substance abuse, No.</td>
<td>134</td>
</tr>
<tr>
<td>No. of days between assessment and first visit for alcohol or substance treatment</td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>22 (16.4)</td>
</tr>
<tr>
<td>30–&lt;60</td>
<td>4 (3.0)</td>
</tr>
<tr>
<td>60–&lt;90</td>
<td>3 (2.2)</td>
</tr>
<tr>
<td>Total</td>
<td>29 (21.6)</td>
</tr>
<tr>
<td>Not referred for substance abuse, No.</td>
<td>56,216</td>
</tr>
<tr>
<td>No. of days between assessment and first visit for alcohol or substance treatment</td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>1037 (1.8)</td>
</tr>
<tr>
<td>30–&lt;60</td>
<td>307 (0.5)</td>
</tr>
<tr>
<td>60–&lt;90</td>
<td>292 (0.5)</td>
</tr>
<tr>
<td>Total</td>
<td>1636 (2.9)</td>
</tr>
</tbody>
</table>

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment.

For assessment type and dates given see footnotes in Table 1.

aParticipating soldiers served in Iraq, Kuwait, or Qatar.

bHealth care utilization data are not available for National Guard and Army Reserve soldiers no longer on active duty status.

cRespondents referred for mental health problems under the PDHA were for combat or operational stress reaction, family problems, or mental health; those referred under PDHRA were for behavioral health in primary care, mental health specialty care, or family support or community service.

dIncludes being seen in outpatient behavioral health clinic or receiving diagnosis of mental disorders (International Statistical Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM] 290-319) or mental health V-code conditions (eg, marital problems).

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lationships and mirrors findings from prior wars.\textsuperscript{23,26} Furthermore, although stigma deters many soldiers from accessing mental health care,\textsuperscript{12,18} spouses are often more willing to seek care for themselves or their soldier-partner, making them important in a comprehensive early intervention strategy. At present, however, spouse-initiated treatment is hindered by lack of parity of access. Unlike other routine health care that is readily available to active soldiers and their families on-post, family-member mental health care is generally only available through the civilian TRICARE insurance network, a system that has been documented to be inadequately resourced, inconvenient, and cumbersome.\textsuperscript{18}

Although National Guard and Army Reserve soldiers had similar results as active soldiers at redeployment from Iraq, by the time of the PDHRA, they reported higher rates of problems and were referred at substantially higher rates than active component soldiers. These higher rates applied to both mental health and general health problems. One reason may be that reservists have concerns with securing ongoing health care for deployment-related problems. Although active component soldiers have ready access to health care, for reservists, standard DoD health insurance benefits (TRICARE) expire 6 months\textsuperscript{27} and standard VA benefits expire 24 months after return to civilian status.\textsuperscript{28} More than half of the guard and reserve soldiers in this sample were beyond the standard DoD benefit window by the time they took their PDHRA. Although stigma concerns may suppress reporting on the PDHRA among active soldiers,\textsuperscript{13} for guard and reserve soldiers, securing ongoing health care may be a more prevailing concern. Other potential factors unique to reservists may be the lack of day-to-day support from war comrades and the added stress of transitioning back to civilian employment.

Another important finding is that soldiers frequently reported alcohol problems yet were very rarely referred for alcohol treatment and infrequently followed-up if referred. One likely reason is that using these treatment services, even when a soldier self-refers, is not confidential. Under present military policies, accessing alcohol treatment triggers automatic involvement of a soldier’s commander and can have negative career ramifications if the soldier fails to comply with the treatment program.\textsuperscript{29} This is in contrast to a variety of protections surrounding mental health care that balance the need of the commander to know when a sol-

### Table 3. Longitudinal Analysis of Posttraumatic Stress Disorder Symptoms From the Post-Deployment Health Assessment to the Post-Deployment Health Re-Assessment by Army Component\textsuperscript{a}

<table>
<thead>
<tr>
<th>PTSD Screen Score on PDHRA</th>
<th>No. (%) of Soldiers With Positive PTSD Score, ( \geq 3 )</th>
<th>No. (%) of Soldiers With Negative PTSD Score, (&lt; 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Army Active Component</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive, ( \geq 3 ) (n = 3474)</td>
<td>1416 (40.8)</td>
<td>2058 (59.2)</td>
</tr>
<tr>
<td>Negative, (&lt; 3) (n = 52876)</td>
<td>3697 (7.0)</td>
<td>49179 (93.0)</td>
</tr>
<tr>
<td>Army Reserve and National Guard Components</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive, ( \geq 3 ) (n = 2119)</td>
<td>1112 (52.2)</td>
<td>1087 (49.4)</td>
</tr>
<tr>
<td>Negative, (&lt; 3) (n = 29766)</td>
<td>3457 (1.16)</td>
<td>26309 (88.4)</td>
</tr>
</tbody>
</table>

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment; PTSD, posttraumatic stress disorder.
\textsuperscript{a}Participants were considered to have met the screening criteria for PTSD if they positively endorsed at least 3 of 4 questions regarding nightmares, avoiding situations, hyperarousal, or detachment on the primary care PTSD screen.

### Table 4. Improvement in Posttraumatic Stress Disorder Symptoms From Post-Deployment Health Assessment to Post-Deployment Health Re-Assessment Among Active Component Soldiers who Screened Positive for PTSD on the Post-Deployment Health Assessment\textsuperscript{a}

<table>
<thead>
<tr>
<th>Referral Status\textsuperscript{a}</th>
<th>No. of Mental Health Visits\textsuperscript{b}</th>
<th>No. (%) of Soldiers With Symptom Improvement on the PDHRA (PTSD Screen Score (&lt; 3))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referred for mental health services</td>
<td>804 (23.1)</td>
<td>349 (43.4)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>128 (15.9)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>70 (8.7)</td>
</tr>
<tr>
<td></td>
<td>( \geq 3)</td>
<td>257 (32.0)</td>
</tr>
<tr>
<td>Not referred for mental health services</td>
<td>2670 (76.9)</td>
<td>1721 (64.5)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>149 (15.7)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>129 (4.8)</td>
</tr>
<tr>
<td></td>
<td>( \geq 3)</td>
<td>401 (15.0)</td>
</tr>
</tbody>
</table>

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment; PTSD, posttraumatic stress disorder.
\textsuperscript{a}For assessment type and dates given see footnotes in Table 1.
\textsuperscript{b}Participants were considered to have met the screening criteria for PTSD if they positively endorsed at least 3 of 4 questions regarding nightmares, avoiding situations, hyperarousal, or detachment on the primary care PTSD screen.

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment; PTSD, posttraumatic stress disorder.
\textsuperscript{a}Participants were considered to have met the screening criteria for PTSD if they positively endorsed at least 3 of 4 questions regarding nightmares, avoiding situations, hyperarousal, or detachment on the primary care PTSD screen.
\textsuperscript{b}Referral for mental health services indicated on PDHA for mental health (Mental Health Screen Score, \( \geq 3\)) or mental health V-code.
\textsuperscript{c}Mental health sessions includes being seen in an outpatient behavioral clinic or receiving a diagnosis of a mental health problem based on International Statistical Classification of Diseases, 10th Revision, Clinical Modification (ICD-10-CM) codes 290-319 or mental health V-code.
Given the high rate of alcohol misuse following combat and its comorbidity with PTSD and relationship problems, it is important that mil-
tary policies be conducive to encour-
aging self-referral, referral from medical
professionals, and confidential treat-
ment before alcohol-related behaviors neces-
sitate formal involvement of the
soldier’s commander.

This study is unique in endeavoring to
evaluate the effectiveness of a mass
population mental health screening
program. The findings indicate that
the postdeployment assessments do
not seem to be redundant; they iden-
tify and refer 2 largely distinct cohorts.
The program documents a substantial
increase in mental health needs several
months after return from deployment.
Among active soldiers referred for
mental health care on the PDHRA,
61.0% were documented to receive
services, which compares favorably
with civilian follow-up rates. The
majority of soldiers who used mental health services had
not been referred, most who sought care
did so within 30 days of screening,
and this was associated with having
reported mental health concerns on the
questionnaire. These data suggest
that the screening process may have
couraged self-referral among sol-
diers with symptoms that were ini-
tially not considered serious enough to
warrant clinician referral. This is
important because perceptions of stigma are greater among soldiers with mental health symptoms than soldiers
without symptoms. Factors that may
have promoted help seeking include
recognition of symptoms, communica-
tion with a clinician, and unit-focused
mental health education that accom-
panies the screenings.

Several factors make it difficult to
conclude that the PDHRA portion of the
screening program is effective. Most
soldiers with significant PTSD symp-
toms on the initial PDHA screen had
improvement of symptoms without
treatment, and there was no relation-
ship of referral to symptom improve-
ment. One possible explanation is the
inherent psychometric properties of the
screening tools. Even the best mental health clinical measures will have poor predictive value when
applied on a population level (particu-
larly positive predictive value, which
will not likely exceed 50%). Another
consideration is that PTSD symptoms
may be more transient immediately on
return from deployment than at the
later time of the PDHRA. It is possible
that elements of the screening process,
such as normalization of symptoms
during unit education or by the cli-
nician, may have facilitated resolution
of these early symptoms.

The inverse relationship between
mental health treatment and improve-
ment in PTSD symptoms and the 37% improvement rate among soldiers who
received 3 or more sessions is counter-
tuitive. Even among soldiers with
PTSD symptoms who were referred
from the PDHA, recovery was highest
among those who did not follow-up
with an appointment. This apparent in-
effectiveness of treatment should be in-
terpreted with caution. The 37% re-
sponse is not inconsistent with the
response rate in some PTSD treatment
studies, and soldiers may not have had
sufficient time to respond to treat-
ment (median follow-up 4 months). In
addition, those who use mental health
services are more likely to have severe
or comorbid conditions than those who
do not utilize services, and this rela-
tionship was indeed observed among
soldiers with PTSD symptoms who
were not referred from the PDHA
screening. However, among soldiers
with PTSD symptoms who were re-
ferred, there was no significant differ-
ce in the rate of measurable comor-
bid mental health concerns on the
PDHRA between those who used ser-
vices and those who did not. In the con-
text of the recent DoD task force find-
ings, these results may indicate that
treatment for PTSD is not optimal in
military health clinics because sol-
diers are either not receiving a suffi-
cient number of sessions or the pro-
vided treatment is ineffective. An
important requirement for implement-
ing any population mental health
screening program is that adequate re-
ources are available to cope with the
workload generated by the screening
process.

In terms of treatment efficacy, some
studies suggest that combat-related
PTSD may be more refractory than
PTSD from other traumas, which may
develop as part of the emergence of other
comorbid problems after return home.
Manualized psychotherapy modalities
have been largely based on single-
event traumas in noncombat set-
tings, and there is a lack of clinical
efficacy studies conducted during the
early postcombat period. Thus, in ad-
dition to documenting the large need
for care among soldiers several months
after return from combat, this study
highlights the need for randomized
clinical trials during the early postde-
ployment period; evaluation of exist-
ing clinical practice guidelines; and fur-
ther scientific appraisal of the risks,
benefits, and resources needed for
population mental health screening.

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agement, analysis, or interpretation of the data; or preparation of the manuscript.

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