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

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**O**UR PREVIOUS ARTICLE<sup>1</sup> DESCRIBED the Department of Defense's (DoD's) screening efforts to identify mental health concerns among soldiers and Marines as they return from Iraq and Afghanistan using the Post-Deployment Health Assessment (PDHA). However, the article also raised concerns that mental health problems might be missed because of the early timing of this screening. It cited preliminary data showing that soldiers were more likely to indicate mental health distress several months after return than upon their immediate return.<sup>2,3</sup> Based on these preliminary data, the DoD initiated a second screening similar to the first, to occur 3 to 6 months after return from deployment.<sup>4</sup>

This report reviews the mental health responses of the first cohort of soldiers to complete both the PDHA and the new Post-Deployment Health Re-Assessment (PDHRA) after return from the Iraq war. Because of the longitudinal focus of the study, we included soldiers only from the Iraq war (not from Afghanistan), the larger cohort with the most consistently high rates of combat exposure. We addressed several questions regarding the 2 screening programs: (1) Overall, what percentage of veteran soldiers of the Iraq war were

**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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identified as having clinically significant mental health problems and are rates higher on the PDHRA than on the PDHA? (2) As the UK experience sug-

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gests,<sup>5</sup> 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.<sup>1</sup> 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.<sup>6</sup> Both the PDHA and PDHRA (DoD forms DD2796<sup>7,8</sup> and DD2900,<sup>9,10</sup> respectively) become part of the soldier's permanent medical record, and an electronic copy is integrated into the Defense Medical Surveillance System (DMSS) database.<sup>11</sup> 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 deploy-

ment. Marine records were excluded because the PDHRA had not been widely implemented among Marine units during the study period and may not be representative.<sup>1,12</sup> 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.<sup>1</sup> Both assessments include a 2-item depression instrument from the Patient Health Questionnaire (PHQ)<sup>13,14</sup> and the Primary Care 4-item posttraumatic stress disorder screen (PC-PTSD).<sup>15</sup> A question on suicidal ideation from the PHQ<sup>13</sup> 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." Interper-

sonal 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<sup>1</sup> 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.<sup>2,16</sup> 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-

man Use Review Committee that deemed it exempt from informed consent.<sup>17</sup> Analyses using SAS version 9.1 (SAS Institute Inc, Cary, North Carolina) were conducted. Because of the very large population-based cohort, virtually all comparisons would be statistically significant. Therefore, comparisons using odds ratios (ORs) with 95% confidence intervals (CIs) and  $\chi^2$  testing were only used to confirm epidemiologically plausible associations.

## RESULTS

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.<sup>11,12</sup> 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, 12.7% to 24.5%), depression (active, 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 (35.5% 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 documented during the study period subsequent to their PDHRA. The rate of reporting overall mental health risk on the PDHRA was similar for those soldiers who 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 PDHA 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. Out 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  $\geq 3$ ), 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 PDHA. 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 Component<sup>a</sup>

Outcomes	No. (%) of Participating Soldiers <sup>b</sup>			
	Active		National Guard and Reserve	
	PDHA (n = 56 350)	PDHRA (n = 56 350)	PDHA (n = 31 885)	PDHRA (n = 31 885)
PHQ-2 depression screen, No. of positive responses <sup>c</sup>				
1	2003 (3.5)	3485 (6.2)	940 (2.9)	2338 (7.3)
2	671 (1.2)	2346 (4.2)	270 (0.9)	1795 (5.6)
≥1	2674 (4.7)	5831 (10.3)	1210 (3.8)	4133 (13.0)
Primary care–PTSD screen, No. of positive responses <sup>d</sup>				
1	5769 (10.2)	6934 (12.3)	3614 (11.3)	4712 (14.8)
2	3160 (5.6)	4311 (7.7)	1933 (6.1)	3246 (10.2)
3	1986 (3.5)	2784 (4.9)	1176 (3.7)	2235 (7.0)
4	1488 (2.6)	2329 (4.1)	943 (3.0)	2334 (7.3)
≥2	6634 (11.8)	9424 (16.7)	4052 (12.7)	7815 (24.5)
≥3	3474 (6.2)	5113 (9.1)	2119 (6.6)	4569 (14.3)
Suicidal ideation	651 (1.2)	353 (0.6)	283 (0.9)	463 (1.5)
Interpersonal conflict	1975 (3.5)	7893 (14.0)	1342 (4.2)	6724 (21.1)
Interpersonal aggressive ideation	1204 (2.1)	1231 (2.2)	672 (2.1)	1285 (4.0)
Mental health risk <sup>e</sup>	9581 (17.0)	15 264 (27.1)	5588 (17.5)	11 333 (35.5)
Combat experiences				
Witness someone wounded or killed	30 183 (53.6)		17 198 (53.9)	
Discharged weapon	14 224 (25.2)		7686 (24.1)	
Felt in danger of being killed	27 626 (49.0)		17 644 (55.3)	
≥1	37 472 (66.5)		22 190 (69.6)	
Fair or poor overall health assessment	4341 (7.7)	9286 (16.5)	3097 (9.7)	6620 (20.8)
Hospitalized during deployment	2986 (5.3)		1901 (6.0)	
Alcohol, No. of positive responses to 2-item screen				
1		3910 (6.9)		2423 (7.6)
2		2759 (4.9)		2364 (7.4)
≥1		6669 (11.8)		4787 (15.0)
Referrals				
Referral for any problem, including physical health	13 455 (23.9)	15 235 (27.0)	10 981 (34.4)	17 583 (55.1)
Substance abuse <sup>f</sup>		134 (0.2)		179 (0.6)
Mental health problems <sup>g</sup>	2453 (4.4)	5234 (9.3)	1472 (4.6)	5054 (15.9)
Referred for mental health problems including EAP <sup>h</sup>		8294 (14.7)		11 552 (36.2)
Already under care for mental health concern <sup>i</sup>		2635 (4.7)		2771 (8.7)
Referred for mental health concern, EAP, or already under mental health care		9993 (17.7)		12 973 (40.7)
Any PDHA or PDHRA clinician–identified mental health problem <sup>j</sup>	11 429 (20.3)		13 515 (42.4)	

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.

<sup>a</sup>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.

<sup>b</sup>Participating soldiers served in Iraq, Kuwait, or Qatar.

<sup>c</sup>Respondents were considered at risk for depression if they positively answered either or both of the following questions: “little interest or pleasure in doing things” or “feeling down, depressed, or hopeless”; more than half the days, a lot, or nearly every day were considered positive responses.

<sup>d</sup>Respondents were considered at risk for PTSD if they positively endorsed questions about nightmares, avoiding situations, hyperarousal, or detachment on the primary care PTSD screen.

<sup>e</sup>Respondents were considered at mental health risk if their answers included 1 or more of any 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.

<sup>f</sup>Referred to Army Substance Abuse Program (ASAP) on PDHRA for an alcohol or substance abuse problem.

<sup>g</sup>Respondents with mental health problems under the PDHA were referred for combat or operational stress reaction, family problems, or mental health; under PDHRA soldiers were referred for behavioral health in primary care, mental health specialty care, or family support or community service.

<sup>h</sup>Referred for mental health problems, including EAP, for PDHRA. This also includes referral to care manager, which comprised 1084 (1.9%) active component and 56 (0.2%) National Guard or Army Reserve component soldiers. Military One-Source is an EAP contractor that offers up to 6 sessions of counseling for V-code conditions (eg, marital problems).

<sup>i</sup>At PDHRA, soldier was under care for depression, PTSD, anger, suicide, or family conflict.

<sup>j</sup>PDHA mental health referral or PDHRA mental health referral, PDHRA EAP referral, or already under care for mental health.



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 ( $\geq 1$  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, 1.31-1.96;  $P < .001$ ; 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.<sup>1</sup> 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.<sup>18</sup> 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.<sup>19,20</sup> The combined DoD screening identified 20.3% to 42.4% of soldiers as requir-

ing 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 symp-

toms become chronically entrenched, or before comorbid conditions develop.<sup>21-24</sup>

The same task force also found that DoD is failing to provide adequate mental health care to military family members.<sup>18</sup> 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 re-

**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<sup>a</sup>

Referral Status for Active Component <sup>b</sup>	No. (%) of Soldiers Accessing Health Care	
	PDHA	PDHRA
Total evaluated in active component, No. <sup>c</sup>	56 350	56 350
Referred for mental health problem, No. <sup>d</sup>	2453	5234
No. of days between assessment and first mental health visit <sup>e</sup>		
<30	522 (21.3)	2644 (50.5)
30-<60	280 (11.4)	338 (6.5)
60-≤90	223 (9.1)	209 (4.0)
<b>Total</b>	<b>1025 (41.8)</b>	<b>3191 (61.0)</b>
Not referred for mental health problem, No.	53 897	51 116
No. of days between assessment and first mental health visit		
<30	3369 (6.3)	6633 (13.0)
30-<60	2182 (4.0)	1338 (2.6)
60-≤90	2328 (4.3)	1103 (2.2)
<b>Total</b>	<b>7879 (14.6)</b>	<b>9074 (17.8)</b>
Referred for substance abuse, No. <sup>f</sup>		134
No. of days between assessment and first visit for alcohol or substance treatment <sup>g</sup>		
<30		22 (16.4)
30-<60		4 (3.0)
60-≤90		3 (2.2)
<b>Total</b>		<b>29 (21.6)</b>
Not referred for substance abuse, No.		56 216
No. of days between assessment and first visit for alcohol or substance treatment		
<30		1037 (1.8)
30-<60		307 (0.5)
60-≤90		292 (0.5)
<b>Total</b>		<b>1636 (2.9)</b>

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment.  
<sup>a</sup>For assessment type and dates given see footnotes in Table 1.  
<sup>b</sup>Participating soldiers served in Iraq, Kuwait, or Qatar.  
<sup>c</sup>Health care utilization data are not available for National Guard and Army Reserve soldiers no longer on active duty status.  
<sup>d</sup>Respondents 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.  
<sup>e</sup>Includes 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).  
<sup>f</sup>Referred to Army Substance Abuse Program (ASAP) on PDHRA for an alcohol or substance abuse problem.  
<sup>g</sup>Includes being seen in outpatient substance abuse clinic or received alcohol diagnosis (*ICD-9-CM 291, 303, 305.0*).

relationships and mirrors findings from prior wars.<sup>25,26</sup> Furthermore, although stigma deters many soldiers from accessing mental health care,<sup>12,18</sup> 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 in-

adequately resourced, inconvenient, and cumbersome.<sup>18</sup>

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<sup>27</sup> and standard VA benefits expire 24 months after return to civilian status.<sup>28</sup> 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,<sup>12</sup> 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.<sup>29</sup> 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<sup>a</sup>

PTSD Screen Score on PDHA <sup>b</sup>	PTSD Screen Score on PDHRA	
	No. (%) of Soldiers With Positive PTSD Score, ≥3	No. (%) of Soldiers With Negative PTSD Score, <3
Army Active Component		
Positive, ≥3 (n = 3474)	1416 (40.8)	2058 (59.2)
Negative, <3 (n = 52 876)	3697 (7.0)	49 179 (93.0)
Army Reserve and National Guard Components		
Positive, ≥3 (n = 2119)	1112 (52.2)	1087 (49.4)
Negative, <3 (n = 29 766)	3457 (11.6)	26 309 (88.4)

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment; PTSD, posttraumatic stress disorder.

<sup>a</sup>For assessment type and dates given see footnotes in Table 1.

<sup>b</sup>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<sup>a</sup>

Referral Status <sup>c</sup>	No. of Soldiers With PTSD Screen Score ≥3 on PDHA by Referral Status (n = 3474) <sup>b</sup>	No. of Soldiers by the No. of Mental Health Visits Received Between PDHA and PDHRA		No. (%) of Soldiers With Symptom Improvement on the PDHRA (PTSD Screen Score <3)
		No. of Mental Health Visits <sup>d</sup>	No. (%) of Soldiers	
Referred for mental health services	804 (23.1)	0	349 (43.4)	205 (58.7)
		1	128 (15.9)	69 (53.9)
		2	70 (8.7)	36 (51.4)
		≥3	257 (32.0)	96 (37.3)
Not referred for mental health services	2670 (76.9)	0	1721 (64.5)	1181 (68.6)
		1	419 (15.7)	254 (60.6)
		2	129 (4.8)	67 (51.9)
		≥3	401 (15.0)	150 (37.4)

Abbreviations: PHDA, Post-Deployment Health Assessment; PDHRA, Post-Deployment Health Re-Assessment; PTSD, posttraumatic stress disorder.

<sup>a</sup>For assessment type and dates given see footnotes in Table 1.

<sup>b</sup>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.

<sup>c</sup>Referral for mental health services indicated on PDHA for mental health problem, combat or operational stress reaction, or family problem.

<sup>d</sup>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.

dier is mentally unfit for duty with the soldier's medical confidentiality.<sup>30,31</sup> Given the high rate of alcohol misuse following combat and its comorbidity with PTSD and relationship problems,<sup>12,21,26</sup> it is important that military policies be conducive to encouraging self-referral, referral from medical professionals, and confidential treatment before alcohol-related behaviors necessitate 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 identify 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.<sup>32</sup> Although 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 encouraged self-referral among soldiers with symptoms that were initially 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.<sup>12</sup> Factors that may have promoted help seeking include recognition of symptoms, communication with a clinician, and unit-focused mental health education that accompanies the screenings.<sup>33-35</sup>

Several factors make it difficult to conclude that the PDHA portion of the screening program is effective. Most soldiers with significant PTSD symptoms on the initial PDHA screen had improvement of symptoms without treatment, and there was no relation-

ship of referral to symptom improvement. 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 (particularly positive predictive value, which will not likely exceed 50%).<sup>36</sup> 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<sup>33-35</sup> or by the clinician, may have facilitated resolution of these early symptoms.

The inverse relationship between mental health treatment and improvement in PTSD symptoms and the 37% improvement rate among soldiers who received 3 or more sessions is counterintuitive. 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 ineffectiveness of treatment should be interpreted with caution. The 37% response is not inconsistent with the response rate in some PTSD treatment studies,<sup>37,38</sup> and soldiers may not have had sufficient time to respond to treatment (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,<sup>21</sup> and this relationship was indeed observed among soldiers with PTSD symptoms who were not referred from the PDHA screening. However, among soldiers with PTSD symptoms who were referred, there was no significant difference in the rate of measurable comorbid mental health concerns on the PDHA between those who used services and those who did not. In the context of the recent DoD task force findings, these results may indicate that treatment for PTSD is not optimal in military health clinics because soldiers are either not receiving a sufficient number of sessions or the pro-

vided treatment is ineffective.<sup>18</sup> An important requirement for implementing any population mental health screening program is that adequate resources are available to cope with the workload generated by the screening process.<sup>39</sup>

In terms of treatment efficacy, some studies suggest that combat-related PTSD may be more refractory than PTSD from other traumas,<sup>40</sup> which may be due in part to the emergence of other comorbid problems after return home. Manualized psychotherapy modalities have been largely based on single-event traumas in noncombat settings,<sup>41,42</sup> and there is a lack of clinical efficacy studies conducted during the early postcombat period. Thus, in addition 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 postdeployment period; evaluation of existing clinical practice guidelines; and further scientific appraisal of the risks, benefits, and resources needed for population mental health screening.

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