

## An Intensive Outpatient Program for Veterans With Posttraumatic Stress Disorder and Traumatic Brain Injury

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*Post-9/11 service members may return from military service with a complicated set of symptoms and conditions, such as posttraumatic stress disorder (PTSD), depression, substance misuse, and traumatic brain injury (TBI), that interfere with reintegration and impair functioning. Although evidence-based treatments that facilitate recovery exist, their successful delivery at a sufficient dose is limited. Barriers to accessing treatment combined with challenges compiling a comprehensive treatment team further delay delivery of effective evidence-based care for PTSD, TBI, and co-occurring mental health conditions. This paper describes the development of a comprehensive, multidisciplinary, 2-week intensive day program for post-9/11 veterans with complex mental health concerns. The treatment program combines skill building groups, family education, and integrative health approaches with evidence-based individual PTSD or TBI care. Initial results from the first 132 participants were notable for a 97% completion rate, as well as statistically significant and clinically meaningful reductions in PTSD, neurobehavioral, and depression symptom severity for the 107 veterans who completed the PTSD track and the 21 who completed the TBI track. These data suggest the intensive program approach is an effective, well-tolerated model of treatment for post-9/11 veterans with PTSD and/or TBI. Future controlled studies should examine the effectiveness of this intensive model compared to standard evidence-based therapy delivery, as well as longitudinal outcomes.*

ANY military service members and veterans have complex and treatment-resistant physical and mental health problems. An estimated 12%–20% of

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those returning from Operation Iraqi Freedom, Operation Enduring Freedom, and Operation New Dawn meet criteria for posttraumatic stress disorder (PTSD; Higgins et al., 2014; Hoge et al., 2004; Hoge et al., 2008; Thomas et al., 2010). PTSD has a pervasive negative impact on veterans' quality of life and is a leading cause of disability (Murdoch et al., 2011; Olatunji, Cisler, & Tolin, 2007; Pittman, Goldsmith, Lemmer, Kilmer, & Baker, 2012; Schnurr, Hayes, Lunney, McFall, & Uddo, 2006). Approximately 10%–23% of service members and veterans have experienced a traumatic brain

injury (TBI; Cifu et al., 2013), with approximately 6%–7% meeting criteria for both PTSD and TBI (Carlson et al., 2011). The vast majority of TBIs experienced by service members are mild, and it is anticipated that they will experience a full clinical recovery from these injuries. Some service members sustain mild TBIs in a combat situation, often in association with other bodily injuries and under psychologically traumatic circumstances—and these service members might be at risk for worse overall clinical outcome (Hoge et al., 2008; Koren, Norman, Cohen, Berman, & Klein, 2005). In a prospective longitudinal study of active-duty U.S. military service members who sustained in-theater concussive blast injuries, 72% declined in their overall functioning between 1 year and 5 years following injury, and worsening in postconcussion symptoms was common (Mac Donald et al., 2017). The reasons for this decline are unclear, and they are likely multifactorial and biopsychosocial in nature. Although PTSD and TBI are the most commonly studied deployment-related conditions, post-9/11 veterans often struggle with multiple other psychiatric and medical conditions, including depression, substance use disorders, chronic pain, and sleep disorders (Hoge et al., 2008; Rytwinski, Scur, Feeny, & Youngstrom, 2013; Schneiderman, Braver, & Kang, 2008). Having multiple comorbidities is associated with a greater level of disability (Lippa et al., 2015) and a more complicated set of treatment needs for veterans and service members that may necessitate a more innovative, multidisciplinary targeted treatment approach.

Although effective treatments for PTSD are available, veterans may face barriers when seeking care. Barriers to treatment or reasons for attrition include financial difficulties, stigma associated with seeking treatment, lack of availability of trained clinicians, and insufficient time to attend to all patient concerns during a course of treatment (Hoge et al., 2014; Tanielian et al., 2016). Some veterans also experience difficulties accessing care in the Veterans Affairs (VA) Healthcare System due to their discharge status or other factors. Retention in care long enough to achieve a sufficient “dose” of treatment consistent with evidence-based psychotherapy and pharmacotherapy treatment options for PTSD is quite challenging in general, and high rates of premature treatment dropout have been reported for veterans in particular (Chard, Schumm, Owens, & Cottingham, 2010; Harpaz-Rotem & Rosenheck, 2011; Steenkamp & Litz, 2013). A systematic review of 1,191 individuals across 20 studies examining PTSD interventions revealed a mean dropout rate of 36% in post-9/11 veterans, with higher rates of dropout in routine clinical care settings than in clinical trials (Goetter et al., 2015). Without question, many people with PTSD delay seeking treatment, drop out, or do not fully respond to treatment (Carlson et al., 2011; Hoskins et al., 2015; Imel, Laska, Jakupcak, & Simpson, 2013); innovative programs are thus needed to improve health outcomes, reduce disability, and enhance quality of life.

Increased efforts to overcome these barriers, reduce dropout, and improve outcomes for veterans are needed. Condensed treatment approaches may alleviate some of these barriers. Few studies, however, have examined intensive, short-term, multidisciplinary, evidence-based treatment approaches for PTSD, TBI, and co-occurring conditions. Chard and colleagues (2011) reported that 42 male veterans with mild to moderate TBI and PTSD experienced reductions in PTSD and depression symptoms following a 7-week cognitive-behavioral, trauma-focused residential treatment program that offered twice weekly group cognitive processing therapy (CPT), with at least 2 individual CPT sessions. A follow-up study of this program found that dropout rates were substantially lower in the residential program than in naturalistic outpatient CPT, although residential patients had more severe symptoms at baseline and had lesser responses to treatment (Walter, Varkovitzky, Owens, Lewis, & Chard, 2014). These data offer preliminary support for shortening the duration of CPT to 7 or 8 weeks with increased intensity of treatment delivery. Prior data also support a fairly rapid response to prolonged exposure (PE) therapy, with excellent outcomes in an outpatient study delivering 8 sessions of individual PE over 4 to 6 weeks (Simon et al., 2008). A case study by Blount and colleagues (2014) illustrated a clinically meaningful decrease in the severity of combat-related PTSD symptoms after receiving daily PE during a 2-week intensive outpatient program. In addition, a study involving an 8-week residential treatment program for PTSD and TBI reported that decreases in either PTSD or postconcussive symptoms were related to reductions in symptom severity of the other symptoms (Walter, Kiefer, & Chard, 2012), suggesting that successful treatment of PTSD may reduce co-occurring postconcussive symptoms (Belanger, Spiegel, & Vanderploeg, 2010). Taken together, these data provide preliminary support for the potential effectiveness of a brief, intensive approach to evidence-based care for PTSD in veterans with or without TBI and other comorbid conditions.

A number of veterans receive treatment outside the VA Healthcare System, and access to military-informed clinical expertise in PTSD and TBI assessment and treatment may be more limited in civilian settings (Richards et al., 2017). Home Base, a Massachusetts General Hospital and Red Sox Foundation program, is a public-private partnership comprised of a multidisciplinary team of health care providers who aspire to overcome barriers and improve care for PTSD, TBI, and related conditions for service members, veterans, and their families through clinical care, fitness and wellness-based programs, community outreach, education, and research. As part of these efforts, a 2-week intensive day program was created with the goal of increasing access to care by delivering a substantive amount of evidence-based

treatment in a condensed format. The 2-week timeframe was selected to allow for the delivery of a sufficient number of treatment sessions to gain a clinically meaningful treatment effect while balancing the ability of veterans to take a short leave from work, school, or other responsibilities to participate. The selection of the various components of the program was based on available evidence to support short-term treatment in a comprehensive fashion (see [Method](#) section). The goal of the present paper is to describe and evaluate the feasibility, acceptability, and initial effectiveness of the Home Base Intensive Clinical Program (ICP), a 2-week multidisciplinary intensive day program targeting PTSD, TBI, and associated conditions.

## Method

### Participants

Participants were 132 post-9/11 veterans and active-duty service members who participated in the 2-week intensive outpatient day program at Home Base between February 2016 and March 2017. This program period included 14 cohorts of 6 to 10 veterans referred from around the United States. Deidentified demographic and clinical data were maintained in a database repository approved by the Massachusetts General Hospital Institutional Review Board.

Veteran patients completed a screening process, including chart reviews and initial clinical interviews. Through this process they were classified as having primary PTSD, TBI, or another mental health disorder by the multidisciplinary treatment team. Post-9/11 veterans of any discharge status and active-duty service members with primary presenting problems related to PTSD, TBI, and/or other service-related mental health concerns, such as depression or anxiety, were eligible for the program. Veterans were not eligible for the program if they had current psychotic or manic symptoms, a suicide attempt within the last 90 days, or a current substance use disorder requiring detoxification. Participants were required to abstain from alcohol and other nonprescribed substances during the 2-week treatment program, and all participants were informed that daily breathalyzer and rapid urine toxicology screens would be conducted. Serious medical and/or other psychiatric conditions requiring a higher level of care were also exclusionary, including suicide or homicide intent, though suicide ideation alone was not exclusionary.

Upon arrival, all participants completed a clinical psychiatric evaluation; assessments and clinical diagnoses were reviewed and confirmed in a multidisciplinary case review meeting. In addition, all participants completed a brief medical review, physical exam, nutrition assessment, and psychosocial assessment for case management and aftercare planning. In addition, they completed a set of

patient-reported outcome measures before and after treatment, as described below.

### Program Description

The ICP combines individual and group treatment, with each component of the program selected to target the needs of this complex military population. Each participant is assigned to either the PTSD or TBI track based on their treatment needs, as determined by the clinical screenings conducted by the multidisciplinary team. In addition, all participants receive evidence-based and evidence-informed group treatment and integrative health approaches. A multidisciplinary team of psychiatrists, clinical psychologists, neuropsychologists, nurses, physical medicine and rehabilitation specialists, licensed clinical social workers, a dietitian, integrative health providers (i.e., art therapist, yoga, and Tai Chi instructors), strength and conditioning specialists, and peer-to-peer veteran and family outreach coordinators provide the services described below.

#### *Individual Treatment*

Individuals who are referred to the TBI track and screened by phone and their medical records are reviewed. Those who seem appropriate for the program then travel to the academic medical center and undergo multidisciplinary evaluations by specialists in physical medicine and rehabilitation, physical therapy, psychiatry, clinical psychology, and neuropsychology. Through these evaluations it is determined whether the person has a set of clinical problems that are a good fit for the services offered in the TBI track. Through the specialty evaluations, and collaborative discussions with the patient, it is determined that the TBI track, with a focus on cognitive rehabilitation and multimodal physical therapy, is appropriate. In some circumstances, individuals who initially were considered for the TBI track are treated in the PTSD track instead. Participants in the TBI track receive daily, 1-hour individual cognitive rehabilitation sessions, provided by a licensed psychologist, based on empirically supported treatments to improve cognition, including Goal Management Training (Levine et al., 2000) and Executive Plus/Step: Problem Solving Training and Emotional Regulation Training (Cantor et al., 2014). TBI track participants also receive consultation sessions with a physical medicine and rehabilitation physician for medical care focused on rehabilitation needs, such as headache treatment. They receive additional medical evaluation and care, as needed, with specialties including neuroendocrinology. All patients in the TBI track participate in three to four physical therapy sessions typically focused on vestibular rehabilitation. In addition, those in the TBI track participate in numerous groups

designed to improve psychological health and resilience, as described below.

PTSD track participants receive daily, 1-hour individual cognitive behavioral therapy sessions, provided by licensed psychologists, including PE or CPT, both of which are strongly supported as first-line treatments for PTSD (Institute of Medicine, 2008). The choice of PTSD treatment modality is based on the participant's preference, prior treatment experience, and their provider's clinical judgment. For participants with a primary psychiatric diagnosis other than PTSD, individual cognitive behavioral therapy focusing on that presenting problem (e.g., major depressive disorder) is delivered. All treatment protocols have been adapted to be delivered within the structure of the 2-week day program (see below).

All patients are also screened by a physician for general health problems that might need to be considered or accommodated during their 2-week treatment program. In addition, participants receive an individual medication evaluation by a psychiatrist or psychiatric nurse practitioner, with adjustment to the medication regimen when indicated.

#### *Group Treatment*

A group model has been selected to facilitate the development of camaraderie and encouragement among veteran participants, while allowing for expedited delivery of empirically supported care (Sloan, Bovin, & Schnurr, 2012). Throughout the 2-week program, participants receive approximately 45 combined hours of group therapy. These groups include Dialectical Behavior Therapy skills, *In Vivo* exposure, Cognitive Health, Resilient Warrior, and Dual Recovery, as described below.

Eight 55-minute Dialectical Behavior Therapy (DBT) skills group sessions target deficits in emotion regulation, distress tolerance, and interpersonal functioning commonly seen in veterans with PTSD and other emotional disorders (Cahill, Rothbaum, Resick, & Follette, 2008; Wagner & Linehan, 2006). The DBT skills group sessions also aim to increase participants' capacities for healthy coping during the 2-week program in the context of intensive trauma-focused and cognitive rehabilitative individual therapy (Vujanovic, Niles, Pietrefesa, Schmertz, & Potter, 2011).

Five 90-minute *In Vivo* group sessions target the avoidance behaviors that maintain PTSD-related symptoms. *In vivo* (or "real world") exposure is a key component of PE to address the avoidance that maintains PTSD-related symptoms by having patients gradually, systematically, and repeatedly approach trauma reminders (e.g., Barrera, Mott, Hofstein, & Teng, 2013). The *In Vivo* group treatment has been developed using adapted materials from the Prolonged Exposure Therapy for PTSD Therapist Guide (Foa, Hembree, & Rothbaum, 2007) and the Group

Prolonged Exposure Therapy Manual (addendum to the Prolonged Exposure Therapy Manual; Smith et al., 2015).

Eight 55-minute Cognitive Health group sessions are delivered to all patients and aim to help patients identify and manage factors that impact cognitive functioning in their daily life. The session content has been informed by veteran-reported problems with cognition (Silverberg et al., 2017). The group emphasizes specific strategies for improving attention and memory in the context of mental health problems and stressors and includes psychoeducation regarding cognitive health. The group content is tailored to a veteran population and incorporates strategies from empirically supported sources, including Cognitive Symptom Management and Rehabilitation Therapy (CogSMART; Twamley, Jak, Delis, Bondi, & Lohr, 2014) and the Defense & Veterans Brain Injury Center's Study of Cognitive Rehabilitation Effectiveness (DVBIC-SCORE) manual (Cooper et al., 2017).

Six 75-minute sessions of "Resilient Warrior," an adaptation of the Relaxation Response Resiliency Program (Park et al., 2013; Vranceanu et al., 2014) for post-9/11 service members and veterans, are included to facilitate the management of anxiety and stress through mind-body techniques (Sylvia et al., 2015). This group focuses on eliciting the relaxation response through a variety of methods, such as meditation, deep breathing, and yoga.

Four 55-minute Dual Recovery group sessions are offered to participants with co-occurring problematic substance use. The Dual Recovery group addresses the common co-occurrence of PTSD and substance use disorders (SUDs) in returning veteran populations (Seal et al., 2009) that often leads to poorer outcomes in standard treatment (Back, 2010; Carter, Capone, & Short, 2011). This group, adapted from evidence-based SUD and integrated PTSD-SUD treatment models (Norman, Wilkins, Tapert, Lang, & Najavits, 2010) enhanced with brain-based models of addiction published by the National Institute on Drug Abuse (Volkow, 2014), provides education highlighting the association between PTSD and substance use, the psychological and physiological impacts of addiction, and teaches skills to identify triggers and manage common symptoms of PTSD and substance abuse in a healthier, more-effective manner.

#### *Integrative Health Approaches*

Integrative health approaches, including art therapy, yoga, Tai Chi, exercise, and nutrition, are also offered over the course of the 2-week program. These approaches are considered complementary because they may hold promise for PTSD treatment but require further evidence (Collie, Backos, Malchiodi, & Spiegel, 2006; Nanda, Gaydos, Hathorn, & Watkins, 2010). Some have demonstrated evidence supporting their use in common co-occurring conditions such as obesity, pain, metabolic syndrome,

depression, and anxiety (Descilo et al., 2010; Grodin, Piwowarczyk, Fulker, Bazazi, & Saper, 2008; Smith-Marek, Durtschi, Brown, & Dharnidharka, 2016).

Four 90-minute sessions of fitness, two 90-minute sessions of art therapy, and two 60-minute sessions each of yoga and Tai Chi are also provided. All participants also receive a brief, individualized nutritional consult with a certified dietitian, as well as one 55-minute group session of nutritional education and a more hands-on experience through a cooking demonstration and related meal planning. These experiences provide an overview of a range of strategies veterans may choose to continue in depth after returning home, and also provide strategies to support self-care, health and well-being, and relaxation skills during the emotionally intensive 2-week treatment period.

#### *Case Management*

Throughout the course of the ICP, each participant works with a social worker or nurse case manager to streamline his or her return to previous providers or to identify new sources of care and support for the veteran participant as well as his or her family member, if applicable. In addition, 1 month following completion of the ICP, participants are contacted to determine if they attended appointments and/or to assess if further case management assistance is needed.

#### *Veteran Peer Outreach*

Consistent with the Home Base program outpatient model developed to enhance treatment engagement (Goetter et al., 2017), post-9/11 Veteran Peer Outreach Coordinators are integrated into the 2-week ICP to provide social connectedness, positive role-modeling, destigmatization, and encouragement around care-seeking (Jain, McLean, & Rosen, 2012). In the ICP, the outreach coordinators fill a unique peer role with a focus on nonscheduled time and availability outside the clinical day, as well as being the logistical conduit between the program and the patients. Outreach coordinators are on staff 24 hours per day and help with everything from airport pickups to urgent issues that occur after the clinical program hours. Most important, they consistently interact with veteran participants and build strong connections that enhance their overall experience.

#### *Family Education*

Many veterans and service members prefer family involvement in their PTSD treatment, with 75%–80% of surveyed veterans reporting a strong interest in having their intimate partner involved in their treatment (Batten et al., 2009; Friedemann-Sanchez, Sayer, & Pickett, 2008; Khaylis, Polusny, Erbes, Gewirtz, & Rath, 2011; Meis et al., 2013). Integration of family members into care may also serve as a pathway for treatment engagement among veterans (Ohye et al., 2015). Thus, veterans are invited to identify a family

member or close friend to participate in 2 days of in-person education and support during the ICP. They receive 12 hours of psychoeducational groups about the symptoms of and treatments for PTSD and TBI, how PTSD affects relationships and parenting, the relationship between PTSD and substance use, medications used to treat PTSD and co-occurring disorders, and how PTSD and TBI affect cognitive functioning. A joint veteran-family group is included to facilitate veterans' and family members' communication on the impact of PTSD and/or TBI on the family system. Family members also engage in integrative health approaches such as art therapy and yoga.

#### **Outcomes Assessment**

Participants complete a set of clinical measures before and after the 2-week program. Measures assess key treatment targets of PTSD, depression, neurobehavioral symptoms, and satisfaction with their ability to participate in their expected social roles (see below). The PTSD Checklist for the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; Weathers et al., 2013), Neurobehavioral Symptom Inventory (Cicerone & Kalmar, 1995), and Patient Health Questionnaire-9 (Kroenke, Spitzer, & Williams, 2001) are used as primary measures of symptom improvement in this report. A Patient-Reported Outcomes Measurement Information System measure, developed by the National Institute of Health (Cella et al., 2007), is used to assess satisfaction with social roles.

#### **Measures**

The PTSD Checklist for DSM-5 (PCL-5) is a 20-item self-report measure that is psychometrically sound. It is useful for quantifying PTSD symptom severity, and detecting clinical change over time in PTSD symptoms (Bovin et al., 2016; Wortmann et al., 2016). PCL-5 total scores range from 0 to 80, with increased scores indicating greater PTSD symptom severity. Cronbach's alpha in our sample was 0.91 before treatment and 0.94 after. The PCL-5 is administered using standard instructions before treatment and adapted so that veterans rate their symptoms over the "past week" after treatment (instead of the "past month").

The Neurobehavioral Symptom Inventory (NSI) is a 22-item symptom rating scale used in the U.S. Department of Defense and Veterans Administration to screen for persistent symptoms following mild TBI (Cicerone & Kalmar, 1995). The scale includes a broad range of symptoms such as headaches, dizziness, fatigue, sleep difficulties, anxiety, irritability, and cognitive deficits. Factor analytic studies have repeatedly demonstrated that the NSI is multidimensional, measuring a range of somatic/sensory, affective, and cognitive symptoms in those with TBI or due to other causes, including PTSD (Caplan et al., 2010; Meterko et al., 2012; Vanderploeg et al., 2015). Total scores

range from 0 to 80. The pre- and posttreatment alphas in our sample were both 0.93.

The Patient Health Questionnaire-9 (PHQ-9) is a 9-item, validated, self-report measure of depression based on the DSM-IV-TR (Kroenke et al., 2001). The PHQ-9 is widely used in primary care and psychiatric settings and shown to be reliable and valid when screening depression in those with TBI (Fann et al., 2005) and active-duty service members (Hoge et al., 2004; Thomas et al., 2010). Total scores range from 0 to 27, with increased scores reflecting greater symptom severity. The alpha in our sample was 0.84 before treatment and 0.86 after treatment.

The National Institutes of Health have funded the development, evaluation, and distribution of the Patient-Reported Outcomes Measurement Information System (PROMIS<sup>®</sup>) measures. These highly reliable and precise tests are designed to measure physical, psychological, and social well-being. The Satisfaction with Participation in Social Roles–Short Form 8a (version 1.0) is used to assess “satisfaction with participation” in different social settings such as work, family, leisure activities, and relationships with friends (Cella et al., 2010; Cella et al., 2007). The pre- and posttreatment alphas for this measure were 0.93 and 0.96, respectively.

### Statistical Approach

This report examines outcomes for all participants who were eligible for and entered the program over the initial 14-month period of the program. Endpoint PCL-5 for the first two cohorts ( $n = 17$ ) were missing, as the “past week” version of the measure was not administered until the third cohort. A small subset of patients ( $n = 4$ ) did not complete the program and thus have only pretreatment measures. Two patients completed the program but did not complete their posttreatment measures on time, resulting in 126 participants (105 PTSD track and 21 TBI track patients) with analyzable endpoint data. Finally, for each measure, if data were missing at either baseline or endpoint, the participant was excluded from that analysis (only one to three participants excluded per analysis). Outcomes are reported for all program participants, and pre- to post-treatment change for each measure was examined using paired sample Student's  $t$ -tests. Pre-post change effect sizes were also calculated (Cohen's  $d$ ). All statistical analyses were conducted using Stata 13.0 (College Station, TX). The level of statistical significance was set to 0.05 (two-tailed).

## Results

### Sample Description

Participants were post-9/11 veterans and active-duty service members who were accepted into the ICP from February 2016 to March 2017. Participants in this sample had a mean age of 38.0 years ( $SD = 8.3$ ), and 18.9% ( $n = 25$ ) were women. Additional demographic

data are presented in Table 1. Of those who entered the program, 24 (18.2%) participants had never received previous treatment or evaluation for TBI, PTSD, or other

Table 1  
Demographic Characteristics of  $N = 132$  Intensive Clinical Program Participants

Characteristic	$n$ (%)
Male ( $n=132$ )	107 (81.1%)
Heterosexual ( $n=132$ )	128 (97.0%)
Race ( $n=122$ )	
American Indian/Alaskan Native	4 (3.0%)
Black/African American	7 (5.3%)
White	107 (81.1%)
Asian	1 (0.8%)
Other	12 (9.1%)
Hispanic/Latino ( $n=131$ )	12 (9.2%)
Relationship Status ( $n=132$ )	
Divorced	22 (16.7%)
Engaged	6 (4.6%)
Married/Domestic Partnership	68 (51.5%)
Single	21 (15.9%)
Widowed	1 (0.8%)
Separated	11 (8.3%)
Deployed ( $n=130$ )	122 (93.9%)
Total Deployments ( $n=122$ )	
One	69 (56.6%)
Two	28 (23.0%)
Three	17 (13.9%)
Four or more	8 (6.6%)
Military Branch ( $n=132$ )	
Army (including Reserves and National Guard)	89 (67.4%)
Marine Corps (including Reserves)	19 (14.4%)
Navy	7 (5.3%)
Air Force (including National Guard)	16 (12.1%)
Coast Guard	1 (0.8%)
Military Status ( $n=131$ )	
Active Duty	18 (13.7%)
Discharged	60 (45.8%)
Medically Retired	20 (15.3%)
National Guard	11 (8.4%)
Reserves	4 (3.1%)
Retired	18 (13.7%)
Current Primary Diagnosis based on outcomes measures and clinical interview ( $n=132$ )	
PTSD	104 (78.8%)
TBI	21 (15.9%)
Depression	6 (4.6%)
Alcohol Use Disorder	1 (0.8%)
Total Diagnoses ( $n=132$ )	
One	19 (14.4%)
Two	35 (26.5%)
Three	38 (28.8%)
Four	30 (22.7%)
Five or more	10 (7.6%)

mental health concerns. Of those who had been previously evaluated or received care, 91.7% ( $n = 108$ ) sought care or evaluation for PTSD, 54.6% ( $n = 59$ ) for TBI, and 50.0% ( $n = 54$ ) for both TBI and PTSD. Based on self-report among 126 veterans, a large majority of participants ( $n = 105$ ; 83.3%) were already receiving some form of psychiatric pharmacotherapy when they entered the ICP.

All participants on the TBI track had a primary diagnosis of TBI. The patients reported a history of multiple TBIs ( $M = 4.2$ ,  $SD = 3.7$ ,  $Range = 1-12$ ). The most severe injury was classified as mild for 16 (72.7%), moderate for 4 (18.2%), severe for 1 (4.5%), and missing for 1 (4.5%). All patients had significant concerns about their cognitive functioning in their daily life. Following a comprehensive neuropsychological evaluation, approximately one-third were considered to have objective evidence of at least mild cognitive deficits and the majority had broadly normal cognitive functioning on testing. The large majority in the TBI track reported difficulties with headaches (68%) and bodily pain (72%), and most were identified as having a vestibular or oculomotor problem that might be treatable with physical therapy (88%). Most participants in the TBI track reported sleep problems (92%), and (28%) were diagnosed with sleep apnea. The vast majority of those on the "PTSD" mental health track ( $n = 104$ ; 93.7%) had a primary PTSD diagnosis. Most patients on the TBI track also had a diagnosis of PTSD ( $n = 16$ ; 76.2%). Most patients on both tracks met criteria for two or more psychiatric diagnoses ( $n = 113$ ; 85.6%), with 30.3% ( $n = 40$ ) meeting criteria for four or more diagnoses. Depression was the most common co-occurring disorder ( $n = 72$ ; 54.6%),

followed by substance use disorders ( $n = 60$ ; 45.5%). Of those with co-occurring substance use disorders ( $n = 60$ ), most ( $n = 42$ ; 70.0%) were diagnosed with alcohol use disorder.

### Program Completion

A total of 132 participants entered the treatment program with a 97% completion rate ( $n = 128$ ). The ICP completers included all 21 TBI track participants and 107 of the 111 PTSD track program participants. Four PTSD track participants required a higher level of care and discontinued early.

### Individual Treatment Delivery

There was some customization of the individual evidence-based therapy selected for patients by their providers. In these cohorts, all participants on the TBI track received individual cognitive rehabilitation. Of the 111 patients on the PTSD track, 53 (47.8%) received PE, 23 (20.7%) received CPT, and 35 (31.5%) received more general cognitive behavioral therapy for PTSD, depression, or other presenting complaints.

### Treatment Outcomes

Pre- and posttreatment patient-reported outcome measures are presented in Table 2. Those in the PTSD track experienced a statistically significant and clinically meaningful improvement in traumatic stress (PCL-5 Cohen's  $d = 1.16$ ), neurobehavioral symptoms (NSI  $d = .65$ ), depression (PHQ-9  $d = .87$ ), and satisfaction with participation in social roles ( $d = -0.82$ ). Similarly, those in the TBI track experienced a statistically significant and

Table 2  
Pre- and Posttreatment Outcome Measures

	Pre-treatment <sup>a</sup>		Post-treatment <sup>b</sup>		<i>p</i>	Cohen's <i>d</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
PTSD/mental health-focused track ( $n=105$ )*						
PCL-5 ( $n=88$ )	54.8	13.5	37.4	16.3	<.001	1.16
PHQ-9 ( $n=105$ )	16.1	5.6	11.1	5.9	<.001	0.87
NSI ( $n=103$ )	42.7	16.2	31.9	17.1	<.001	0.65
PROMIS Satisfaction ( $n=105$ )	17.2	6.9	23.4	8.3	<.001	-0.82
TBI track ( $n=21$ )*						
PCL-5 ( $n=16$ )	50.4	15.9	35.3	16.8	<.001	0.89
PHQ-9 ( $n=20$ )	14.4	6.9	10.4	5.1	<.01	0.66
NSI ( $n=19$ )	50.6	18.7	37.7	15.2	<.001	0.76
PROMIS Satisfaction ( $n=20$ )	16.5	6.3	24.4	7.4	<.001	-1.15

Note. PCL-5 = PTSD Checklist for DSM-5; PHQ-9 = Patient Health Questionnaire-9; NSI = Neurobehavioral Symptom Inventory; PROMIS Satisfaction = Patient-Reported Outcomes Measurement Information System (PROMIS<sup>®</sup>) Satisfaction with Participation in Social Roles – Short Form 8a (version 1.0).

<sup>a</sup> PCL-5 past month version.

<sup>b</sup> PCL-5 past week version.

\* Data presented for each measure are for the subsamples noted with complete data.

clinically meaningful improvement in traumatic stress (PCL-5  $d = .89$ ), neurobehavioral symptoms (NSI  $d = .76$ ), depression (PHQ-9  $d = .66$ ), and satisfaction with participation in social roles ( $d = -1.15$ ). Anonymous posttreatment satisfaction survey data were available for 95% ( $n = 126$ ) of participants. Veterans reported a high level of program satisfaction across items. For example, 92% ( $n = 116$ ) agreed the care helped them function better in life, and 96% ( $n = 121$ ) would recommend the program to another veteran.

### Discussion

This article describes a novel 2-week, multidisciplinary, comprehensive, intensive outpatient treatment program for veterans with complex, often difficult-to-treat, mental health problems. The program has two tracks, one for those with primary PTSD and related mental health concerns, and one for those who have had TBIs and who might benefit from cognitive rehabilitation, multimodal physical therapy, and psychological health treatment. In contrast to the high rates of dropout seen with outpatient PTSD treatment, with a mean dropout rate of 36% in post-9/11 veterans (Goetter et al., 2015), ICP completion was very high, with 97% of participants completing the program in its first 14 cohorts. One of the strengths of this brief intensive cohort model is the minimization of factors that interfere with treatment completion compared to interventions spread over 3 to 4 months of regular outpatient visits. Participants received intensive evidence-based therapy targeting their primary concern delivered daily alongside a full complement of other treatments designed to support recovery and enhance coping and life skills.

It is important to emphasize that those who are treated in the TBI track are carefully evaluated by a multidisciplinary team and they are selected because they present with complex symptoms and problems that are believed to be modifiable through active rehabilitation. The large majority of service members with a history of mild TBI experience a full clinical recovery. In contrast, the patients we see represent a very small minority who have extensive and diverse symptoms problems that are multifactorial in etiology. We do not assume that the problems are all caused by underlying brain injury; instead, we assume that multiple factors are contributory and a biopsychosocial approach to treatment and rehabilitation is provided.

Consistent with the hypothesis that 2 weeks of intensive treatment delivery in a cohort may be an effective and efficient model for post-9/11 veterans with PTSD and/or TBI, both groups experienced large improvements in standard self-report measures of PTSD, neurobehavioral symptoms, depression, and quality of life following program completion. Satisfaction ratings with the program and its intensive 2-week cohort model of care were also high. These

findings are particularly notable given the large majority (81.8%) of veterans had engaged in some form of mental health care prior to the ICP, and many described feeling as though prior treatment had not resulted in the improvement they were seeking, which contributed to their participation in the program. Conclusions from these naturalistic data are limited by the lack of formal randomized comparisons or blinded ratings. Nonetheless, changes were clinically meaningful as represented by the level of reduction seen in symptom scales, resulting in large effect sizes.

The comprehensive and innovative nature of this program—including the intensity and breadth of interventions—provided a high “dose” of treatment that likely facilitated these robust outcomes. Further investigation is needed to understand which treatment components contributed most to these outcomes. It is noteworthy that such positive outcomes were achieved in a sample in which over 50% of participants met criteria for three or more major psychiatric diagnoses. The implication of these findings is that veterans seen for a “primary” condition, such as PTSD or TBI, also experience parallel improvement in co-occurring conditions. Additional research is needed to understand how this model of care delivery compares to standard outpatient delivery of weekly evidence-based PTSD treatments such as PE and CPT alone. Additional research is also needed to learn whether short-term gains at the end of the 2-week intensive treatment period are maintained over time.

Several environmental factors may contribute to effectiveness of this intensive approach. First, the value of being in a cohort with other veterans in treatment and as peer mentors was repeatedly noted by both veterans and family member participants. Group cohesion likely increased motivation to work toward improvements in symptom management and overall satisfaction with the program. A veteran enhanced staffing model also helped facilitate a sense of camaraderie and feeling of being understood among patients, and also supported nonmilitary staff members in their work with program participants. These unmeasured factors likely contributed to symptomatic improvements, and may be important components to consider in the model’s effectiveness.

### Clinical Challenges

Several clinical challenges were encountered in developing and implementing this new treatment program. First, 60 patients with PTSD and/or TBI (45.5%) met criteria for a co-occurring substance use disorder. All participants were encouraged to refrain from substance use from the date of acceptance into the program; however, it was anticipated that patients’ compliance would be variable. We quickly learned that some participants viewed this time interval

between acceptance and program start as “unmonitored” and their last opportunity for substance use prior to program initiation. Thus, some participants arrived in varying degrees of withdrawal from different substances. In some cases, withdrawal was significant enough to impair an individual’s ability to participate in treatment modalities (i.e., feeling agitated or sleepy during group therapy), and staff members needed to triage ways to mitigate the impact of withdrawal on participation.

For all patients, abstinence from alcohol and other illicit substances is mandated during the entire 2-week program. As a way of increasing adherence to this rule, daily urine toxicology and breathalyzer screens are conducted, with results available within the same day to the treatment team. Some participants found these screens to be intrusive, unnecessary, or simply a violation of trust. In response, the clinical team intensified efforts to provide the rationale for these policies prior to program participation, at program onset, and as needed. Our experience anecdotally supported that providing this additional psychoeducation and staying “on message” as a team greatly helped reduce patient expression of negativity regarding these policies. Importantly, ICP participants with a history of a substance use disorder were required to attend the Dual Recovery group. This group facilitated the ability of clinical staff members to formally address the risk for relapse and teach relapse prevention strategies to this subset of patients.

Second, although we expected this population to experience significant psychosocial stress upon entry to the program, we quickly learned that despite preprogram screening, the *degree* to which a stressor (e.g., marital conflict, financial strain) was present was often unclear until the patient’s arrival. Thus, there were cases in which patients began the program less able to focus on primary treatment goals. For instance, one participant arrived at the program soon after learning his spouse wished for a divorce, and the acute distress he experienced significantly impaired his ability to focus on PTSD treatment. As a result of these experiences, we further strengthened our prescreening of family/relationship functioning and individually tailored the family portion of the program to address acute issues in this realm.

Finally, participation in this intensive, 2-week clinical program requires patients to integrate into a cohort of peers, all of whom are in significant psychological distress. Participants spend a significant portion of the day together, both in the treatment setting as well as informally (e.g., meals, exercise, local trips). Successful integration requires interpersonal effectiveness, distress tolerance, and the ability to resist fostering or becoming part of negative within-cohort alliances. We experienced several situations in which such alliances became treatment-interfering, permeating the content of group and individual therapies

and distracting from primary treatment goals. In response to this, we improved our prescreening process to include a specific assessment for how individuals previously functioned within a group treatment setting and how they responded in situations of interpersonal conflict. While such issues are common in PTSD and related comorbidities, this additional knowledge improved screening to identify those in need of additional skills, as well as helping with balancing the make-up of cohorts.

### Limitations

Several important limitations should be considered. This was an open, uncontrolled evaluation of a treatment program provided in a naturalistic clinical setting. As described, the program includes numerous conventional treatments and integrative health approaches, as well as environmental factors that might contribute to positive outcomes. The multifaceted approach imbedded in a highly supportive environment prevents determination of the most active components of the intensive program. Finally, longitudinal assessment and evaluation of the durability of the large clinical improvements seen at the end of the program is needed. Future research examining the cost-effectiveness of intensive treatment approaches for service-related mental health disorders is warranted.

### Public Health Significance and Future Directions

An effective and scalable private sector intensive clinical program, which offers post-9/11 veterans and service members rapid access to cost-free, evidence-based, and multifaceted care, helps address a significant public health problem: *untreated or inadequately treated mental health problems in a highly vulnerable population who face barriers to timely access to high-quality mental health care.* Priorities for further development of the Home Base intensive program will include systematic measurement of long-term outcomes to examine durability of treatment gains, refinement of the process of matching treatment “packages” to specific clinical presentations, and determination of what treatment components account for specific outcomes. With these efforts, we hope this model will enhance the delivery of efficient and effective evidence-based care to this underserved population.

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