

Vocational Rehabilitation for Veterans with Traumatic Brain Injury: a 10-year Multi-study Investigation

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Disclaimer and Acknowledgement

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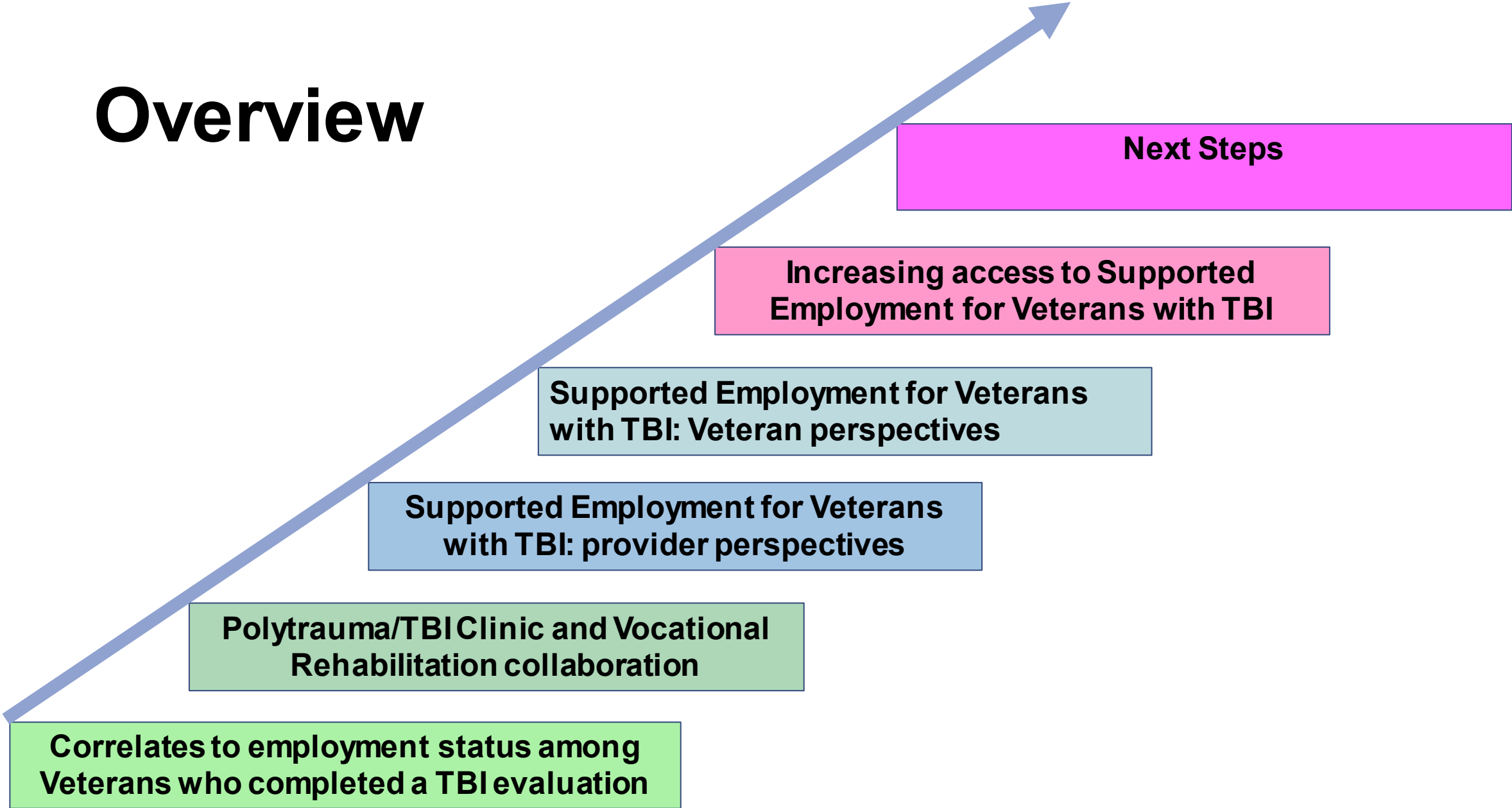
Polytrauma/TBI

- David X. Cifu, MD
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Prospective Longitudinal Study

Overview



Background:

Post-9/11 Veterans with TBI

- In the Veteran Health Administration (VHA), since 2007, more than 1.7 million Post-9/11 Veterans screened for possible TBI, resulting in more than 107,000 with a clinician-confirmed TBI.¹
 - An additional ~100,000 self-reported a previous TBI diagnosis.¹
- From 2000-2023, Q1: 479,953 TBIs have been documented among U.S. Service Members (82.2% mild TBI).²
- Mild TBI comorbidities may include PTSD, depression, anxiety, pain, and substance use, which can contribute to disability.³
- VHA administrative, survey, and interview data suggest unemployment is a problem in Veterans with TBI.⁴⁻⁶

Community Reintegration: Return to Work and School

- **Veterans Benefits Administration (VBA):** Veteran Readiness & Employment (VR&E), Post-9/11 GI Bill
- **VHA:** Vocational Assistance, Compensated Work Therapy (CWT) (e.g., Transitional Work, Community-Based Employment Services, Supported Employment)
- **Meaningful Work:** identity, structure, income, daily activity, and socialization.
- **Employment:** improved psychological health,^{7,8} financial security,⁹ self-esteem,^{8,9} quality of life,^{10,11} and physical health.¹²
- **Unemployment:** preoccupation with symptoms, social isolation, economic instability, family problems, substance use, homelessness, and increased suicide risk.¹³⁻¹⁵

**What is the relationship between
deployment-related TBI history,
suspected psychiatric conditions, neurobehavioral
symptoms, and employment status among
Post-9/11 Veterans?**

VHA HSR&D Grant: SDR 08-405

**Screening for mild traumatic brain injury in OEF-OIF deployed
US military: an empirical assessment of VHA's experience**

PI: Ann M. Hendricks, PhD

VHA Polytrauma/TBI System of Care: TBI Screening and Comprehensive TBI Evaluation Mandate Effective 2007

- All Veterans seeking VA health care who served in combat and separated from active duty after September 11, 2001 are screened for possible TBI.
- **TBI screener:** A positive screen on this 4-item measure should lead to a referral to a Comprehensive TBI Evaluation (CTBIE).
- **Comprehensive TBI Evaluation:** Determination of a TBI diagnosis by a TBI specialist; Interdisciplinary assessment of other health and psychosocial needs.
- **Individual Rehabilitation and Community Reintegration Care Plan:** For Veterans with a TBI diagnosis who are engaged with a Polytrauma/TBI team and have TBI-related skilled therapy (e.g., neuropsychology, physical therapy) and case management needs. This facilitates coordinated care with the goal of maximizing function.

Comprehensive TBI Evaluation (CTBIE) includes:

1. Sources of injury (bullet, vehicular, fall, blast, other blunt trauma)
2. Blast exposure: (IED, Rocket propelled grenade, bomb, other)
3. Experiences immediately after injury/duration
 - a) Loss of Consciousness
 - b) Alteration of Consciousness
 - c) Posttraumatic Amnesia (immediately before or after)
4. If yes or suspected/probable, symptoms of which disorders?
 - Depression
 - PTSD
 - Anxiety disorder (other than PTSD)
 - Alcohol abuse/dependence
 - Drug abuse/dependence
 - Psychotic disorder
 - Other AXIS I disorder
 - Somatoform disorder
5. Neurobehavioral Symptom Inventory (NSI)

	Neurobehavioral Symptom Inventory
Vestibular	1. Feeling Dizzy
	2. Loss of balance
	3. Poor Coordination, clumsy
Somato-sensory	4. Headaches
	5. Nausea
	6. Vision problems, blurring, trouble seeing
	7. Sensitivity to light
	8. Hearing difficulty*
	9. Sensitivity to noise
	10. Numbness or tingling on parts of my body
	11. Change in taste and/or smell
	12. Loss of appetite or increased appetite*
Cognitive	13. Poor concentration, can't pay attention
	14. Forgetfulness, can't remember things
	15. Difficulty making decisions
	16. Slowed thinking, difficulty getting organized, can't finish things
Affective	17. Fatigue, loss of energy, getting tired easily
	18. Difficulty falling or staying asleep
	19. Feeling anxious or tense
	20. Feeling depressed or sad
	21. Irritability, easily annoyed
	22. Poor frustration tolerance, feeling easily overwhelmed by things

Please rate the following symptoms with regard to how they have affected you over the past 30 days
Use the following scale:

None 0 - Rarely if ever present; not a problem at all
Mild 1 - Occasionally present, but it does not disrupt activities; I can usually continue what I'm doing; doesn't really concern me.

Moderate 2 - Often present, occasionally disrupts my activities; I can usually continue what I'm doing with some effort; I am somewhat concerned.

Severe 3 - Frequently present and disrupts activities; I can only do things that are fairly simple or take little effort; I feel like I need help.

Very Severe 4 - Almost always present and I have been unable to perform at work, school, or home due to this problem; I probably cannot function without help

*Symptom did not load on any factor, per Meterko et al., 2012¹⁷

What is the relationship between deployment-related TBI history, suspected psychiatric conditions, neurobehavioral symptoms, and employment status among Post-9/11 Veterans?

Pogoda TK, Stolzmann KL, Iverson KM, Baker E, Krengel M, Lew HL, Amara JH, & Meterko M. (2016) Associations between traumatic brain injury, suspected psychiatric conditions, and unemployment in Operation Enduring Freedom/Operation Iraqi Freedom veterans. *Journal of head trauma rehabilitation*, 31(3):191-203.

Methods

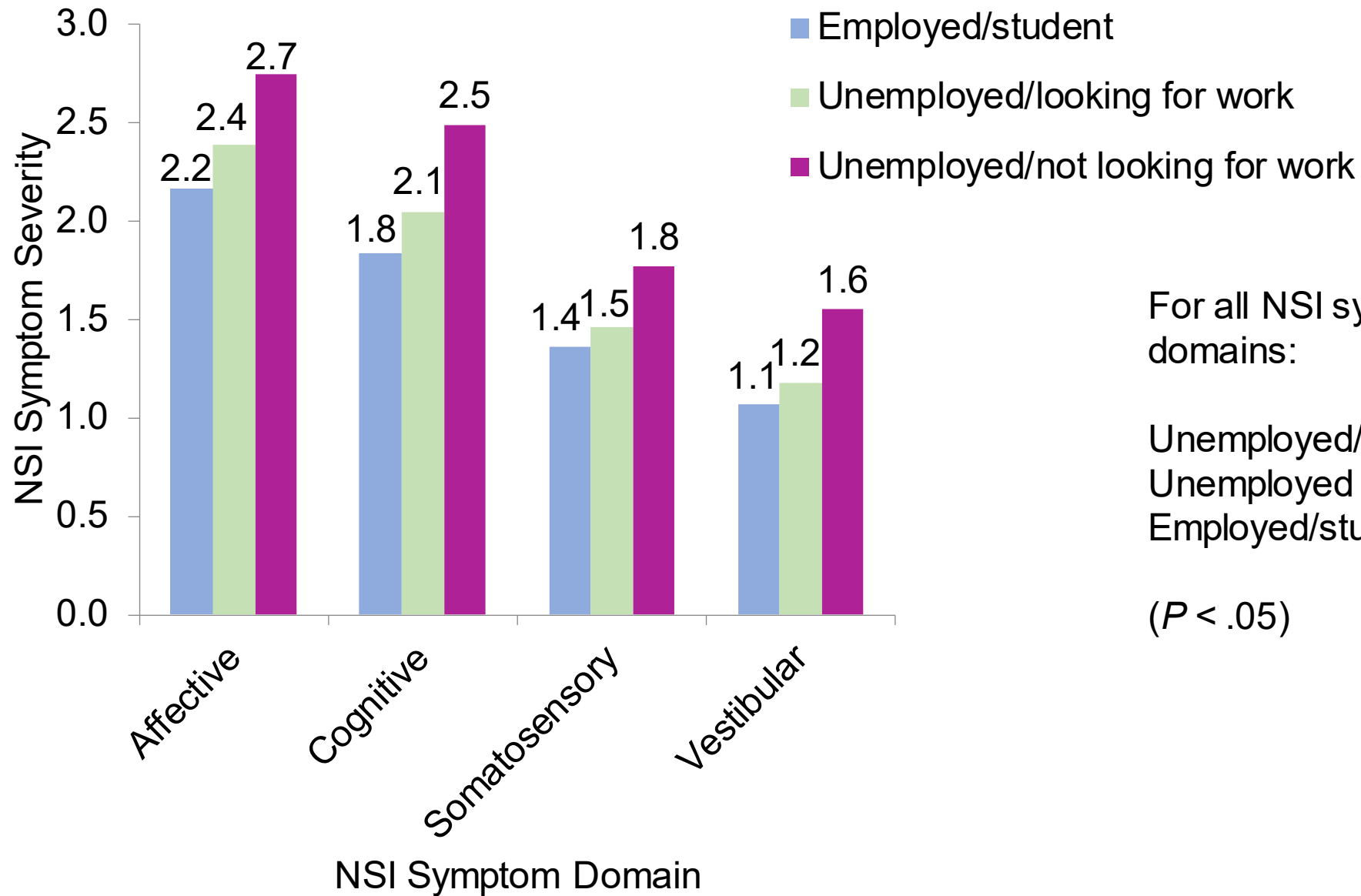
- **Retrospective cross-sectional database review** of CTBIE from October 2007-June 2009.
 - VHA Patient Care Services (CTBIE)
 - Department of Defense (DoD) Manpower Data Management Center (Military/Demographic characteristics)
- **Outcome: Employment status at CTBIE**
 - Employed/Student: Full-time or part-time work, student
 - Unemployed/looking for work
 - Unemployed/not looking for work (excluded volunteering and homemaking)
- **Veteran Characteristics**
 - Demographics
 - Deployment-related TBI severity
 - Suspected psychiatric conditions
 - NSI severity
- **Statistical Testing:** ANOVA, chi-square, multinomial logistic regression

Table 1. Injury and Health Characteristics among Post-9/11 Veterans who Completed a CTBIE

Characteristics	Total (N=11,683) %	Employed/ Student (n=7,680; 65.7%) %	Unemployed/ looking for work (n=2,293; 19.6%) %	Unemployed/ not looking for work (n=1,710; 14.6%) %
Injury Etiology				
Non-blast only	19.6	18.8	20.8	21.2
Blast only	39.4	39.9	39.2	37.7
Non-Blast + Blast	41.0	41.3	40.0	41.1
Deployment-related TBI Severity*				
None	30.5	32.5	28.4	24.9
Mild	56.0	56.4	56.6	53.2
Moderate/Severe	13.5	11.1	15.0	22.0
Suspected Psychiatric Condition				
PTSD*	68.3	65.3	70.2	79.2
Depression*	39.9	36.6	43.0	50.4
Anxiety*	25.1	24.1	27.3	26.3
Alcohol abuse/dependence*	7.5	6.4	8.9	10.5
Drug abuse/dependence*	2.1	1.2	3.1	4.7

*p<.05

Figure 1. NSI symptom severity, by employment status.



For all NSI symptom severity domains:

Unemployed/not looking for work >
Unemployed looking for work >
Employed/student

($P < .05$)

Figure 2. NSI symptom severity and employment status, by number of suspected psychiatric conditions, among Veterans with clinician-confirmed deployment-related mild TBI (N = 6,352)

**0 Suspected
Psychiatric Conditions**

**1 Suspected
Psychiatric Conditions**

**≥ 2 Suspected
Psychiatric Conditions**

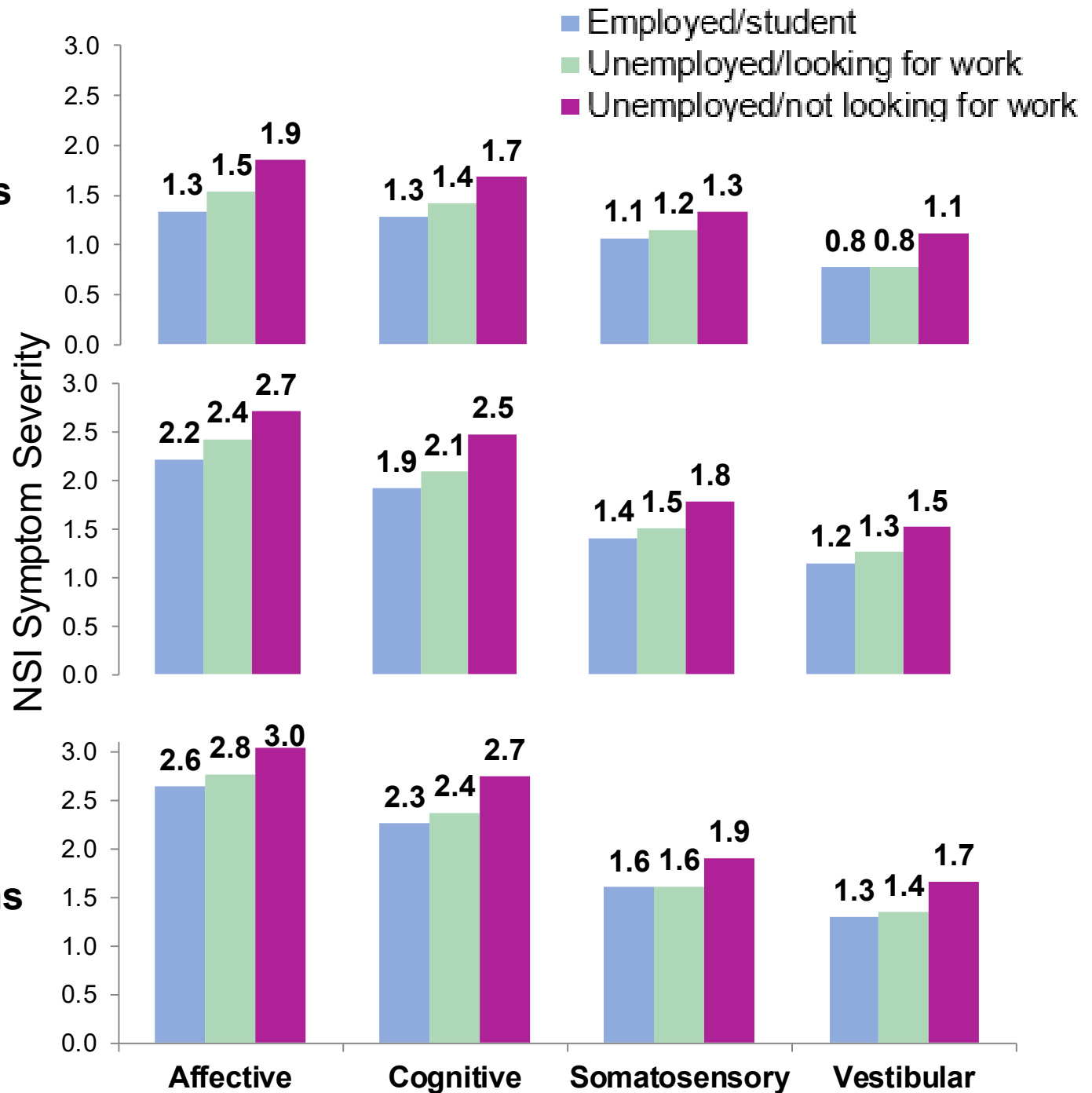


Table 2. Factors associated with employment status at CTBIE among Post-9/11 Veterans with deployment-related mild TBI history

Characteristic	Ref: Employed/Student	
	Unemployed/ looking for work	Unemployed/ not looking for work
	Adjusted OR 95% CI	Adjusted OR 95% CI
Education (reference: Bachelor's Degree or Higher)		
High School or Less	1.27 (.93-1.75)	1.63 (1.13-2.36)
Some Post High School Education	.98 (.71-1.35)	1.38 (.95-2.00)
Suspected Psychiatric Condition		
PTSD	.87 (.74-1.02)	1.51 (1.21-1.88)
Anxiety	.90 (.77-1.05)	.91 (.76-1.09)
Depression	1.09 (.95-1.25)	1.15 (.98-1.35)
Alcohol Abuse/Dependence	1.10 (.87-1.41)	1.09 (.83-1.43)
Drug Abuse/Dependence	2.43 (1.58-3.76)	3.34 (2.12-5.25)
NSI Symptoms		
Affective	1.26 (1.13-1.41)	1.37 (1.19-1.58)
Cognitive	1.04 (.95-1.15)	1.25 (1.12-1.40)
Somatosensory	.96 (.84-1.10)	1.10 (.94-1.28)
Vestibular	1.02 (.92-1.14)	1.13 (1.00-1.28)

Also adjusted for sex, age, marital status, military branch, military component, and blast/non-blast exposure

Summary

- Among Post-9/11 Veterans who completed a CTBIE, a non-trivial minority were unemployed and either looking (19.6%) or not looking (14.6%) for work. The majority (56%) had clinician-confirmed deployment-related mild TBI history.
- Increased neurobehavioral symptom severity and number of suspected psychiatric conditions were associated with lower levels of employment.
- Clinical and behavioral interventions to alleviate neurobehavioral symptoms and psychiatric conditions may lead to improved function.
- Including vocational rehabilitation as part of interdisciplinary care may fill a critical gap and facilitate return to work.



Is Collaboration between Polytrauma/TBI and Vocational Rehabilitation teams Associated with Employment Status?

**VA HSR&D IIR: 11-078
Organizational and Patient Factors Related to
Polytrauma/TBI Patient Outcomes
PI: Terri K. Pogoda, PhD**

VHA Polytrauma System of Care

Outpatient Polytrauma/TBI Core Staffing



Methods

- Polytrauma/TBI Director Survey (N = 24)
 - Who are the “Core” team providers
- Veteran survey on community reintegration, including employment status (July 2014)
 - 24 Polytrauma/TBI Sites
 - 6,000 surveys → 5,537 recipients had “good” addresses
 - 881 respondents (16%)
- VHA Administrative Data (Jan 2011-Sep 2013)
 - CTBIE
 - ICD-9 codes
- Interviews: Providers for Veterans with polytrauma/TBI (n = 68)

Methods

- **Outcome of Interest: Intent for Paid Employment (Yes vs. No)**
 - **CTBIE (Time 1)**
 - **Yes** = Full-time or part-time work, Student, Unemployed/looking for work
 - **No** = Unemployed/not looking for work, Volunteer, Homemaker
 - **Survey (Time 2)**
 - **Yes** = Full-time or part-time work, student, Unemployed/looking for work
 - **No** = Unemployed/not looking for work, Volunteer, Homemaker, Unable to work due to disability, Retired
- **Veteran Characteristics**
 - Demographics
 - Military characteristics
 - Deployment-related TBI severity
 - Psychiatric conditions
 - Time between CTBIE and survey completion
 - **Completed CTBIE at a Polytrauma/TBI clinic that collaborated with Vocational Rehabilitation**
- **Statistical Testing:** t-test, chi-square, logistic regression

Results

Polytrauma/TBI Director Survey (n = 24)

- Which disciplines do you consider to be part of the outpatient Polytrauma/TBI clinic core team?

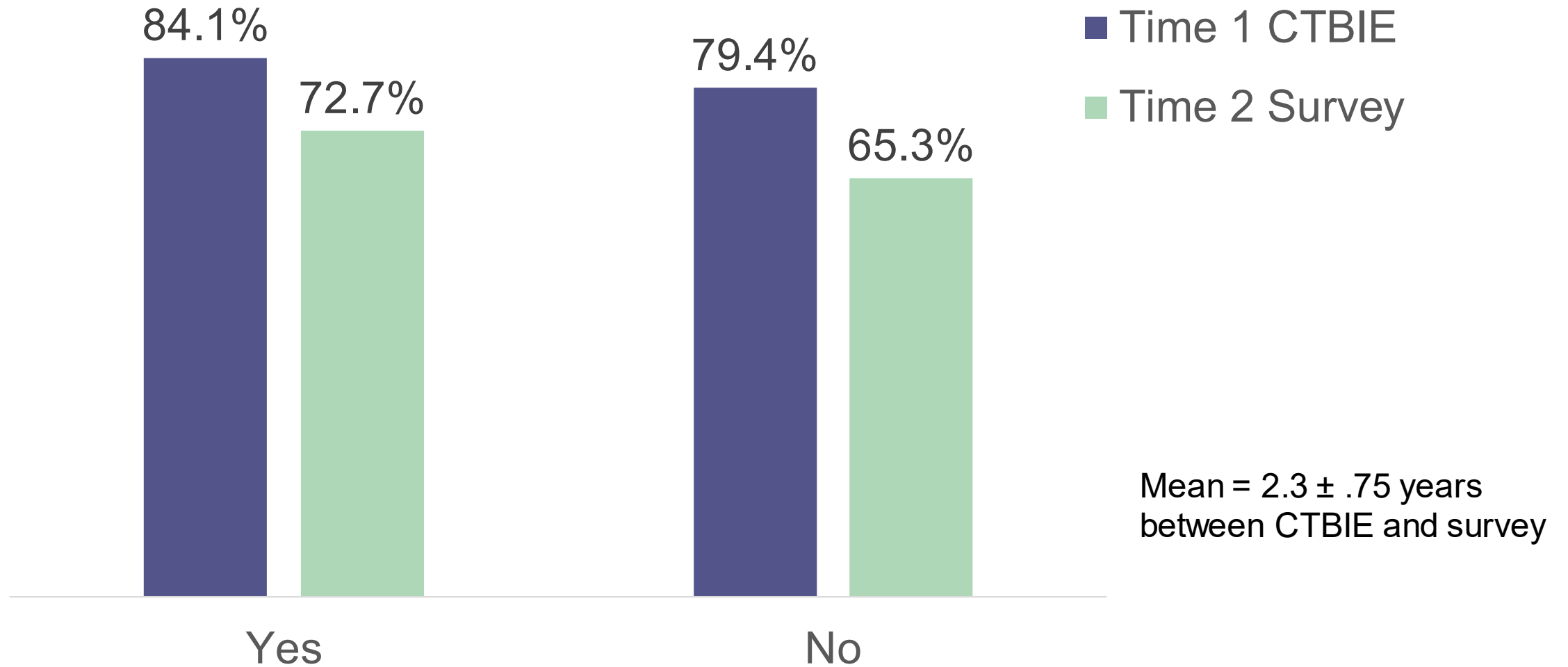
Yes		n	%
<input checked="" type="checkbox"/>	Vocational Rehabilitation Specialist	5	20.8

“In general, the outpatient Polytrauma/TBI clinic core team consists of the staff who are **supported by the dedicated funding for the Polytrauma/TBI clinics**. However, you may have additional staff supported by other sources of funding that you consider to be part of your outpatient Polytrauma/TBI core team. Please include them if they **regularly attend Polytrauma/TBI clinic meetings** with other core staff or are **involved in the Comprehensive TBI Evaluation process for all or almost all new Polytrauma/TBI clinic patients**. *(Check all that apply.)*”

Table 1. Veteran survey respondents (N = 881)

Characteristics	%
Male	82.1
White	69.4
Hispanic	15.7
Age at survey completion	M = 37.1 ± 9.4
Army	71.8
Marines	16.7
Navy/Air Force/Coast Guard	11.4
Non-blast exposure	29.5
Blast exposure	40.4
Non-blast + Blast exposure	30.1
Deployment-related TBI Severity	
None	26.2
Mild	69.0
Moderate/Severe	4.8
PTSD	63.5
Depression	43.4
Anxiety	24.9
Alcohol use disorder	12.7
Drug use disorder	5.9

Fig 1. Veteran Intent for Paid Employment = Yes



Polytrauma/TBI Clinic-Vocational Rehabilitation Collaboration

Table 3. Adjusted odds of Intent for Paid Employment at Time of Survey.

Characteristic	Adjusted Odds Ratio (95% Confidence Interval)
Polytrauma/TBI-Vocational Rehabilitation collaboration (Yes vs. No)	2.12 (1.12-4.02)
Age	.95 (.92-.97)
No PTSD vs. PTSD	3.56 (2.18-5.82)
Marines vs. Army	2.08 (1.11-3.88)

Note. The model was also adjusted for TBI severity, sex, race, ethnicity, military branch, military rank, injury etiology, marital status, education, depression, anxiety, alcohol use disorder, drug use disorder, # of years between CTBIE and survey completion, and number of Polytrauma/TBI clinic visits within 2-years post-CTBIE.

Summary

- Veterans who completed a CTBIE at a Polytrauma/TBI clinic with Vocational Rehabilitation collaboration had **2.12 times the odds of intent for paid employment** than Veterans who completed a CTBIE at a Polytrauma/TBI clinic without Vocational Rehabilitation collaboration.
- The impact of PTSD on intent for paid employment highlights the importance of interdisciplinary care including mental health providers.
- From CTBIE to survey completion, the rate of intent for paid employment **decreased** across the sample.



Experiences with Vocational Rehabilitation Services

Polytrauma/TBI Interdisciplinary Team Experiences

“And this Veteran is working and his employer just loves him but it was one of those where **it really took a village.**”
-Psychologist

“His information is valued. All [team members] being able to talk to the [VRS] about what they may be able to do or **how we can make modifications or what we can do to move the patient forward vocationally.**”
-Polytrauma/TBI Director



“I work with the treatment team members that are also providing services to try to get information from them, and they get information from me since I actually go out into the community and see the Veterans.”
-Supported Employment Provider

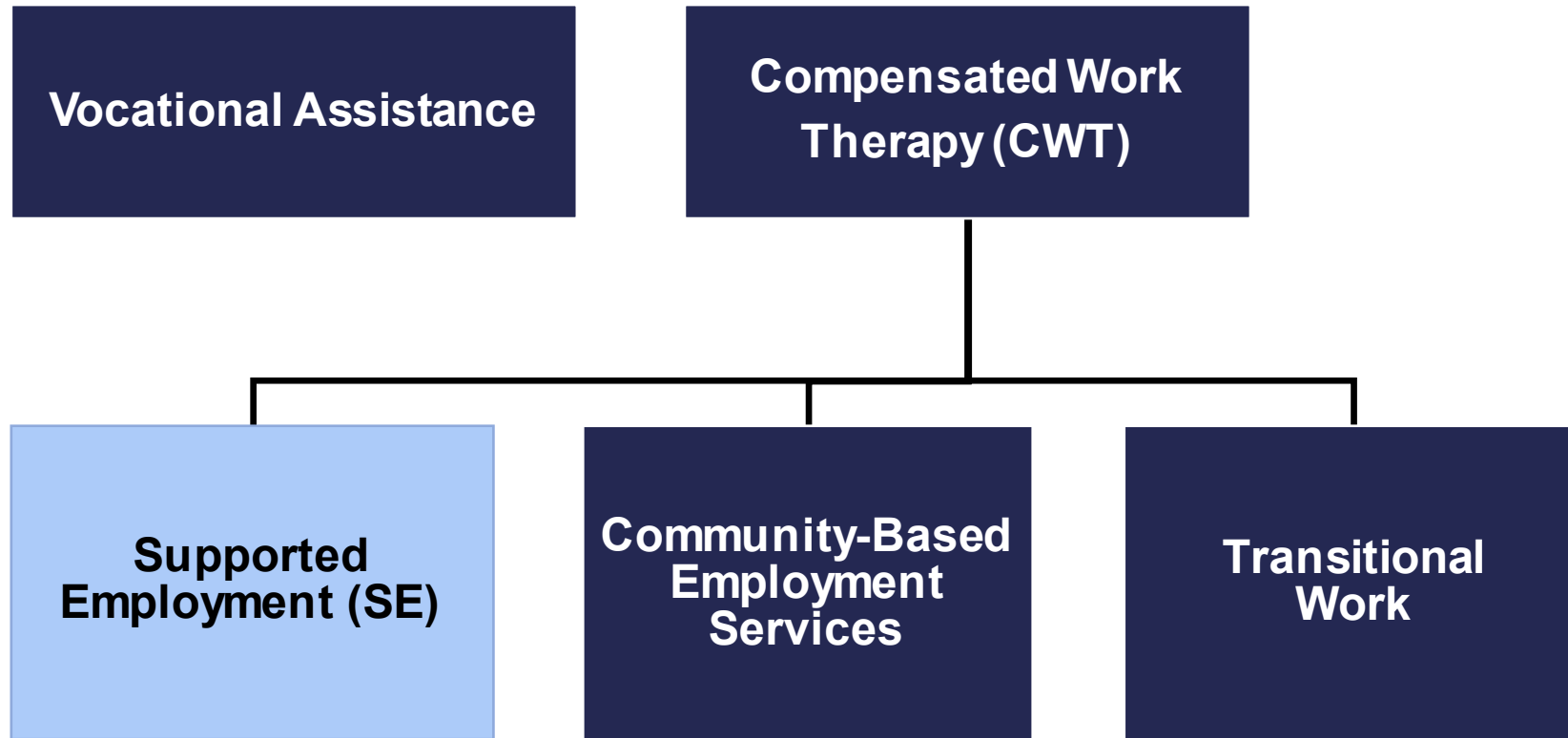
Organizational Factors Associated with Supported Employment for Veterans with TBI

Locally Initiated Project (2014)

**Funder: Center for Organization, Leadership and Management Research (COLMR),
a VA Health Services Research & Development Center of Excellence**

PI: Terri K. Pogoda, PhD

VHA Vocational Rehabilitation Programs



Recovery-oriented vocational rehabilitation services, integrated with clinical treatment, intended to assist Veterans with mental health conditions and/or physical impairment to find and maintain meaningful, community-based employment.

Principles of Individual Placement & Support Model of Supported Employment (IPS-SE)

1. Goal is competitive employment
2. Rapid job search
3. Systematic job development
4. Attention to worker preferences
5. Zero Exclusion
6. Benefits counseling
- 7. Integration of SE and treatment team**
8. Time-unlimited support

Populations Served by VHA Supported Employment

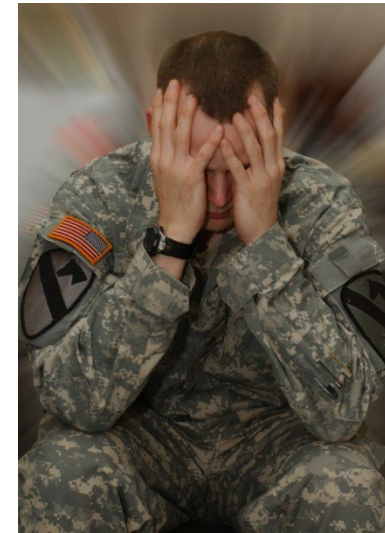
TBI



**Serious Mental
Illness**



PTSD



Spinal Cord Injury



Homeless



Substance Use Disorder



Methods

- **Participants:** 146 CWT program supervisors who oversee SE program
 - VA medical center previous experience providing SE to Veterans with TBI
 - Yes: 13 (Response: N = 5, 38.5%)
 - No: 133 (Response: N = 49, 36.8%)
- **Open-ended Survey Question:** “What improvements could be made to how SE services are delivered to Veterans with TBI at your VA Medical Center?”
- Survey invitations sent August 2014
- Qualitative analysis of responses

CWT Manager Suggestions for SE Program Improvement

Suggestion	Quote
Increase SE Staffing	“Have a [SE Provider] dedicated to, or embedded in supporting the Polytrauma/TBI program...”
Base SE eligibility on employment support needs, not diagnosis	“SE needs to be expanded to vets with TBI and PTSD...”
Add Vocational Rehabilitation as part of rehabilitation treatment plan	“Vocational rehabilitation is seen as a tertiary referral that often comes just prior to discharge from other Polytrauma services. This delay in referral and focus on vocational rehabilitation also results in veterans feeling that vocational options are not part of their future planning...”

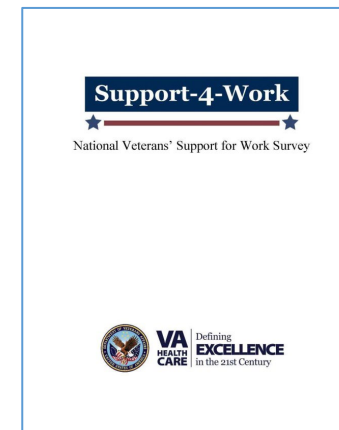
Supported Employment for Veterans with Traumatic Brain Injury: Needs and Barriers

VHA HSR&D Grant: PPO 13-123

**Supported Employment for Veterans with
Traumatic Brain Injury: Needs and Barriers
PI: Kathleen Carlson, PhD**

Methods

- **Qualitative:** Interviews and focus groups of Veterans with TBI about their experiences with employment and Vocational Rehabilitation after military separation
 - Interviews: May 2014-February 2015
- **Quantitative:** Survey Veterans with TBI on use of, interest in, and perspectives about SE (N = 1,800 mailed)
 - Surveys first mailed May 2015



Characteristic	N = 37
VHA Vocational Rehabilitation Services Use	8%
Deployment-related TBI History	
Mild	92%
Moderate/severe	8%
Male	92%
Age	M = 38.6 (24-69 years)
White, non-Hispanic	78%
Married/cohabitating	46%
Completed at least some college	94%
Work status (select all that apply)	
Employed/Student	57%
Unemployed	14%
Unable to work for pay	19%
Retired/homemaker	22%
PTSD	78%
Substance Use Disorder	78%
Depression	70%

Focus Group and Interview Participants

Characteristic	N = 616
Knowledge and past use of any VA employment service	21%
Deployment-related TBI History	
Mild	63%
Moderate/severe	37%
Male	94%
Age: 18-39 years	75%
White	64%
Married	56%
Highest completed education: Up to high school	85%
Employed	55%
PTSD	83%
Substance Use Disorder	36%
Depression	63%

Survey Respondents

Post-9/11 Veterans with TBI: Post-military Employment Experiences (May 2014-Feb 2015)

“I couldn’t concentrate on my work. I was not dependable. And I’ve never not been dependable in my entire life. It’s humiliating for a person like me.... I still do not feel like myself.”



“My hearing is a little bit off now so that makes things even more difficult because I mishear and misspeak.”

“I had a blowup at work...the memory issues and agitation—sometimes I get frustrated where I just shut down.”

Veterans with TBI: Perspectives on Supported Employment

That an employment specialist would go out there and try to find something that's suitable for you....it's kind of like they are setting it up to be tailored to your needs ...and to what the employer wants.



I wouldn't mind if the employment specialist disclosed [symptoms] on my behalf. It would break the ice. It's not . . . easy to say oh, by the way, I have PTSD and anxiety and [TBI] and all this stuff.

Survey of Veterans with TBI (n = 616)

Interested in SE if offered	42%
Have not used, but know about SE	12%
Have used SE	<1%

Carlson KF, Pogoda TK, Gilbert TA, Resnick SG, Twamley EW, O'Neil ME, Sayer NA. Supported employment for veterans with traumatic brain injury: patient perspectives. Archives of physical medicine and rehabilitation. 2018 Feb 1;99(2):S4-13.

Wyse JJ, Pogoda TK, Mastarone GL, Gilbert T, Carlson KF. Employment and vocational rehabilitation experiences among veterans with polytrauma/traumatic brain injury history. Psychological services. 2018 Sep 27.

Improving Access to Supported Employment for Veterans with Polytrauma/Traumatic Brain Injury

VHA HSR&D Grant: IIR 16-089

**Improving Access to Supported Employment for Veterans with
Polytrauma/Traumatic Brain Injury
PI: Terri K. Pogoda, PhD**

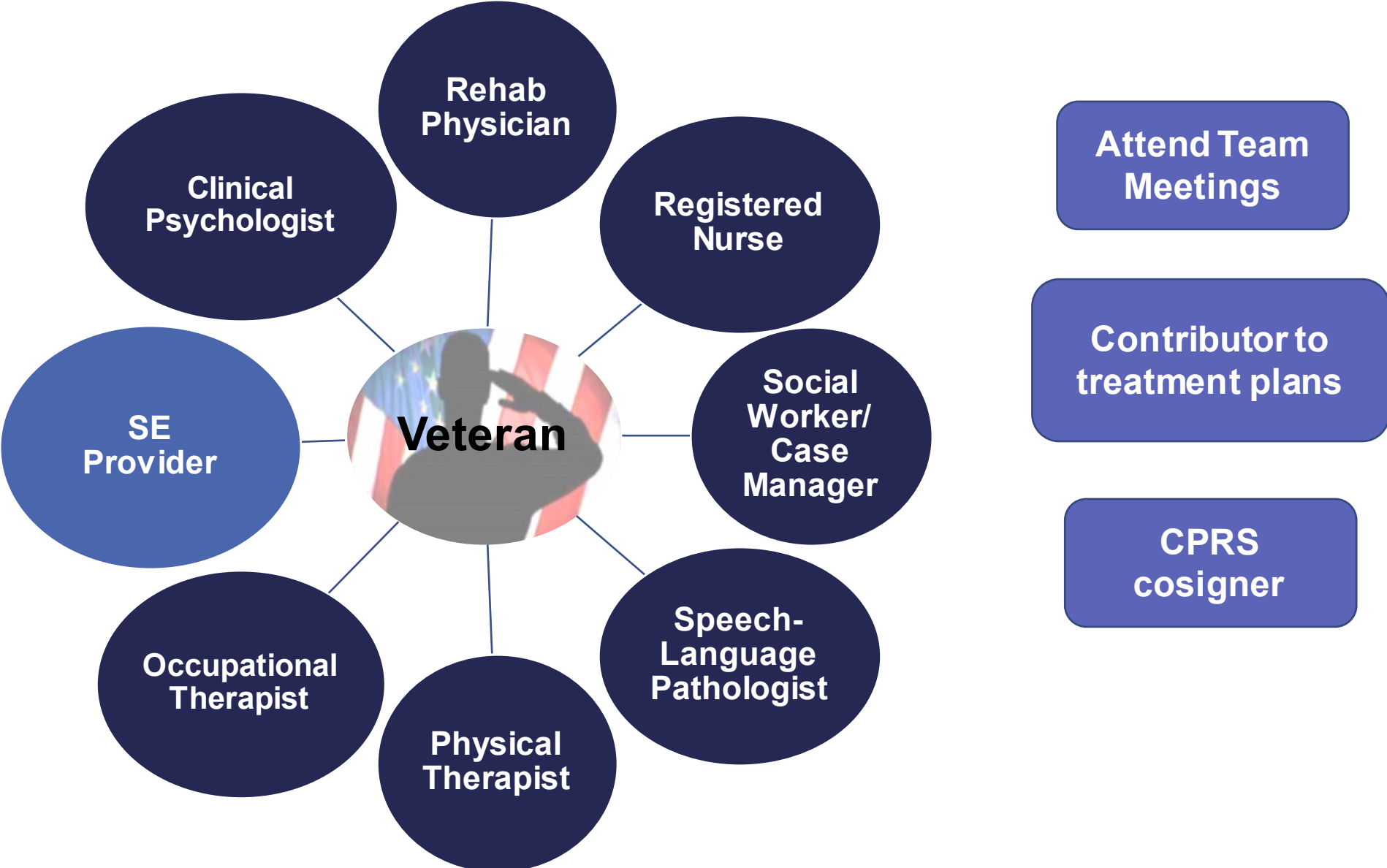
VHA Polytrauma System of Care

Outpatient Polytrauma/TBI Core Staffing



VHA Polytrauma System of Care

Outpatient Polytrauma/TBI Core Staffing



Comprehensive TBI Evaluation (CTBIE)

3. Current employment status:*

1. Unemployed, looking for work

3. Working part-time

5. Student

7. Homemaker

2. Unemployed, not looking for work

4. Working full-time

6. Volunteer



Are you interested in employment?

How is work going?

- **Work does not have to be full-time; it can be a few hours per week.**
- **It may be easier to get a job than to keep a job; advancing sustainable, satisfying employment is a strength of SE.**

Methods

Mentor Training Videoconferences

- 12 VA SE programs
- Began 05/04/2020-12/18/2020 through 09/30/2022
- Weekly 1-hour meeting individualized per site
- Range: 34-72 calls/site

Videoconferencing: Blended Facilitation

- External Facilitators (2 mentor trainers)
- Internal Facilitators (Managers of CWT programs, SE providers)
- Review and apply SE principles
- Audit and Feedback

On-site Visits

- Fidelity evaluation 1- and 2-years after study initiation
- Remediation visit by mentor trainer after first fidelity review



Veteran Study Criteria

Inclusion

- U.S. Military Veteran
- Any history of TBI indicated in electronic medical record
- Wants to work competitively

Exclusion

- Unable to complete study (e.g., deployment, incarceration, re-location)
- Diagnosis that includes psychosis

Employment Outcomes among 107 Veterans with TBI History



**Obtained at least 1 job:
58.9%**



Hourly Wages:
 $\$19 \pm \8



Hours worked/week:
 35 ± 10



Time between SE enrollment and Job 1 start
Median = 40 days

Veteran Jobs

surveyor
laundry*assistant field*engineer security
kennel*assistant electrical*apprentice
housekeeping dishwasher machinist
sawmill food*prep customer*service*rep
building*inspector valet caseworker
animal*caretaker fry*cook
benefits*officer construction
restaurant*manager
cdl*a*driver carpenter realtor
delivery*driver financial*crime*analyst
fire*arms*instructor home*health*aide
health*unit*coordinator postal*carrier

Table 1. Veteran Demographics, Service Era, Legal, and Housing History

Characteristic	N = 107 (%)
TBI history	100
Male	94.4
White	75.7
Hispanic	25.2
Age	40.6 ± 10.0 years (Range: 24-70)
Service Era	
Post-9/11 Veterans	60.7
Persian Gulf Veterans	29.9
Vietnam or Post-Vietnam Era	9.3
Incarceration History	15
Homelessness History	15

Table 2. Service-connected disability characteristics

Characteristic	N = 107 (%)
Service-connected disability rating	
No service connection	13.1
10-40%	8.4
50-100%	78.5
Service-connected conditions	
PTSD	51.4
Migraine	52.3
Tinnitus	57.0
Impaired Hearing	16.8
Sleep apnea	18.7

A 3D bar chart with seven bars of increasing height from left to right. Each bar has a letter on top: S (red), U (orange), C (yellow), C (green), E (cyan), S (blue), and S (purple). Below the bars, the letters S, T, O, R, and Y are arranged in a slightly curved line, representing the word 'STORY'.

S U C C E S S

S T O R Y

Fred's Story: Characteristics

- Male, 60 years old
- Army/Post-Vietnam Era
- High school education
- Multi-lingual

- Many siblings
- Divorced
- Children, grandchildren

Barriers

- Functional
- Transportation
- Finances
- Clothing
- Emotional distress

Vocational Assessment Profile

- Sculpting/painting
- Baking/cooking

Fred's Story: Health and Other Challenges

Gunshot wound to head as a teenager

TBI, poor manual dexterity, seizures, substance use disorder, diabetes

Uses a wheelchair, no income, no personal vehicle, housing and food insecurity

20+ years of prison, limited employment options

Parole officer needs to approve job activities, Veteran had a curfew

SE in action



SE provider met with Veteran



SE provider collaborated with social worker, OT, and psychiatrist to discuss health and psychosocial needs



SE provider met with employers to discuss job opportunities and fit.





Approval needed by Parole Officer; curfew of 10 pm limited work hours



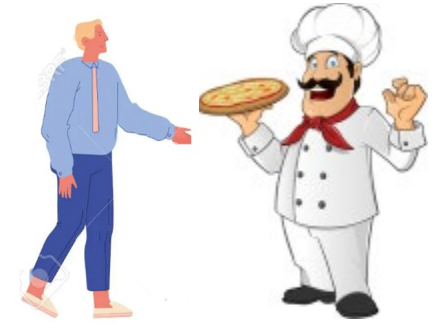
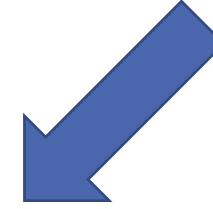
Job at Pizza Shop



Wheelchair accessible kitchen, cutting vegetables, sauce preparation, folding pizza boxes, sweeping

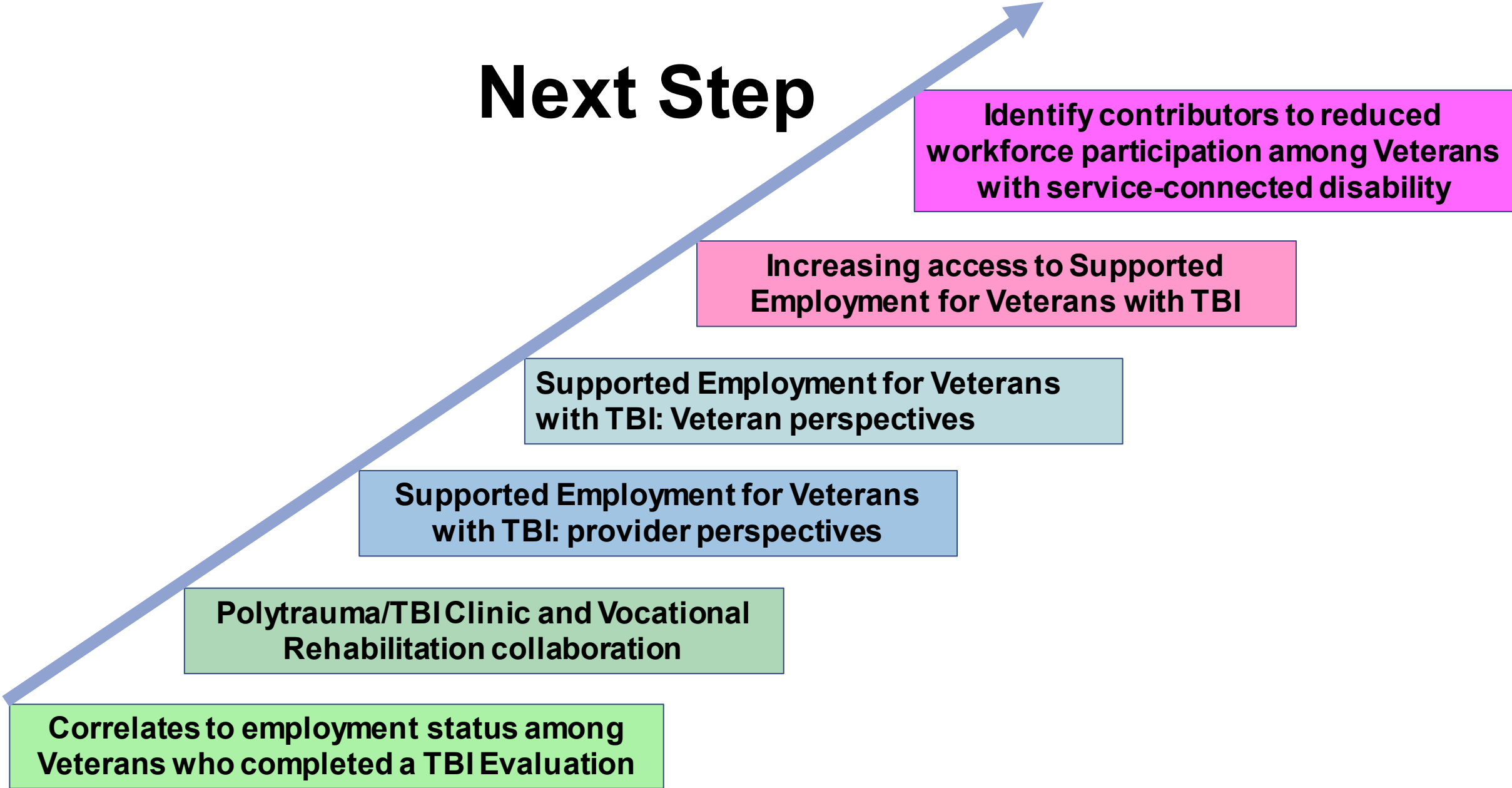


Continued collaboration between SE provider and other providers for physical, mental, and psychosocial health needs



SE provider met with manager to discuss work hours

Next Step



Thank you!

Questions?

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