

A mixed methods epidemiological investigation of preventable deaths among U.S. Army soldiers assigned to a rehabilitative warrior transition unit

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Abstract.

BACKGROUND: The prevalence of medical risk factors for suicide (e.g., mental disorders, severe disability, social disruption) may be higher among WTUs compared to traditional Army units. Likewise, the extent to which traditional factors that protect soldiers from developing serious mental disorders (e.g., social support, unit cohesion, leadership) are present among soldiers assigned to the WTU is unclear.

OBJECTIVES: An epidemiological consultation (EPICON) was conducted in 2010 to assess potential causes for a perceived high rate of suicides and preventable deaths in U.S. Army Warrior Transition Units (WTUs) and to identify potential improvements to the system of care.

METHODS OF STUDY: The EPICON focused on: (1) risk factors for suicide/preventable deaths; (2) chronic pain management; (3) utilization of and access to WTU medical and behavioral health (BH) services; and (4) the impact of the WTU environment on mission focus and warrior disposition. BH history was examined for soldiers who died by suicide or preventable death while assigned to the WTU (index cases) and a representative comparison group of non-index case soldiers. Surveys and focus groups were conducted at four WTUs with Warriors in Transition (WTs) and key support staff.

RESULTS: The use of psychotropic and/or CNS depressant medications, prevalence of BH diagnoses and substance use disorders, polypharmacy, alcohol use, and a high cumulative number of stressors were identified as important risk factors for preventable deaths in the WTC. Areas of potential improvement to the system of care included addressing negative perceptions of the WTU environment, lack of social support, barriers to accessing BH services and issues related to coordination of care.

CONCLUSIONS: There was no one single risk factor found to be associated with an increased likelihood of preventable deaths within the WTU. The unique design and operation of the WTUs as environments focused on treatment and rehabilitation provide both benefits and challenges to recovery and risk mitigation.

Keywords: Military, behavioral health, soldiers, polypharmacy, suicide

1. Introduction

Mental disorders, injuries and musculoskeletal disorders have long been associated with morbidity and lost productivity among U.S. Service Members [1–4].

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In 2011, physical injuries and mental disorders accounted for more than half (57%) of all service member inpatient hospital bed days, and in combination with musculoskeletal diseases were the most common conditions for which service members missed work [5]. More than half of the soldiers assigned to a Warrior Transition Unit (WTU) (i.e., Warriors in Transition (WT)) have multiple conditions, with the most common conditions being orthopedic, internal medicine, posttraumatic stress disorders, mental health issues (non-posttraumatic stress) and neurological conditions (including traumatic brain injury) [6]. A Warrior Transition Unit can be defined as a dedicated unit to which wounded, ill, and injured soldiers in the U.S. Army requiring at least six months of rehabilitative care and complex case management are assigned where their primary mission is to heal and return to military duty or transition to civilian life. The WTU model of care serves as a novel approach for treating, managing and rehabilitating soldiers more effectively than what has traditionally existed in military or civilian settings (e.g., patients left to navigate the system of care and appointments on their own). It is difficult to draw comparisons to other military and civilian systems of care, and thus there truly is a lack of relevant comparison literature to help establish what might be 'normal' baseline risk in the WTU population. Located at major military treatment facilities (MTFs) since 2007, WTUs provide a standardized framework of care and support. While assigned to the WTU, each soldier is assigned three team members (triad of care) who aim to coordinate all aspects of the soldier's medical and non-medical care. The triad of care is comprised of a primary care manager (i.e., health care provider (HCP)), nurse case manager (NCM) and squad leader (military cadre). The triad of care is augmented by an interdisciplinary team of specialists (e.g., social workers, physical and occupational therapists). As of June 2012, more than 9,600 soldiers were receiving care in WTUs and community based WTUs; the Army anticipates approximately half of those soldiers will return to their units and resume normal work duties, and those unable to return to work due to various reasons (e.g., physical or mental disabilities) will be prepared to successfully transition to civilian life [6].

Just prior to beginning the current study (2009), rates of suicide were higher in the overall WTU population (~50–60 per 100,000) compared to the overall Army (20 per 100,000) and the U.S. general population (11 per 100,000) [7]. Although comparing sui-

cide rates among these populations is problematic due to the variation in population characteristics, the WTU rate was concerning to Army leadership. The prevalence of medical risk factors for suicide (e.g., mental disorders, severe disability, social disruption) [8,9] may be higher among WTs compared to traditional Army units, and thus the "healthy worker" [10] effect typically observed among soldiers may not be present in a population of severely wounded and ill soldiers. Likewise, it was unclear the extent to which traditional factors that protect soldiers from developing serious mental disorders (e.g., social support [11], unit cohesion [12–14], leadership [15]) were present among soldiers assigned to the WTU. The authors were not able to identify any other peer-reviewed studies exploring morbidity and associated factors within the WTU.

In November 2009, the Army Surgeon General and the Warrior Transition Command (WTC) Commanding General (CG) requested a behavioral health (BH) epidemiological consultation (EPICON) to assess potential causes of suicides and preventable deaths in the WTUs and to identify opportunities for improving the existing model of care. The U.S. Army Public Health Command (USAPHC) Behavioral and Social Health Outcomes Program (BSHOP) was tasked to assess risk and associated factors of preventable death within the Army WTU population and recommend strategies for risk mitigation. The study objectives of the EPICON focused on four primary areas: (1) risk factors for suicide and preventable deaths, (2) chronic pain management, (3) utilization of and access to WTU medical and BH services, and (4) the impact of the WTU environment on mission focus and medical disposition. Findings presented in this manuscript describe unique risk factors for suicide and preventable deaths among soldiers assigned to a WTU, and identify potential improvements to the system of care.

2. Method

2.1. Study design

Primary data collection (i.e., surveys and focus groups) for the EPICON was conducted at Fort Riley, Kansas; Fort Carson, Colorado; Walter Reed Army Medical Center (WRAMC), Washington, D.C.; and Fort Bragg, North Carolina. Although patient populations vary across WTUs, these locations were chosen by the Office of the Surgeon General, WTC and the USAPHC to serve as a representative sample of WTUs.

An examination of cases and controls were identified from the entire WTC population. Under the provisions of Army Regulation 40-5 (Preventive Medicine), US-APHC is the designated public health authority for the Army and conducts required public health investigations [16]. Three study arms were carried out: (1) index case analysis and nested case-control study, (2) facilitation of focus groups with WTs and support staff (i.e., military cadre, chaplains, HCPs, NCMs), and (3) development and administration of anonymous surveys to WTs, military cadre, NCMs and HCPs. The EPI-CON was executed in four phases: preparation, data collection, data analysis, and synthesis of findings.

The preparation phase included strategic planning, preliminary background data collection, collection of index case data, preliminary site coordination to assess key issues and leadership concerns, and survey and focus group design and pilot testing. Data collection included site visits to conduct anonymous surveys and focus groups, as well as leadership briefings to present any immediate actionable recommendations. Following data analysis, the team met with internal and external subject matter experts to discern the most important findings and actionable recommendations for the WTC. Researchers used a mixed methods approach, using clinical review, qualitative and quantitative procedures, and individual and population-level assessments.

As appropriate, tests of significance were utilized to identify differences between the index case population and relevant comparison populations to highlight possible areas for improvement. It was recognized at the outset of the study that in some instances statistical comparisons may not be possible or yield very imprecise estimates. Rather than aggregate case groups, or important strata (e.g., demographics), the decision was made to describe the population in detail so the Warrior Transition Command could utilize this information to develop specific appropriate solutions. Likewise, surveys and focus groups were conducted to enable further characterization of results even though conducting these at a single point in time temporality and/or causality cannot be determined.

2.2. Index case analysis

Sixty-two soldiers who died by suicide or preventable death (i.e., accidental overdose or non-overdose accidental causes) while assigned to the WTU from July 2007 to April 2010 were identified by the WTC to USAPHC as index cases. A suicide case was

defined as death caused by self-directed injurious behavior with any intent to die as a result of the behavior ($n = 18$). Accidental overdose cases were defined as ingestion of a lethal or toxic amount of drug(s) without the intent to die ($n = 31$). Non-overdose accident cases included those soldiers who died by an unforeseen and unplanned event or circumstance without involving an overdose ($n = 13$). Because researchers hypothesized (and initial descriptive analyses confirmed) demographics and stressors would vary between these three different preventable death categories, all analyses were stratified to enable identification of specific between-group differences that might help develop appropriate improvement strategies.

Based on subject matter expertise and a comprehensive literature review of potential risk factors for preventable death, data elements were identified to help build a profile from entry into service to death (or start date of the study) for the index cases and a representative comparison group of non-index case soldiers assigned to the WTU. The data sources obtained included demographic and military characteristics (Armed Forces Health Surveillance Center (AFHSC)), medical encounters and prescription drug use (AFHSC; Armed Forces Health Longitudinal Technology Application (AHLTA) electronic health record; Essentris Inpatient Record System; Pharmacy Data Tracking System (PDTs)), legal history (Criminal Investigation Division (CID); Centralized Operations Police Suite (COPS)), alcohol and substance abuse history and treatment (Drug and Alcohol Management Information Systems (DAMIS)), domestic issues (Army Central Registry (ACR)-Family Advocacy Program (FAP)), and event (i.e., suicide or other preventable death) and pre-event characteristics (Department of Defense Suicide Event Report (DoDSER); Equivocal Death Reports (EDR)).

Patients treated for more than one medical condition frequently require care from multiple healthcare providers (HCP) and are often treated with a variety of medications, a definition of "polypharmacy" used by the Army (Department of the Army, Office of the Surgeon General, Policy Memo 10-076). Psychotropic medication use before and after entry to the WTU was classified using the therapeutic classification index (TCI) for antidepressants, stimulants, anxiolytics and sedatives, sleep, anticonvulsants, antipsychotics, and opiate agonists. BH medical encounters were categorized using the International Classification Diagnosis, version 9 (ICD-9) codes designated for each inpatient and outpatient visit, including acute stress, ad-

justment disorders, anxiety disorders (excluding post-traumatic stress disorder(PTSD)), personality disorders, psychoses, and PTSD.

To identify common characteristics and unique risk factors for suicide and other preventable deaths, data on index cases were reviewed individually and compared to data from two non-index case groups: (1) WTs in the overall WTU population assigned from 2007 to 2010 ($n = 31,177$), and (2) WTs who completed the anonymous survey during on-site data collection. Descriptive statistics were used to categorize the index cases. Frequencies and percentages summarized categorical variables, and measures of central tendencies (e.g., mean, median) were used to describe continuous variables. Significant differences between the prevalence of individual and cumulative stressors in index case groups and the survey population were determined using two sample z-tests with a significance level of 0.05.

A retrospective nested case-control study was conducted to compare index cases with a matched set of non-index controls. Up to five matched controls were chosen from a random subset of the entire WTU population matching on the following three criteria: (1) sex, (2) component (i.e., active duty, National Guard, or Reserve), and (3) time in WTU (i.e., < 90 days, 90–180 days, 180–364 days, 365 or more days). Matched controls were restricted to WTs active within 90 days of each index case's date of death. Conditional logistic regression (exact logistic regression for pairwise comparisons, when appropriate) was performed to compare matched index cases and controls. All analyses were performed using Statistical Analysis Software (SAS), version 9.2 (SAS® is a registered trademark of SAS institute, Inc.) and SPSS (SPSS® is a registered trademark of the International Business Machines (IBM) Corporation), version 16.0.

2.3. Survey and focus group domains

Surveys and focus groups were conducted with WTs, military cadre, NCMs and HCPs to provide context for associations between identified risk factors, the WTU environment, and issues which impact the system of care. Guiding domains were identified to aid development of both survey and focus group questions. A multi-disciplinary team identified the most relevant domains to answer the primary objectives based on subject matter expertise, preliminary index case analysis, and a comprehensive literature review. Semi-structured interview guides for all participant popula-

tions were developed in a similar manner; however, guiding questions and probes differed between participant populations. Using varying probes across groups is standard practice, and is not likely to induce confounding variation because the questions and probes were very broad, and rather than comparing group response differences to each question, researchers compared the major themes from each group related to domains of importance. Participants were also encouraged to speak openly about other related topics of interest.

Survey domains differed for each participant population (i.e., WT, military cadre, NCM, HCP), thus requiring tailored surveys based on role in the WTU. To the extent possible, existing validated survey questions and scales were incorporated into the final survey tool. Additional questions were designed by a team of subject matter experts to address specific domains of interest for which previously validated questions could not be identified. A description of survey domains and associated questions for each role are shown in Table 1. Briefly, domains of importance for WTs included those related to demographic, military (e.g., deployment, rank), and WTU (e.g., reason for entry, phase of care, outlook) patient characteristics [17]; mental health issues (i.e., substance use, anxiety, depression, hopelessness, insomnia, mental status) [18–28]; stressors [29–31]; risk taking [32–34]; pain and pain management [35–37], protective factors (including social support) [38–40]; BH access, attitudes and barriers to care [17,41]; and suicide prevention training. Domains of importance for military cadre, NCM, and HCP included those related to demographic, military (where applicable) and role characteristics [42], BH attitudes and knowledge, level of contact [42]; training, perceived attitudes about WTs [41], and job satisfaction.

2.4. Survey and focus group data collection

Survey and focus group data collection was piloted with sample populations from the Fort Meade WTU to ensure face validity, understanding, and readability of questions, determine time requirements, and better understand logistical requirements for data collection (i.e., focus group audio recording, electronic survey administration) before implementation at the four designated WTU sites. Following facilitation of surveys and focus groups, informal discussions soliciting feedback from pilot study participants assisted in improving the instruments. Data collected during the pilot phase was not analyzed for the purposes of informing the results of the WTC EPICON.

Table 1
Survey domains and associated question sources

| Population | Domain | Source |
|---------------------|--------------------------------------|---|
| Cadre, NCM, HCP, WT | Demographic/Military Characteristics | Group Designed/MHAT-IV Questionnaire [17] |
| Cadre, NCM, HCP | Patient Ratio | Level of Contact Report [27] |
| Cadre, NCM, HCP, WT | Stigma | Self Stigma of Mental Health [41] |
| Cadre, NCM, HCP, WT | Suicide Prevention Training | Group Designed |
| Cadre, NCM, HCP | Training | Group Designed |
| Cadre, NCM, HCP | WTU Attitudes | Group Designed |
| Cadre, NCM, HCP | Role Satisfaction | Group Designed |
| HCP | Pain Management | Group Designed |
| WT | Alcohol Use Disorders | AUDIT C [22] |
| WT, Cadre, NCM, HCP | BH Access and Attitudes | Group Designed |
| WT | BH Care Utilization | Perceived Barriers Scale [17] |
| WT | Depression, Hopelessness, Anxiety | Beck Inventories [18–21] |
| WT | Functional/Mental Health | SF-12 & RAND-36 [23–28] |
| WT | Insomnia | Insomnia Rating Scale [25] |
| WT | Lethal Means & Attitudes | Weapon Use Survey [32,33] |
| WT | Pain | Brief Pain Inventory [35] |
| WT | Perceived Stress | Predictive Stress Scale [29–31] |
| WT | Prescription Medication Use | Multiple Scales [36,37] |
| WT | Protective Factors | Multiple Scales [38–40] |
| WT | Risk Taking | DOSPERT [34] |
| WT | Social Support | SSQ-6 [41] |
| WT | Patient Characteristics | Group Designed |

Cadre-military cadre squad leaders; NCM-nurse case managers; HCP-Behavioral Health/Primary Care Managers; WT-Warriors in Transition.

Survey and focus group facilitation at each of the four study sites was coordinated between USAPHC and points of contact within the local WTU and other local medical facilities. Facilitation was conducted in centralized locations convenient for each WTU population. Although all available WTU populations were directed by their leaders to report to the survey site and a sample was directed to report to the focus group site, participation in surveys and focus groups was voluntary, and any persons not wishing to participate were excused. Refusal to participate was rare (less than 0.5%).

The WTC survey was designed to be administered via laptop computers using Snap v10 Professional (Snap Surveys® is a registered trademark of Snap Software, Inc., Tidestone First Impression, and Pixel Translations). Upon reporting to the survey-site, prior to starting survey completion, participants were provided a short briefing describing the purpose, intent, and confidential nature of the survey. Gateway questions were included throughout the survey to direct participants to the most appropriate domain questions for their role within the WTU. Each participant sat at a computer station and completed the survey using either the touchpad or stylus. WTs unable to complete the survey due to physical disabilities were excused (if desired, but this was a rare occurrence (< 5 cases)) or were assisted by an EPICON team member or friend/family member, as necessary. The time re-

quired for survey completion varied by WTU role and the number of relevant questions answered, and ranged as follows for WTs (25–95 minutes), military cadre (15–50 minutes), and NCM/HCP (12–28 minutes).

Purposive sampling (i.e., sample based on stakeholder knowledge of the population and the purpose of the study) was used to conduct focus groups with specific WT and support populations. WT groups were stratified by length of time the WTs had been assigned to the WTU (i.e., less than 90 days, 90–180 days, and over 180 days) to account for possible perceptual differences based on program tenure. Separate focus groups were also conducted with NCMs, HCPs, and family members. All groups were conducted in private rooms by trained facilitators (i.e., Graduate level or Non-Commissioned Officer trained in related BH fields and several hours of training on facilitation principles and fidelity protocols prior to conducting the focus groups) who explained the purpose, highlighted the non-therapeutic nature of the groups, explained the importance of and limits to confidentiality, and described how collected data would be used. Participants were asked for verbal consent to participate and allow the group to be digitally recorded. A dedicated onsite BH provider was available during focus group sessions and safety protocols were in place for referring participants who expressed concerns or distress. Facilitators took field notes immediately following the conclusion of each group.

2.5. Survey and focus group participants

Anonymous surveys and focus groups were conducted April–October 2010. Surveys were administered to available WTs ($n = 1,219$), military cadre ($n = 351$), NCMs, ($n = 101$), and HCPs ($n = 257$) at the four WTUs. The survey captured 97% of the available WT and military cadre population across the four survey sites; participation rates could not be calculated for NCMs and HCPs due to a lack of definition for the total available medical population serving WTs (i.e., some combination of WTU and MTF staff). All survey data was collected anonymously and was not attributable to any single person, nor was it linkable to other data sources.

Sixty-seven focus groups ($n = 504$ participants) were conducted with WTs ($n = 318$), military cadre ($n = 82$), NCMs ($n = 33$), HCPs ($n = 45$), and family members ($n = 8$). Approximately 94 hours of audio files were transcribed to over 2,400 pages of text documents. The average focus group size was 7 participants with a range of 2 to 12 participants. The average duration of a focus group was 75 minutes.

2.6. Survey and focus group analysis

Surveys from all WTU sites were aggregated for statistical analysis. Survey data were analyzed to identify the prevalence of BH issues, stressors, and other factors strongly associated with reporting high risk behaviors among WTs, as well as systematic concerns related to access and barriers to care. Perceptions of military cadre, NCMs, and HCPs were examined as they related to concerns identified by WTs to provide additional contextual information. Statistical significance testing was used to compare the differences in self-reported characteristics among all survey respondents. Relevant stratifications were carried out to further explore differential associations between subpopulations of WTs and military cadre (e.g., time in WTU, rank). To approximate risk within a population similar to the index cases, WTs who reported current or recent suicidal ideation were examined in detail (compared with WTs who did not report current or recent suicidal ideation). Bivariate and backwards step-wise multivariable regression techniques [43] were used to identify factors that were strongly associated with reporting suicidal ideation and high risk behaviors. All analyses were completed using SAS, v9.2.

Following transcription and de-identification of audio files, focus group transcripts were uploaded and

organized using NVivo 8 Qualitative Analysis software. Transcripts were analyzed by three senior qualitative scientists (i.e., doctoral degrees in social work or sociology) and two trained qualitative analysts (i.e., master's degrees in public health or psychology) using constant comparison methods [44–47], rooted in the grounded theory approach [43]. Initial codes were created by categorizing similar concepts in the data into codes through independent line-by-line coding of transcripts by two analysts. The analysts compared their coding structures to resolve any coding discrepancies through consensus and continued this process until saturation was reached. Once the coding structure was complete, all analysts applied this set of codes to the remaining transcripts. During the axial phase of coding, two senior analysts collapsed and expanded the initial codes until distinct conceptual categories emerged to create themes and subthemes. After major themes were extracted from the data, these themes were compared across WT and support staff groups to determine if there were any similarities or differences in the strength and interpretation of the themes based on group composition.

2.7. Synthesis of results across mixed methods

Data collected from each study arm (i.e., index case, survey, and focus groups) were analyzed independently of each other, and then findings were compared, synthesized, and integrated. Convergence of findings across populations and methods allows for greater confidence in the results as well as a more comprehensive understanding of the problem through triangulation of the data. Following completion of preliminary analyses, a scientific panel of internal and external subject matter experts was convened to review the major findings and inform interpretation of results. Findings from the various modes of data collection helped inform one another.

3. Results

3.1. Risk factors for suicide and preventable death

The majority of index cases were male (92%), White (72%), and less than 30 years of age (65%) with a high school education or equivalent (76%). More than half were married (53%) and had no children (68%). During the same time period, the overall WT population characteristics were: male (87%), White (67%), less

Table 2
Demographic Characteristics of WTU index cases, WT survey population and general WTU cohort (2007–2010)

| | Index cases | | | WT survey | WTU cohort |
|--------------------|--------------------------------------|--|--|---|--|
| | Suicide (<i>n</i> = 18) n (%) | Accidental overdose (<i>n</i> = 31) n (%) | Non-overdose accident (<i>n</i> = 13) n (%) | Population (<i>n</i> = 1219) n (%) | Population (<i>n</i> = 32177) n (%) |
| Age | | | | | |
| ≤ 20 | 1 (6) | 0 (0) | 2 (15) | 20 (2) | 781 (2) |
| 20–24 | 3 (17) | 9 (29) | 5 (39) | 287 (24) | 9116 (28) |
| 25–29 | 5 (28) | 11 (36) | 4 (31) | 367 (30) | 7462 (23) |
| 30–34 | 4 (22) | 3 (10) | 0 (0) | 169 (14) | 4194 (13) |
| 35–39 | 4 (22) | 4 (13) | 1 (8) | 151 (12) | 3797 (12) |
| ≥ 40 | 1 (6) | 4 (13) | 1 (8) | 225 (19) | 6827 (21) |
| Sex | | | | | |
| Male | 17 (94) | 30 (97) | 10 (77) | 1073 (88) | 27884 (87) |
| Female | 1 (6) | 1 (3) | 3 (23) | 146(12) | 4293 (13) |
| Race/Ethnicity | | | | | |
| Caucasian/White | 16 (84) | 26 (84) | 7 (54) | 766 (63) | 21502 (67) |
| African American | 1 (6) | 3 (10) | 4 (31) | 204 (17) | 5727 (18) |
| Hispanic | 0 (0) | 1 (3) | 1 (8) | 118 (10) | 3134 (10) |
| Other | 1 (5) | 1 (3) | 1 (8) | 131 (11) | 1333 (4) |
| Missing | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 481 (2) |
| Education | | | | | |
| Some high school | 0 (0) | 0 (0) | 0 (0) | 22 (2) | 692 (2) |
| High school/GED | 13 (72) | 22 (71) | 12 (92) | 386 (32) | 25473 (79) |
| Some college | 1 (6) | 8 (26) | 0 (0) | 613 (50) | 2062 (6) |
| College degree | 2 (11) | 1 (3) | 0 (0) | 198 (16) | 2988 (9) |
| Missing | 2 (11) | 0 (0) | 1 (8) | 0 (0) | 93 (1) |
| Marital status | | | | | |
| Single | 3 (17) | 12 (39) | 6 (46) | 299 (25) | 16377 (51) |
| Married | 11 (61) | 15 (48) | 7 (54) | 669 (55) | 14166 (44) |
| Separated | 3 (17) | 2 (7) | 0 (0) | 113 (9) | — |
| Divorced | 1 (6) | 2 (7) | 0 (0) | 130 (11) | — |
| Other/Missing | 0 (0) | 0 (0) | 0 (0) | 8 (1) | 1634 (5) |
| Dependents | | | | | |
| No children | 11 (61) | 21 (68) | 10 (77) | — | 11784 (37) |
| 1 or more children | 7 (39) | 10 (32) | 2 (23) | — | 20284 (63) |

— Data element not captured from respective data source. Note: Small numbers and a lack of variance across so many strata resulted in imprecise statistical comparisons which are not presented.

than 30 years of age (53%), with a high school education or equivalent (81%), married (44%), and had no children (37%) (Table 2). The primary causes of death for suicide cases (*n* = 18) were gunshot wound (39%), hanging (28%) and intentional overdose (38%). The majority of non-overdose accidental deaths (69%) were the result of motor vehicle accidents. Twenty-five percent of all index case deaths involved alcohol.

The suicide and accidental overdose index cases (*n* = 49) were quite dissimilar from the non-overdose accidental death index cases (*n* = 13) with regards to relationship issues, legal issues, polypharmacy and the number of BH issues (Tables 3–5). Recent relationship failures and legal issues were common among the index cases who died by suicide or accidental overdose. Over 75% of the suicide and accidental overdose index cases had experienced a recent loss (i.e., failed relationship or loss of significant other) within three

months of death; and nearly 50% were dealing with a recent legal problem (including civil or criminal) prior to death. Having three or more stressors (i.e., work, financial, legal, substance abuse, relationship failures, and/or death of friend/family member) was significantly more common among index cases who died by suicide (56%) or accidental overdose (48%) compared with WTs who completed the EPICON survey (31%) (*p* < 0.05).

A history of inpatient (lifetime) and outpatient (during previous 6 months) BH medical encounters were common among index cases who died by suicide (72% and 94%, respectively) or accidental overdose (52% and 90%, respectively). WTs who died by suicide or accidental overdose were significantly more likely to have been hospitalized for a BH diagnosis compared with a matched sample of WTs who did not die by suicide (unadjusted odds ratio (OR) 29.8, 95% confidence

Table 3

Individual and Cumulative Number of Behavioral and Social Stressors among Warriors in Transition index cases and WT survey population (within 3 months of event (index cases) or survey)

| | Index cases | | | WT survey |
|---------------------------------------|--------------------------------------|--|---|---|
| | Suicide (<i>n</i> = 18) n (%) | Accidental overdose (<i>n</i> = 31) n (%) | Non-overdose accident ¹ (<i>n</i> = 13) n (%) | Population (<i>n</i> = 1219) n (%) |
| Individual Stressors | | | | |
| Work issues | 8 (44) | 8 (26) | 1 (8) | 512 (42) |
| Financial problems | 5 (28) | 9 (29) | 0 (0) | 439 (36) |
| Legal issues | 12 (67) ² | 11 (36) ² | 2 (15) | 207 (17) |
| Alcohol/Drug Abuse | 5 (28) ² | 17 (55) ² | 4 (31) | 195 (16) |
| Failed spousal relationship | 13 (72) | 15 (48) | 4 (31) | 611 (50) |
| Failed non-spousal relationship | 2 (11) | 7 (23) | 0 (0) | — |
| Death of Friend/Family Member | 3 (17) | 8 (26) | 0 (0) | 337 (28) |
| Cumulative Number of Stressors | | | | |
| 0 | 1 (6) | 0 (0) | 6 (46) | 315 (26) |
| 1 | 3 (17) | 6 (19) | 5 (38) | 268 (22) |
| 2 | 4 (22) | 10 (32) | 1 (8) | 257 (21) |
| 3+ | 10 (56) ² | 15 (48) ² | 1 (8) | 379 (31) |

¹Data for non-overdose accidents was not well documented and most likely reflects some amount of underreporting; ²z-test of two proportions indicates a significant difference ($p < 0.05$) from the survey population.

interval (95% CI) 3.8–233.8) or accidental overdose (OR 8.0, 95% CI 2.8–25.4) (Table 4). Of those with a BH hospitalization, 42% of suicide cases (8 of 18), and 33% of accidental overdose cases (10 of 31) died within 30 days subsequent to being discharged.

Compared to the general WTU cohort population, index cases were more likely to have a prescription for the classes of drugs examined (Table 5), taking an average of 3 different classes of psychotropics (including narcotic pain medication). WTs who died by suicide or accidental overdose were significantly more likely to have been prescribed psychotropics from 3 or more classes compared with a matched sample of WTs who did not die by suicide (OR 9.5, 95% CI 2.2–40.4) or accidental overdose (OR 49.7, 95% CI 9.2–267.3) (Table 5).

Nine percent of WTs surveyed reported having suicidal ideation in the past 4 weeks. WTs surveyed who reported suicidal ideation ($n = 202$) were significantly more likely than WTs who did not report suicidal ideation ($n = 1017$) to report depressive symptoms (OR 1.3, 95% CI 1.2, 1.4), multiple stressors (OR 1.2, 95% CI 1.1, 1.3), entering the WTU for combat-related BH concerns (OR 2.4, 95% CI 1.1, 5.2), and perceiving stigma associated with seeking help for BH (OR 1.2, 95% CI 1.0, 1.5). The presence of 3 or more different BH issues was significantly more common among WTs surveyed who reported suicidal ideation (81%) compared with WTs surveyed who did not report suicidal ideation (33%) ($p < 0.05$).

WTs expressed concern about unsafe alcohol use among soldiers in the WTU, particularly in conjunc-

tion with medication use. Among WTs who reported consuming alcohol, 40% screened positive for problematic alcohol use. The percent of WTs screening positive for the misuse of alcohol did not differ significantly according to whether or not they were prescribed psychotropic medication. Since joining the WTU, 53% of WTs reported decreasing alcohol use, while 13% reported increasing alcohol use. Prescription medication use, misuse, and associated side effects were perceived as the largest risk factor for preventable death in the WTU across all focus group populations.

3.2. Use of prescription drugs

WTs and Cadre described abuse and misuse of prescription drugs throughout the WTU (e.g., taking more than prescribed, using other's prescription medication, and mixing medication with alcohol). Reasons some WTs reported misusing medication included: helping with sleep (31%), needing more medication than prescribed for a problem (31%), managing stress (30%), improving mood (29%), or self-treating undiagnosed conditions (24%). In focus groups, medication use was a major theme with several strong subthemes including abuse and misuse, overmedication, and side effects. WTs perceived themselves as overmedicated and prescribed unnecessary medications or multiple medications for the same symptoms, or that medication had been "pushed" on them. WTs were also concerned about side effects they felt placed them in unsafe situations (e.g., medicated while driving). Military cadre and family members expressed concerns about a lack

Table 4
Inpatient and outpatient behavioral health encounters for index cases and matched controls

| | Suicide | | | Accidental overdose | | | Non-overdose accident | | |
|-------------------------------|----------------------------|---------------------------------------|---------------------------------------|----------------------------|--|---------------------------------------|----------------------------|---------------------------------------|---------------------------------------|
| | Cases (n = 18) n (%) | Matched controls (n = 90) n (%) | Odds ratio 95% confidence interval | Cases (n = 31) n (%) | Matched controls (n = 155) n (%) | Odds ratio 95% confidence interval | Cases (n = 13) n (%) | Matched controls (n = 65) n (%) | Odds ratio 95% confidence interval |
| Inpatient¹ | | | | | | | | | |
| Any BH encounter | 13 (72) | 17 (19) | 29.8 | 16 (52) | 21 (14) | 7.5 | 5 (39) | 14 (22) | 2.8 |
| Any mood disorder | 6 (33) | 10 (11) | 4.3 | 7 (23) | 4 (3) | 10.8 | 1 (8) | 6 (9) | 0.8 |
| PTSD | 4 (22) | 6 (7) | 3.6 | 6 (19) | 4 (3) | 9.2 | 2 (15) | 2 (3) | 5.0 |
| Other anxiety disorder | 1 (6) | 1 (1) | 5.0 | 1 (3) | 1 (1) | 5.0 | 0 (0) | 0 (0) | — |
| Adjustment disorder | 3 (17) | 2 (2) | 12.4 | 0 (0) | 5 (3) | — | 0 (0) | 2 (3) | 2.1 |
| Substance abuse | 1 (6) | 3 (3) | 1.7 | 9 (29) | 4 (3) | 11.3 | 1 (8) | 2 (3) | 2.5 |
| Personality disorder | 1 (6) | 0 (0) | — | 0 (0) | 0 (0) | — | 0 (0) | 1 (2) | 5.0 |
| Psychoses | 1 (6) | 1 (1) | 5.0 | 1 (3) | 2 (1) | 2.5 | 0 (0) | 3 (5) | 1.2 |
| Outpatient² | | | | | | | | | |
| Any BH encounter | 17 (94) | 30 (33) | 38.7 ³ | 29 (90) | 58 (37) | 14.6 | 10 (77) | 25 (39) | 6.7 |
| Any mood disorder | 8 (44) | 13 (14) | 7.1 | 13 (42) | 14 (9) | 6.4 | 3 (23) | 11 (17) | 1.5 |
| PTSD | 11 (61) | 10 (11) | 19.3 | 19 (61) | 11 (7) | 37.4 | 5 (38) | 8 (12) | 4.2 |
| Other anxiety disorder | 9 (50) | 10 (11) | 6.9 | 13 (42) | 13 (8) | 9.6 | 5 (38) | 5 (8) | 9.5 |
| Adjustment disorder | 6 (33) | 13 (14) | 3.5 | 14 (45) | 23 (15) | 4.5 | 3 (23) | 11 (17) | 1.7 |
| Substance abuse | 6 (33) | 4 (4) | 9.2 | 11 (36) | 6 (4) | 15.7 | 3 (23) | 2 (3) | 7.5 |
| Personality disorder | 3 (17) | 0 (0) | 19.2 ³ | 2 (6.5) | 3 (2) | 4.0 | 0 (0) | 3 (5) | 1.3 |
| Psychoses | 4 (22) | 1 (1) | 22.3 ³ | 0 (0) | 0 (0) | — | 0 (0) | 0 (0) | — |

¹Inpatient diagnoses for controls were "ever" with a primary diagnosis; ²Outpatient diagnoses for controls were extracted up to 6 months prior to cases death; ³The exact median unbiased estimate of the coefficient for behavioral health diagnosis (13.8, $p < 0.0001$), personality disorder (2.9, $p = 0.009$) and psychosis (15.7, $p = 0.003$) was statistically significant.

Table 5
Physician prescribed psychotropic and narcotic pain medications (180 days pre-death) for WTU index cases and matched controls¹

| | Suicide | | | Accidental overdose | | | Non-overdose accident | | |
|----------------------|----------------------------|---------------------------------------|---------------------------------------|----------------------------|--|---------------------------------------|----------------------------|---------------------------------------|---------------------------------------|
| | Cases (n = 18) n (%) | Matched controls (n = 90) n (%) | Odds ratio 95% confidence interval | Cases (n = 31) n (%) | Matched controls (n = 155) n (%) | Odds ratio 95% confidence interval | Cases (n = 13) n (%) | Matched controls (n = 65) n (%) | Odds ratio 95% confidence interval |
| Drug class | | | | | | | | | |
| Anti-Depressants | 10 (56) | 21 (23) | 5.1 | 27 (87) | 34 (22) | 33.4 | 7 (54) | 19 (29) | 2.7 |
| Stimulants | 3 (17) | 3 (3) | 10.0 | 3 (10) | 3 (2) | 5.0 | 2 (15) | 1 (2) | 10.0 |
| Anxiolytics | 4 (22) | 12 (13) | 4.0 | 15 (48) | 31 (20) | 14.2 | 3 (23) | 14 (22) | 4.3 |
| Sleep | 8 (44) | 8 (9) | 14.6 | 13 (42) | 23 (15) | 4.6 | 6 (46) | 13 (20) | 3.7 |
| Anticonvulsants | 9 (50) | 13 (14) | 5.8 | 22 (71) | 28 (18) | 13.0 | 6 (46) | 9 (14) | 5.3 |
| Antipsychotics | 7 (39) | 8 (9) | 6.2 | 15 (48) | 11 (7) | 11.9 | 5 (38) | 5 (8) | 9.5 |
| Pain | 7 (39) | 27 (30) | 1.5 | 28 (90) | 58 (37) | 16.4 | 7 (54) | 23 (35) | 2.4 |
| Total classes | | | | | | | | | |
| 0 | 5 (28) | 52 (58) | Referent | 3 (10) | 84 (54) | Referent | 4 (31) | 32 (49) | Referent |
| 1-2 | 5 (28) | 23 (26) | 2.4 | 3 (10) | 40 (26) | 2.0 | 2 (15) | 23 (35) | 0.8 |
| 3+ | 8 (44) | 15 (17) | 9.5 | 25 (81) | 31 (20) | 49.7 | 7 (54) | 10 (15) | 21.8 |

¹Cases were matched to controls who had been in the WTU for 6 months.

of effective medication management for WTs. More than half of WTs with a current prescription for pain reported their pain as “poorly or fairly” controlled (57%) and/or reported trouble sleeping three or more nights per week (53%).

More than half (55%) of providers involved with direct chronic pain management of WTs reported being “somewhat or extremely” frustrated by the complexity of managing chronic pain. However, providers reported “good” to “excellent” quality training to prepare them for identifying/treating drug diversion (68%), drug abuse/addiction (77%), and pharmacological management (70%). Common practices reported for managing chronic pain patients on opiate therapy included: checking electronic medical record and/or prescription tracking system prior to prescribing (78%), using the electronic outpatient medical record to monitor patient use of controlled substances (87%) and regularly asking WTs about misusing substances (i.e., prescription drugs (76%), illicit drugs (64%) and alcohol (70%).

3.3. Utilization and access to WTU BH service

WTs often described the available BH services as difficult to access (due to what they perceived as few providers), and reported experiencing long wait times and frequent appointment rescheduling. Many WTs perceived BH services as ineffective due to lack of symptom relief, lack of confidentiality, poor coordination between HCPs, and an emphasis on medication.

Stigma reported by WTs was similar to what has been reported in traditional non-WTU Army populations [48,49]. Many WTs expressed concerns about negative consequences associated with seeking BH services, including fear of hospitalization, not being able to return to duty, and negative career impact. WTs who entered the WTU primarily for BH problems were significantly more likely to report stigma than other WTs ($p < 0.01$).

WTs who sought BH services at the WTU stated they were viewed or treated differently by military cadre (e.g., labeled, judged, viewed as malingering) or feared being treated this way for seeking BH services. A disconnect was observed between WTs’ perceptions of military cadre BH skills/duties and the military cadre’s perceptions of themselves (Table 6). WTs commonly stated military cadre lacked understanding about WT BH problems and needs, have an insufficient amount of contact with them to assess their BH status, and/or ignore BH medical recommendations. Cadre

felt they were adequately trained, that they had the necessary skills to work with all WTs, and described themselves as supportive of WTs with BH concerns. NCMs and HCPs had predominantly negative views of the quality of military cadre’s response to WTs with BH concerns.

Many HCPs, NCMs, and military cadre thought the WTU environment interfered with their ability to adequately perform their job duties (e.g., lack authority, disagreements about medical recommendations, poor communication among staff members). WTU staff also perceived their workloads as excessive, often felt overwhelmed with responsibilities, and felt criticized and undervalued by their chain of command. Poor communication between the WTU triad was stated as a major work stressor impacting effective treatment.

3.4. WTU environment and climate

WTs felt the WTU was a stressful environment that lacked unit cohesion, camaraderie, and social support. They frequently cited concerns about loneliness, lack of peer support, unfamiliarity with other WTs, and that being in the WTU prevented access to typical support systems (e.g., unit, family, and friends). WTs frequently cited concerns about not knowing other WTs well enough to feel comfortable reaching out to them in times of need or to recognize changes in behavior/warning signs for suicide. WTs who reported higher social support were correlated with significantly fewer ($p < 0.001$) reported symptoms of anxiety (correlation (r) = -0.43), hopelessness (r = -0.46), depression (r = -0.49), insomnia (r = -0.30), and suicidal ideation (r = -0.26). WTs commonly perceived the WTU as a negative atmosphere promoting feelings of frustration, a loss of autonomy, and a lack of support for returning to duty. Many WTs did not know when they would be released, felt unable to plan for their future, and felt that decisions about their career were out of their control.

Some positive aspects of the WTU environment were described in focus groups. WTs appreciated the time dedicated to healing and the opportunity to pursue higher education while assigned to the WTU. They also reported greater satisfaction with WTU services, treatment, and medical care compared to what they received in their former units.

3.5. Risk assessment and suicide prevention

No single standardized system of record for documenting and tracking WT risk assessment was iden-

Table 6
Beliefs about military cadre skills, as reported by warriors in transition and military cadre

| | Warriors in transition ¹ | Military cadre ² | p |
|--|-------------------------------------|-----------------------------|---------|
| | n(%) agree | n(%) agree | |
| Can recognize the risk signs for suicide in Soldiers in my unit | 478 (39) | 272 (78) | < 0.001 |
| Know how to communicate with soldiers with BH problems | 469 (39) | 283 (81) | < 0.001 |
| Know how various BH problems are treated | 423 (35) | 187 (53) | < 0.001 |
| Know basic information about psychiatric medications and their side effects | 383 (31) | 190 (54) | < 0.001 |
| Can recognize the symptoms and early warning signs of BH problems | 413 (34) | 214 (61) | < 0.001 |
| Know how to help soldiers in the unit to manage their stress | 428 (35) | 253 (72) | < 0.001 |
| Can tell the difference between a soldier with a real BH problem and one who is faking | 340 (28) | 103 (29) | < 0.05 |
| Have a good understanding of the causes of BH problems | 387 (32) | 166 (47) | < 0.001 |
| Refer soldiers to BH services when he/she suspects a problem | 515 (42) | 266 (76) | < 0.001 |
| Keep it private and confidential when a soldier in the unit seeks BH services | 485 (40) | 277 (79) | < 0.001 |

¹Perceptions about military cadre, as reported by Warriors in Transition; ²Perceptions about military cadre, as reported by military cadre themselves.

tified at the WTU sites visited. Many WTs perceived the risk assessment processes as ineffective, impersonal, inconsistent, and poorly monitored. They felt impersonal relationships between WTs and military cadre may preclude cadre from recognizing key warning signs. Many WTs admitted being dishonest or “knowing what to say” on risk assessments to avoid being labeled as high risk and the associated negative consequences. WTs frequently reported a lack of understanding about and inconsistent application of controlled access to firearm policies. Military cadre, NCMs and HCPs were also more likely to describe risk assessment methods as ineffective (than effective).

Most military cadre (95%) and NCMs (95%) reported having completed Army suicide prevention training, but only 50% of WTs surveyed had completed the same training since joining the WTU (completion was not higher among WTs assigned for longer periods of time). Only 36 percent of WTs thought the training made them more comfortable talking to someone about suicide. Fewer WTs (44%) thought suicide prevention training was worthwhile, compared with military cadre (82%) and NCMs (69%). These questions have not been asked in other population surveys, so comparison data are not available.

4. Discussion

The WTU, by definition, represents a population of soldiers with career- and life-altering medical conditions brought together in an environment focused on healing, rehabilitation, and transition. While the potential for increased population-level risk for suicide and other preventable death among WTU soldiers is not surprising, the triad of care, intensive case management, and ready access to medical care are important

mitigating strategies. While the current study identified several important areas for future improvement to the WTU system of care and risk mitigation, no single risk factor was associated with an increased likelihood of preventable death among soldiers in the WTU. The use of psychotropic and/or CNS depressant medications, prevalence of BH diagnoses and substance use disorders, polypharmacy, alcohol use, and a high cumulative number of stressors were identified as important risk factors for preventable deaths in the WTC. These risk factors represent critical opportunities for intervention that may impact the overall rate of preventable death, but would most certainly improve the health and well-being of many WTU soldiers, regardless of suicide risk.

Soldiers assigned to the WTU who died by suicide, accidental overdose, or non-overdose accidental causes appeared to have similar demographic and military characteristics as other soldiers assigned to the WTU during the same time period. Suicide and accidental overdose index cases differed significantly from non-overdose accidental index cases with respect to most behavioral and social health issues. The predominant factors associated with WTU suicide and overdose accidental death index cases in the current study (e.g., behavioral health disorders, substance abuse, psychotropic medication use, polypharmacy, legal issues) were similar to risk factors identified in other studies of military and civilian suicides [50–52]. While the prevalence of problematic alcohol use is marginally higher than reported in other military populations (20–35%) [48,53], the potential misuse of alcohol among WTs prescribed psychotropic medications is particularly striking since recommending abstinence from alcohol for individuals prescribed psychotropic medication is standard guidance from the WTU triad of care

and should be a routine part of the prescribing clinician's instructions.

Index cases with a confluence of behavioral and social health issues and polypharmacy had a significantly greater likelihood of dying by suicide or accidental overdose. These factors were also similar to those reported by WTs who endorsed suicidal ideation on the population survey, including multiple stressors, substance use, and depressive symptoms. Other studies have demonstrated a synergistic effect of multiple risk factors among suicide-related deaths [54–59]. Specifically, among U.S. Army soldiers, studies have shown that a substantial percentage of those who die by suicide have multiple mental health issues and/or stressors (e.g., legal or personal stressors) [50]. Mitigation strategies that target management of multiple comorbid physical and behavioral health conditions, substance use, polypharmacy, and associated social stressors, including legal problems, will likely decrease the unique risk factors observed by this investigation.

The use, misuse and associated side effects of prescription drugs were perceived as an important risk factor in the WTU across all focus group populations (i.e., military cadre, NCM, HCP). Many of the reasons reported for misuse were related to self-management of what could be perceived as inadequately treated conditions (e.g., sleep, pain, stress). While it isn't clear what percentage of WTs are currently being treated for chronic pain, around 60% of the WTs surveyed reported being prescribed a pain medication, and of these more than half felt their pain was insufficiently controlled. A majority of HCPs directly involved with pain management of WTs reported being at least somewhat frustrated by the complexity of managing chronic pain. Other studies of non-WTU populations have demonstrated that patients with moderate to severe pain have only about a 50 percent chance of obtaining adequate pain relief [60]. Patients in civilian settings being treated for a complex set of conditions (e.g., mental health, chronic pain, sleep), have been shown to be more susceptible to polypharmacy practices [61–67]. Polypharmacy has the potential to increase the likelihood of adverse effects and drug interactions, decrease drug adherence, and increase the mortality risk [68,69]. Three major initiatives are ongoing or under development that should help to mitigate the risks of polypharmacy in the WTC: (1) Standardized training in the risks of polypharmacy (i.e., accidental overdose, addiction, over-medication) for HCPs and WTU staff (i.e., military cadre, NCMs, social workers) and how to address risks when discovered; (2) Development of a notifica-

tion alert in the electronic medical record that identifies when a soldier crosses the threshold of polypharmacy and suggests the potential need for an in-depth clinical pharmacist consultation to mitigate potential risks; and (3) Policy that establishes the authority and details how and who should perform a "pill count" to help deter WTs from sharing, selling, or abusing their controlled substances.

WTs perceived that those seeking BH services were viewed and treated more negatively by military cadre. While military cadre often described themselves as supportive of WTs with BH concerns, many also alluded to the possibility of WTs with BH issues who may be malingering. Previous field studies conducted among Army units [48,49] revealed that leaders commonly believe soldiers who are seeking help for BH issues are malingering, but this was somewhat of an unexpected observation within the WTU since a significant proportion (> 30%) of the WT population have BH-related diagnoses. The acuity and comorbidity of physical and BH issues in the WT population poses management challenges to clinical staff and military cadre who, while dedicated to their mission, frequently report the potential for burn-out, fatigue, and a sense of being overwhelmed and undervalued. Some military cadre may also find WTs with BH issues more difficult to manage than WTs with physical illness or injury. The triad of care model is greatly improved over what has been observed as a lack of coordinated care in other military populations [48,70], but the potential for improvement in communication and coordination among triad members regarding the care of WTs should remain a priority. In addition, the perceived lack of support for BH issues from military cadre reported by WTs may reflect the need for enhanced training to more adequately prepare cadre for managing soldiers with a wide array of complex behavioral and social health issues [71].

For many WTs, WTU assignment results in isolation from their primary support systems (e.g., family, unit) and perceived lack of autonomy and support for returning to duty. Both unit cohesion [12–14] and social support [72] are associated with a decrease in negative mental health outcomes. Not surprisingly, WTs who reported the highest social support in the current study had fewer negative behavioral and social health outcomes. WTs reporting a lack of peer support and familiarity with other WTs attributed the deficit to the emphasis on personal healing rather than team oriented missions. Furthermore, WTs expressed frustration and stress related to a loss of autonomy and control over

their situation while assigned to the WTU. Social support has been shown to protect against the development of further mental health issues, particularly when individuals express feelings of powerlessness and lack of control over their own lives [73]. This significant loss of unit-based social support and cohesion compounded with frequent distance from family and friends has the potential to negatively impact successful recovery.

The following limitations should be considered in conjunction with the results of the study. The index case analysis was restricted to cases provided by the WTC during the study period of interest and findings do not necessarily represent risk for suicidal behavior among current WT soldiers. Several data sources were unavailable at the time of the study (including community services and civilian in-patient hospitalization information), which would have provided useful information related to additional in-patient care, financial problems, stress management and help seeking behavior among the index cases. Data for non-overdose accidents were not as well-documented as for WTs who died by suicide or accidental overdose and most likely reflect some amount of underreporting for these cases. Between-index case group significance testing was not possible due to the small number of cases. Tests of significance between each index case groups and the survey population, WT population, and/or matched controls which were conducted, were all limited by the small case group sample size, and thus estimates presented lack precision. However, rather than aggregated all preventable deaths to increase statistical power, the authors opted to retain the specificity between groups to enable identification and development of improvement strategies aimed at preventing each specific type of preventable death since they are likely to differ. Because focus groups and surveys were conducted at a single point in time, temporality and/or causality cannot be determined. Focus group findings are a representation of the perceptions and beliefs of the participants and may not reflect the attitudes of all WTs across the WTC. Additionally, because of the specificity and uniqueness of the study population, there are no comparable focus groups or survey data to provide context to the findings. Focus groups could not be coordinated with some special populations (e.g., family members) at all WTU sites visited. Due to sampling constraints, we also were not able to identify differences across other strata present in the population (e.g., rank, gender, service component, occupational specialty). Perhaps most importantly, it has been more than two years since data collection was completed for

this study, and thus it is expected that new procedures and regulations have been developed and implemented that may address many of the important issues identified in this study. However, as of the time of this writing, the present EPICON is the most comprehensive external assessment of the scope, severity, and burden of BH issues within the Army WTU population.

5. Conclusion

The WTC triad of care model represents a major transformation in the way the U.S. Army treats soldiers with complex medical conditions and disabilities. Wounded Warriors who participated in this study reported greater satisfaction with support services, treatment, and medical care compared to what they received in their former units and conveyed an appreciation for the dedicated time and focus on healing experienced in the WTU environment. However, the unique design and operation of WTUs as environments focused on treatment and rehabilitation provide both benefits and challenges to recovery and risk mitigation. Clinicians balancing the use of multiple medication treatment strategies for the management of chronic pain and symptoms of injuries, posttraumatic stress and mental health issues must recognize that in this study population, those medication treatment strategies were associated with increased odds of death by suicide and accidental overdose.

The U.S. Army WTC has begun to address many of the issues identified in this study. The Comprehensive Transition Plan Policy, published in 2011, focuses on the execution of the interdisciplinary team collaborative efforts to assist the soldier, identifies capabilities of the triad of care, and responds to the need for improved coordination and collaboration in support of a single, unified plan for each soldier. The WTC has also developed an Organizational Inspection Program (OIP) review team to examine standard operating procedures, speak with soldiers and their families, and examine unit safety programs across a sample of WTUs annually. Clinical training for military cadre and staff has been continually updated. A number of initiatives related to education and employment for soldiers transitioning out of the Army have been established. Online learning resources for family members and caregivers who support WTs were established to provide detailed information related to the soldiers' individual recovery plan and the role caregivers play throughout the process. In November 2012, the Army Surgeon General

directed an Army-wide WTU “Stand Down” focusing on customer service training for WTU leaders, military cadre and staff to equip these personnel with the tools to better understand the needs of the WTs.

Managing patients with complicated issues presents a unique challenge for any healthcare system. Likewise, managing soldier transitions from one unit to another and/or from military to civilian life also requires a range of unique support, particularly when illness, injury, or disability is present. The WTC has a mission to support and manage both of these complex processes for a population that can require extensive assistance with each. This study identified what may be unintended consequences resulting from the aggregation of patients requiring extensive support, management and treatment outside of a traditional Army unit or military care environment. Despite major strides made by the WTC to treat and care for Wounded Warriors, additional population strategies targeting management of BH issues (especially in the high risk period following BH hospitalization [74]); chronic pain; polypharmacy; and WTs with multiple stressors, while fostering a supportive and cohesive environment, may further improve the system of care and potentially help mitigate unique risk factors identified by this investigation.

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