



**Caring for Post-9/11 Veterans in the Civilian Sector:
Knowledge and Readiness of Registered and Advance
Practice Nurse Providers**

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Caring for Post-9/11 Veterans in the Civilian Sector: Knowledge and Readiness of Registered and Advance Practice Nurse Providers

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Abstract

Importance Since 2001, 3.5 million military service members deployed overseas in support of the post-9/11 Global War on Terror. While healthy and fit upon deployment, Veterans have experienced many ill-defined illnesses and chronic diseases, with more than 520,000 being diagnosed with cancer. With the implementation of the VA MISSION and PACT Acts, post-911 Veterans increasingly are being seen in non-VHA healthcare facilities by non-physician providers.

Objective To assess the readiness of registered and advance practice nurses to provide knowledgeable and competent healthcare for post-9/11 Veterans in the civilian healthcare system.

Design, setting, and participants A web-based survey was administered by the HunterSeven Foundation (a Veteran founded non-profit organization), with 541 nurse respondents.

Main outcomes and measures: Questions were designed to assess military knowledge, comfort level caring for Veterans, self-reported proficiency, and prior training of participants. Mean differences were compared using a restricted maximum likelihood, fixed-effects model, with incidence between groups estimated as log-binomial relative risks.

Results Meaningful gaps in clinical knowledge of screening for and treatment of medically related conditions were identified. Our assessment also highlighted a sparseness of knowledge for making care recommendations based on apposite resources.

Conclusions and relevance Cognitive biases among healthcare providers in the civilian sector may lead to missed and/or delayed diagnoses, therefore emphasizing the need for additional training focused on caring for post-9/11 Veterans.

Keywords Civilian healthcare setting; global war on terror; knowledge and readiness; Veterans

Key Points

Question Are civilian (non-VHA) nurses competent and knowledgeable to provide healthcare to post-9/11 military Veterans?

Findings Results from our survey of 541 respondents suggest that many nurses employed in the civilian setting do not have ideal knowledge and understanding of post-9/11 military Veteran-related risk factors and healthcare concerns. However, nurse respondents with a history of military service were significantly more familiar with the five key areas of military knowledge (i.e., war-reported illness, traumatic brain injury, psychological impact, military Veteran-culture, and resources available) than non-Veteran nurse respondents. This difference also was true for surface-level knowledge of mental health concerns, combat exposures, healthcare use, demographics, and medical outcomes. Having a post-baccalaureate degree did not correspond to greater military knowledge.

Meaning Non-VHA nurses may benefit from additional targeted trainings focused on the needs of post-9/11 Veterans receiving care in the civilian healthcare setting.

Introduction

Background

The United States has deployed over three-million uniformed service members to areas in the Middle East and Southwest Asia in support of the Global War on Terror since the turn of the 21st century.¹ While research is limited and preliminary, the data suggests that Veterans who have deployed to Iraq and/or Afghanistan are more likely to experience chronic physical symptoms, increased shortness of breath, and a decreased level of physical fitness post-deployment compared with pre-deployment.²⁻⁴ Prior data extracted from medical records suggests that the same population is experiencing chronic, complex, terminal, and otherwise unexplainable medical issues. This includes rare forms of cancer occurring at increased rates than their non-Veteran, civilian counterparts with similar demographics.⁵

Most of the literature surrounding post-9/11 service members focuses mainly on mental health, post-traumatic stress disorder, and suicidality. Few studies addressed the relationship between non-VHA healthcare providers, specifically those in the nursing profession, and care provided to Veterans. A 2015 Congressional appropriations committee report suggests that 26% of post-9/11 Veterans were enrolled in and received care from the Veterans Health Administration (VHA). This lead researchers as well as committee members to believe that the remaining are using civilian-based (non-VHA) medical facilities.⁶ While it is assumed that healthcare providers who work in a military or VHA setting offer culturally competent care to Veterans, it is important to examine the level of cultural competence, among non-VHA healthcare providers.^{7,8}

The information available on this topic highlights an increasing gap of concern considering post-9/11 Veterans account for approximately 19% of the total Veteran population. According to projections provided by the Joint Economics Committee this number is expected to increase to 32% by the year 2034.^{9,10} As part of the HunterSeven Foundation's Military

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3 Exposures Education and Awareness initiative, the aim of this manuscript is to describe the
4 level of knowledge, beliefs, and perceptions among civilian nurses in providing care to post-
5 911 Veterans. An important premise is that registered and advanced practice nurses should
6 have basic knowledge about military culture, military experiences, and the possible health-
7 related consequences of serving in the military, to provide adequate and competent care to
8 Veterans in a non-VHA setting.
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19 *Current Knowledge*

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21 Post-9/11 Veterans are defined as those who have served in the US military (Army,
22 Navy, Marine Corps, and Air Force) and have been deployed to Iraq, Afghanistan, Syria, or
23 Kuwait on or after September 11, 2001 (including Operation Enduring Freedom, Iraqi
24 Freedom, Inherent Resolve, New Dawn and Resolute Support).¹¹ Although young (~35 years
25 in age), these Veterans encountered high-risk, diverse experiences and may manifest unusual
26 health outcomes than civilians as a result of military service.^{5,12} Respiratory disorders,
27 eosinophilic lung disease, asthma, and an array of presumptive conditions including rare forms
28 of malignancies began to appear in the months and years following deployments to Southwest
29 Asia.¹³
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45 **Unique Healthcare Needs of Post-9/11 Veterans**

46 *Mental Health*

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48 Many Veterans of the post-9/11 cohort were exposed to improvised explosive devices
49 (IED) and blasts consequent to serving in and traveling through active war zones.¹⁴ In addition,
50 there has been a sizeable uptick in claims for mental health conditions, although many cases
51 go undetected until Veterans experience other life crises. While the mental health burden
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3 experienced by post-9/11 Veterans is well recognized, it has not been acknowledged as a
4 potential barrier for accessing care for other health concerns.
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10 *Primary Cancer Diagnoses in Post-9/11 Active-Duty Service Members*

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12 A twenty-year review of the primary diagnosis of cancers in active-duty service
13 members by the Department of Defense (2001-2021) found that those who served on active
14 duty were more likely to be diagnosed with malignancies than civilians. This determination
15 was made by comparing the National Cancer Institute Surveillance, Epidemiology, and End
16 Results (SEER) Program's reporting of cancer diagnoses in the US population by year (age-
17 adjusted) with cancer diagnoses by the Department of Defense Military Health System Data
18 Repository.^{15,16} Rates of the most commonly diagnosed cancers (i.e., prostate, lung, colorectal,
19 bladder cancers, and melanoma) are 1.4% higher among Veterans than civilians.¹⁷
20 Furthermore, post 9/11 Veterans averaged 5.2 cases of brain cancer (mostly glioblastomas) per
21 100,000 per year from 2015 to 2019 among those aged 30-39. In an article published in
22 Military.com, data from the VA and NIH suggests glioblastomas occur at a rate 26% higher in
23 the post-9/11 Veteran cohort in comparison to the US non-Veteran population.¹⁸
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40 Military hazards and potential exposures can vary depending on geographical location,
41 service members' role, and assigned duties.⁵ Several factors may affect the development of
42 health problems after leaving military service. Hazards may be dependent on jobs performed,
43 exposure to military-grade fuel, airborne emissions from mechanical equipment, geographical
44 air pollution, and high levels of particulate matter in their location of deployment (e.g.,
45 Afghanistan and Iraq).^{5,13} Reported exposures among post-9/11 Veterans included combat-
46 related smoke, burn pits (i.e., medical and human waste, tires/rubber, plastics, toxic chemicals,
47 benzene-based jet fuel propellant, and general refuse/debris), geologic dust, improvised
48 explosive devices, asbestos, and depleted uranium. Vaporized depleted uranium contaminated
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3 dust and soil created a long-term health risk, owing to the long half-life of this radioactive,
4 cancer-causing element. Over 85% of those deployed to Iraq and Afghanistan had burn pit
5 contact.¹⁹
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10 Ninety percent of those deployed reported post-deployment exposure-related health
11 concerns. Majority of post-9/11 Veterans receiving care at the VHA since 2002 have been seen
12 for various medical concerns (e.g., endocrine, nutritional, metabolic, digestive, respiratory, and
13 ill-defined conditions).⁵ The healthcare needs resulting from military service place these
14 Veterans at an increased risk for health conditions in comparison with civilians.
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21 Post-9/11 Veterans who were exposed to airborne toxins during their deployment
22 frequently reported an increase in respiratory-related symptoms and a decrease in physical
23 fitness status.⁴ The hazards exceeded safe exposure guidelines which coincide with deployment
24 periods.⁴ Overall, participants were young and did not fall into the demographic of those
25 experiencing specific adverse health conditions (i.e., those with chronic or terminal illnesses
26 that are more commonly seen in the older general population versus a previously healthy and
27 fit military cohort). These findings highlight the importance of a nurse's role in healthcare
28 specifically, in patient assessment, education, navigation, and advocacy.⁴ With cancers being
29 more prevalent in Veterans, mental health concerns and other comorbidities can present as
30 challenges that may interfere with cancer identification and treatment.²⁰
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47 *Veteran Healthcare Use*

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49 In August 2014, the US Congress passed the Veterans Access, Choice, and
50 Accountability Act (VACAA) in response to the VHA not being able to provide timely access
51 to healthcare for Veterans and their families. The passing of VACAA established the Veterans
52 Choice Program (VCP) that covers Veterans who are seeking treatment at non-VHA
53 facilities.²¹ The recently passed PACT Act in 2022 provides additional coverage for Veterans
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3 with an expanded list of presumptive health conditions and specifically addresses health-related
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5 military exposures.¹³
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8 With the increasing use of community healthcare options, most post-9/11 Veterans do
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10 not seek medical care or are followed by a provider at the VHA.²² Knowledge and competency
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12 differences between nurses practicing in non-VHA (versus VHA) healthcare facilities is a
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14 growing concern and reflects the readiness to provide effective care for this at-risk group.
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17 18 19 *Civilian Nursing Knowledge and Understanding of Veteran Healthcare* 20

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22 Timely and cost-effective healthcare services are critical however, an understanding of
23
24 military culture by non-VHA community healthcare providers are essential to prevent poor
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26 health outcomes and delayed diagnoses. A recent study assessed how nurses' awareness of
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28 Veteran healthcare needs effects assessment, planning, interventions, and evaluation of
29
30 outcomes in this Veteran cohort.⁸ While nurses typically learn about cultural norms, beliefs,
31
32 and values of specific populations as a component of nursing curriculums, those providing care
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34 for Veterans may benefit from additional training to understand how Veterans' individualized
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36 experiences influence health needs. Another benefit is gaining perspective on Veterans'
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38 healthcare in the context of military culture.
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42 Often, military culture has been overlooked, misunderstood, and insufficiently
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44 addressed by non-VHA nurses.⁸ Twelve percent of non-VHA nurses reported collecting patient
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46 military history or related health information, while 80% of non-VHA nurses reported they
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48 were "completely unfamiliar" or "a little bit unfamiliar" with support services available to
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50 Veterans. Additionally, 70% of non-VHA nurses do not inquire about military or Veteran status
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52 when completing an assessment. Less than 4% of non-VHA nurses within this study
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54 understood military culture and few reported having a background of military service.⁸
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Veteran reliance on care from non-VHA facilities is projected to increase over the next two decades. Frequently nurses are the first point of contact for patients receiving care (e.g., initial encounters, assessments, and subsequent interactions), therefore it is instrumental that concerns regarding barriers to care be addressed. This highlights the need for policymakers and key stakeholders to implement guidelines for non-VHA providers to deliver culturally competent healthcare services. Having appropriate guidance and training is a key priority for nursing professionals, however clarity is needed as to when and where guidance should be offered.²³

Materials and Methods

Instrument

A Qualtrics online survey was administered to participants. The instrument was adapted from the validated RAND Corporation's "Ready or Not" web-based tool and followed SQUIRE 2.0 standard guidelines.²⁴ Questions were designed to assess military knowledge, comfort level caring for Veterans, self-reported proficiency, and prior training of participants (Appendix A). Prior to use, the questions were reviewed by subject matter experts in the field including nursing professionals, military medical providers, and service members. Modifications of the survey were based on a thorough literature review and changes to the wording were suggested to improve readability. Approval was granted by the HunterSeven Foundation Ethics Review Committee (#HS-0231Z) and the Rhode Island College Institutional Review Board (#2122-2247). The survey was distributed by the HunterSeven Foundation (a Veteran founded non-profit organization) and participation access was open for one month in 2021.

Like the RAND Corporation survey instrument, categorical responses were ranked using a psychometric, 5-point Likert scale for two sections of questions. For Q10.1 through

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3 Q10.5, respondents were asked to rate their level of familiarity regarding five specific topics
4 (e.g., war-related illnesses, traumatic brain injuries, psychological impacts of war,
5 military/Veteran culture, and military/Veteran resources) in relation to providing care for post-
6 9/11 Veterans, with response options ranging from 1 = completely unfamiliar to 5 = extremely
7 familiar. For Q13, respondents were asked to rate their comfort level for competently caring
8 for post-9/11 Veterans, with response options ranging from 1 = extremely uncomfortable to 5
9 = extremely comfortable.
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19 Participants also were asked a series of dichotomous (true/false) questions (Q11.1
20 through Q11.7) derived from findings in the literature review pertaining to their surface-level
21 knowledge of post-9/11 Veterans, including mental health concerns, combat exposures,
22 healthcare use, demographics, and medical outcomes. These were posed as statements
23 requesting participants to decide the accuracy of the response options. This was the preferred
24 method to gain insight into respondent knowledge. That is, providing a close approximation of
25 inferred mastery using either informed reasoning based on statement attractiveness or informed
26 reasoning with endorsement bias (e.g., a defined misunderstanding of a distractor).²⁵ The
27 definitive knowledge items were Q11.1, Q11.2, Q11.3, Q11.4, and Q11.7, with the first 4
28 questions being reverse code. Two true/false items (Q11.5 and Q11.6) were included as
29 distractor questions, without a definitive answer.
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44 A second set of dichotomous questions (Q12.1 through Q12.5) were related to the
45 practice assumptions and self-awareness of respondents. Specially, the nurses were queried
46 about their beliefs regarding Veteran suicidal thoughts, status changes, psychosomatic
47 symptoms (mental), and physical fitness / overall health. They also were asked about their
48 physical safety when caring for Veterans.
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3 In the final survey question (Q14), nurse respondents were asked for their profession-
4 al opinion based on clinical experience regarding the average age range of the general non-
5 Veteran patient population they observe and diagnosed with cancer.
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9 10 *Participants*

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12 Participants were identified through professional organizations using a point of
13 reference sample. Registered nurses and mid-level providers employed either full or part-time
14 in a non-VHA healthcare practice (e.g., emergent, urgent, ambulatory care, and in-patient
15 specialty departments) were included. For administrative reasons, agency, travel, and telehealth
16 nurses were excluded. Age group, gender, level of education, practice location (state), and
17 military service history were collected as non-identifiable, anonymous information, in
18 compliance with the U.S. Health Insurance Portability and Accountability Act (HIPAA). No
19 participation incentive was offered.
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33 *State Level Data*

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35 State level population data from 2021 were tabulated because there may be variations
36 affecting Veterans' healthcare needs and how they receive care.²⁶ This included the percentage
37 of registered nurses and post-9/11 Veterans, as well as the number of VA medical centers per
38 state. Data from states with the most survey respondents were presented to contrast with
39 population-based data. Average responses for Q10 and Q13 and percentages for Q9 and Q11
40 were included in the table.
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51 *Data Collection, Missing Values, and Statistical Analysis*

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53 Questionnaire information was converted into numerical identifiers and entered in SAS
54 9.4 (SAS Institute, Cary, NC) and SPSS Version 26.0.1.1 (IBM, Armonk, NY) for analysis. To
55 better accommodate statistical applications, transformations were applied to the data when
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3 appropriate. This involved 1) rank-linearizing the observations from high to low, 2) right-
4 shifting the results by their least upper bound, and 3) variance stabilizing the elements, such
5 that their variability is minimally related to their mean value.
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10 Few observations had missing data (<0.5). An examination of the missing data patterns
11 suggested that the unknown values were not randomly aligned, with unequal spacing between
12 the clusters^{27,28}. Accordingly, listwise deletion, which requires the missing data to be missing
13 completely at random (MCAR), was not used when analyzing the data.²⁹
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19 A multistage, expectation-minimization (EM) algorithm was implemented to
20 accommodate missing values. This entailed finding maximum 'a posterior' estimates of model
21 parameters for the set of transformed values, with respect to the unobserved latent variables.³⁰
22 Euclidean distances between the 'a posterior' and maximum-likelihood estimates for the
23 respective levels of a variable were computed. The distances were used to partition missing
24 values into their optimal completion categories, akin to a Boolean similarity measure.³¹ When
25 the percentage of missing data is low, different approaches for accommodating binary and
26 Likert-scaled data tend to yield comparable results.^{32,33}
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38 Descriptive characteristics were tabulated to determine variable cell frequencies, with
39 differences between male and female respondents assessed using Fisher's exact test. In the case
40 of variables having more than 5 levels, *p*-values were computed by Monte-Carlo simulation.
41 The sampling frame consisted of 1,000,000 randomly drawn tables in proportion to their
42 hypergeometric probabilities, conditional on the marginal frequencies (i.e., same total sample
43 size and row/column totals as the observed table).³⁴
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51 Cronbach's alpha was used to determine instrument consistency in subjective
52 responses. In contrast to the Kruder-Richardson (KR) score that can only be computed for
53 dichotomous survey items, the Cronbach's alpha score may be computed for both dichotomous
54 and multi-level Likert data to determine internal consistency.³⁵ A Cronbach's alpha score \geq
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3 0.70 generally is considered to be an adequate score for a survey tool, consistent with the
4 criterion of Nunally.³⁶ However, this score is not a measure of dimensionality, nor a test of
5 one-dimensionality (i.e., one latent variable). An exploratory factor analysis was used to
6 address this question, examining the diminishing total variance explained by each component
7 eigenvalue.³⁷
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15 Mean differences for participants with a history of military service versus those without,
16 as well as participants with a post-baccalaureate degree (masters and/or doctorate) versus those
17 without, were compared using a restricted maximum likelihood, fixed-effects model,
18 controlling for age group and sex. Fixed-effects estimates are robust for detecting mean
19 differences between two groups, providing that the samples are reasonably large and that there
20 are few extreme outliers (i.e., finite variances).^{38,39}
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29 Adjusted relative risk (RR) was used as the measure to compare incidence between
30 groups and computed with a log-binomial model.^{40,41} P -values were estimated using the
31 likelihood ratio test and denoted as " P_{LRT} ". Similarly, significance levels corresponding to the
32 additive interaction between groups (RR_1/RR_2) were denoted as P_{INT} . Goodness-of-fit was
33 evaluated by Akaike's Information Criteria and case wise diagnostic statistics, generalized to
34 log-binomial regression.⁴²
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42 Unless indicated otherwise, p -values less than 0.05 were indicative of a significant
43 association. Rounding was based upon significant figures rather than fixed decimal places
44 (Goldilocks method).⁴³
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51 **Results**

52 *Demographics*

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56 A total of 541 eligible participants completed the survey. They varied by practice state,
57 setting, age range, military service history, and level of education (Table 1). Thirty five percent
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3 of participants were aged 20-29 years and 49% were aged 30 to 39 years. Majority (83%) of
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5 nurses indicated practicing in a hospital setting (emergency department, inpatient care, and
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7 intensive care/critical care), with the remaining respondents practicing in management, primary
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9 care, mental health, oncology, and surgical settings. Ninety percent reported working full-time
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11 (32 hours or more weekly).
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15 All participants were licensed and actively involved in direct patient care, with 69%
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17 having obtained a bachelor's degree and 11% a post-baccalaureate degree. Participants
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19 predominately identified as female (86%). Sixty-four respondents (12%) reported having
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21 served in the military, averaging 7.2 years of service (ranging between 2.5-21 years, median =
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23 6 years). Over half (61%) of the participants stated they had an immediate family member who
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25 serves or had served in the military. Employment status ($p = 0.028$) and history of military
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27 service ($p < 0.001$) differed by sex.
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33 *Frequently Occurring Health Issues*

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35 Health issues (Q9) believed to frequently occur among post-9/11 Veterans were mental
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37 health concerns (e.g., post-traumatic stress, depression, anxiety, suicidal ideation, and
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39 addiction) (92%); medical illness characterized as pulmonary diseases, cancer, and
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41 autoimmune disorders (7%); and physical injury (e.g., amputations, musculoskeletal injuries,
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43 brain injuries) (1%).
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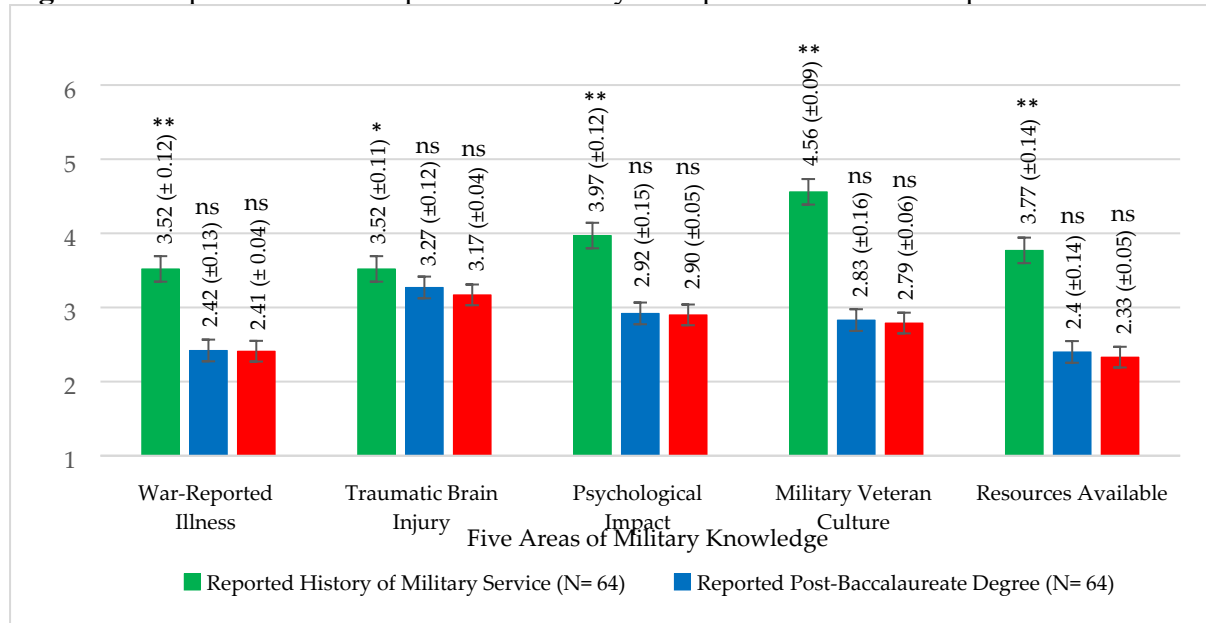
49 *Knowledge and Preparedness*

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51 The items in the “knowledge and competencies” domain (Q10) were internally
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53 consistent (standardized Cronbach’s alpha = 0.84) and unidimensional, with the first eigen-
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55 value for the reduced correlation matrix of 2.8 being considerably larger than the next value of
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57 0.24. Factor loadings for the first principal component were of similar magnitude (Military
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3 Veteran Culture = 0.50, Resources Available = 0.48, War-Related Injury = 0.48, and
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5 Psychologic Impact = 0.46), except for the lower value of 0.29 associated with Traumatic Brain
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7 Injury. However, since omitting the latter competency only increased the standardized
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9 Cronbach's alpha by a fractional amount (0.04), we opted to retain all the factors for this
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11 domain when presenting our analysis (in-line with the original validation of this instrument).
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15 Among respondents who reported being "very to extremely familiar" regarding their
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17 current level of knowledge and preparedness with topics pertaining to post-9/11 Veterans, 35%
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19 indicated traumatic brain injuries (mean = 3.2; SE = 0.04), 28% psychological impacts of war
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21 (mean = 2.9; SE = 0.05), 27% military/Veteran culture (mean = 2.8; SE = 0.06), 15%
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23 military/Veteran resources available (mean = 2.3; SE = 0.05), and 12% war-related illnesses
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25 (mean = 2.4; SE = 0.04) (Figure 1).
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29 Independent of their age and sex, when nurses with a history of military service were
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31 compared with nurses without a history of military service there was a significant difference
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33 for war-related illness, psychological impacts of war, military and Veteran culture, and
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35 resources available ($p < 0.001$), and to a lesser degree for traumatic brain injuries ($p = 0.014$).
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37 It was expected that military Veterans would have a higher level of familiarity owing to lived
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39 experiences. In contrast, there was no statistically significant difference on all five
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41 competencies between nurses who obtained a post-baccalaureate degree(s) than those without
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43 a post-baccalaureate degree.
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Figure 1. Respondents' self-reported familiarity with post-9/11 Veteran topics.

P-values above indicated bars provide comparisons with respective reference group (e.g., no reported history of military service and no reported post-baccalaureate degree), adjusting for age-group and sex (restricted maximum likelihood, fixed-effects model). Error bars indicate standard error. **p* < .05, ***p* < .001, and ns = not significant.

Surface-Level Knowledge

The correct answers to the definitive knowledge items were as follows: Q11.1 (FALSE): 7,057 have died in combat or from combat-related injuries, while over 5,116 have committed suicide while on active duty and over 30,177 have committed suicide following military service^{44,45}; Q11.2 (FALSE): While many have served in a combat zone, no more than 10% have been engaged in combat⁴⁶; Q11.3 (FALSE): As of 2018, only 38.9% of post-9/11 veterans had ever received care within VA. The majority did not utilize external healthcare in the community⁴⁷⁻⁵⁰; Q11.4 (FALSE): Approximately 13.5% of post-9/11 Veterans have screened positive for PTSD, whereas ~16.6% (520,966) have been diagnosed with cancer.^{51,52} Q11.7 (TRUE): The median age is 38 years as of 2022.^{50,53}

More Veteran vs. non-Veterans respondents accurately answered the non-distractor knowledge questions (i.e., age-group adjusted RR >1.0), except for Q11.1 (Table 2). Significant differences were noted for Veterans responding to Q11.3 (Male: age-group adjusted RR = 1.9, *P*_{LRT} = .019; Female: age-group adjusted RR = 1.4, *P*_{LRT} = .023; Combined: age-

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3 group and sex adjusted RR = 1.4, $P_{LRT} = .0015$, not shown in table), Q11.4 (Combined:
4 unadjusted RR = 2.6, $P_{LRT} = .027$, not shown in table), and Q11.7 (Males only: age-group
5 adjusted RR = 1.3, $P_{LRT} = .022$). No significant knowledge differences were observed for
6 respondents with a post-baccalaureate vs. no post-baccalaureate degree. All 'Male x Female'
7 interactions for Veteran and post-baccalaureate degree knowledge questions were insignificant
8 (except for post-baccalaureate degree Q11.4, which was indeterminate).
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12 A composite knowledge score was created by summing the individual definitive
13 knowledge questions. Overall, Veteran respondents (mean = 3.3, SE = .01) had a significantly
14 higher composite knowledge score than non-Veteran respondents (mean = 2.8, SE = .04) $p =$
15 .011) (Table 3). Although the mean difference was significant, the Cronbach's alpha value
16 corresponding to the questions in this domain was only 17%, likely reflecting the diffuse nature
17 of the dichotomous items in this domain. The composite knowledge score for respondents with
18 a post-baccalaureate degree (mean = 2.9, SE = .13) did not significantly differ from those
19 without a post-baccalaureate degree (mean = 2.9, SE = .04; $p = .69$).
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36 Male vs. female Veteran respondents were more likely to answer false to distractor
37 question Q11.5, asking if more post-9/11 Veterans experienced mental health concerns than
38 Vietnam Veterans (Male: aRR = .54, $P_{LRT} = .0036$; Female: aRR = .99, $P_{LRT} = .95$; $P_{INT} = .018$)
39 (Table 4). The other distractor questions for Veterans and post-baccalaureate degree holders
40 were not significant, with no interactions being observed by sex.
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49 *Practice Assumptions and Self-Awareness*

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51 Nearly all the respondents (94%) stated they did not feel concerned or worried for their
52 safety when caring for Veterans (Q12.1) while almost half (43%) believe most Veterans have
53 had thoughts of suicide or are actively suicidal (Q12.2). When the nurses were asked if
54 "Veteran status" changes how they provide a patient's care (Q12.3), 84% stated status did not
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3 impact care processes. Approximately three-quarters (72%) believed that Veterans experience
4
5 psychosomatic symptoms related to mental health concerns (Q12.4). Over half (62%) thought
6
7 that most Veterans returned from combat physically fit and overall healthy (Q12.5). The
8
9 standardized Cronbach's alpha score for Q12.1 through Q12.5 was 11%, suggesting only
10
11 moderate to low consistency for these dichotomously coded items.
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17 *Additional Questions*

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19 Approximately 62% reported feeling either "somewhat comfortable to extremely
20
21 comfortable" in providing accurate, competent, holistic care to post-9/11 Veterans through
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23 individualized screenings, assessments, or treatments (Q13). Seventy percent of respondents
24
25 reported cancer diagnoses ranging between 50 to 69 years. These findings are slightly less than
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27 those reported by the National Cancer Institutes (SEER) Program citing a median cancer
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29 diagnosis of 66 years.¹⁶
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35 *State-Level Data*

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37 Every state except for West Virginia and Vermont were represented in the survey.
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39 California (14%), Massachusetts (6.7%), Texas (6.5%), Florida (5.7%), New York (4.6%),
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41 Arizona (3.9%), and North Carolina (3.8%) were the most frequently reported states of practice
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43 (Table 5). However, the percentage of survey respondents and the respective number of VA
44
45 medical centers per practice state were not uniformly distributed. Similarly, the percentage of
46
47 respondents in each state and the corresponding percentage of nurses in their respective state
48
49 of practice differed. California had the greatest percentage of respondents and the highest
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51 number of VA medical centers (n = 9) but was home to few post-9/11 Veterans (0.83%). On
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53 the other hand, only 0.68% of respondents practiced in Massachusetts, yet the state had 4 VA
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55 medical centers. Both Texas (1.2%) and Florida (1.1%) had a reasonable representation of post-
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3 9/11 Veterans, relative to the number of VA medical centers in each state (7 and 8,
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5 respectively).

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8 Mental health (Q9) was the most frequently reported issue for post-9/11 Veterans,
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10 averaging 94% (SE = 1.5) across the indicated states in Table 5, except for Pennsylvania (83%).
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12 Physical injury and medical illness were sparsely reported, with means of 0.83% (SE = 0.53)
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14 and 5.5% (SE = 1.3), respectively.

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17 The current level of knowledge and preparedness (Q10) varied across the five domains
18
19 (war-related illness, traumatic brain injury, psychological impact, military Veteran culture, and
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21 resources available), with Illinois (Mean = 2.9, SE = 0.12) having the highest and Washington
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23 (Mean = 2.5, SE = 0.14) the lowest composite, self-reported familiarity scores. Across the
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25 indicated states, 'Traumatic brain injury' had the highest composite score (Mean = 3.1, SE =
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27 0.05), with California (Mean = 3.4 SE = 0.11) having the highest individual score within this
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29 domain. In contrast, 'Resources available' had the lowest composite score across states (Mean
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31 = 2.4, SE = 0.06), with Florida (Mean = 2.1, SE = 0.21) having the lowest individual score
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33 within this domain.
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38 Illinois had the highest composite mean score of 65% (SE = 15) for correctly answering
39
40 the five definitive knowledge questions (Q11), compared with Indiana which had the lowest
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42 score (Mean % = 52, SE = 12). Across the indicated states, few participants (Mean % = 5.4,
43
44 SE = 2.3) were able to correctly answer that more post-9/11 Veterans have been diagnosed
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46 with cancer than post-traumatic stress disorder (Q11.4). This contrasted with a mean % of 8.2
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48 (SE = 2.0) for correctly answering that more post-9/11 Veterans are under the age of 40 years
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50 (11.7). A mean % score of 55 (SE = 3.7) was observed for affirmatively answering that majority
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52 of post-9/11 Veterans use VA hospitals and clinics for most health concerns/services (Q11.3).
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3 Participants practicing in the state of Florida indicated being the most comfortable and
4 competent at diagnosing/treating/caring for post-9/11 Veterans (Mean = 4.1, SE = 0.25), while
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6 Washington state had the least mean score of 3.4 (SE = 0.22).
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12 **Discussion**

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14 Veterans share a unique culture and common set of values that influence their behavior.
15
16 Even after serving, Veterans are still influenced by this culture and set of values that makes it
17 important for healthcare providers to understand so they can better serve this population. This
18 includes listening to Veteran's unique stories and refraining from making assumptions about
19 their individual experiences is essential. Furthermore, asking questions, showing concern,
20 building trust, understanding trauma, and thanking Veterans for their service with sincerity are
21 all important considerations when working with Veterans in healthcare settings.⁵⁴
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31 As the care for many post-9/11 Veterans has transitioned to the civilian sector in recent
32 years, we expressed concern that registered and advance practice nurse professionals working
33 outside of the VA System may not be fully prepared to provide knowledgeable and culturally
34 competent healthcare for the distinct needs of post-9/11 Veterans.⁷ A key purpose of the current
35 manuscript was to assess this potential practice gap, with the ultimate goal of improving the
36 quality of health services provided to Veterans in this setting.
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45 Our findings suggest that few nurses employed in the civilian, non-VHA setting have
46 ideal knowledge or understanding of post-9/11 military Veteran-related risk factors and
47 healthcare concerns. While most non-VHA nurses believe that post-9/11 Veterans' health
48 issues are predominantly related to mental health, post-traumatic stress, and suicidality, this
49 precludes attention to other important health conditions. Survey respondents were divided
50 between if post-9/11 Veterans use the VHA for most of their medical care or if they seek non-
51 VHA care. Majority indicated limited knowledge of resources available to Veteran patients in
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3 addition to risks of potential war-related illnesses and culture. Interestingly, a greater
4 percentage of Veteran respondents answered false to the distractor question Q11.5 (stating that
5 more post-9/11 Veterans experience more mental health concerns than Vietnam Veterans),
6 suggesting this to be a potential area needing further research and explanation.
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12 If mental health diagnoses or history of traumatic experiences in post-9/11 Veterans
13 leads providers to believe psychological conditions are the most frequently occurring and most
14 expected conditions in practice, this may bias health outcomes. The potential for misdiagnosed
15 or unidentified medical illnesses or malignancies and diagnostic errors in relation to mental
16 health conditions points to provider cognitive biases (i.e., illnesses are mistakenly minimized
17 or ignored because of preconceived notions of prevalent mental health diagnoses in this
18 population). These beliefs may be a result of an unconscious bias towards Veterans. Important
19 ways to address this concern can involve education and trainings. VHA medical facilities
20 across the US offer healthcare providers these trainings to increase an awareness of one's own
21 unconscious bias towards Veterans; however, it is unclear if non-VHA healthcare facilities
22 offer similar trainings.⁵⁵
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37 Provider anchoring (a.k.a. “the anchoring effect”), occurs when the providers’ decision
38 is influenced by a particular reference point or “anchor.” In this case, civilian providers may
39 base a diagnosis on an initial impression despite evidence pointing to the contrary. This may
40 lead to a delay in care.⁵⁶ For example, a post-9/11 Veteran who seeks care for persistent
41 shortness of breath and chest pain may be seen as an otherwise healthy, non-smoking individual
42 under the age of forty, with a mental health anchor diagnosis.
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51 Implicit or unconscious bias by providers is another consideration. A norm is to at-
52 tribute certain qualities to an entire group or cohort that an individual belongs to and is applied
53 widely as a generalization across individuals within that group.⁵⁷ In this setting, the assumption
54 is that post-9/11 Veterans have related mental health conditions, and their assessment,
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3 diagnoses, and treatment are based on that attribution. Given a lack of preventive screening,
4 inaccurate assessments, and a paucity of individualized 'Veteran-focused' care in non-VHA
5 settings, further evidence-based interventions are warranted to ameliorate the situation.
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10 Knowledgeable frontline nurses are pivotal medical care providers, especially with
11 respect to Veterans who are at-risk because of their military-related exposures. They have been
12 considered the most trusted profession in the US for the past 20 years based on their honesty
13 and ethical standards in practice, surpassing other providers by upwards of twenty percent.⁵⁸
14 These highly skilled professionals conduct health assessments, gather historical information,
15 coordinate care, and in many settings have more interactions with patients than any other
16 provider or member of the care team. As the VHA faces budgetary constraints and provider
17 shortages, longer driving distances and wait times will further propel Veterans to seek services
18 within their community through the VA MISSION and PACT Acts.
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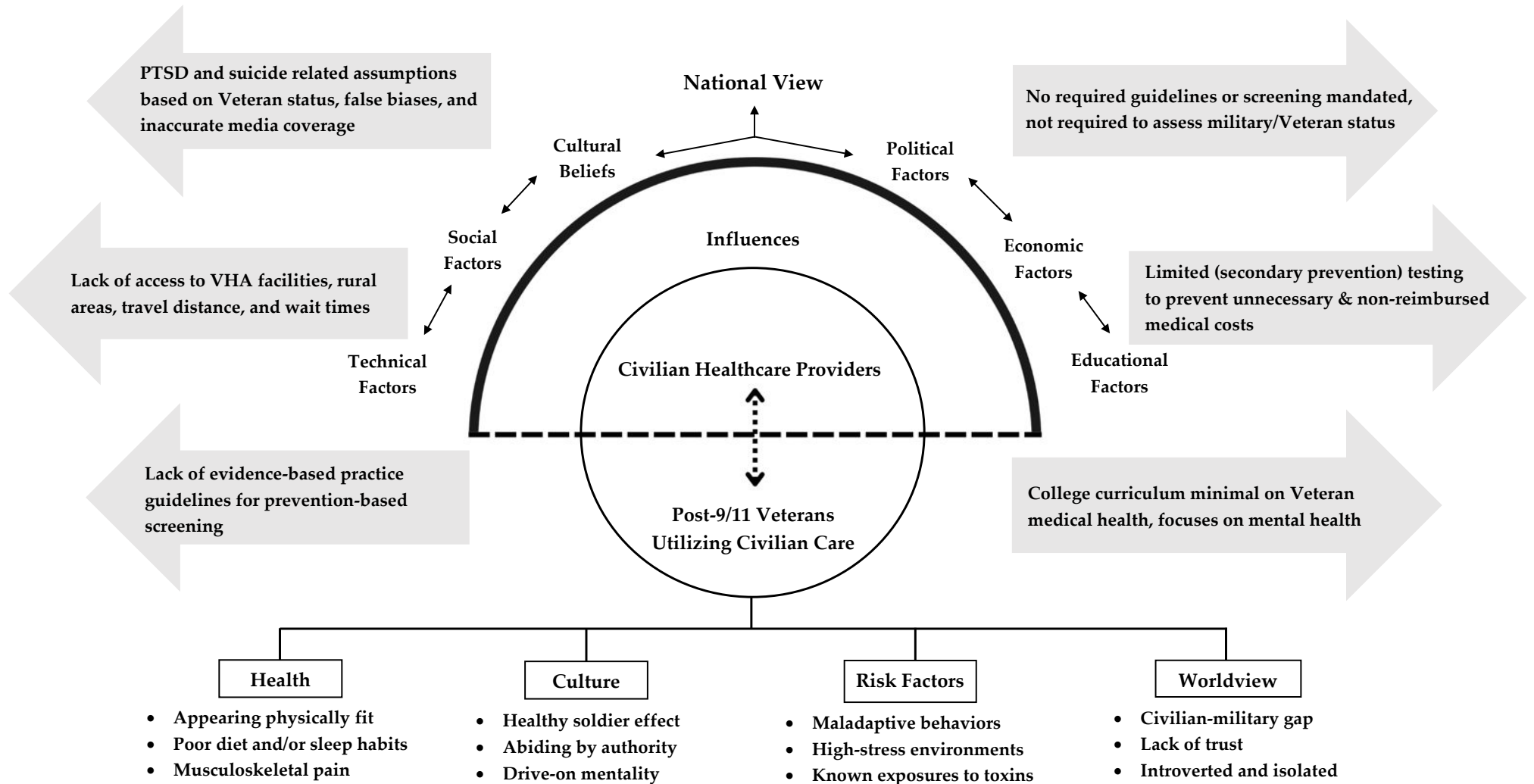
30 Many VHA facilities across the US are in urban versus rural areas, emphasizing that
31 the location of VHA facilities should not be overlooked. This further reinforces the barrier that
32 living in a rural area can place on an individual accessing healthcare. The need for more VHA
33 facilities to adequately meet the needs of post 9/11 Veterans, especially in rural areas is another
34 driving force for Veterans to seek care in non-VHA facilities.⁵⁹ As this priority population
35 continues to grow it is important that civilian-based nurses are appropriately trained in the
36 diagnosis and care of Veterans.
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46 Unlike our positive findings for survey respondents who were Veterans, there was no
47 significant difference among those with a post-baccalaureate degree(s) versus those without.
48 This highlights that post-baccalaureate degree(s) do not guarantee competence with military
49 related knowledge and the healthcare needs of Veterans and more appropriate trainings may be
50 necessary.
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3 The Joining Forces Campaign was created when the Director of the Connecticut VHA
4 teamed up with the American Academy of Nursing and Dr. Jill Biden.⁶⁰ This joint effort
5 requests that non-VHA providers ask patients the fundamental question “Have you ever served
6 in the military?”. The intent is to facilitate communication between patients and providers, in
7 hopes of identifying risk factors that relate to Veteran’s health and to promote individualized
8 medical care. While non-VHA nurses generally wish to attend to the needs of Veterans, many
9 feel inadequately prepared and ill-informed to provide appropriate holistic care based on our
10 survey findings. Despite the call for providers to inquire about military service history, many
11 Veterans are not being asked about their service-related background in non-VHA care
12 settings.⁶¹ Nurses cannot be expected to provide assessments, treatments, and care based on
13 information they do not know, which is why evidence-based, multimodal, and interactive
14 training specific to post-9/11 Veterans is essential.

15
16 Premised on Leininger’s transcultural model for cultural care, there are six structural
17 dimensional barriers governing the holistic, competent, and individualized care for Veterans in
18 the non-VHA setting (i.e., cultural beliefs, technical, social, political, economic, and
19 educational factors) (Figure 2).⁶² Questions in our survey targeted these dimensions with the
20 aim of providing ideas for constructive improvements. Cultural beliefs related to ill-informed,
21 inaccurate media coverage and fictional portrayals in films perpetuate stereotypical beliefs
22 around post-9/11 Veterans. Social factors were divided in nurse respondents when asked where
23 post-9/11 Veterans receive most of their care. While some surmised that most use VHA
24 services, others thought Veterans accessed community care.

Figure 2:



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3 Actionable items and advanced practice population nursing recommendations include:
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6 (a) Enacting an evidence-based curriculum for undergraduate and graduate nursing students
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8 and for healthcare providers focusing on post-9/11 Veteran risk factors and health issues.
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10 (b) Advocating for development and access to cost-free, continuing education credits (CEU)
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12 for specified Veteran health-related topics and requiring nurses to participate for
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14 licensure and renewal.
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16 (c) Forming academic partnerships with the VHA to train students in Veteran-centric clinical
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18 settings, which can be applied to non-VHA healthcare.
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20 (d) Identifying the most at-risk states (e.g., by using data collected on region size, amount of
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22 post-9/11 Veteran residents, and average distances to VHA and non-VHA medical
23
24 centers) and enacting guidelines by severity ranking to influence informed policymaking.
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26 (e) Conducting studies involving nurses that identify provider-related factors associated with
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28 positive health outcomes in the post-9/11 Veteran population.
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36 *Limitations*

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38 The information provided herein is best interpreted considering several limitations.
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40 Surveys are subjective and may not capture the full picture of a complex topic. Recall,
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42 investigator, and regional biases, and the selectivity of respondents are important factors
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44 potentially impacting the validity of this survey. The organization administering the survey and
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46 the intent of the questions being asked were not blinded. Internal consistency and
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48 unidimensionality were only established for items in the “knowledge and competencies”
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50 domain.
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54 Exposures were not uniform during the Global War on Terror and every Veteran has a
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56 unique individual health profile related to his/her location of deployment. Upon return from
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58 deployment Veterans may be more likely to reside near the base they were deployed from.
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3 Battalions and companies from the same states often were deployed to different locations with
4 different inherent health risks. While the analysis lacks granularity in this respect, the
5 manuscript is an important first step to more detailed assessments of this topic. We do not
6 believe these limitations influence the conclusions, with most biases being towards the null.
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12 Nurse participants completing our survey were not randomly selected and may not
13 necessarily reflect the broader population of nurses working in a particular state. However,
14 given the survey focused on non-VHA Veteran care we anticipated that the percentage of
15 respondents would not reflect the proportion of nurses practicing in their respective states. That
16 is, voluntary response bias could have been present in our sample given that respondents may
17 have been more likely to practice in non-VHA hospitals that serve Veterans. Our survey did
18 not include referent participants practicing in VHA healthcare facilities and thus precluded a
19 comparison with the latter group.
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30 The number of VA Medical Centers listed in Table 5 by state also did not include
31 community-based outpatient clinics and 'Vet' centers. For example, in the state of
32 Massachusetts there are 14 outpatient clinics and 7 Vet centers. While outpatient clinics are not
33 hospitals, like the 4 other medical centers in Massachusetts, they provide primary and mental
34 healthcare services to Veterans. In contrast, Vet centers are non-medical settings that provide
35 no cost help to Veterans and their families. This includes counseling and stress management
36 services for PTSD and military sexual trauma. Excluding outpatient clinics and Vet Centers in
37 Table 5 could be considered an undercount of services provided to Veterans; however, in this
38 exploratory overview we wanted to focus on larger-scaled medical facilities that offer a broad
39 range of specialties including emergency and surgical departments.
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53 Our survey, being conducted by a Veteran run non-profit organization, was able to
54 engage with participants that otherwise may not have responded to a survey sent from other
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3 organizations (i.e., Veterans Affairs or the Department of Defense). While participants may
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5 have been more inclined to respond, we cannot rule out conformity bias.
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8 Lastly, the results of this analysis must be carefully interpreted considering the large
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10 number of comparisons and the potential for multiplicity bias.
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14 **Conclusions**

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17 Nurses are at the forefront to evaluate the specific medical needs of Veterans receiving
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19 care in the non-VHA/civilian sector, especially in the post-9/11 era. They also are well
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21 positioned to advocate for interventions and promote positive outcomes for this often-
22
23 underserved population. The results of our survey indicate that majority of nurses practicing in
24
25 non-VHA settings believe that mental health is the most commonly occurring condition among
26
27 post-9/11 Veterans. This potentially neglects attention to other commonly occurring conditions
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29 that may present as life-long challenges to post-9/11 Veterans. As seen among Veterans from
30
31 previous wars, it still holds true that Veterans' healthcare needs may peek decades after their
32
33 deployment and service ⁶³.
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38 Demographically, the number of Veterans who receive care in non-VHA settings is
39
40 expected to grow. It is important that nurses are prepared to provide evidence-based care and
41
42 demonstrate high levels of knowledge and competency for this at-risk population. As noted by
43
44 the Post-Deployment Integrated Care Initiative, "The most important action a provider can take
45
46 to ensure that a Veteran receives optimal care is perhaps the easiest and, ironically, the most
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48 neglected: asking if a patient has served in the military and taking a basic military history ⁶⁴."
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51 While our findings have important implications for nurse training, policy, and practice,
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53 they also are relevant to physicians and other medical practitioners.
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3 **Author Contributions:** Conceptualization, C.S., J.C., L.B., J.R., and S.K.; survey curation,
4 C.S., J.C., and J.R.; formal analysis, C.S., J.R., C.J., K.C., and J.T.E.; writing - review and
5 editing, C.S., J.C., L.B., J.R., P.M, C.J., K.C., Y.C., S.K., J.T.E. The corresponding author
6 attests that all listed authors meet the authorship criteria and that no others meeting the criteria
7 have been omitted. The corresponding author further affirms that the manuscript is an honest,
8 accurate, and transparent work.
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20 Foundation Ethics Review Committee (#HS-0231Z) and the Rhode Island College Institutional
21 Review Board (#2122-2247).
22
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26 **Informed Consent Statement:** This project meets exempt human subjects research criteria
27 Category 4 and an informed consent form is not applicable.
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31 **Disclaimer:** The views and opinions expressed in this article are those of the authors and do
32 not necessarily reflect those of their respective institutions or the United States Government.
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36 **Data Availability Statement:** Available by request.

37
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41 Hau (VA Boston) for technical assistance.
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47 **Conflicts of Interest:** The authors have no conflict of interest to disclose.
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3 **Appendix A**
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5 *Adopted Survey Instrument*
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Question	Choice Selection
8 Q1. Are you trained and licensed as a registered 9 nurse (RN, APRN, FNP, DNP, etc.) 10 11	Yes / No
12 Q1a. Do you work directly with, or provide care 13 to patients as part of your regular professional 14 activities? 15	Yes / No
16 Q1b. Which best describes your highest level of 17 education? 18	Associates Degree 19 Bachelor's Degree 20 Master's Degree 21 Doctoral Degree
22 Q2. Please tell us which best describes your 23 practice setting. 24 25 26 27 28 29 30 31	Emergency Department Mental Health Acute Care (in-patient) Case Management Oncology Intensive Care Surgical Primary Care
32 Q3. Are you employed? 33 34 35 36	Leadership / Education Full time (≥ 32 hours) Part time (< 32 hours) Per Diem
37 Q4. Gender at birth: 38 39 40	Male Female
41 Q5. Which state do you currently practice in? 42	[Free text]
43 Q6. Please select your age range (years): 44 45 46 47 48 49 50 51	< 20 20-29 30-39 40-49 50-59 60-69 >70+
52 Q7. Have you ever served in the United States 53 Armed Forces (this includes the Army, Navy, 54 Air Force, Marine Corps, and National Guard / 55 Reserves). 56 57	Yes / No
58 Q7a. If yes, please indicate how long (in years) 59 you served in the military. 60	[Free text - numerical]

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4 Q8. Do you have any close family members Yes / No
5 who currently or formerly served in the United
6 States Armed Forces?
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9 Q9. Based on your experience, what issue do Mental Health
10 you believe is occurring most frequently in the Physical Injury
11 post-9/11 Veteran population? Medical Illness
12
- 13 Q10. Using the [Likert scale], please rate your Completely unfamiliar (1)
14 current level of knowledge and preparedness A little bit familiar (2)
15 regarding the following topics pertaining to Moderately familiar (3)
16 post-9/11 Veterans: Very familiar (4)
17 Q10.1 War-related illness Extremely familiar (5)
18 Q10.2 Traumatic brain injury
19 Q10.3 Psychological impacts of war
20 Q10.4 Military and Veteran culture
21 Q10.5 Resources available
22
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25 Q11. Please select 'true' or 'false' for each True / False
26 question pertaining to post-9/11 veteran
27 knowledge.
28 Q11.1 More post-9/11 Veterans have died in
29 combat than by suicide.
30 Q11.2 Most post-9/11 service members who
31 have deployed have been involved in combat.
32 Q11.3 A majority of post-9/11 Veterans use the
33 Veterans Affairs hospitals and clinics for most
34 healthcare needs and services.
35 Q11.4 More post-9/11 veterans have been
36 diagnosed with post-traumatic stress than
37 cancer.
38 Q11.5 Post-9/11 veterans are more likely to
39 experience mental health concerns than
40 Vietnam Veterans.
41 Q11.6 Vietnam Veterans are more likely to be
42 diagnosed with cancer than post-9/11 veterans.
43 Q11.7 Most post-9/11 Veterans are under the
44 age of 40 years old.
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- 49 Q12. Please select 'true' or 'false' for each True / False
50 question based on your beliefs about post-9/11
51 Veterans.
52 Q12.1 When caring for Veterans I worry about
53 my physical safety.
54 Q12.2 The majority of Veterans are suicidal and
55 have had thoughts of suicide.
56 Q12.3 A patient's Veteran status changes how I
57 provide overall care.
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3 Q12.4 I believe veterans experience many
4 psychosomatic symptoms related to mental
5 health.

6 Q12.5 I believe Veterans returning from combat
7 are physically fit and overall healthy.
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10 Q13. I feel competent and comfortable in Extremely uncomfortable (1)
11 providing thorough assessments, treatments, Somewhat uncomfortable (2)
12 and care to post-9/11 Veterans. Neither comfortable nor uncomfortable (3)
13 Somewhat comfortable (4)
14 Extremely comfortable (5)
15
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17 Q14. In my opinion and based on my personal <20
18 clinical experiences, the average age range 20-29
19 (years) of patients are diagnosed with cancer is? 30-39
20 40-49
21 50-59
22 60-69
23 70-79
24 ≥ 80
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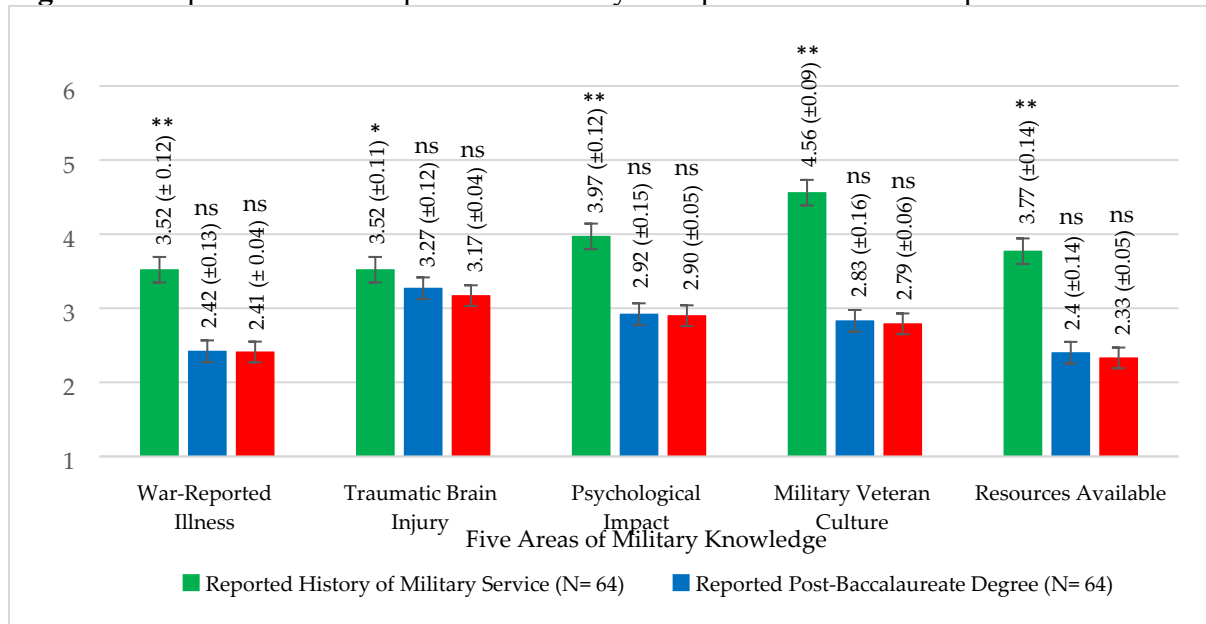
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Figure 1. Respondents' self-reported familiarity with post-9/11 Veteran topics.

P-values above indicated bars provide comparisons with respective reference group (e.g., no reported history of military service and no reported post-baccalaureate degree), adjusting for age-group and sex (restricted maximum likelihood, fixed-effects model). Error bars indicate standard error. **p* < .05, ***p* < .001, and ns = not significant.

Figure 2:

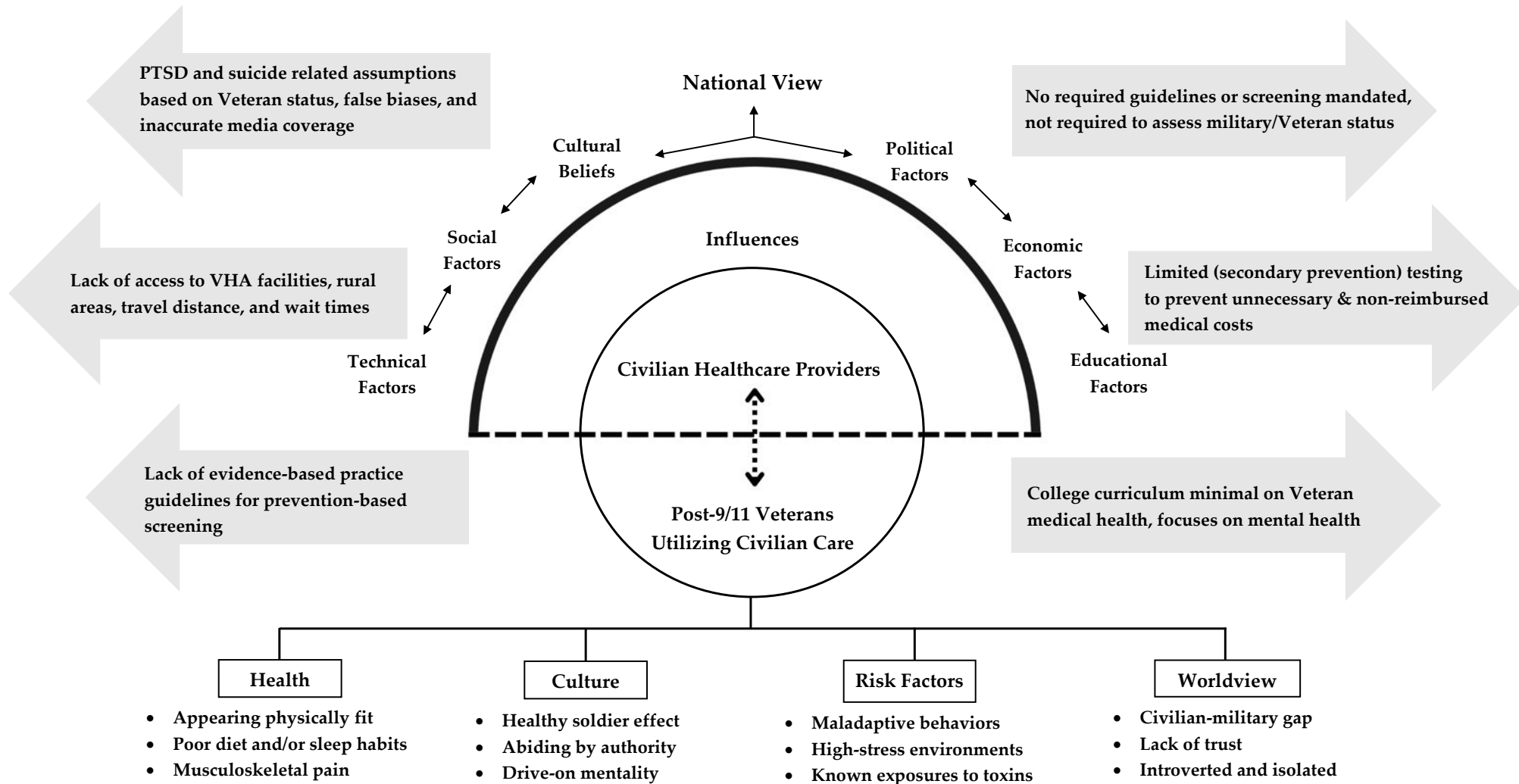


Table 1. Respondent characteristics by sex (N = 541)[†]

Respondent Characteristic	Male n (%)	Female n (%)	P-value [‡]
Total (n)	78	463	---
Age (years)			
20-29	25 (32)	163 (35)	.93
30-39	41 (53)	224 (48)	
40-49	10 (13)	60 (13)	
≥50	2 (3)	16 (3)	
Employment status (per week)			
Full time (≥32 hours)	74 (95)	413 (89)	.028
Part-time (<32 hours)	4 (5)	20 (4)	
Per diem	0 (0)	30 (6)	
Military service	30 (38)	34 (7)	<.0001
Years served in military			
≤4	3 (33)	18 (33)	1.0
>4-6	3 (33)	16 (29)	
>6-10	2 (22)	14 (25)	
>10	1 (11)	7 (13)	
Family member served in military	47 (60)	285 (62)	.90
Highest degree obtained			
Associate	20 (26)	85 (18)	.34
Bachelor	52 (67)	320 (69)	
Master	6 (8)	50 (11)	
Doctorate	0 (0)	8 (2)	
Practice setting			
Emergency department	35 (45)	169 (37)	.17
Mental health	3 (4)	16 (3)	
Acute care (in-patient)	10 (13)	112 (24)	
Case management	0 (0)	5 (1)	
Oncology	1 (1)	11 (2)	
Intensive care	22 (28)	99 (21)	
Surgical	5 (6)	20 (4)	
Primary care	2 (3)	31 (7)	

[†]Percentages may add up to greater than 100% owing to rounding. [‡]Fisher's exact.

Table 2. Percentage of respondents accurately answering knowledge questions by sex (N = 541)

Knowledge Question		Profile	Male (n = 78)			Female (n = 463)			P_{Int}	
			Accurate Yes No n (%)		aRR P_{LRT}	Accurate Yes No n (%)		aRR P_{LRT}		
Q11.1 [†]	More post-9/11 Veterans have died in combat than by suicide	Veteran	Yes	26 (39)	4 (36)	.95	23 (6)	11 (10)	88	.58
			No	41 (61)	7 (64)	.59	334 (94)	95 (90)	.26	
		Post-Bac	Yes	5 (7)	1 (9)	1.1	44 (12)	14 (13)	.95	.17
			No	62 (93)	10 (91)	.65	313 (88)	92 (87)	.53	
Q11.2 [†]	Most post-9/11 service members who have deployed have been involved in combat	Veteran	Yes	27 (40)	3 (27)	1.1	26 (8)	8 (6)	1.2	.74
			No	40 (60)	8 (73)	.30	301 (92)	128 (94)	.23	
		Post-Bac	Yes	5 (7)	1 (9)	.99	40 (12)	18 (13)	.97	.91
			No	62 (93)	10 (91)	.96	287 (88)	118 (87)	.71	
Q11.3 [†]	A majority of post-9/11 Veterans use the Veterans Affairs hospitals and clinics for most health care needs and services	Veteran	Yes	26 (46)	4 (18)	1.3	23 (10)	11 (5)	1.4	.84
			No	30 (54)	18 (82)	.019	210 (90)	219 (95)	.023	
		Post-Bac	Yes	6 (11)	0 (0)	1.3	30 (13)	28 (13)	.99	.35
			No	50 (89)	22 (100)	.16	203 (87)	202 (88)	.96	
Q11.4 [†]	More post-9/11 Veterans have been diagnosed with post-traumatic stress than cancer	Veteran	Yes	6 (60)	24 (35)	2.4	2 (10)	32 (7)	1.5	.63
			No	4 (40)	44 (65)	.18	19 (90)	410 (93)	.62	
		Post-Bac	Yes	0 (0)	6 (9)	---	2 (10)	56 (13)	.56	---
			No	10 (100)	62 (91)	*	19 (90)	386 (87)	.39	
Q11.7	Most post-9/11 Veterans are under the age of 40 years old	Veteran	Yes	27 (46)	3 (16)	1.3	28 (8)	6 (7)	1.1	.12
			No	32 (54)	16 (84)	.022	345 (92)	84 (93)	.54	
		Post-Bac	Yes	5 (8)	1 (5)	1.2	48 (13)	10 (11)	1.1	.15
			No	54 (92)	18 (95)	.35	325 (87)	80 (89)	.24	

[†]Question is reverse coded (False). *Indeterminate. aRR = Age-group adjusted relative risk (estimated by log-binomial regression model). Bac = Baccalaureate. Ind = Indeterminate. Int = Interaction. LRT = Likelihood ratio test.

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Table 3. Comparison of respondent composite knowledge scores (N = 541)

Profile	Composite Knowledge[‡] Mean ± SE	P-value[†]
Veteran		
Yes	3.3 ± .13	.011
No	2.8 ± .04	
Post-Baccalaureate		
Yes	2.9 ± .13	.69
No	2.9 ± .04	

[‡]Composite knowledge scores were computed as the sum of Q11.1, Q11.2, Q11.3, Q11.4, and Q11.7. [†]Fixed-effects model adjusted for age-group and sex. SE = Standard error.

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Table 4. Percentage of respondents responding to distractor knowledge questions by sex (N = 541)

Distractor Knowledge Question		Profile	Male (n = 78)			Female (n = 463)			P_{Int}
			Response True False n (%)		aRR P_{LRT}	Response True False n (%)		aRR P_{LRT}	
Q11.5	Post-9/11 Veterans are more likely to experience mental health concerns than Vietnam Veterans	Veteran							
		Yes	12 (27)	18 (55)	.54	24 (7)	10 (7)	.99	.018
		No	33 (73)	15 (45)	.0036	298 (93)	131 (93)	.95	
		Post-Bac							
Yes	3 (7)	3 (9)	.80	44 (14)	14 (10)	1.1	.40		
No	42 (93)	30 (91)	.55	278 (86)	127 (90)	.13			
Q11.6	Vietnam Veterans are more likely to be diagnosed with cancer than post-9/11 Veterans	Veteran							
		Yes	24 (41)	6 (30)	1.0	26 (7)	8 (8)	.98	.79
		No	34 (59)	14 (70)	.88	339 (93)	90 (92)	.79	
		Post-Bac							
Yes	3 (5)	3 (15)	.57	40 (11)	18 (18)	.87	.30		
No	55 (95)	17 (85)	.11	325 (89)	80 (82)	.24			

aRR = Age-group adjusted relative risk (estimated by log-binomial regression model). Bac = Baccalaureate.
Int = Interaction. LRT = Likelihood ratio test.

Table 5. Population statistics and survey responses by primary practice states having the highest percentage of respondents (N = 541)

Characteristic		Selected Primary Practice State											
		AZ	CA	FL	IL	IN	MA	NC	NY	PA	RI	TX	WA
Population Statistics													
% Post-9/11 Veterans		1.1	.83	1.1	.82	1.1	.68	1.3	.61	.90	1.1	1.2	1.4
% Registered nurses (RNs)		2.0	9.2	6.9	4.3	2.4	2.0	.33	2.9	.54	1.5	.79	2.3
No. VA medical centers		3	9	8	5	1	4	4	3	7	1	7	3
Survey Responses													
% Respondents		3.9	14	5.7	2.8	2.4	6.7	3.8	4.6	3.3	2.6	6.5	3.0
Q9	Most frequent issue for post-9/11 Veterans (%)*												
	1. Mental health	90	89	94	100	100	94	100	100	83	93	91	94
	2. Physical injury	0	1	0	0	0	3	0	0	6	0	0	0
	3. Medical illness	10	9	6	0	0	3	0	0	11	7	9	6
Q10	Self-reported familiarity (Mean)†												
	1. War-reported illness	2.1	2.5	2.2	2.7	2.1	2.6	2.7	2.6	2.6	2.2	2.4	2.3
	2. Traumatic brain injury	2.9	3.4	3.2	3.3	3.0	3.2	3.3	3.2	3.1	2.9	3.2	3.0
	3. Psychological impact	2.9	3.1	2.9	3.1	2.8	2.9	3.1	2.8	3.0	3.3	2.9	2.4
	4. Military Veteran culture	3.0	3.0	2.7	2.9	2.8	2.8	2.9	3.0	2.9	2.8	2.8	2.4
	5. Resources available	2.5	2.5	2.1	2.7	2.4	2.3	2.5	2.3	2.6	2.6	2.1	2.2
Q11	Definitive knowledge questions answered accurately (%)												
	1. More post-9/11 Veterans have died in combat than by suicide	76	79	88	93	77	86	67	72	78	64	77	69
	2. Most post-9/11 service members who have deployed have been involved in combat	52	71	81	80	62	69	81	80	72	79	74	75
	3. A majority of post-9/11 Veterans use the VA hospital clinics for most health care needs/services	62	56	55	67	46	33	38	56	72	64	40	69
	4. More post-9/11 Veterans have been diagnosed with post-traumatic stress than cancer	0	3	10	7	8	8	0	0	11	7	11	0
	7. Most post-9/11 Veterans are under the age of 40 years old	86	76	77	80	69	89	86	88	78	93	77	81
Q13	I feel competent and comfortable in providing thorough assessments, treatments, and care to post-911 Veterans (Mean)‡	3.5	3.9	4.0	4.1	3.5	3.8	3.9	3.9	4.0	3.7	3.6	3.4

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*Mutually exclusive. †Likert scale (1 = Completely unfamiliar, 2 = A little bit familiar, 3 = Moderately familiar 4 = Very familiar, 5 = Extremely familiar).
‡Likert scale (1 = Extremely uncomfortable, 2 = Somewhat uncomfortable, 3) Neither comfortable nor uncomfortable, 4) Somewhat comfortable, 5) Extremely comfortable.

For Review Only