Supplemental Material

Healthcare Services versus Programs

For the purposes of this manuscript, **health services** (1) cover primary care, mental health and behavioral health, preventative, rehabilitative, and palliative among others. These services are centered around making health care high quality and patient-centered. Health services consist of medical professionals, organizations, and ancillary health care workers who provide medical care to those in need. Health services serve patients, families, communities, and populations. Many different types of care and providers are necessary in order to offer successful health services. For example, within the VA mental health services are provided by licensed clinical social workers (LCSWs), psychologists, marriage and family therapists (MFTs), licensed professional counselor (LPCs), psychiatrists, advanced practice psychiatric nurses (APPNs), and primary care providers (e.g., physicians, advanced practice registered nurses, and physician assistants).

Health programs (2) are defined as organizational units intended to accomplish one or more objectives through a plan of action that describes what work is done, by whom, when, and how, as well as what resources will be used. Health programs target any of the determinants of health. They can focus aspect of the physical environment, on human behavior, and on social factors that affect people, among others. For example, people may receive information about safe sex practices or how to eat healthier in the context of health education programs. Programs are embedded in organizations (e.g., government, non-profits, community-based) that are typically (although not always) provided outside of formal healthcare systems. Within the Veteran context, the Healthcare for Re-Entry Veterans (HCRV) Program is intended to connect Veterans recently released from federal or state prison to needed primary care, mental health, or SUD services (3). The program also provides outreach through a police training coordinator and justice outreach coordinator to local police enforcement and criminal justice systems to educate and advocate for mental health treatment as an alternative to incarceration when Veterans with mental illness commit non-violent offenses. In many cases, health programs are used by those who are also receiving health services. Note, that in the case of HCRV, the intent is to "connect" Veterans to services, not to provide services.

1) World Health Organization (2018). Delivering quality health services: a global imperative for universal health coverage. Geneva: World Health Organization, Organization for Economic Co-operation and Development, and The World Bank.
2) Longest, BB. (2014). *Health program management: From development through evaluation.* New York: John Wiley.
3) National Academies of Sciences, Engineering, and Medicine (2018). Evaluation of the Department of Veterans Affairs mental health services. Washington, DC: The National Academies Press.

Measures

The data collected in this study did not provide an opportunity to examine the validity of the screening measures that were used. In addition, it was not possible to calculate the rates of false positive or false negative screens. Another limitation of the study was that the sensitivity and

specificity of the screening instruments could not be calculated. However, it is important to note that prior research examining the psychometric properties of these screening instruments suggest that they have demonstrated reasonable validity. Below, several studies are highlighted with a brief summary of the evidence for the validity of the measures.

Cameron, R. P., & Gusman, D. (2003). The primary care PTSD screen (PC-PTSD): development and operating characteristics. *Primary care psychiatry*, *9*(1), 9-14. The Spearman rank point-biserial correlation between the PC-PTSD and the Clinician-Administered PTSD Scale (CAPS) was 0.83 (P < .001). The optimally efficient cutoff score was 3. The PC-PTSD had a sensitivity rate of 0.78, a specificity rate of 0.87, a positive predictive value of 0.65, and a negative predictive value of 0.92.

Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2009). An ultra-brief screening scale for anxiety and depression: the PHQ–4. *Psychosomatics*, *50*(6), 613-621. Construct validity was demonstrated by the fact that increasing PHQ– 4 scores were strongly associated with multiple domains of functional impairment. The effect of increasing PHQ– 4 symptom severity was greatest for mental health impairments.

Löwe, B., Kroenke, K., & Gräfe, K. (2005). Detecting and monitoring depression with a two-item questionnaire (PHQ-2). Journal of psychosomatic research, 58(2), 163-171. The PHQ-2 demonstrated sensitivity of 87% and specificity of 78% for major depressive disorder. The sensitivity was 79% and specificity was 86% for any depressive disorder. The convergent validity of the PHQ-2 was demonstrated by significant correlations with a number of depression measures (rs ranging from .67 to .87). Divergent validity was evidenced by the PHQ's low correlation with the physical component summary score of the SF-12 (r=−.23).

Plummer, F., Manea, L., Trepel, D., & McMillan, D. (2016). Screening for anxiety disorders with the GAD-7 and GAD-2: A systematic review and diagnostic meta-analysis. *General hospital psychiatry*, *39*, 24-31. The pooled sensitivity and specificity values were acceptable at a cutoff of 3. The sensitivity of the GAD was 0.76 and its specificity was 0.81. Two out of four samples reported the AUC for the GAD-2 against a gold standard diagnosis of any anxiety disorder: both reported AUC values above 0.85 and 0.86.

Bush, K., Kivlahan, D. R., McDonell, M. B., Fihn, S. D., & Bradley, K. A. (1998). The AUDIT alcohol consumption questions (AUDIT-C): An effective brief screening test for problem drinking. Archives of internal medicine, 158(16), 1789-1795. Using a cutoff of 3 and a total of 12 points, analyses revealed that the AUDIT-C would identify 90% of patients with active alcohol abuse or dependence and 98% of patients with heavy drinking, although the specificity was only 60% (false-positive rate 40%). A cutoff of 4 or more identified 86% of patients with heavy drinking and/or active alcohol abuse or dependence (sensitivity), with a specificity of 72%.

Data Analytic Approach

In the current study, three variables were available to apply weights (i.e., gender, branch and paygrade). Differences between the weighted and unweighted proportion estimates were

analyzed for design effects (1). A design effect provides a ratio of the population percentage by the corresponding response percentage. When a design effect ratio is greater than one, a larger sample would have to be drawn in order to have confidence that the population was being accurately represented by the sample. A design effect ratio less than 1 indicates that fewer cases would be needed to obtain the results of a random sample. No meaningful design effects were found. Thus, only weighted proportion estimates are provided. Whereas it is recommended that weighted data be used in the calculation of descriptive statistics (2), there is less agreement as to whether or not weighted data should be used for other data analytic models (3, 4) use of weighted data is indicated when other data analytic techniques are used (2). Logistic regression was used to analyze factors associated with the use of healthcare programs and services. While the results presented in Tables 3 and 4 present weighted estimates in logistic regression analyzing factors associated with the use of healthcare programs and services (e.g., gender, race, ethnicity, combat exposure), the unweighted estimates are available upon request from the corresponding author.

1) Johnson DR, Elliott LA. Sampling design effects: Do they affect the analyses of data from the National Survey of Families and Households? J Marriage Fam [Internet]. 1998;60(4):993–1001. Available from: http://www.jstor.org/stable/353640
2). Kish L, Frankel MR. Inference from complex samples. J R Stat Soc Ser B. 1974;36(1):1–37.
3). Young R, Johnson D. (May, 2012). To weight or not to weight, that is the question: Survey weights and multivariate analysis. Paper presented at the Annual American Association for Public Opinion Research. Orlando, Florida.
4). Winship C, Radbill L. Sampling weights and regression analysis. Sociol Methods Res. 1994;23(2):230–57.

Unweighted Proportion Estimates

Table 1: Sample Demographics

	Unweighted n = 3,295
White Non-Hispanic	58%
Black Non-Hispanic	14%
Hispanic	16%
Asian, Hawaiian Pacific Islander Non-Hispanic	4%
More than one race Non-Hispanic	6%
Other race Non-Hispanic	1%
Work Full-time	39%
Army	43%
Navy	21%
Air Force	15%
Marine Corps	21%
Separated from active component, serving in National Guard/Reserves	12%
Support service military occupation	34%
Combat arms military occupation	24%
Combat support military occupation	41%
Warfare exposure	64%
Male	80%
Enlisted rank E1 to E4	30%
Enlisted rank E5 to E6	33%
Enlisted rank E7 to E9	23%
Warrant officers- W1 to W5	2%
Officer O1 to O3	5%
Officer O4 to O7	7%

Table 2: Health and Program/Service Use of Veterans' Who Screening Positive for a Probable Mental Health Problem

	Unweighted n = 3,295
Health Status	
Probable anxiety	72%
Probable depression	49%
Probable PTSD	71%
Probable alcohol misuse	54%
Physical health condition, illness, or disability	80%
Mental health condition, illness, or disability	74%
Medical discharge	11%
Health Programs and Service Used	
VA hospitals or clinics	48%
Non-VA hospitals or clinics	22%
Counseling for mental health, relationship, or substance use	29%
Used alternative medicine	11%
Any health programs nominated	10%
Program to increase access to care	3%
Program for brain injury or PTSD	3%
Program for physical activity, weight management	2%
Non-Use of Programs or Services	29%

Study Limitations

This study did not screen for a number of other possible mental health problems, including psychotic disorders, bipolar disorder, or substance use conditions not related to alcohol. The use of opioids in particular is of growing concern among Veterans. Thus, the results of our study should not be generalized to Veterans who are formally diagnosed with mental health problems. Those who screened positive for a probable mental health problem represented only 6.7% of the total population of Veterans separating from the military at the time of the study. Thus, it is not clear how representative this sample is of all post-9/11 Veterans. The study asked Veterans about their use of healthcare services using fairly broad terms. Thus, we do not have information of a number of specific kinds of healthcare services that Veterans used, such as primary care, office-based/private practice care, pharmacological treatment, or specific kinds of counseling (e.g., motivational interviewing, alcohol brief counseling, cognitive behavioral therapy, couples counseling).