



Cohen Veterans
Network

Predictors of Clinically Elevated Suicide Risk Among Military Members and Veterans in an Outpatient Mental Health Network

RESEARCH REPORT

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Introduction

Suicide risk assessment and management are of critical importance in behavioral health care. Those engaged in mental health treatment report suicidal thoughts and behaviors (STB) at substantially higher rates compared to non-clinical populations, with many psychiatric diagnoses, i.e., major depressive disorder and posttraumatic stress disorder specifically identified as risk factors for or predictors of STBs (Krysinska et al., 2010; Ribiero et al., 2018; Xu et al., 2023). Other risk factors identified in the literature include trauma exposure (Kimerling et al., 2016; Monteith et al., 2015) and adverse childhood experiences (ACEs; McGuinness & Waldrop, 2015). Additionally, a variety of social determinants of health, including resource constraints (i.e., housing, food, or employment insecurity) and the absence of social or familial support (Blosnich et al., 2020, 2021; Elbogen et al., 2024; Kamdar et al., 2021) have also been identified as risk factors.

Subpopulations including veterans and military service members have also been consistently identified in the literature as endorsing higher rates of STBs and are at demonstrably higher baseline risk than their non-military/non-veteran counterparts (Hoopsick & Yockey, 2023; Schaefer et al., 2022). Previous studies have reported that suicidal ideation was reported by nearly 20% of military members and veterans seeking mental health care (Pietrzak et al., 2011) while Lancaster and Linkh (2023) reported a positive SI screening rate of 27.8% using the Columbia Suicide Severity Rating Scale (C-SSRS) in a retrospective study of veterans who received care through a multi-site outpatient mental health network.

Systematically evaluating clinically relevant suicide risk factors in these high-risk client populations can play a key role in improving our understanding of their individual and combined impact and magnitude with potential to improve targeted screening and clinical intervention for those specific populations. Furthermore, predictive modeling based on electronic health record (EHR) data can provide valuable insights into risk for those engaged in mental health care, allowing more accurate assessment and risk monitoring, and leading to improved outcomes. Cohen Veterans Network (CVN) was established in 2015 to provide care to Post 9/11 veterans, military members, and their families and currently includes a network of 22 outpatient mental health clinics across the US. This report summarizes descriptive risk factor data extracted from the CVN EHR into our central data warehouse via a data pipeline developed specifically for this study. These data were then used to develop a range of predictive models associated with clinically elevated suicide risk among CVN clients.

Objectives of the report

The objectives of this report entail describing the impact of suicide risk factors included in predictive modeling through a Face the Fight-supported CVN Suicide Risk Ecosystems Study. First, descriptive tables are provided to illustrate the impact of a range of hypothesized risk factors across key domains including diagnosis, trauma exposure, and social determinants of health on clinician-assessed suicide risk status. Second, a series of logistic regression models were

employed to identify significant risk factors within each domain which were then included in a combined model. Model results are reviewed and discussed in the sections below with a focus on implications for practice and research. Finally, the findings and implications are translated into actionable recommendations for CVN and the field.

Methodology

Data Sources

The data for the current project were drawn from the EHRs of military veteran and active-duty clients who initiated care at Cohen Clinics between January 1, 2023, and June 30, 2024. Data from these clinics are collected in a centralized data warehouse, which was queried for the current project. The data used in the current project are collected in several ways during the client intake and initial assessment process. Basic demographic information, including gender, sexual orientation, and client type, are collected during the intake process. Subsequently baseline clinical and social history data is collected during a comprehensive assessment session, which precedes the initiation of therapy. This assessment session covers medical and mental health history, client strengths and needs, trauma history, educational and work history, and is designed to lead to a formal diagnosis and treatment plan. During this intake process, clients also complete several standardized measures/scales to assess their current functioning, symptoms, and needs. One of these measures, the Resource Assessment, can either be entered directly into the EHR or scanned as a PDF into the client record. Data on clients whose records are scanned as PDFs are available to their treatment team but are not available in the data warehouse, leading to missing data. Data impacted by this process is noted below. All other values are entered directly into the EHR, which can then be pulled into the data warehouse and queried by the research team at Cohen Veterans Network.

Variables: Variables were selected for the current analysis based on previous identification in the literature indicating they are associated with increased suicide risk. These variables fit into three broad categories: Diagnoses, Trauma History, and Social Determinants of Health. The diagnoses included in the current project – PTSD, Depression, Generalized Anxiety Disorder, Substance Use Disorder, Alcohol Use Disorder – have been linked to suicide risk in a wide range of previous studies (Bohnert et al., 2017; Pfeiffer et al., 2009; Pompili et al., 2013). For trauma history, we aimed to assess trauma as broadly as possible and included three assessments of trauma. First, we included a binary indicator of whether the client reported adverse childhood experiences (Blosnich et al., 2021; Nichter et al., 2020). Second, a binary indicator of whether the client reported Military Sexual Trauma (MST; Kimerling et al., 2016; Monteith et al., 2015). Finally, a measure of whether the client reported any Serious Traumatic Events, with three options: Within the last 6 months, Greater than 6 months ago, or None. Lastly, we included two measures of Social Determinants of Health. The first measure assessed insecure housing, insecure employment, lack of family support, and lack of social support – all of which have

previously been strongly linked to suicidal ideation in military veterans (Table 5, Blosnich et al., 2020). The other measure assessed food insecurity (Elbogen et al., 2024), feeling unsafe at home, needing utility or eviction assistance, or needing household goods assistance (Blosnich et al., 2020). However, as noted above, given process differences the number of clients with this final set of data was significantly smaller than the number available for the other variables.

Suicide Risk Categories: Each client’s suicide risk category (Low, Moderate, or High) was determined by a clinician at the culmination of a standardized risk stratification process. Following universal screening using the C-SSRS and a comprehensive biopsychosocial assessment, the clinician gathers necessary information to make a reasoned clinical determination about clients’ acute and chronic risk for suicide, violence, and other risky behaviors. Risk assessments are conducted, or supervised, by a licensed provider. The comprehensive risk assessment includes current, recent, and historical suicidal/homicidal ideation, a desire to die, violent fantasies, suicidal/homicidal plans, intent, capabilities, access to lethal means, history of attempts or self/other-directed violent behaviors or injury. Additionally, the clinician probes for and assesses acute and chronic risk factors (static & modifiable), direct and indirect warning signs, precipitants to crisis or acute risk, ambivalence about living, perceived burdensomeness, thwarted belongingness, and reduced fear of death or injury. Clinicians also identify protective factors (static and modifiable), existing buffers and social supports, client strengths, reasons for living, and values. The clinician uses the information gathered in this assessment process to develop a risk formulation that is stratified temporally as acute versus chronic risk and by severity. The assigned risk level is entered into the EHR.

Statistical Analysis: Two basic statistical methods were used in the current report. First, we created a series of descriptive tables to better understand the distribution of our predictive variables at varying levels of suicide risk. These are presented in **APPENDIX TABLES 1-4**. We then used these results to inform a series of regression models in which we attempted to predict risk level using selected variables of interest. Given the categorical nature of the predicted variable, we utilized logistic regression throughout that phase of analysis.

Results

Descriptive Statistics

Suicide risk differed across diagnostic status in the clinical population included in this report. Specifically, of clients at Low Risk for suicide 12.9% met criteria for Depression, while 26.2% of those with Moderate risk and 30.7% of those at High risk were diagnosed with Depression. Similarly, for PTSD, 23.1% of those at Low risk were diagnosed with PTSD while those at elevated suicide risk (34.0% for Moderate and 33.2% for High risk), had substantially higher rates of PTSD.

The relationship between trauma history and suicide risk demonstrated a similar pattern across a range of trauma types. In this population, clients were much more likely to report adverse childhood experiences, military sexual trauma, and experiencing a serious traumatic event in the last 6 months if they were designated as at elevated risk for suicide (Moderate or High). They were also more likely to report these traumatic experiences at High, compared to Moderate risk, but the difference between Low and Moderate was larger than the Moderate to High gap.

As noted above, social determinants of health/social risks are collected using two different processes at Cohen Clinics and thus were analyzed separately for this report. The first set (reported in **APPENDIX TABLE 3**) examines employment, housing, and indicators of family/social support. Across all four of these indicators a similar pattern emerged in which elevated risk for suicide (Moderate or High) was linked to a much higher rate of reporting these social risks. While a small difference was also found between Moderate and High risk, this difference was much smaller than the difference between Low versus Moderate risk. As noted in the Data Sources section above, due to process differences, the second measure of Social Determinants (reported in **APPENDIX TABLE 4**) had significantly less data than the first measure. However, given the importance of these variables in mental health, mental health care treatment seeking, and mental health care outcomes, they are included, nonetheless. The results of these analyses demonstrate a similar pattern to the first set of social risks, with a demonstrably higher rate of endorsement of each of these items for those at elevated (Moderate or High) suicide risk compared to those at Low risk.

To summarize this section, across a range of variables, endorsement of each of the social risks was more likely for those at elevated suicide risk (Moderate or High) than those at Low risk, while generally small differences were found *between* Moderate and High risk. This finding supports the current clinical practice standards at the Cohen Clinics in which clients who are at either Moderate or High risk enter the same “Elevated” treatment pathway. Based on these empirical findings and consistent with network clinical practices, the dependent variable of interest was dichotomized into elevated vs. low risk for the regression analyses in the next section.

Regression Analysis

For the second phase of the analyses, a series of regression models were run to examine predictors of elevated suicide risk status within military veteran and active-duty clients at Cohen Clinics. The results of these sub-analyses are presented in **APPENDIX TABLES 5-8**. While the results of each of the sub-analyses will not be discussed in full, a few contextual notes will be offered. First, while Depression, PTSD, and Generalized Anxiety Disorder all emerged as significant predictors, it should be noted that SUD and AUD are much less commonly diagnosed at Cohen Clinics. This may have impacted their ability to predict risk. Second, while Utility or Eviction Assistance in **APPENDIX TABLE 8** was predictive of risk status, as noted above, the variables in these analyses are missing for most clients in the current database. Thus, including them in the full analysis would lead to significant data loss and for this reason, these variables were not included in the final regression model. The results of these sub-analyses led to the development a full model which included the following predictor variables: PTSD, Depression, GAD, ACEs, Serious Trauma History, Military Sexual Trauma History, Insecure Housing, Insecure Employment, Lack of Family Support, Lack of Social Support.

The full model with all variables listed above was evaluated and Military Sexual Trauma, Generalized Anxiety Disorder, and Lack of Social Support were not found to be significant predictors. Thus, they were removed, and the model was rerun. The results are presented below.

TABLE 1
Final Model Predicting Suicide Risk

	<i>B</i>	<i>SE B</i>	β
<i>Adverse Childhood Experiences</i>	.35	.08	.41***
<i>Serious Trauma > 6 months ago</i>	.17	.11	.20
<i>Serious Trauma < 6 months ago</i>	.41	.14	.36**
<i>Depression</i>	.85	.09	.96***
<i>PTSD</i>	.43	.08	.53***
<i>Insecure Employment</i>	.47	.09	.53***
<i>Insecure Housing</i>	.44	.18	.25*
<i>Lacking Family Support</i>	.50	.09	.53***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$

Discussion

The findings of these analyses reveal a clear and consistent pattern: clients at elevated risk for suicide (Moderate or High) are characterized by higher rates of mental health diagnoses, trauma history, and social determinants of health challenges compared to those at Low risk. Specifically,

Depression and PTSD are significantly more prevalent among clients at elevated risk, with a stepwise increase from Low to Moderate to High risk, indicating a strong association between each of these conditions and suicide risk. Clients at High Risk are particularly vulnerable. Trauma history also plays a critical role, as those at elevated risk more frequently report adverse childhood experiences, military sexual trauma, and recent serious traumatic events. Further, the notable difference between Low to Moderate risk suggests that trauma is a key factor in escalating clients from low to elevated risk status.

In terms of social determinants, they are robustly implicated as predictors of clinically elevated suicide risk in the present study. Clients at elevated risk report greater social challenges, such as insecure housing, employment, and lack of social support. While there are differences between Moderate and High risk, these distinctions are less pronounced, reinforcing the notion that all clients at elevated risk confront a constellation of interconnected challenges. Overall, the data underscores that clients at elevated risk for suicide are grappling with a complex array of mental health, trauma, and social needs, highlighting the imperative for comprehensive assessment and client supports including provision of case management services as an adjunct to clinical care.

Implications for Policy and Practice

Although these data included a relatively large and diverse sample of military and veteran clients seen in community mental health settings across the US, caution is warranted in generalizing to the population at large or even all military members and veterans. The implications and recommendations below focus primarily on applications for practices, policies, and future research within our network. However, we also acknowledge the potential for these insights to inform mil/vet services and outpatient mental health care more broadly.

The similarity between Moderate and High-risk clients in terms of mental health diagnoses, trauma, and social determinants suggests that CVN clients benefit from our unified “Elevated” care pathway vs a tiered approach. This unified approach is validated by the current project and should be maintained. Multiple types of trauma exposure were also significant in the combined model, suggesting that while proximal trauma (< 6 months) was the strongest predictor, the impact of historical trauma remains predictive of clinically elevated suicide risk demonstrating its unique and additive contribution. Clinicians should be encouraged to consider each of these trauma factors in formulating assessments based on their independent contributions to risk. While this is consistent with CVNs current practice recommendations it warrants further reinforcement and amplification in light of these findings. The observations above have been addressed with CVN Clinical Programs team and will be integrated into both required and annual refresher trainings on suicide risk assessment.

These results also suggest that clients at elevated risk may benefit from case management services to address resource and support needs in addition to clinical issues and symptoms. These services,

which are currently available at all CVN clinics, should be maintained with a focus on holistic support and standardized data collection.

In terms of limitations/opportunities that involve both a clinical and data component the regression analyses indicated that some variables, including Substance Use Disorder (SUD) and Alcohol Use Disorder (AUD), were not significant predictors. This is inconsistent with the literature and is likely attributable to their low prevalence in the clinical diagnosis data resulting in insufficient data in this variable field. The finding highlights a need for additional research to explore these and other underreported variables, potentially through multi-site studies or collaboration with other clinics or agencies. In conjunction with data capture improvements, there may also be opportunities to increase the focus on these diagnoses/comorbidities within the network with enhanced training and protocols which are currently in development through CVNs Clinical Programs team.

The results of this report are also tempered by several additional data limitations. As noted above, data from some Cohen Clinics for some variables is missing due to varied data collection procedures. This limits the conclusions we can draw across the network. Given the nature of the data, we are unable to determine if the data was not provided by the client, not entered by the clinic staff, or not extracted correctly in the data pipeline. Each or all of these may have occurred in some measure and may have affected the results in unknown ways.

EHR data is known to be challenging to collect and analyze for inclusion in quantitative studies. Even under the best circumstances it tends to be incomplete, complex, and difficult to clean, analyze, and interpret. Case management data was all the more so in this case as it was collected by case managers vs. clinicians and integrated into the EHR through an additional step. Significant data loss associated with specific social determinant variables suggests an opportunity for improved data collection methods and is currently being addressed by CVN.

Ensuring more comprehensive and consistent data collection on variables including utility or eviction assistance will enhance our ability to understand and address the full scope of social risks faced by clients. Process changes currently underway through a CVN End to End Process Review will ensure robust and consistent data capture of social determinants as well as the impact of case management services across the network. Armed with these findings in conjunction with the efforts already underway will allow Cohen Clinics to better support clients at elevated risk for suicide, leading to improved outcomes and a reduction in suicide rates among the veteran and active-duty populations we serve.

Conclusion

Suicide risk screening, assessment, stratification, and intervention are essential services offered at Cohen Clinics, together comprising CVNs comprehensive suicide risk management ecosystem. This study aimed to assess key risk predictors relevant to clinical assessment and care. Our

premise was that combining the best clinical care practices with cutting-edge data insights will ensure sustained optimal care for military veterans and active-duty service members.

This report's findings offer several key opportunities. First, our data supports a unified Elevated Risk pathway, as many variables showed similarities between Moderate and High-risk clients. Second, Diagnostic, Trauma Related, and Social Determinants of Health variables emerged as significant predictors of risk level, emphasizing the need to continue to integrate all these factors into training policies and conceptual modeling of client risk. Third, clinic processes may require minor adjustments to enhance data collection across the full range of EHR variables. Fourth and finally, the presence of mutable social determinants of health in clients with elevated risk suggests that these clients will continue to benefit from additional resources such as case management which exceeds the scope of care typically provided to clients in outpatient mental health settings. Based on these findings case management services should be maintained and potentially enhanced across the network. At present, each of these recommendations are being addressed or implemented at CVN as described in the preceding sections.

To increase the potential value and impact of this project, this report will be made accessible to other clinical leaders and scholars in the field as these findings may be instructive to other behavioral health providers both within and beyond military and veteran clinical care.

Acknowledgement

We gratefully acknowledge the Face the Fight Foundation for funding this work. All analyses described in this report were accomplished through establishment of a CVN data pipeline via a grant from Face the Fight. The insights gleaned to date were a direct result of that pipeline and multiple future projects are planned to capitalize on this data and the expanded analytic capabilities it affords. Our partnership with Face the Fight has made this possible and we look forward to continuing to work together to support our military community.

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Appendices

APPENDIX TABLE 1

Suicide Risk by Diagnostic Status

		Suicide Risk		
		Low	Moderate	High
PTSD	No	6382 (76.9%/88.1%)	589 (66.0%/8.1%)	270 (66.8%/3.7%)
	Yes	1915 (23.1%/81.4%)	303 (34.0%/12.9%)	134 (33.2%/5.7%)
Depression	No	7223 (87.1%/88.5%)	658 (73.8%/8.1%)	280 (69.3%/3.4%)
	Yes	1074 (12.9%/75.0%)	234 (26.2%/16.3%)	124 (30.7%/8.7%)
Generalized Anxiety Disorder	No	7402 (89.2%/86.6%)	790 (88.6%/9.2%)	358 (88.6%/4.2%)
	Yes	895 (10.8%/85.8%)	102 (11.4%/9.8%)	46 (11.4%/4.4%)

Note. The first percentage in the parentheses indicates the column value while the second indicates the row value.

APPENDIX TABLE 2

Trauma History by Suicide Risk

		Suicide Risk		
		Low	Moderate	High
Military Sexual Trauma	No	3471 (84.5%/84.6%)	431 (78.5%/10.5%)	200 (75.5%/4.9%)
	Yes	636 (15.5%/77.7%)	118 (21.5%/14.4%)	65 (24.5%/7.9%)
Pain Affecting ADL	No	4222 (48.8%/89.6%)	344 (43.3%/7.3%)	146 (43.3%/3.1%)
	Yes	4426 (51.2%/87.3%)	451 (56.7%/8.9%)	191 (56.7%/3.8%)
Trauma History	None	5294 (49.6%/92.2%)	325 (31.2%/5.7%)	120 (25.9%/2.1%)
	>6 months	4643 (43.5%/84.1%)	605 (58.0%/11.0%)	276 (59.6%/5.0%)
	<6 months	728 (6.8%/80.2%)	113 (10.8%/12.4%)	67 (14.5%/7.4%)
ACEs	No	2442 (38.0%/88.5%)	224 (28.4%/8.1%)	94 (25.3%/3.4%)
	Yes	3983 (62.0%/82.5%)	566 (71.6%/11.7%)	277 (74.7%/5.7%)

Note. The first percentage in the parentheses indicates the column value while the second indicates the row value.

APPENDIX TABLE 3

Social Risks by Suicide Risks - Part I

		Suicide Risk		
		Low	Moderate	High
Insecure Housing	No	6814 (97.1%/85.1%)	824 (94.2%/10.3%)	369 (92.2%/4.6%)
	Yes	202 (2.9%/71.1%)	51 (5.8%/18.0%)	31 (7.8%/10.9%)
Insecure Employment	No	5644 (82.0%/86.6%)	615 (71.8%/9.4%)	262 (66.5%/4.0%)
	Yes	1241 (18.0%/76.9%)	241 (28.2%/14.9%)	132 (33.5%/8.2%)
Lacking Social Support	No	5485 (80.6%/86.0%)	614 (72.6%/9.6%)	277 (70.7%/4.3%)
	Yes	1323 (19.4%/79.2%)	232 (27.4%/13.9%)	115 (29.3%/6.9%)
Lacking Family Support	No	5906 (86.1%/86.2%)	651 (76.8%/9.5%)	294 (75.0%/4.3%)
	Yes	954 (13.9%/76.4%)	197 (23.2%/15.8%)	98 (25.0%/7.8%)

Note. The first percentage in the parentheses indicates the column value while the second indicates the row value.

APPENDIX TABLE 4

Social Risks by Suicide Risk – Part II

		Suicide Risk		
		Low	Moderate	High
Food Insecurity	No	2126 (97.7%/85.5%)	265 (93.6%/10.7%)	96 (94.1%/3.9%)
	Yes	51 (2.3%/68.0%)	18 (6.4%/24.0%)	6 (5.9%/8.0%)
Unsafe at Home	No	2132 (97.9%/85.2%)	271 (95.8%/10.8%)	98 (96.1%/3.9%)
	Yes	46 (2.1%/74.2%)	12 (4.2%/19.4%)	4 (3.9%/6.5%)
Utility or Eviction Assistance	No	2092 (96.1%/85.6%)	259 (91.5%/10.6%)	92 (90.2%/3.8%)
	Yes	85 (3.9%/71.4%)	24 (8.5%/20.2%)	10 (9.8%/8.4%)
Household Goods Assistance	No	2007 (92.2%/86.2%)	241 (85.2%/10.4%)	79 (77.5%/3.4%)
	Yes	170 (7.8%/72.3%)	42 (14.8%/17.9%)	23 (22.5%/9.8%)

Note. The first percentage in the parentheses indicates the column value while the second indicates the row value.

APPENDIX TABLE 5

Diagnoses Predicting Suicide Risk

	<i>B</i>	<i>SE B</i>	<i>β</i>
Depression	1.14	.017	1.34***
PTSD	.77	.07	.99***
Generalized Anxiety Disorder	.32	.10	.28**
Substance Use Disorder	.09	.34	.02
Alcohol Use Disorder	.21	.24	.07

Note. *** $p < .001$, ** $p < .01$, * $p < .05$

APPENDIX TABLE 6

Trauma History Predicting Suicide Risk

	<i>B</i>	<i>SE B</i>	<i>β</i>
Adverse Childhood Experiences	.44	.09	.52***
Military Sexual Trauma	.33	.10	.34**
Serious Trauma > 6 months ago	.25	.11	.30*
Serious Trauma < 6 months ago	.66	.15	.62***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$

APPENDIX TABLE 7

Social Risks Predicting Suicide Risk – Part I

	<i>B</i>	<i>SE B</i>	<i>β</i>
Insecure Housing	.44	.15	.27**
Insecure Employment	.48	.08	.57***
Lacking Social Support	.23	.08	.28**
Lacking Family Support	.46	.09	.50***

Note. *** $p < .001$, ** $p < .01$, * $p < .05$

APPENDIX TABLE 8

Social Risks Predicting Suicide Risk – Part II

	<i>B</i>	<i>SE B</i>	<i>β</i>
Food Insecurity	.49	.29	.29
Unsafe at Home	.41	.31	.21
Utility or Eviction Assistance	.56	.23	.39*
Household Goods Assistance	.51	.27	.31

Note. *** $p < .001$, ** $p < .01$, * $p < .05$