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Corresponding author mail id: kristen.palframan@va.gov

Veterans Justice Programs: Assessing Population Risks for Suicide Deaths and Attempts

Kristen M. Palframan, MPH[1], Jessica Blue-Howells, LCSW[2],
Sean C. Clark, JD[2], John F. McCarthy, PhD, MPH[1,3]

1. Office of Mental Health and Suicide Prevention, U.S. Department of Veterans Affairs
2. Veterans Justice Programs, Homeless Programs Office, U.S. Department of Veterans Affairs
3. Department of Psychiatry, University of Michigan, Ann Arbor, MI

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ABSTRACT

Objectives. Understanding suicide risks among Veteran subpopulations is a national priority. This study assessed risks of suicide, suicide attempts, and other-cause mortality among recipients of Veterans Health Administration (VHA) Veterans Justice Program services as compared to other Veteran VHA users.

Methods. Per VHA records, the cohort included 5,401,192 Veterans alive as of 1/1/2013 and with VHA utilization in 2012. Receipt of Veterans Justice Outreach (VJO) or Health Care for Reentry Veterans (HCRV) services in 2012 was assessed using encounter codes. Multivariable proportional hazards regression assessed risks of suicide (per National Death Index search results from the VA/DoD Mortality Data Repository) and attempts (per diagnoses and site reports) in 2013-2016, adjusting for demographic and clinical indicators.

Results. Compared to other patients, Veterans with VJO encounters had greater risk of suicide (unadjusted HR=2.80, 95% confidence interval [CI]=2.30-3.40; adjusted HR=1.25, 95% CI=1.02-1.53) and attempts (unadjusted HR=8.88, 95% CI=8.45-9.35; adjusted HR=1.06, 95% CI=1.00-1.11). Veterans with HCRV encounters had elevated risk of suicide attempts (unadjusted HR=4.56, 95% CI=4.00-5.20; adjusted HR=1.42, 95% CI=1.24-1.62). Risks were also elevated for other external causes of mortality.

Conclusions. Findings document increased risk of suicidal behavior among Veterans Justice Program recipients. These results have informed VHA suicide prevention activities.

Key words: Suicide; Suicide Attempt; Veterans; Justice; Incarceration

Suicide prevention is the U.S. Department of Veterans Affairs (VA)'s top clinical priority, and assessment of risk across Veteran subpopulations is an important element of VA suicide surveillance. Suicide rates are elevated among Veterans as compared to non-Veterans (U.S. Department of Veterans Affairs, 2018), and among Veterans rates are especially elevated among those who receive Veterans Health Administration (VHA) care (McCarthy et al., 2009). Wortzel and colleagues posited that incarcerated Veterans may be at high risk of suicide, given studies that document elevated rates among incarcerated and Veteran populations (Wortzel, Binswanger, Anderson, & Adler, 2009). For Veteran suicide prevention efforts, it is important to determine whether justice-involved Veterans experience elevated risks.

As of 12/31/2016, there were over 6.6 million adults in the United States (U.S.) criminal justice system, including over 1.5 million state or federal prisoners (Carson, 2018; Kaeble & Cowhig, 2018). Engagement with the criminal justice system, or 'justice involvement', encompasses incarceration in jail or prison as well as arrest, prosecution, probation, and parole (National Academies of Sciences, Engineering, and Medicine, 2017). Sociodemographic characteristics of incarcerated individuals differ from those of other US adults (Carson, 2018) and lifetime risk of incarceration may be greater among military service members and Veterans (Snowden, Oh, Salas-Wright, Vaughn, & King, 2017). However, Veterans are not over-represented among incarcerated adults: they accounted for 8% of US state and federal prisoners in 2011-2012 (Bronson, Carson, Noonan, & Berzofsky, 2015) and 9% of the adult US population in 2012 (U.S. Census Bureau). Among Veterans, risk factors for incarceration include younger age, minority race/ethnicity, mental health or substance use disorders, homelessness, being unmarried, and lack of education beyond a high school degree (Elbogen et al., 2012; Greenberg & Rosenheck, 2009; Institute of Medicine, 2010; Tsai, Rosenheck, Kasprow, & McGuire, 2013).

Suicide risks have been found to be elevated among former inmates and individuals with prior criminal justice involvement as compared to other U.S. adults (Pratt, Piper, Appleby, Webb, & Shaw, 2006; Webb et al., 2011), and suicide rates are estimated to be 7 to 18 times greater (Haglund et al., 2014; Spittal, Forsyth, Pirkis, Alati, & Kinner, 2014). Other external causes of death – including homicide and unintentional overdose – are also leading causes of death in former prisoners (Binswanger, Blatchford, Mueller, & Stern, 2013; Binswanger et al., 2007). Studies on justice-involved populations in other countries indicate that suicide risk factors include prior suicide attempts, substance use disorders, country of birth (Haglund et al., 2014), being unmarried, and number of prior incarcerations (Spittal et al., 2014). In prison settings, identified suicide risk factors include prior suicidality, psychiatric diagnoses, psychotropic medication receipt, substance use problems, violent offenses, and being housed in a single cell (Fazel, Cartwright, Norman-Nott, & Hawton, 2008; Fruehwald, Matschnig, Koenig, Bauer, & Frottier, 2004). Experiences while incarcerated and the challenges following release from incarceration may be additional risk factors for suicide.

One national study has examined suicide risks among formerly incarcerated Veterans. For Medicare-eligible VHA-using Veterans aged 50 and older who were incarcerated between 2012 and 2014, there was greater risk of suicide attempts among older Veterans with a criminal justice history as compared to never-incarcerated Veterans (Barry et al., 2018). No significant differences were found with regard to suicide mortality. The study highlights the need for assessment of suicide risks among justice-involved Veterans of all ages. Although incarcerated Veterans tend to be older than incarcerated non-Veterans (Bronson et al., 2015), justice-involved Veterans are younger than the general Veteran population (Greenberg & Rosenheck, 2009). Furthermore, younger Veterans have particularly high suicide rates, with substantial recent increases (U.S. Department of Veterans Affairs, 2018).

Two Veterans Justice Programs within the U.S. Department of Veterans Affairs (VA) provide services to Veterans engaged with the criminal justice system: Veterans Justice Outreach (VJO) and Health Care for Reentry Veterans (HCRV). VJO connects Veterans involved at earlier stages of criminal justice involvement (for example, arrest, oversight by a treatment court, incarceration in a local jail) with VHA treatment for mental health or substance use disorders, or other appropriate VHA care, with the goal of avoiding criminalization of mental health disorders and reducing incarceration among Veterans (U.S. Department of Veterans Affairs, 2017). The HCRV program helps connect Veterans who are leaving incarceration in state and federal prisons with the appropriate VA services, with the goal of preventing recidivism and homelessness (Finlay et al., 2017). Both programs aim to ensure continuity of care between incarceration and re-entry into the community (Blue-Howells, Clark, Van Den Berk-Clark, & McGuire, 2013). To inform ongoing population-based VA suicide prevention activities, it is important to understand adverse outcomes among the Veteran VHA patients with a history of justice program encounters.

Demographic and clinical characteristics of Veterans engaged with VJO and HCRV have been characterized previously (Finlay et al., 2015, 2017). Studies have shown that these justice-involved Veterans have high prevalence of mental health diagnoses, substance use disorders, and homelessness (Blodgett et al., 2015; Finlay et al., 2016; Tsai et al., 2013). Furthermore, incarcerated Veterans with a history of homelessness are more likely to have mental health

conditions and substance use disorders than other incarcerated Veterans (Tsai, Rosenheck, Kasprow, & McGuire, 2014). These characteristics common to justice-involved Veterans are also established risk factors for suicide among VHA patients (Ilgen et al., 2010; McCarthy et al., 2015).

For a cohort of Veteran VHA patients at the start of 2013, we examined suicide attempts, suicide mortality, homicide, other external-cause mortality, and all-cause mortality in 2013-2016. Analyses assessed differential risks by prior year receipt of Veterans Justice Program services. We hypothesized that Veteran VHA patients who received Veterans Justice Program services had elevated risks for each of these adverse outcomes, as compared to other Veterans receiving VHA services.

METHODS

A retrospective cohort design was used to assess associations between prior year receipt of VHA justice program services in 2012 and risk of suicide attempt and specific mortality outcomes in 2013 through 2016. The cohort included Veterans who received VHA inpatient or outpatient services in 2012 and were alive as of 1/1/2013 (N=5,401,192), excluding Veterans whose documented death or last use in 2012 occurred outside of the 50 US states or the District of Columbia. The study examined prevalent VHA justice program contact rather than initial encounters. Study analyses were conducted as program evaluation activities of the VHA Office of Mental Health and Suicide Prevention.

Data Sources and Measures

The cohort and their demographic and clinical characteristics were identified from the VHA's National Patient Care Database (NPCD) and Corporate Data Warehouse (CDW) per encounters in 2012. The focal predictors were indicators of receipt of HCRV and VJO encounters in 2012, per program-specific outpatient stop codes. Demographic characteristics included age in years as of 12/31/2012 (categorized as 18-34, 35-54, 55-74, 75-115, and <18 or >115 or missing), sex, race/ethnicity (white, black, Hispanic, other, and unknown), marital status (married, divorced/separated/widowed, never married/single, and unknown), region of the US (Northeast, Midwest, South, and West), indications of homelessness (captured by the ICD-9-CM

diagnosis code V60.0, outpatient stop codes, and inpatient specialty codes), and military service-connected disability status. Clinical characteristics included diagnoses of mental health and substance use disorders and documentation of suicide attempts in 2012. For multivariable analyses, mental health and substance use disorder diagnoses were categorized as follows: any substance use disorder, anxiety, bipolar disorder, depression, post-traumatic stress disorder (PTSD), and schizophrenia. Indications of suicide attempts were based on diagnosis codes in inpatient or outpatient records and on data from the VA's Suicide Prevention Applications Network (SPAN), which contains reports of fatal and non-fatal suicidal behavior entered by local VA Suicide Prevention Coordinators (Hoffmire et al., 2016).

The outcomes of interest were suicide attempts, per above, and categories of external- and all-cause mortality. Mortality data were drawn from the VA/Department of Defense (DoD) Mortality Data Repository, which contains comprehensive mortality data for Veterans and active service members from annual searches of the Centers for Disease Control and Prevention's National Death Index (NDI). The NDI is considered the gold standard of mortality databases and includes indicators of vital status, date of death, and cause of death (Cowper, Kubal, Maynard, & Hynes, 2002). In this study, mortality outcomes were classified as suicide, homicide, non-suicide non-homicide ("other") external-cause mortality, and all-cause mortality. Other external-cause mortality included unintentional injuries and accidents – such as accidental drug overdose – and events of undetermined intent. Specific causes of death were categorized using International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) codes as follows: suicide (X60-84, Y87.0, U03), homicide (X85-Y09, Y87.1, U01-02), and non-suicide non-homicide external cause mortality (V01-X59, Y10-36, Y85-86, Y87.2, Y89).

Statistical Analysis

We generated descriptive statistics by whether a Veteran had an encounter with HCRV, VJO, or with either program in 2012. We calculated rates of suicide, homicide, non-suicide non-homicide external-cause mortality, and all-cause mortality for 2013-2016. Risk time for mortality outcomes was calculated from 1/1/2013 until 12/31/2016 or death, whichever came first, using the most recent mortality data available. Rates are presented per 100,000 person-

years and were calculated as the number of deaths in 2013-2016 divided by the sum of risk time in the underlying population in years, multiplied by 100,000. Per CDC data use guidelines, information was suppressed for counts of death less than ten.

Cox proportional hazards regression was used to assess associations between receipt of justice program encounters and mortality risks or an individual's risk for an initial documented suicide attempt in the follow-up period. Mortality outcomes were assessed for 2013 through calendar 2016, per above. Risk time for suicide attempts was calculated from 1/1/2013 until a patient's first documentation of a suicide attempt in SPAN or medical record diagnoses after 1/1/2013, or until 12/31/2016 or death, whichever happened first. For each outcome, unadjusted and adjusted Cox proportional hazards models were run; adjusted models included demographic and clinical characteristics. Individuals with age less than 18 or greater than 115 or missing were excluded from proportional hazards models.

All analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

Table 1 presents demographic, clinical, and mortality characteristics of the cohort. Among 5,401,192 Veteran VHA users in 2012 who were alive through 12/31/2012, there were 6,948 (0.13%) who had an encounter with HCRV, 26,049 (0.48%) who had a VJO encounter, and 32,379 (0.60%) who had an encounter with either HCRV or VJO in 2012. Among patients with an encounter with either program, 4.3% were female and 64.7% were under age 55. Compared to patients without justice program encounters, whose who received justice program services were more likely to be male, younger, black, and unmarried. They were also more likely to have had indications of homelessness (51.1% vs 3.5%), mental health diagnoses (77.6% vs 35.4%), substance use diagnoses (58.3% vs 9.0%), and documented suicide attempts (3.5% vs 0.3%) in 2012.

In the follow-up period, Veteran VHA users with prior-year Veterans Justice Program encounters were more likely to attempt suicide (5.4% vs 0.7%) and to die from suicide (0.4% vs 0.1%), homicide (0.1% vs 0%), or other external-cause mortality (1.6% vs 0.5%), and they were less likely to die from all-cause mortality (7.3% vs 12.8%), compared to Veteran VHA users

without a Veterans Justice Program encounter in 2012 (Table 1). Rates of suicide in 2013-2016 were elevated for Veterans who received services from either Veterans Justice Program (suicide rate of 93.6 per 100,000 person-years), Veterans with HCRV encounters (55.9), and Veterans with VJO encounters (102.5), as compared to Veteran VHA patients with neither encounter type in 2012 (36.6) (Table 2). Overall, suicide rates were highest among Veterans aged 18-34 and 75 and older. In addition, homicide and non-suicide non-homicide external-cause mortality rates were elevated among Veterans with a justice program encounter in 2012, whereas crude all-cause mortality rates were lower, compared to Veterans without a justice program encounter.

As shown in Table 3, having an HCRV encounter was significantly associated with subsequent suicide attempt in unadjusted (HR=4.56, 95% CI=4.00, 5.20) and adjusted (HR=1.42, 95% CI=1.24, 1.62) proportional hazards models, with adjusted models controlling for demographic and clinical characteristics. Having a VJO encounter was significantly associated with both subsequent suicide attempt (unadjusted HR=8.88, 95% CI=8.45, 9.35; adjusted HR=1.06, 95% CI=1.00, 1.11) and suicide death (unadjusted HR=2.80, 95% CI=2.30, 3.40; adjusted HR=1.25, 95% CI=1.02, 1.53). Hazard ratios for all covariates in adjusted models for suicide attempt and suicide mortality are presented in Tables 4 and 5.

In both unadjusted and adjusted models, having a prior HCRV encounter was also associated with increased risk of non-suicide non-homicide external-cause mortality (unadjusted HR=2.80, 95% CI=2.30, 3.41), and prior VJO encounter was also associated with increased risk of homicide (unadjusted HR=6.30, 95% CI=4.45, 8.91) and non-suicide non-homicide external-cause mortality (unadjusted HR=3.36, 95% CI=3.06, 3.69). After adjustment, there was no association between encounters with either Veterans Justice Program and all-cause mortality (Table 3).

DISCUSSION

This study provides the first assessment for all Veteran VHA users of whether risk for suicidal behavior and other causes of mortality varies by involvement with the Veterans Justice Programs. Adjusting for covariates, and compared to other Veteran VHA users, Veterans with VJO encounters were at increased risk for suicide attempts and suicide deaths. They were also

at increased risk for homicide and non-suicide non-homicide external-cause mortality. Veterans with HCRV encounters were at increased risk for suicide attempts and for homicide and non-suicide non-homicide external-cause mortality.

Overall, the suicide rate among Veterans Justice Program recipients was 2.6 times greater than for other Veteran VHA users. This rate ratio is lower than that observed in previous studies (Haglund et al., 2014; Spittal et al., 2014). Several hypotheses could explain these differences. For example, Veterans Justice Program services might reduce risks among justice-involved Veterans, or perhaps the population of Veterans who receive justice program services has characteristics that make them inherently at lower risk than other justice-involved Veterans. The lower incidence rate ratio found here could also be attributable to the high baseline rate of suicide among Veteran VHA patients.

In multivariable proportional hazards regression, the elevated bivariate hazard ratios for suicide attempt (HCRV and VJO) and suicide death (VJO) remained significant yet the associations were substantially attenuated. This indicates that Veterans who received Veterans Justice Program services had high concentration of other important risk factors. These include being younger and having mental health conditions and substance use disorders. Veterans who receive Veterans Justice Program services represent a high-risk population for suicidal behavior and findings suggest that justice-involvement also has unique adverse associations with risks for suicide attempts and suicide deaths.

The observed elevated risks of suicide and suicide attempt after adjustment may in part be due to Veterans' experiences in jail or prison, adverse consequences of justice involvement, or unmeasured factors that contribute both to criminal justice involvement and increased risk of suicide (Qin, Agerbo, & Mortensen, 2003). Differences in the suicide mortality risk for Veterans engaged with HCRV and VJO may be attributable to the different contexts where these programs intervene. For example, Veterans receiving VJO services may be more in crisis because their justice involvement is in the beginning stages, whereas HCRV recipients have already served time in prison. Additionally, VJO recipients move in and out of the community and have more access to lethal means than Veterans receiving HCRV services.

Homicide and drug overdose are two of the leading causes of death of former inmates (Binswanger et al., 2007, 2013). Study findings documented elevated homicide risks among VJO recipients and elevated risks of non-suicide non-homicide external-cause mortality among HCRV and VJO recipients. The associations between receipt of Veterans Justice Programs services and non-suicide non-homicide external-cause mortality remained significant after adjusting for covariates including substance use disorder diagnoses. Future studies could examine contextual factors such as neighborhood characteristics that may differ by justice involvement status (Kubrin & Stewart, 2006).

We did not observe differences in all-cause mortality by justice involvement in adjusted multivariable analyses. In contrast, some prior studies document increased risk of death among former inmates, particularly shortly after release from incarceration. Binswanger and colleagues found a 12.7 times higher risk of death among former inmates in the first two weeks after release and a 3.5 times higher risk of death during an average of 1.9 years of follow-up (Binswanger et al., 2007). However, Wortzel and colleagues compared Veteran former inmates to non-Veteran former inmates and did not observe differences in all-cause mortality risk after adjusting for demographic measures (Wortzel, Blatchford, Conner, Adler, & Binswanger, 2012).

There were three main study limitations. First, ascertainment of justice involvement was specific to Veteran VHA patients with outpatient encounter codes for Veterans Justice Programs, however we expect that some Veteran VHA patients with justice involvement may not receive these services. Consequently, study findings may not be generalizable for all justice-involved Veterans or all VHA-using justice-involved Veterans. Second, it was not possible to ascertain specific information regarding Veterans' justice-related experiences, such as number of incarcerations, specific periods of contact with the justice system, or the nature of Veterans' justice involvement, including whether VJO recipients were convicted or incarcerated. Finally, outcomes were assessed from 2013 through 2016 for Veteran VHA patients alive at the start of 2013, by receipt of Veterans Justice Program encounters in 2012. The cohort study design thus excluded individuals who had died prior to the start of 2013, and non-fatal suicide attempts that occurred in 2012 were included as covariates rather than potential outcomes. Consequently, the observed findings do not assess the immediate impact of justice involvement

on suicide attempt and mortality outcomes. Future work should consider associations between incident program use and subsequent adverse outcomes.

Study strengths include the comprehensive assessment of Veterans Justice Program services for over 5.4 million Veterans who were recent users of VHA care. In contrast, to our knowledge, the only other national study on justice involvement and suicide among Veteran VHA users was limited to Veterans aged 50 and older (Barry et al., 2018).

Findings from this study have informed ongoing VA suicide prevention efforts by supporting trainings for VJO and HCRV professionals, webinars, a national VHA justice program conference, ongoing workgroup reviews for future trainings, and development of clinician educational materials. Other suicide prevention initiatives include partnering Veterans Justice Program Specialists, VHA Suicide Prevention Coordinators, and VA Police Officers to provide trainings to community law enforcement and first responder personnel, and participation of Veterans Justice Program Specialists in community Crisis Intervention teams.

CONCLUSIONS

Study findings document substantially increased burden of suicide and suicide attempts among justice-involved Veterans who received Veterans Justice Program encounters. Adjusting for demographic and clinical covariates, Veterans who received HCRV services were at increased risk for suicide attempts and Veterans who received VJO services were at increased risk for both suicide attempts and suicide death.

This study also contributes new information regarding risks for other causes of death among recipients of VHA justice program services, documenting elevated risks of homicide and other non-suicide external-cause mortality. Further work is needed to support suicide prevention for justice-involved Veterans and to understand and address risks for these other important adverse outcomes.

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TABLE 1

Demographic and Clinical Characteristics of Veteran VHA Users, by Any Encounter with a Veterans Justice Program

	Either program		HCRV		VJO		Neither program	
	N (%) or Mean ± SD		N (%) or Mean ± SD		N (%) or Mean ± SD		N (%) or Mean ± SD	
All	32,379	(0.60)	6,948	(0.13)	26,049	(0.48)	5,368,813	(99.40)
Female***	1,379	(4.3)	162	(2.3)	1,233	(4.7)	442,588	(8.2)
Age,*** y	47.9 ± 13.0		51.7 ± 11.1		46.9 ± 13.3		61.9 ± 16.3	
Age group[a],*** y								
18 to 34	7,045	(21.8)	654	(9.4)	6,488	(24.9)	462,160	(8.6)
35 to 54	13,895	(42.9)	3,252	(46.8)	10,934	(42.0)	1,050,616	(19.6)
55 to 74	11,085	(34.2)	2,938	(42.3)	8,372	(32.1)	2,634,572	(49.1)
75 to 115	354	(1.1)	104	(1.5)	255	(1.0)	1,220,639	(22.7)
Race/Ethnicity***								
White	15,917	(49.2)	3,278	(47.2)	12,930	(49.6)	3,824,570	(71.2)
Black	8,926	(27.6)	2,280	(32.8)	6,827	(26.2)	796,318	(14.8)
Hispanic	1,236	(3.8)	178	(2.6)	1,078	(4.1)	172,349	(3.2)
Other	5,177	(16.0)	894	(12.9)	4,398	(16.9)	406,875	(7.6)
Unknown	1,123	(3.5)	318	(4.6)	816	(3.1)	168,701	(3.1)
Marital Status***								
Married	6,253	(19.3)	1,048	(15.1)	5,306	(20.4)	2,964,206	(55.2)
Divorced/Separated/Widowed	13,086	(40.4)	3,268	(47.0)	10,122	(38.9)	1,435,446	(26.7)
Never married/Single	12,272	(37.9)	2,314	(33.3)	10,166	(39.0)	805,525	(15.0)
Unknown	768	(2.4)	318	(4.6)	455	(1.8)	163,636	(3.1)

Region***							
Northeast	4,291	(13.3)	577	(8.3)	3,781	(14.5)	752,046 (14.0)
Midwest	7,391	(22.8)	1,467	(21.1)	6,076	(23.3)	1,216,847 (22.7)
South	13,555	(41.9)	4,135	(59.5)	9,711	(37.3)	2,299,189 (42.8)
West	7,142	(22.1)	769	(11.1)	6,481	(24.9)	1,100,731 (20.5)
Homelessness[b]***	16,551	(51.1)	3,200	(46.1)	13,787	(52.9)	189,479 (3.5)
Service Connected Disability	13,882	(42.9)	1,865	(26.8)	12,256	(47.1)	2,300,033 (42.8)
Mental Health Diagnoses							
Any Mental Health Diagnosis***	25,118	(77.6)	3,615	(52.0)	22,014	(84.5)	1,898,090 (35.4)
Any Substance Use Disorder Diagnosis***	18,875	(58.3)	2,329	(33.5)	16,965	(65.1)	482,552 (9.0)
Anxiety***	7,076	(21.9)	687	(9.9)	6,546	(25.1)	468,265 (8.7)
Bipolar Disorder***	3,788	(11.7)	400	(5.8)	3,473	(13.3)	123,766 (2.3)
Depression***	15,005	(46.3)	1,647	(23.7)	13,655	(52.4)	1,023,943 (19.1)
PTSD***	9,924	(30.7)	816	(11.7)	9,284	(35.6)	633,838 (11.8)
Schizophrenia***	2,044	(6.3)	217	(3.1)	1,858	(7.1)	84,550 (1.6)
Suicide Attempt in 2012[c]***	1,125	(3.5)	87	(1.3)	1,060	(4.1)	15,015 (0.3)
Suicide Attempt, 2013-2016***	1,749	(5.4)	225	(3.2)	1,565	(6.0)	36,271 (0.7)
Died by suicide, 2013-2016***	117	(0.4)	15	(0.2)	103	(0.4)	7,354 (0.1)
Died by homicide, 2013-2016***	42	(0.1)	<10	—[d]	33	(0.1)	1,039 (0.0)
Died by other external-cause, 2013-2016***	527	(1.6)	100	(1.4)	445	(1.7)	26,403 (0.5)
Died by any cause, 2013-2016***	2,355	(7.3)	505	(7.3)	1,908	(7.3)	688,358 (12.8)

Note. HCRV - Health Care for Reentry Veterans; VJO - Veterans Justice Outreach.

[a]N=826 in the Neither program group had age less than 18, over 115, or missing

[b]Indication of homelessness or receipt of homelessness prevention services

[c]Documentation of suicide attempt captured by SPAN or ICD codes in electronic health records

[d]Suppressed due to <10 deaths

*P<.05; **P<.01; ***P<.001, for difference between Either program and Neither program, derived from the Chi Square or Wilcoxon rank sum test.

TABLE 2

External-Cause and All-Cause Mortality Rates per 100,000 Person-Years, by Any Encounter with a Veterans Justice Program

	Either program Mortality Rate	HCRV Mortality Rate	VJO Mortality Rate	Neither program Mortality Rate
Suicide	93.6	55.9	102.5	36.6
Homicide	33.6	—[b]	32.8	5.2
Other External-Cause Mortality[a]	421.5	372.4	442.7	131.4
All-Cause Mortality	1883.7	1880.8	1897.9	3426.5

Note. HCRV - Health Care for Reentry Veterans; VJO - Veterans Justice Outreach.

[a]Other External-Cause Mortality is non-suicide, non-homicide external-cause mortality such as accidents, unintentional drug overdoses, and events of undetermined intent.

[b]Suppressed due to <10 deaths

TABLE 3

Hazard Ratios for Suicide Attempt or Mortality Among Veteran VHA Patients, by Any Encounter with HCRV or VJO

	HCRV		VJO	
	HR	(95% CI)	HR	(95% CI)
Suicide Attempt				
Unadjusted	4.56	(4.00, 5.20)	8.88	(8.45, 9.35)
Adjusted[a]	1.42	(1.24, 1.62)	1.06	(1.00, 1.11)
Suicide Death				
Unadjusted	1.52	(0.92, 2.52)	2.80	(2.30, 3.40)
Adjusted	1.15	(0.69, 1.91)	1.25	(1.02, 1.53)
Homicide				
Unadjusted	6.31	(3.27, 12.16)	6.30	(4.45, 8.91)
Adjusted	1.90	(0.98, 3.69)	1.51	(1.05, 2.17)
Other External-Cause Mortality[b]				
Unadjusted	2.80	(2.30, 3.41)	3.36	(3.06, 3.69)
Adjusted	1.95	(1.60, 2.38)	1.61	(1.46, 1.78)
All-Cause Mortality				
Unadjusted	0.56	(0.51, 0.61)	0.55	(0.53, 0.58)
Adjusted	0.95	(0.87, 1.04)	1.02	(0.98, 1.07)

Note. HCRV - Health Care for Reentry Veterans; VJO - Veterans Justice Outreach.

[a]Adjusted analyses adjusted for age, sex, race/ethnicity, marital status, region, any indication of homelessness, any service connection, any indication of suicide attempt in 2012, and any diagnosis of a substance use disorder, anxiety, bipolar disorder, depression, PTSD, or schizophrenia in 2012

[b]Other External-Cause Mortality is non-suicide, non-homicide external-cause mortality such as accidents, unintentional drug overdoses, and events of undetermined intent.

TABLE 4

Adjusted Hazard Ratios for Suicide Attempt Among Veteran VHA Patients, by Any Encounter with HCRV or VJO

	HCRV		VJO	
	HR	(95% CI)	HR	(95% CI)
Encounter with HCRV	1.42	(1.24, 1.62)		
Encounter with VJO			1.06	(1.00, 1.11)
Sex				
Female	ref		ref	
Male	0.90	(0.88, 0.93)	0.90	(0.88, 0.93)
Age Group				
18-34	ref		ref	
35-54	0.70	(0.68, 0.72)	0.70	(0.68, 0.72)
55-74	0.33	(0.32, 0.34)	0.33	(0.33, 0.34)
75-115	0.12	(0.11, 0.13)	0.12	(0.11, 0.13)
Race/Ethnicity				
White	ref		ref	
Black	0.79	(0.76, 0.81)	0.79	(0.76, 0.81)
Hispanic	1.00	(0.95, 1.05)	1.00	(0.94, 1.05)

Other	2.65	(2.59, 2.72)	2.65	(2.59, 2.72)
Unknown	0.34	(0.31, 0.38)	0.34	(0.31, 0.38)
Marital Status				
Married	ref		ref	
Divorced/Separated/Widowed	1.35	(1.32, 1.39)	1.35	(1.32, 1.39)
Never married/Single	1.25	(1.22, 1.29)	1.26	(1.22, 1.29)
Unknown	1.44	(1.33, 1.54)	1.44	(1.33, 1.54)
Region				
Northeast	ref		ref	
Midwest	1.25	(1.21, 1.30)	1.25	(1.21, 1.30)
South	1.28	(1.23, 1.32)	1.28	(1.23, 1.32)
West	1.38	(1.33, 1.43)	1.38	(1.33, 1.43)
Homelessness[a]	1.52	(1.48, 1.56)	1.52	(1.48, 1.57)
Any Service-Connected Disability	0.94	(0.92, 0.96)	0.94	(0.92, 0.96)
Suicide Attempt in 2012[b]	6.91	(6.68, 7.15)	6.90	(6.68, 7.14)
Mental Health Diagnoses in 2012				
Any Substance Use Disorder	2.20	(2.14, 2.25)	2.19	(2.14, 2.25)
Anxiety	1.25	(1.22, 1.28)	1.25	(1.22, 1.28)
Bipolar disorder	2.06	(2.00, 2.12)	2.06	(2.00, 2.12)
Depression	2.56	(2.50, 2.63)	2.56	(2.50, 2.63)
PTSD	1.48	(1.44, 1.51)	1.47	(1.44, 1.51)
Schizophrenia	1.97	(1.90, 2.05)	1.97	(1.90, 2.05)

Note. HCRV - Health Care for Reentry Veterans; VJO - Veterans Justice Outreach.

[a]Indication of homelessness or receipt of homelessness prevention services

[b]Documentation of suicide attempt captured by SPAN or ICD codes in electronic health records

TABLE 5

Adjusted Hazard Ratios for Suicide Mortality Among Veteran VHA Patients, by Any Encounter with HCRV or VJO

	HCRV		VJO	
	HR	(95% CI)	HR	(95% CI)
Encounter with HCRV	1.15	(0.69, 1.91)		
Encounter with VJO			1.25	(1.02, 1.53)
Sex				
Female	ref		ref	
Male	2.61	(2.31, 2.94)	2.60	(2.31, 2.93)
Age Group				
18-34	ref		ref	
35-54	0.78	(0.72, 0.85)	0.78	(0.72, 0.85)
55-74	0.66	(0.61, 0.72)	0.67	(0.62, 0.72)
75-115	1.10	(1.00, 1.21)	1.11	(1.01, 1.21)
Race/Ethnicity				
White	ref		ref	
Black	0.26	(0.23, 0.29)	0.26	(0.23, 0.29)
Hispanic	0.50	(0.42, 0.58)	0.50	(0.42, 0.58)

Other	0.66	(0.60, 0.72)	0.66	(0.60, 0.72)
Unknown	1.03	(0.90, 1.19)	1.03	(0.90, 1.19)
Marital Status				
Married	ref		ref	
Divorced/Separated/Widowed	1.63	(1.55, 1.72)	1.63	(1.55, 1.72)
Never married/Single	1.49	(1.39, 1.59)	1.49	(1.39, 1.59)
Unknown	1.12	(0.94, 1.32)	1.12	(0.94, 1.32)
Region				
Northeast	ref		ref	
Midwest	1.12	(1.03, 1.22)	1.12	(1.03, 1.22)
South	1.42	(1.32, 1.54)	1.42	(1.32, 1.54)
West	1.63	(1.51, 1.77)	1.63	(1.51, 1.77)
Homelessness[a]	0.92	(0.83, 1.02)	0.90	(0.82, 1.00)
Any Service-Connected Disability	0.77	(0.73, 0.81)	0.77	(0.73, 0.81)
Suicide Attempt in 2012[b]	3.00	(2.57, 3.50)	2.98	(2.55, 3.48)
Mental Health Diagnoses in 2012				
Any Substance Use Disorder	1.63	(1.53, 1.75)	1.63	(1.52, 1.74)
Anxiety	1.36	(1.28, 1.46)	1.36	(1.28, 1.46)
Bipolar disorder	1.97	(1.80, 2.17)	1.97	(1.79, 2.16)
Depression	1.73	(1.63, 1.83)	1.73	(1.63, 1.83)
PTSD	1.13	(1.06, 1.22)	1.13	(1.06, 1.21)
Schizophrenia	1.65	(1.44, 1.87)	1.64	(1.43, 1.87)

Note. HCRV - Health Care for Reentry Veterans; VJO - Veterans Justice Outreach.

[a]Indication of homelessness or receipt of homelessness prevention services

[b]Documentation of suicide attempt captured by SPAN or ICD codes in electronic health records