

Mortality Among Individuals Released from U.S. Prisons: Does Military History Matter?

Authors

Susan McNeeley, Ph.D.

Minnesota Department of Corrections, Senior Research Analyst

Email: susan.mcneeley@state.mn.us

Mark Morgan, Ph.D.

University of Dayton

Email: mmorgan2@udayton.edu

Matthew W. Logan, Ph.D.

Texas State University

Email: mwl39@txstate.edu

Andrea Hazelwood, M.S.

Pennsylvania State University

Email: avh6066@psu.edu

Valerie Clark, Ph.D.

Minnesota Department of Corrections, Research Supervisor

Email: valerie.clark@state.mn.us



1450 Energy Park Drive, Suite 200

St. Paul, Minnesota 55108-5219

651/361-7200

TTY 800/627-3529

<https://mn.gov/doc>

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Research Summary

The physiological effects of imprisonment are well-documented and include a heightened risk for various forms of mortality post-release. The incarceration-mortality nexus does not apply equally to all groups, however, and research shows that some demographics (i.e., vulnerable populations) confer a greater likelihood of death. In the current study, we analyze correctional data over a 10-year period (2010-2019; n = 36,716) from Minnesota to assess the extent to which formerly incarcerated military veterans differ from non-veterans in their relative risk of mortality, net of relevant control variables. We also examine whether specific risk factors for post-release mortality differ between these groups. Findings indicate that veteran status is not a significant predictor of all-cause, natural, or unnatural mortality among released offenders, though several notable within-group differences were observed. Policy implications of the current study are discussed in relation to the provision of veteran-centric healthcare services and directions for future research are given.

Introduction

The physiological effects of incarceration on individuals are lasting and pervasive (Massoglia, 2008; Schnittker & John, 2007; Wakefield & Uggen, 2010). These may include acute and chronic stressors, exposure to infectious diseases or other contagions, and post-release reintegration challenges that can negatively impact both mental and physical health (Massoglia & Remster, 2019). An outcome of increasing concern among scholars and practitioners is mortality (Barry et al., 2018; Binswanger et al., 2007). Studies comparing previously incarcerated to non-incarcerated individuals show that the former group confers greater relative risk of premature death of any kind—potentially reducing life expectancy by several years, depending on the length of incarceration (Daza et al., 2020; Massoglia & Pridemore, 2015; Norris et al., 2022; Patterson, 2013). Research also suggests the likelihood of early mortality among the formerly incarcerated is not uniform; rather, vulnerable populations tend to exhibit higher levels of risk (Bovell-Ammon et al., 2021; Kouyomdjian et al., 2017; Massoglia et al., 2014; McNeeley et al., 2023). One demographic that has received limited empirical attention is military veterans. This is an important oversight for at least three reasons.

First, although past research indicates veterans have historically evinced lower all-cause mortality rates when compared to the general population—a phenomenon known as the “healthy soldier effect” (McLaughlin et al., 2008)—recent findings suggest this effect is eroding among U.S. veterans who served in Iraq and Afghanistan (Bollinger et al., 2015). Specifically, these veterans display a significantly higher risk of suicide and rising rates of other external or unnatural causes of death such as accidents (e.g., drug overdoses) and homicides (Kang et al., 2015; Lin et al., 2019; Reger et al., 2018). While the relationship between veteran status and mortality is nuanced, predictors of increasing concern include the greater prevalence of mental health

problems, substance use disorders, and service-connected disabilities among current and former service members (Jobson & Gentry, 2021; Maynard et al., 2018; Trivedi et al., 2020). For example, the lifetime prevalence of post-traumatic stress disorder (PTSD) among U.S. military veterans ranges between 10% and 30%, compared to approximately 7% among American adults overall (Gradus, 2021). Justice-involved veterans with a probable PTSD diagnosis have also been shown to score higher on measures of “criminogenic needs” (i.e., risks) like antisocial thinking, associations with criminal peers, drug problems, and social or marital dysfunction (Blonigen et al., 2023). Similarly, a recent review of the military-crime nexus literature suggests that substance abuse is among the most pressing of criminogenic risk factors facing veterans (Edwards et al., 2023). Therefore, it is possible that the lingering effects of incarceration are especially pronounced among justice-involved veterans who are already coping with these (and other) comorbid afflictions.

Second and relatedly, a substantial number of veterans are returned from U.S. prisons and jails to the community every year. Some estimates suggest that upwards of 90,000 veterans make this transition from jails annually (Schaffer, 2016). Within prisons, nationwide figures from 2012 reported that veterans account for 8.4% of all inmates—approximately 131,500 individuals—while composing just under 9% of the total U.S. population (Bronson et al., 2015). Notably, although the number of imprisoned veterans has nearly doubled over the last few decades, the actual proportion of veterans behind bars has declined considerably from its previously recorded high of 23.8% in 1978. The most recent national survey of incarcerated male combat veterans taken in 2016 found that, among those in state prisons, 41% had served in Vietnam, 19% in the Persian Gulf War, 28% in Iraq, 16% in Afghanistan, and 36% in “other” peacekeeping military

operations (Maruschak et al., 2021).¹ To this end, research indicates that veterans are especially vulnerable to experiencing adverse outcomes upon release from prison, which represent collateral consequences or barriers that might independently correlate with premature mortality (Fahmy & Wallace, 2018; Pajak, 2020; Wortzel et al., 2009). For instance, they are overrepresented in violent sexual offending, which creates subsequent challenges for the U.S. Department of Veterans Affairs (VA) that is often tasked with securing accommodations for veterans upon reentry. Federal regulations currently prohibit the issuance of housing vouchers to sexual offenders subject to lifetime registration, which may exacerbate homelessness among veterans (Finlay et al., 2019; Tsai & Rosenheck, 2015). By the same token, many formerly incarcerated veterans have been non-honorably discharged and, as such, are generally ineligible for healthcare or other VA benefits, which could increase the prospect of premature death (Highfill-McRoy et al., 2010; Metraux et al., 2017; Moulta-Ali & Panangala, 2015). According to Maruschak et al. (2021), an estimated 74.2% of veterans in state prisons received an honorable (58.9%) or general under honorable conditions discharge (15.3%) while 18.6% received a general (2.4%), other than honorable (10%), or bad conduct/dishonorable discharge (6.2%)—with the remaining 7.2% categorized as “other” (e.g., medical, psychological, or unspecified). This is a particularly salient concern given the increasing amount of post-9/11 service men and women suffering from a litany of service-connected disabilities (Vespa, 2020).

Third, there is considerable debate within the scientific literature regarding the robustness of military service—that is, the “veteran effect”—as either a protective or risk factor for criminal justice involvement and adjacent outcomes (Baktir et al., 2020; Edwards et al., 2023; White et al., 2012). Empirical observations across domains vary with some research finding that veteran status

¹ Percentages do not add to 100% because veterans could report serving in more than one conflict.

confers an advantage relative to non-veterans (Bouffard, 2003; Brooke & Gau, 2018); some showing that they fare considerably worse (Drapela et al., 2019; Wright et al., 2005); and still other studies indicating that veterans are not necessarily different from other groups with respect to system contact and subsequent adjustment (Lucas et al., 2022; Logan et al., 2023; Stacer & Solinas-Saunders, 2015). Among veterans, disentangling the military-crime link remains a challenging issue as cohort era, race, sex, social class, and service history have all been identified as potential determinants (Bouffard, 2005; Snowden et al., 2017; Teachman & Tedrow, 2016). While serving in the military has generally been seen as a beneficial “turning point” in the life-course for the majority of service members (Elder et al., 1991; Orak & Welker, 2021), just the opposite has been found for Vietnam veterans and especially for those veterans who have experienced combat or developed PTSD—as they are significantly more likely to experience unnatural death (e.g., suicides) and greater all-cause mortality due to poor health (Boscarino, 2006; MacLean & Elder, 2007).

Those suggesting that veteran status is a potential asset often underscore the importance of their sociodemographic profiles; namely, that veterans tend to be, on average, older, better educated, are more likely to have been employed, and possess less extensive criminal histories which correlates with prosocial prison adjustment compared to other inmates (Logan & Pare, 2017; Noonan & Mumola, 2007). Beyond this, numerous government initiatives have been devised to provide social support and a myriad of legal or programmatic services specifically to justice-involved veterans (Rosenthal & Finlay, 2022). This logic comports with the notion of “special resiliency”—a term used to describe offender groups who, by virtue of their individual characteristics and prior experiences, have an easier time coping while in custody (Benson & Cullen, 1988; Long et al., 2021). Scholars in this area also point to the fact that prisons are highly

regimented organizations whose day-to-day operations, routines, and structure somewhat parallel those of the military (Stacer & Solinas-Saunders, 2018). Thus, former service members familiar with hierarchical systems and imbued with discipline through their training (or the broader military culture) may more readily adapt to the prison lifestyle (May et al., 2017; Soeters et al., 2006).

On the other hand, studies viewing veteran status as a liability point to the social determinants of health (Duan-Porter et al., 2018) and the prevalence of various afflictions including substance abuse, homelessness, exposure to trauma, and mental health disorders within the veteran population—all of which can be exacerbated by criminal justice contact, especially imprisonment (Hoggatt et al., 2017; Kachadourian et al., 2023; Tsai et al., 2014). Indeed, according to recent findings, incarcerated veterans are significantly more likely to exhibit serious mental illnesses compared to non-veteran offenders and over one in four had experienced homelessness in the year before their arrest (Elbogen et al., 2023). Compounding this issue is the interaction between these aforementioned problems and veteran-specific concerns like traumatic brain injury that may increase suicide risk (Wilks et al., 2019; Wortzel et al., 2009). This perspective is congruent with the notion of “special sensitivity,” which assumes that the social histories of some individuals make the prison experience and, by extension, the reentry process exceptionally difficult (Logan et al., 2021). Accordingly, based on our research question and review of the literature, we formed the following hypotheses:

H1: Veterans will significantly differ in their likelihood of post-release mortality.

H1a: Post-release mortality will occur significantly *later* for veterans relative to non-veterans (i.e., the special resiliency hypothesis).

H1b: Post-release mortality will occur significantly *earlier* for veterans relative to non-veterans (i.e., the special sensitivity hypothesis).

Methods

The goal of this study is to determine the degree to which formerly incarcerated military veterans are at risk of mortality after release from prison. We specifically examine whether formerly incarcerated veterans and non-veterans differ in their relative risk of mortality, net of relevant control variables. This is especially important because, to our knowledge, only one such study exists. Wortzel and colleagues (2012) compared mortality rates and the relative risk of death between formerly incarcerated veterans and non-veterans released by the Washington State Department of Corrections over a five-year period (1999-2003). Although the crude mortality rate was significantly higher among veterans, differences were rendered null upon adjusting for factors including age, sex, time in prison, and time since release.

While the study by Wortzel and colleagues (2012) represents a key contribution to the literature, the relationship between veteran status and post-release mortality that was observed has yet to be empirically validated over time and across contexts—a fundamental aspect of scientific replication (Pridemore et al., 2018). Similarly, the composition of returned veterans, their demographic characteristics (e.g., age, sex, race), and the degree of community support offered to them likely varies between states or geographic areas of the country. Furthermore, examining differences in mortality risk between veterans and non-veterans may further facilitate the design and implementation of equitable prevention strategies in reentry and is consistent with the promotion of best practices in establishing “what works” to enhance public safety and improve the lives of vulnerable populations (Latessa et al., 2020). This study also extends the work of Wortzel and colleagues (2012) by controlling for a host of relevant institutional covariates and by examining whether within-group risk factors for post-release mortality differ between formerly incarcerated veterans and non-veterans. Doing so should provide insights into how prior military

experience shapes health outcomes during reentry.

Data

This study examines a sample of 36,716 adults released from Minnesota state prisons between 2010 and 2019. When individuals were released multiple times during that period, only their final release from prison was included. Individuals were removed from the sample if they were released to another state, released with a hold from another agency, released on conditional medical release, or died in prison. The sample was obtained from administrative records collected by the Minnesota Department of Corrections (MnDOC).

Measures

Dependent variables. Death data through January 2020 were obtained from the Minnesota Department of Health. All-cause mortality measures whether an individual died following their release from prison, regardless of manner or cause of death (coded as 1) or survived until the end of the follow-up period (coded as 0). Natural deaths indicate whether the individual died of natural causes (coded as 1) or survived until the end of the follow-up period (coded as 0), with unnatural or undetermined causes of death excluded from the analyses. Unnatural deaths (see Graham, 2003) indicate whether the individual died of homicide, suicide, or accident (coded as 1) or survived until the end of the follow-up period (coded as 0), with natural or undetermined causes of death excluded.

Independent variables. All independent variables were taken from the Corrections Operations Management System (COMS) operated by the Minnesota Department of Corrections. Veteran status was a binary variable indicating whether the individual self-reported having served in the military. Control variables included the following: gender (female = 1, male = 0); education (high school diploma or GED = 1, less than high school = 0); security threat group (STG) affiliation

(1 = any known affiliation, 0 = no known affiliation); admission type (1 = new commitment, 0 = release return); in-prison programming (1 = participated in educational or vocational programming or chemical dependency, sex offender, or cognitive-behavioral treatment, 0 = no program participation); race, which was measured in three categories including non-Hispanic White (reference group), Native American, or another minority group; and offense type, which consisted of a series of binary variables indicating whether the individual was incarcerated for a sexual offense, non-sexual violent offense, or another type of offense.

Continuous variables were included to measure age in years at the time of release, the number of mental health diagnoses noted in COMS, the number of physical illnesses or disabilities recorded in COMS, body mass index (BMI), the number of prior prison admissions, the length of incarceration in months, the number of discipline convictions, the average number of visits received per month, and the number of days spent in solitary confinement. We also included aspects of release from prison: geographic location after release (1 = released to the seven-county Twin Cities metropolitan area, 0 = released to Greater Minnesota); release year, which ranged from 2010 to 2019; and release type, which includes standard supervision (reference group), released to a community program such as work release or the Challenge Incarceration Program (CIP; see Duwe & Kerschner, 2008), intensive supervised release (ISR; see Duwe & McNeeley, 2021), or discharged with no supervision.

Statistical Analysis

The study employed Cox regression, which uses both “status” and “time” variables to estimate the association between the independent variables and the risk of post-release mortality. The “status” variable measures whether the individual died after release from prison, while the “time” variable measures the number of days between release from prison and the date of death

or, for survivors, either the date of reincarceration or the end of the follow-up period. We estimated separate Cox regression models for veterans and non-veterans and used the equality of coefficients test (Paternoster et al., 1998) to determine whether coefficient differences were statistically significant. Missing data were handled using listwise deletion.²

Results

Descriptive and Bivariate Results

Descriptive statistics are presented in Table 1. A majority of the sample (86%) was male. About half (54%) were non-Hispanic White, 28% were Black, 10% were Native American, 6% were Hispanic or Latino, and 2% were Asian. The average age was about 36 years old; the age range was 16 to 90 years.³ Approximately one-quarter (28%) were incarcerated for non-sexual violent offenses, 8% for sexual offenses, and 64% for other offense types. The individuals in the sample were incarcerated for an average of about 16 months; length of incarceration ranged from less than one month to 494 months (about 41 years). Approximately 5% of the sample were military veterans.

Table 1 also shows differences between veterans and non-veterans for all study variables. Several disparities were observed. For example, a smaller proportion of veterans were female, non-White, affiliated with STGs, had less than a high school education, were incarcerated for sexual offenses, or were released to Greater Minnesota. Veterans had greater numbers of mental and physical health concerns, were older, had higher BMIs, had been incarcerated longer, and received fewer visits. These demographic characteristics largely mirror those found in other national samples of veteran inmates (Brooke & Gau, 2018; Maruschak et al., 2021).

² Twelve individuals were missing data on BMI.

³ Four individuals in the sample were under the age of 18 when released.

Table 1. Descriptive Statistics

	Full Sample			Veterans			Non-Veterans			<i>t</i>
	<i>Mean</i>	<i>SD</i>	<i>Min-Max</i>	<i>Mean</i>	<i>SD</i>	<i>Min-Max</i>	<i>Mean</i>	<i>SD</i>	<i>Min-Max</i>	
Dependent Variables										
All-cause mortality	0.04	0.20	0-1	0.08	0.27	0-1	0.04	0.19	0-1	6.31***
Natural death	0.02	0.12	0-1	0.05	0.22	0-1	0.01	0.12	0-1	7.02***
Unnatural death	0.02	0.15	0-1	0.03	0.16	0-1	0.02	0.15	0-1	0.78
Independent Variables										
Veteran	0.05	0.21	0-1	---	---	---	---	---	---	---
Female	0.14	0.35	0-1	0.02	0.15	0-1	0.15	0.35	0-1	-30.45***
White (reference group)	0.54	0.50	0-1	0.72	0.45	0-1	0.54	0.50	0-1	16.07***
Native American	0.10	0.30	0-1	0.06	0.23	0-1	0.10	0.30	0-1	-7.26***
Other minority	0.36	0.48	0-1	0.23	0.42	0-1	0.37	0.48	0-1	-13.13***
Age at release	36.22	10.62	16-90	47.65	12.39	19-90	35.66	10.20	16-88	39.61***
Security threat group affiliation	0.18	0.385	0-1	0.09	0.280	0-1	0.19	0.389	0-1	-14.213***
High school diploma or GED	0.74	0.44	0-1	0.89	0.31	0-1	0.73	0.44	0-1	20.53***
Number of mental health concerns	0.48	0.90	0-10	0.65	1.00	0-6	0.47	0.89	0-10	7.06***
Number of physical health concerns	0.40	0.76	0-8	0.69	1.01	0-8	0.39	0.74	0-7	11.99***
Health services encounters per month	2.83	3.61	0-152	2.91	2.75	0-37.33	2.83	3.65	0-152	0.90
BMI	28.27	5.37	13.95-59	28.68	5.08	18.31-59	28.25	5.38	13.95-59	3.40**
Violent offense	0.28	0.45	0-1	0.29	0.46	0-1	0.28	0.45	0-1	1.57
Sexual offense	0.08	0.28	0-1	0.20	0.40	0-1	0.08	0.27	0-1	12.35***
Other offense type (reference group)	0.64	0.48	0-1	0.51	0.50	0-1	0.65	0.48	0-1	-11.19***
Prior prison admissions	1.67	2.46	0-27	1.80	2.66	0-20	1.66	2.46	0-27	2.34*
New commitment	0.68	0.47	0-1	0.65	0.48	0-1	0.68	0.47	0-1	-2.76**
Length of stay in months	15.50	27.78	0-494	26.05	47.86	0-464	14.98	26.33	0-494	9.66***
Number of discipline convictions	2.60	8.23	0-278	2.33	9.39	0-237	2.61	8.16	0-278	-1.24
Visits per month	0.93	2.43	0-46.43	0.76	2.15	0-28	0.94	2.45	0-46.43	-3.28**
Any program participation	0.64	0.48	0-1	0.67	0.47	0-1	0.64	0.48	0-1	2.61**
Days in segregation	19.28	111.64	0-6639	19.31	145.41	0-3884	19.28	109.70	0-6639	0.01
Released to Twin Cities metropolitan area	0.45	0.50	0-1	0.40	0.49	0-1	0.45	0.50	0-1	-4.03***
Program release	0.14	0.35	0-1	0.12	0.33	0-1	0.14	0.35	0-1	-2.27*
ISR	0.12	0.32	0-1	0.17	0.38	0-1	0.12	0.32	0-1	6.22***
Discharge	0.15	0.36	0-1	0.14	0.35	0-1	0.15	0.36	0-1	-0.61
Standard supervision (reference group)	0.59	0.49	0-1	0.56	0.50	0-1	0.59	0.49	0-1	-2.76***
Release year	2015.20	2.89	2010-2019	2014.47	3.07	2010-2019	2015.24	2.88	2010-2019	-10.18***

***p < .001, **p < .01, *p < .05, †p < .10

Consistent with past research (Wortzel et al., 2012), veterans had significantly higher rates of all-cause mortality; 8% of veterans died during the follow-up period, compared with 4% of non-veterans. Veterans were also more likely to die of natural causes (5% of veterans compared to 1% of non-veterans). However, rates of death by unnatural causes (e.g., homicide, suicide, or accidents) did not differ based on past military service.

Multivariate Results

Table 2 presents the results of Cox regression models predicting post-release mortality. Most importantly, and consistent with the findings of Wortzel et al. (2012), veteran status was not significantly related to all-cause mortality, nor was it associated with the risk of either natural or unnatural death upon statistically adjusting for relevant covariates. However, a number of control variables were significantly associated with mortality. Native Americans had a higher risk of mortality than Whites, while other minority groups had a lower risk of mortality compared to Whites. Age was associated with a higher risk of all-cause mortality and natural death. Those with known STG affiliations had a higher risk of all-cause mortality and unnatural deaths. The number of mental health concerns increased the risk for all-cause mortality and unnatural deaths, while the number of physical health concerns was associated with higher mortality risk in all three models. Individuals who received more healthcare while incarcerated had a higher risk of all-cause mortality and natural death. BMI was related to higher mortality risk, especially by natural causes. Those incarcerated for sexual offenses had a lower mortality risk than those incarcerated for non-violent, non-sexual offenses. Mortality risk was also positively associated with prior prison stays but negatively associated with visits from friends and family and days spent in segregation. Those released to the Twin Cities metropolitan area had a higher risk of all-cause and unnatural deaths, while those released to community programs had a lower risk of all-cause and natural death.

Table 2. Cox Regression Models Predicting Post-Release Mortality, By Cause of Death

	<i>All Causes</i>	<i>Natural Causes</i>	<i>Unnatural Causes</i>
Veteran	1.106 (0.096)	0.980 (0.125)	1.022 (0.163)
Female	0.945 (0.083)	1.284 (0.131)†	0.821 (0.110)†
Native American	1.471 (0.081)***	1.430 (0.135)****	1.451 (0.105)***
Other minority	0.612 (0.068)***	0.623 (0.113)***	0.576 (0.090)***
Age at release	1.040 (0.003)***	1.103 (0.004)***	0.998 (0.004)
STG	1.212 (0.076)*	0.774 (0.156)	1.375 (0.093)**
High school diploma or GED at release	0.996 (0.063)	0.905 (0.099)	1.146 (0.086)
Number of mental health concerns	1.056 (0.027)*	1.025 (0.042)	1.125 (0.036)**
Number of physical health concerns	1.272 (0.027)***	1.442 (0.036)***	1.108 (0.043)*
Health services encounters per month	1.013 (0.004)**	1.011 (0.004)*	1.008 (0.009)
BMI	1.015 (0.005)**	1.028 (0.007)***	1.011 (0.006)†
Violent offense	0.959 (0.063)	0.903 (0.107)	1.020 (0.080)
Sexual offense	0.444 (0.126)***	0.520 (0.169)***	0.331 (0.207)***
Prior prison admissions	1.018 (0.011)	1.042 (0.017)*	1.043 (0.015)**
New commitment	0.777 (0.071)***	0.770 (0.111)*	0.787 (0.095)*
Length of stay in months	0.997 (0.001)*	0.995 (0.002)**	0.998 (0.002)
Number of discipline convictions	1.014 (0.003)***	1.014 (0.007)*	1.014 (0.004)**
Visits per month	0.965 (0.014)*	0.932 (0.030)*	0.970 (0.017)†
Any program participation	1.028 (0.064)	1.162 (0.103)	0.992 (0.085)
Days in segregation	0.999 (0.000)*	1.000 (0.001)	0.999 (0.000)
Released to Twin Cities metropolitan area	1.224 (0.057)***	1.068 (0.093)	1.369 (0.075)***
Program release	0.592 (0.101)***	0.615 (0.171)**	0.633 (0.129)***
ISR	0.975 (0.091)	1.025 (0.139)	0.784 (0.129)†
Discharge	0.919 (0.084)	0.910 (0.135)	0.889 (0.110)
Release year	0.988 (0.012)	0.965 (0.021)†	0.994 (0.015)
N	36,704	35,812	36,094

Hazard ratios are presented with standard errors in parentheses. ***p < .001, **p < .01, *p < .05, †p < .10

Table 3 presents Cox regression models predicting all-cause mortality separately for veterans and non-veterans. Among veterans, the risk of death was 67% lower among those released to community programs. The risk of death among veterans increased by 5.5% for each year older, 18.6% for each additional mental health diagnosis, and 24.7% for each additional physical health diagnosis. Among non-veterans, the risk of death was 51.4% higher for Native Americans but 39.8% lower for other minorities, 21.9% higher among those affiliated with STGs, 24.9% higher for those released to the Twin Cities metropolitan area, 59% lower among those incarcerated for sexual offenses, 26% lower among those incarcerated for new offenses (compared to release returns), and 37.9% lower for those released to community programs. The risk of death among

non-veterans increased by 3.9% for each year older, 28.8% for each additional physical health diagnosis, 1.3% for each average health service visit per month, 1.4% for each point on the BMI, and 1.8% for each additional discipline conviction, while it decreased by 3.2% for each average visit from friends or family per month and by 0.1% for each additional day spent in segregation.

Table 3. Cox Regression Models Predicting All-Cause Mortality, By Veteran Status

	Veteran	Non-Veteran	z
Female	1.161 (0.736)	0.942 (0.084)	0.28
Native American	0.723 (0.397)	1.514 (0.083)***	-1.82†
Other minority	0.677 (0.242)	0.602 (0.072)***	0.47
Age at release	1.055 (0.009)***	1.039 (0.003)***	1.69†
STG	0.826 (0.385)	1.219 (0.078)*	-0.99
High school diploma or GED at release	1.470 (0.276)	0.970 (0.065)	1.47
Number of mental health concerns	1.186 (0.078)*	1.040 (0.029)	1.57
Number of physical health concerns	1.247 (0.073)**	1.288 (0.029)***	-0.41
Health services encounters per month	1.019 (0.032)	1.013 (0.004)**	0.19
BMI	1.024 (0.016)	1.014 (0.005)**	0.54
Violent offense	0.908 (0.211)	0.959 (0.066)	-0.25
Sexual offense	0.594 (0.295)†	0.410 (0.143)***	1.13
Prior prison admissions	1.039 (0.039)	1.018 (0.012)	0.49
New commitment	1.210 (0.229)	0.740 (0.074)***	2.04*
Length of stay in months	0.994 (0.004)†	0.998 (0.001)	-0.97
Number of discipline convictions	0.977 (0.031)	1.018 (0.004)***	-1.31
Visits per month	0.870 (0.085)	0.968 (0.014)*	-1.24
Any program participation	0.886 (0.216)	1.034 (0.068)	-0.68
Days in segregation	1.000 (0.002)	0.999 (0.000)*	0.50
Released to Twin Cities metropolitan area	1.041 (0.193)	1.249 (0.060)***	-0.91
Program release	0.328 (0.474)*	0.621 (0.104)***	-1.32
ISR	1.050 (0.247)	0.954 (0.098)	0.36
Discharge	0.754 (0.289)	0.929 (0.088)	-0.69
Release year	0.938 (0.044)	0.991 (0.013)	-1.20
N	1,728	34,976	

Hazard ratios are presented with standard errors in parentheses. ***p < .001, **p < .01, *p < .05, †p < .10

The z-scores revealed three notable differences in coefficients between veterans and non-veterans. First, the relationship between admission type and all-cause mortality was only observed among non-veterans. Second, higher mortality risk among Native American releasees did not appear to be a factor for veterans as it was for non-veterans. Third, older age appeared to be more strongly associated with mortality among veterans than among non-veterans.

Discussion

The effects of imprisonment on reentry are insidious and varied, yet they do not exert an equal effect across all demographics. Identifying who is most affected by incarceration is of critical importance (McNeeley et al., 2023), especially as it pertains to the provision and delivery of care and the subsequent removal of barriers for those returning to the community (i.e., “collateral consequences;” see Kirk & Wakefield, 2018). We replicated the results of Wortzel and colleagues (2012) and found that military veterans leaving prison faced significantly higher rates of mortality before adjusting for relevant covariates. However, when model specification was improved by accounting for the sociodemographic and legal histories of returnees, we found that veterans showed no greater or less risk of mortality compared to non-veterans.

These null findings have implications for policy regarding justice-involved veterans. Most importantly, they comport with recent large-scale reviews of the military-crime nexus and the presence of a “veteran effect,” which is based on the notion that established differences in the sociodemographic and legal histories between veterans and non-veterans necessarily correspond with an array of criminal justice outcomes (Baktir et al., 2020; Edwards et al., 2023; Logan et al., 2023; Lucas et al., 2022). The consensus of these studies is that little discernable evidence exists—one way or the other—to suggest that veterans are unique, particularly among those who are incarcerated (Logan et al., 2021; Morgan et al., 2019). As such, our results should serve as a caution to policymakers who may infer that military veterans are inherently and unequivocally different from non-veterans in terms of criminogenic risk—an assumption that has contributed to the proliferation and rapid adoption of veteran-centric criminal justice policy, including veterans treatment courts, veterans mental evaluation teams, and veterans wings in prisons and jails (Albertson et al., 2017; Baldwin & Brooke, 2019; Burke et al., 2019; Douds et al., 2021;

Villanueva & Sherin, 2019). Accordingly, further research is warranted to identify specific domains, especially those upstream of the prison system and during the transition back to civilian life, where early intervention for veterans could yield more promising results (Metraux et al., 2017; Morgan et al., 2023a; Timko et al., 2014).

Irrespective of the similarities between groups across our outcomes of interest, it is still important to focus on the incarceration-mortality nexus *among* military veterans. Our within-group analyses extended the work of Wortzel et al. (2012) and revealed that some risk factors for post-release mortality were not uniform when considering military history. First, while older age was associated with post-release mortality among both groups, this relationship was significantly stronger among veterans. Second, mental health appeared to be more predictive of death among veterans than non-veterans. Taken together, these findings likely comport with the challenges veterans already face in the general population and the increasing number of those seeking VA assistance (Bond et al., 2022). Surveys and interviews of veterans, for example, continue to highlight their concerns over accessing care, managing substance abuse issues, reintegrating back into society, and obtaining employment (Brown, 2011; Derefinko et al., 2018). Notably, a recent study of aging veterans over 55 found that one in ten will develop exacerbated PTSD symptoms approximately three decades after experiencing their worst traumatic event (Mota et al., 2016). In addition, economic research has reported that older-adult households with a disabled veteran are at a greater risk of medical hardships, financial difficulties, and food insufficiency (Wilmouth et al., 2015).

Third, several studies have shown that post-release mortality is lower among Black, Hispanic, and Asian individuals (Binswanger et al., 2007, 2011, 2013; Pizzicato et al., 2018; Rosen et al., 2008; Spaulding et al., 2011; Testa et al., 2018), but higher among Native Americans

compared to their White counterparts (Binswanger et al., 2011; McNeeley et al., 2023). However, these racial differences in post-release mortality were not observed among our subsample of veterans. Finally, the finding regarding admission type suggests that those who returned to prison after being unsuccessful during a previous reentry attempt have a higher risk of death when subsequently released. Yet that relationship was not observed among veterans. While speculative, these results may speak to the homogenizing effect of military culture, physical (and behavioral) recruitment standards during enlistment, or equity in access to VA services for traditionally underserved groups (Bachman et al., 2000; Harada et al., 2005; Soeters et al., 2006).

Notwithstanding its contribution, our study is subject to some of the limitations previously acknowledged by Wortzel et al. (2012). For instance, we were unable to measure specific aspects of military history that may be relevant for understanding mortality risk. As others have noted, military veterans are not a monolithic group and vary substantially across several service-specific domains (Baktir et al., 2020). Thousands of soldiers are deployed overseas but many never serve in a warzone or experience combat, while others will return from their tours of duty having sustained physical and emotional harm (Booth-Kewley et al., 2010; MacLean & Elder, 2007; see also Morgan et al., 2023b). To this end, former service members differ considerably in their level of service-connectedness regarding injury or traumatic experiences (Maynard et al., 2018). Consequently, the degree to which they receive benefits from the VA is key to contextualizing future discussions of the incarceration-mortality nexus among military veterans. Similarly, other veteran-specific measures like branch of service, occupational specialty, cohort era, discharge type, and length of military tenure are also worthy of exploration (Reger et al., 2015).

This point was further emphasized by Wortzel and colleagues (2012) who, in addition to their main analyses, found that the receipt of VA benefits was associated with a reduced risk of

all-cause mortality as well as medical deaths. They noted that, while veteran status itself may not be a risk factor for premature mortality, multimorbid service-related afflictions could potentially interact with the typical hazards associated with being released from prison, thus placing veterans at greater risk relative to non-veterans. Unfortunately, we could not account for the degree of service-connectedness in disability statuses or access to specific VA programs, such as Veterans Justice Outreach (VJO) or Health Care for Reentry Veterans (HCRV), in the current study (Blue-Howells et al., 2013). In particular, research indicates that contact with these programs is associated with *elevated* rates of suicide and external-cause mortality among veterans, presumably reflecting the high-risk nature of the justice-involved veteran population or other adverse consequences (Palframan et al., 2020). The importance of future research controlling for service-connected disability is illustrated by the recent work of Tsai and colleagues (2021), who found that homelessness and the use of emergency department services are increasing among veterans for a variety of reasons. This is possibly the result of the VA successfully contacting veterans through outreach efforts and cataloguing them in their system. Moreover, it also points to the utility of targeted reintegration programs focused on housing and healthcare among those who qualify—and expanding access to those who do not.

Finally, our data are derived from a single state, and the prison system in Minnesota might not be representative of other regions where the demographics of military veterans, the incarcerated population, correctional budgets, and access to VA services vary. Relatedly, although we excluded individuals from the sample if they were released to another state or agency, we could only match death records with those available to the Minnesota Department of Health, which means some individuals may have moved and later died out of state but were not accurately recorded as deceased. Our results should also be contextualized according to the time period of the

study. Wortzel and colleagues' (2012) analyses were based on individuals released between 1999 and 2003, which naturally would have resulted in a low representation of post-9/11 veterans. To this end, our analyses were based on more recent releases between 2010 and 2019. However, it is possible that military veterans today have different rates of death and criminal justice involvement than several years ago, especially in the aftermath of a global pandemic that disproportionately affected elderly and otherwise medically vulnerable populations. Continued assessment of military veterans by cohort and release date is therefore necessary.

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