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Non-Fatal Suicidal Behaviors in the Administrative Records of Activated U.S. Army National Guard and Army Reserve Soldiers, 2004–2009

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Abstract

Objective: The U.S. Army suicide rate increased sharply during the wars in Iraq and Afghanistan. There is limited information about medically documented, non-fatal suicidal behaviors among soldiers in the Army's Reserve Component (RC), which is composed of the Army National Guard and Army Reserve. Here we examine trends and socio-demographic correlates of suicide attempts, suspicious injuries, and suicide ideation among activated RC soldiers.

Methods: Data come from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS) Historical Administrative Data Study (HADS), which integrates administrative records for all soldiers on active duty during the years 2004–2009 ($n=1.66$ million).

Results: We identified 2,937 unique RC soldiers on active duty with a non-fatal suicidal event documented at some point during the HADS study period. There were increases in the annual incidence rates of suicide attempts (71–204/100,000 person-years) and suicide ideation (326–425/100,000 person-years). Incidence rates for suspicious injuries also generally increased but were more variable. Using hierarchical classification rules, we identify the first instance of each soldier's most severe behavior (suicide attempt vs. suspicious injury vs. suicide ideation). For each of those suicide- or injury-related outcomes, we found increased risk among those who were female, younger, Non-Hispanic White, less educated, never married, and lower-ranking enlisted.

These socio-demographic associations significantly differed across outcomes, although the patterns were similar.

Conclusion: Results provide a broad overview of non-fatal suicidal trends in the RC during 2004–2009 and demonstrate that integration of multiple administrative data systems enriches analysis of the predictors of such events.

The suicide rate in the U.S. Army increased sharply during the wars in Iraq and Afghanistan (Black, Gallaway, Bell, & Ritchie, 2011; Schoenbaum et al., 2014). Much of the research on suicide-related outcomes, including ideation, attempts, and deaths, has focused on the Army's Active Component (AC) (Gilman et al., 2014; Ursano, Kessler, Stein, et al., 2015; Ursano, Kessler, Stein, et al., 2017). Less is known about suicidal behaviors within the Reserve Component (RC), which consists of the Army National Guard and Army Reserve. Addressing this gap is crucial for understanding and preventing suicidal behaviors across the total Army population, as research conducted with the AC may not be applicable to the RC due to differences in socio-demographic and service characteristics, self-reported mental health outcomes (e.g., stress, anxiety, and depression), and risk for suicide ideation and attempt (Lane, Hourani, Bray, & Williams, 2012; Millner et al., in press; Rosellini et al., 2015; Ursano, Heeringa, et al., 2015).

While soldiers in the AC function as the Army's primary fighting force, are on call 24 hours a day, and receive full-time military pay (Office of the Assistant Secretary of Defense for Readiness and Force Management, 2016), the RC currently represents about 53% of the total Army population (Department of Defense, 2017) and is composed predominantly of part-time "citizen-soldiers" who are often pursuing a civilian career or college education. The RC is designed to augment the full-time soldiers of the AC as needed (e.g., at times of war and during combat operations). While the U.S. President controls the AC and Army Reserve, the Army National Guard units are assigned to, and primarily controlled by, the state governors (Title 32 of the U.S. Code). National Guard units exist in all 50 states, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam. They often assist their state during emergencies (e.g., as first responders during storms, floods, fires, and other disasters), but can also become federalized into active duty by the President if a national emergency is declared (Title 10 of the U.S. Code). Importantly, federalized National Guard troops can also be incorporated into the regular Army and deployed to military operations overseas. The Army Reserve is primarily composed of support units that provide engineering, logistics, information, medical, and civil affairs capabilities. The Reserve does not have combat units of its own, unlike the National Guard.

The RC's size, roles, and responsibilities in local and global operations have increased over the past decade. By 2010, nearly half a million RC soldiers had deployed in support of Operation Enduring Freedom and Operation Iraqi Freedom (Bonds, Baiocchi, & McDonald, 2010). As of December 2012, approximately half of all RC soldiers had deployed at least once, compared to 71% of AC soldiers (O'Connell, Wenger, & Hansen, 2014). When not deployed, typical RC soldiers participate in military training approximately 39 days per year (one weekend a month, plus an annual two-week training activity; 10 USC Ch. 1601). Although RC soldiers undergo extensive booster training before deploying, those who report

feeling less prepared for deployment are at higher risk of new-onset posttraumatic stress disorder (PTSD) following combat deployment (Polusny et al., 2011). If called to active duty, RC soldiers function as AC soldiers do: they are part of a larger force whose mission is federally defined and serve whenever and wherever needed. However, compared to the AC, RC soldiers are more likely to deploy as individual augmentees, in support of a unit other than their regular unit, putting them at higher risk for mental health problems regardless of level of deployment preparedness (Ursano et al., in press). Once in combat, soldiers in the RC report similar levels of combat-related stressors as those in the AC (Milliken, Auchterlonie, & Hoge, 2007). However, there are substantial differences between the AC and RC after combat deployments end. Deactivated RC soldiers return to their communities and civilian jobs, which can result in post-deployment stressors that are unique to the RC, including difficulties with civilian employers and job loss (Riviere, Kendall-Robbins, McGurk, Castro, & Hoge, 2011). Within months after returning from deployment, these stressors may contribute to the higher rates of mental health referral and self-reported PTSD, depression, and interpersonal conflict compared to the AC (Milliken et al., 2007; Thomas et al., 2010).

In addition to the potential for combat deployments, RC soldiers are also required to participate in peacekeeping operations, large-scale domestic disturbances and emergencies such as hurricanes and wildfires, and border protection. Humanitarian operations often require National Guard forces to assume critical roles in security, infrastructure protection, and search and rescue. Following the 9/11 terrorist attacks, RC soldiers were mobilized to provide security at airports, support critical infrastructure, and to fill the gap left by AC units that deployed to the Middle East (Kapp, 2005).

A number of studies have examined correlates of suicide death among RC soldiers (Griffith, 2012a, 2012c, 2017). Findings on non-fatal suicidal events, which are among the strongest predictors of dying by suicide (Joiner et al., 2005; but see also Franklin et al., 2017), are based largely on self-report data from RC survey research (e.g., Calabrese et al., 2011; Griffith, 2012b; Kline, Ciccone, Falca-Dodson, Black, & Losonczy, 2011). Little work has been done to understand risk for suicide ideation or attempt within the RC using important administrative data collected by the Army and Department of Defense (DoD).

Administrative records are a valuable source of information, allowing for examination of risk factors and outcomes using existing data that the Army routinely collects on all soldiers. Such data has been used to identify univariable (Ursano, Kessler, Heeringa, et al., 2015) and multivariable (Ursano, Kessler, Stein, et al., 2015; Ursano, Kessler, Stein, et al., 2017) predictors of suicide ideation and attempt among AC (Regular Army) soldiers, including being female, younger, Non-Hispanic White, and less educated.

Here we complement previous research on the AC by using administrative data from the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS; Ursano et al., 2014) to examine the incidence, time trends, and socio-demographic correlates of non-fatal suicidal events among all activated RC soldiers from 2004 through 2009. Army STARRS integrates various data sources to comprehensively capture medically documented, non-lethal suicidal events among RC soldiers activated during the study period. We first classify Army and DoD administrative records into distinct categories of non-fatal suicidal

outcomes (suicide attempts, suspicious injuries, and suicide ideation). We then examine temporal changes in the incidence rates of those events, as well as associations of socio-demographic risk factors with each outcome. To our knowledge, this is the most comprehensive accounting of documented non-fatal suicidal events in the activated RC population.

METHOD

Sample

The Army STARRS Historical Administrative Data Study (HADS) is an integrated data file that includes individual-level records from 38 Army and DoD administrative data systems for all soldiers on active duty between January 1, 2004 and December 31, 2009 ($n=1.66$ million) (Kessler et al., 2013). This includes 743,171 RC soldiers who were federally activated in support of Operations Enduring Freedom, Iraqi Freedom, and New Dawn for more than 30 days under Title 10, comprising 14.0 million person-months of active federal service. During this time of active service, 2,937 unique RC soldiers had a suicide attempt, suspicious injury, or suicide ideation. We selected an equal-probability sample of 69,867 control person-months from the Army, exclusive of individuals identified as cases (soldiers with a suicide attempt, suspicious injury, or suicide ideation) and any person-months during which a soldier died (suicides, combat deaths, homicides, and deaths due to other injuries or illnesses). To create the control sample, we selected every 200th person-month after stratifying the HADS records by number of months in service, deployment status (never, currently, and previously deployed), gender, and rank. This control sample was selected to reduce the computational intensity of statistical analyses (described below). The total analytic sample combined the person-months involving a non-fatal suicidal event with the control sample person-months (total $n=72,804$ person-months). Control sample person-months were each assigned a weight of 200 to adjust for under-sampling.

Measures

There is currently no centralized Army system for tracking suicidal behaviors that do not result in death, and records in one system do not automatically trigger records in another system. As a result, comprehensive efforts to identify documented non-fatal suicidal events require examination of multiple Army and DoD administrative data systems (Ursano, Kessler, Heeringa, et al., 2015). A more detailed discussion of the recent history of suicidal behavior surveillance in the Army is available elsewhere (Ursano, Kessler, Heeringa, et al., 2015). Here we summarize Army STARRS data sources and coding decisions, including the identification of nonfatal suicidal events using:

1. Records from the Department of Defense Suicide Event Report (DoDSER) (Gahm et al., 2012), a DoD-wide surveillance mechanism that aggregates information on suicidal behaviors (ideation, attempts, deaths) via a standardized form completed by medical providers at DoD treatment facilities. Implemented in 2008, the DoDSER replaced all previous suicidal event reporting systems, including its Army-specific predecessor, the Army Suicide Event Report (ASER) (Gahm, 2005). Importantly, DoDSER data in the Army STARRS HADS contains

records from all previous versions of the ASER (2004–2007). The ways in which suicidal events were recorded in this system underwent a series of revisions from the initial versions of the ASER in 2004 through the introduction of the DoDSER, necessitating a number of decisions regarding how events were categorized (described below).

2. *International Classification of Diseases, 9th Revision-Clinical Modification* (ICD-9-CM) and NATO Standardization Agreement 2050 (STANAG; Amoroso, Bell, Smith, Senier, & Pickett, 2000) diagnostic codes from the Military Health System Data Repository (MDR), Theater Medical Data Store (TMDS), and TRANSCOM (Transportation Command) Regulating and Command and Control Evacuating System (TRAC²ES), which together provide healthcare encounter information from military and civilian treatment facilities, combat operations, and aeromedical evacuations.

Categorization of Suicidal Events

DoDSER records, ICD-9-CM codes, and STANAG codes were organized into five categories of events:

(i) Definite Suicide Attempt.—This category includes DoDSER (and ASER) records indicating suicide attempt. From 2004 to 2006, medical providers completing the ASER identified whether the suicidal event resulted in (a) *completed suicide*, (b) *hospitalization*, (c) *evacuation*, or (d) *other* (Gahm, 2005; Gahm & Lucenko, 2006, 2007). There were no explicit options for indicating a non-lethal suicide attempt, suicide ideation, or any other non-fatal self-injurious behavior. Thus, if a 2004–2006 ASER record listed the type of event as *hospitalization*, *evacuation*, or *other*, and also indicated a method of injury, we categorized the event as a definite suicide attempt (those with a missing or unknown method were excluded from this category). A 2007 revision of the ASER changed the options for event type to (a) *completed suicide*, (b) *suicide attempt/gesture*, and (c) *suicidal ideation only (without an attempt or gesture)*. We included all 2007 ASER records coded as *suicide attempt/gesture* in our definite suicide attempt category. Beginning with the first DoDSER form in 2008, medical providers were required to identify the type of event as (a) *suicide*, (b) *suicide attempt (evidence of intent to die)*, (c) *self harm (without intent to die)*, or (d) *suicidal ideation only (without attempt/self harm)*. For 2008–2009 DoDSER records, we included those in which either *suicide attempt (evidence of intent to die)* or *self-harm (without intent to die)* was listed as the type of event. *Self-harm (without intent to die)* was included in the definite suicide attempt category because it was unclear how medical providers who filled out the DoDSER were making determinations about suicidal intent, and it has been recommended that self-injurious behaviors should only be considered nonsuicidal when there is absolutely no evidence of intent to die (Nock & Favazza, 2009). It also brings the 2008–2009 DoDSER data more in line with the 2004–2007 ASER, which did not require providers to make this distinction.

(ii) Probable Suicide Attempt.—This category includes ICD-9-CM E950-E958 codes for self-inflicted poisoning or injury with suicidal intent. We excluded E959 (late effects of a self-inflicted injury) because our focus was on acute injuries rather than encounters due to

previous self-inflicted injuries, and it has been suggested that use of the E959 code confounds the temporal relationships between the predictor variables and suicide attempt (Walkup, Townsend, Crystal, & Olfson, 2012). E95x codes have been used as indicators of suicide attempts in several previous studies (Farmer & Rohde, 1980; Lundin, Lundberg, Allebeck, & Hemmingsson, 2011; Shi, Thiebaud, & McCombs, 2004; van de Voorde, Hooft, & Mulkers, 1993; Walkup et al., 2012; Wojcik, Akhtar, & Hassell, 2009). Here we categorized E95x codes as *probable* suicide attempts because the procedures for assigning these codes are not as rigorous or time consuming as those for completing an ASER/DoDSER.

(iii) Suspicious Injury.—This category includes ICD-9-CM E980-E988 codes (in combination with a suspicious injury diagnosis) and STANAG codes. Our list of suspicious injuries was based on previous work identifying ICD-9-CM injury codes most frequently associated with suicide attempts (Patrick et al., 2010). We considered certain injuries (e.g., open wound to elbow, forearm, or wrist; poisoning by psychotropic agents) suspicious when they were accompanied by an E980-E988 code indicating the injury was potentially self-inflicted and the intent was undetermined. E98x codes have been used to indicate potential suicide attempts in several studies (Farmer & Rohde, 1980; Lundin et al., 2011). As with E959, the E989 code (late effects) was excluded (a full list of the included diagnostic codes is available from the authors upon request). STANAG codes for intentionally self-inflicted non-battle injuries were also included in this category because these codes do not indicate if there was suicidal intent. STANAG trauma codes are used by the military as an additional injury coding system for inpatient hospitalization encounters (Amoroso et al., 2000). Those that are intentionally self-inflicted have previously been used in studies of suicide and self-inflicted injuries in the U.S. military (Bell, Harford, Amoroso, Hollander, & Kay, 2010; Trofimovich, Skopp, Luxton, & Reger, 2012).

(iv) Definite Suicide Ideation.—This category includes 2007 ASER and 2008–2009 DoDSER records that specifically list *suicidal ideation* as the event type, as well as 2004–2006 ASER records that listed the type of event as *hospitalization*, *evacuation*, or *other*, but did not indicate a method of injury.

(v) Probable Suicide Ideation.—This category includes the ICD-9-CM V-code for suicide ideation (V62.84). Following its addition to the ICD-9-CM in October 2005, use of this code as a primary or secondary diagnosis in the U.S. military increased substantially (Armed Forces Health Surveillance Center, 2011). Due to inconsistent use of this V-code, these events were categorized as probable suicide ideation.

Socio-demographic Correlates of Suicidal Events

Socio-demographic variables (gender, current age, race, education, marital status, Army rank) were constructed from administrative records. To examine the socio-demographic correlates of the non-fatal event categories listed above, we identified one suicide-related event per soldier. If a soldier had records for multiple events, we selected the first most severe event using a hierarchical classification scheme with three components. First, we selected the most severe event(s). For example, if a soldier had one record indicating suicide

ideation and one record indicating suicide attempt, we included only the suicide attempt. Second, we selected the record(s) from the most substantiated source. For example, if a soldier had an E95x record and DoDSER record indicating a suicide attempt, we included only the DoDSER, as it requires a more thorough investigation and validation of the event. Third, we selected the event that occurred first. For example, if a soldier had two or more suicide attempts, we selected the earliest attempt.

Analysis—After identifying and categorizing records for each type of non-fatal outcome, annual incidence rates were calculated based on the ratio of the number of RC soldiers within each category per year divided by the number of person-*years*, not person-*months*, in the population for that particular year (i.e., soldiers per 100,000 person-years). Average annual incidence rates per 100,000 person-years were calculated within subgroups defined by socio-demographic predictors (gender, current age, race, education, marital status, rank) and each hierarchically classified outcome (the first most severe non-fatal event). Univariable logistic regression analyses were used to examine the associations of socio-demographic predictors with each outcome. To test whether associations with socio-demographic predictors differed across outcomes, separate logistic regression models were estimated, where the dependent variable was an aggregate of the outcome categories (i.e., any non-fatal event) and the independent variable was the interaction between one of the socio-demographic variables (e.g., gender) and each non-fatal event category (e.g., definite suicide attempt). In these analyses a significant interaction indicates that the socio-demographic variable is differentially associated with one or more of the outcomes.

Given evidence that suicidal events increased substantially over the study period (Black et al., 2011; Department of the Army, 2012; Schoenbaum et al., 2014; Ursano, Kessler, Heeringa, et al., 2015), all logistic regression equations included a separate dummy predictor variable for calendar month and year to control for secular trends. Estimated model coefficients and the confidence limits were exponentiated to obtain estimated odds-ratios (OR) and 95% confidence intervals (CI). Significance of predictors was evaluated using Wald χ^2 tests and statistical significance was determined based on .05-level two-sided tests.

RESULTS

From 2004 through 2009 there was documentation of 34–80 activated RC soldiers per year with a definite suicide attempt (15–44 per 100,000 person-years [PY]), 126–294 with a probable suicide attempt (56–160/100,000 PY), and 38–59 with a suspicious injury (18–32/100,000 PY). From 2007 through 2009, the only years for which both definite and probable suicide ideation data is available, there were 62–95 soldiers with definite suicide ideation (36–48/100,000 PY) and 502–770 with probable suicide ideation (291–379/100,000 PY) (Table 1). From 2004 to their peak in 2008, rates of definite and probable suicide attempts increased 189% and 186%, respectively. Rates of definite and probable suicide ideation each increased 30% from 2007 to 2009. Rates of suspicious injury trended slightly upward over time but were more variable from year to year compared to other outcomes.

Among soldiers with a DoDSER suicide attempt record, 32.4% also had an E95x code, and among those with an E95x code, 12.4% also had a DoDSER suicide attempt record. Among

soldiers with a DoDSER suicide ideation record, 28.4% also had a V62.84 code, but only 4.1% of those with a V62.84 code also had a DoDSER ideation record. Among 309 total soldiers with a STANAG code for intentionally self-inflicted injury, only 10 did not have a DoDSER, E95x, or E98x record, suggesting that sole use of these STANAG codes with activated RC soldiers is uncommon.

Socio-demographic Characteristics across Non-Fatal Suicidal Events

To examine socio-demographic correlates of each non-fatal outcome, we identified each soldier's first most severe event using the hierarchical classification scheme previously described. Among 2,937 unique RC soldiers with at least one non-fatal event during 2004–2009, this classification scheme resulted in a total of 336 definite suicide attempts, 767 probable suicide attempts, 230 suspicious injuries, 213 cases of definite suicide ideation, and 1,391 cases of probable suicide ideation (Table 2).

Table 3 displays the basic socio-demographic characteristics for each hierarchically classified event. As can be seen in Table 4, there is substantial variation in the distribution of risk (rate per 100,000 person-years) across socio-demographic subgroups and event categories. Univariable logistic regression analyses (controlling only for secular time) found that odds of any outcome are significantly higher among soldiers who are female, younger, less than high school educated (including GED and alternative education), never married, and lower ranking enlisted (particularly E1-E2) (Table 5).

We then examined whether associations with predictor variables differed across non-fatal event categories. Analyses revealed significant differences for gender (Wald $\chi^2_4=29.9$, $p<0.0001$), current age (Wald $\chi^2_8=39.5$, $p<0.0001$), marital status (Wald $\chi^2_8=35.6$, $p<0.0001$), and rank (Wald $\chi^2_{16}=66.7$, $p<0.0001$), indicating that odds ratios for these socio-demographic variables differed across outcomes. Associations did not differ for race (Wald $\chi^2_{16}=15.0$, $p=0.52$) or education (Wald $\chi^2_{12}=17.2$, $p=0.14$).

DISCUSSION

Annual incidence rates of suicide ideation and attempts among RC soldiers generally increased over the 2004–2009 study period, although the attempt rate fell in 2009. Annual rates of definite attempts were approximately 2–7 times higher than those of suicide deaths reported during the same period (Department of the Army, 2012). When probable suicide attempts are included, the attempt-to-death ratio for those years was in the range 11–24. These RC ratios are comparable to those reported for the AC during 2004–2009 (Ursano, Kessler, Heeringa, et al., 2015). They are also generally comparable to 2008 U.S. general population data on young adult males (age 18–25), for whom the crude rate of documented injuries from self-harm was approximately 11 times greater than the crude rate of suicide deaths (National Center for Injury Prevention and Control & Centers for Disease Control and Prevention). Compared to suicide ideation and attempts, the upward trend in suspicious injury rates was less consistent. Further examination of suspicious injuries in combination with mental health records may reveal whether these events are relevant to understanding non-fatal suicidal behavior or are truly distinct. Given that the ASER/DoDSER system was first implemented in 2004, part of the annual increase in definite attempts may be due to

lower compliance with reporting among providers during the early stages of this new system (Gahm, 2005). However, the increase in suicide fatalities over the same time period suggests that the upward trend in non-fatal events was not due only to systemic changes in awareness and documentation among health care providers, unit commanders, and peers (e.g., Armed Forces Health Surveillance Center, 2011).

The current study represents the most comprehensive accounting of documented non-fatal suicidal events among activated RC soldiers to date, complementing previously published data on the AC (Ursano, Kessler, Heeringa, et al., 2015). In addition to hospitalizations, the administrative records in the Army STARRS HADS capture *all* ambulatory visits for suicidal events among activated RC soldiers as long as those events were properly coded (Wilk et al., 2016). Nevertheless, the part-time nature of RC service presents challenges for mental health surveillance and research. Whereas a broad range of information on AC soldiers is routinely captured in Army/DoD administrative data systems, the records of RC soldiers are largely limited to periods in which they are activated, creating extended information gaps during periods of deactivation. However, it is during the periods of activation when RC soldiers experience many of the same service-related stressors as those in the AC (e.g., combat deployment, separation from family) and interact with the Army healthcare system. As such, the records of activated RC soldiers provide important insights into the health of this population.

Within each non-fatal event category, univariable analyses found higher odds of suicidal behavior among those who are female, younger (<21 years), less than high school educated, never married, and lower ranking enlisted (E1-E3). The associations of gender, current age, marital status, and rank statistically differed across the five outcomes. Additional research will be needed to determine if these differential associations are of clinical or practical significance. It will also be important for future RC research to consider additional administrative variables such as deployment status (never deployed, currently deployed, or previously deployed) time in service (e.g., first tour vs. second tour), military occupation (e.g., combat arms, combat medic), and history of mental health diagnosis, all of which have been important for understanding how risk for non-fatal suicidal events is concentrated among AC soldiers (Ursano, Kessler, Naifeh, Herberman Mash, Fullerton, Ng, et al., 2017; Ursano, Kessler, Stein, et al., 2015; Ursano et al., 2016; Ursano, Kessler, Stein, et al., 2017). Furthermore, survey research indicates that exposure to suicide is associated with increased risk of suicidal thoughts and behaviors among National Guard soldiers, particularly among those who were close to the decedent (Bryan, Cerel, & Bryan, 2017). Given evidence that previous suicide attempts within an AC Army unit increases subsequent risk of attempt among unit members (Ursano, Kessler, Naifeh, Herberman Mash, Fullerton, Bliese, et al., 2017), it will be important examine this question in the RC as well.

The univariable findings are very similar to what has been observed in the AC using administrative records (Ursano, Kessler, Heeringa, et al., 2015). The findings are also generally similar to risk factors for RC soldiers who die by suicide (Griffith, 2017), although suicide deaths in the RC are more likely among males, just as they are in the AC (Bachynski et al., 2012; Black et al., 2011; Gilman et al., 2014) and general population (Nock et al., 2008). Future Army STARRS studies will examine multivariable models to better

understand the direct and interactive effects of these socio-demographic variables and other potentially important characteristics (Nock et al., 2013). Researchers might also consider how the unique aspects of RC service impact suicide risk, such as stressors related to the activation and deactivation process (Stetz, Castro, & Bliese, 2007) and civilian employment stressors (Riviere et al., 2011). Finally, although a direct comparison between AC and RC was beyond the scope of the current report, it may be valuable to formally examine whether the patterns and predictors of non-fatal suicidal events differ for AC and RC soldiers.

Several limitations to the study are noteworthy. First, as noted above, these administrative data only capture nonfatal suicidal events that occurred while RC soldiers were activated. We are not able to determine how many RC soldiers received medical treatment for suicide attempts, suspicious injuries, or suicide ideation while deactivated, nor whether suicidal events that occur during deactivation have different socio-demographic correlates. Additionally, these data include only activated RC soldiers who came into contact with the military healthcare system and, therefore, do not capture suicidal events for which no medical treatment was necessary or sought, nor do they capture treatment at civilian medical facilities that was not paid for by the military. Most service members with a mental health disorder report that they are not receiving treatment (Colpe et al., 2015) and perceive significant barriers to mental health care (Hoge et al., 2004; Naifeh et al., 2016). This may include soldiers with suicide ideation (Warner et al., 2011) and those who choose not to seek medical treatment following a less severe suicide attempt. Second, due to variations in the nature and quality of the Army and DoD administrative data systems, we had to make decisions in categorizing non-fatal suicidal events. Although we sought to strike a reasonable balance between over- and under-inclusiveness, alternative categorizations could be justified. For example, 2008–2009 DoDSER events originally coded as *self-harm (without intent to die)* were categorized as definite suicide attempts due to uncertainty about the procedures and reliability of these coding decisions. This may have somewhat increased total suicide attempts (n=45). It is also possible that providers might have applied *ICD-9-CM* or STANAG diagnostic codes multiple times for a single event (i.e., during the initial encounter and any follow-up encounters). If these duplications spanned more than one year it would have inflated the annual count and incidence rate of that outcome to an unknown degree. On the other hand, our categorization of E95x codes as probable, rather than definite, suicide attempts may be overly conservative. Several civilian studies have relied on E95x codes as indicators of suicide attempt; however, questions regarding their validity remain (Walkup et al., 2012). There are similar considerations for our categorization of definite and probable suicide ideation. Third, the 2004–2009 study period encompasses the time during which the ASER/DoDSER systems were first being implemented, and therefore may not have captured all non-fatal suicidal events. Additionally, the ASER did not have specific coding options for suicide attempts and other non-fatal events until 2007. Fourth, as in all studies of medically documented suicide deaths and attempts, it is unclear the degree to which suicide attempts may have been misclassified (e.g., as accidents). There is evidence suggesting that misclassification of Army suicide deaths was uncommon during the wars in Iraq and Afghanistan (Cox et al., 2017), but we are not aware of comparable data on documented suicide attempts. Lastly, we combined data from the Army National Guard and Army Reserve, which is reasonable given that they are both part of the RC. However, these

groups are not identical in composition, structure, or function. Given that they differ on factors that correlate with suicide risk (i.e., National Guard soldiers more likely to be male, younger, and junior enlisted rank than Reserve soldiers) (Griffith & Vaitkus, 2013), it may be beneficial for future studies to consider these differences.

Within the context of these limitations, the current investigation provides important information on trends and socio-demographic correlates of non-fatal suicidal events among activated RC soldiers during the wars in Iraq and Afghanistan. The individual and organizational burden of suicidal events are substantial. Hospitalization, in particular, disrupts Army units and their mission, and soldiers hospitalized primarily for psychiatric problems are significantly more likely to be involuntarily separated from the Army than those hospitalized for other medical reasons (Hoge et al., 2005). In addition to the direct financial costs associated with non-fatal suicidal events (e.g., evacuation, hospitalization, treatment), there are also substantial indirect costs (Eibner, Ringel, Kilmer, Pacula, & Diaz, 2008), which may include lost work productivity, medical board evaluation, and administrative and/or legal actions.

Going forward, it will be important for studies to identify effective points of intervention among RC soldiers. For example, research on the AC has demonstrated that risk of suicide attempt is highest in the initial months after entering service (Ursano, Kessler, Stein, et al., 2015) and at particular points in time depending on deployment status (Ursano et al., 2016). These times of peak risk may also vary across military occupations (Ursano, Kessler, Naifeh, Herberman Mash, Fullerton, Ng, et al., 2017), which carry different demands and stressors during training and deployment. In addition, a study of DoDSER suicide attempt records found evidence of prior inpatient mental health care in 24% of cases and prior outpatient mental health care in 60% of cases (Bush et al., 2013), suggesting that mental health care providers often have opportunities for intervention prior to a suicide attempt. Improving documentation of suicide risk assessments could help facilitate this (Ribeiro et al., 2017). Importantly, the majority of service members treated for self-inflicted injuries or poisonings do visit primary care in the month preceding the event (Trofimovich et al., 2012), providing a potential point of intervention outside the mental health care system. Army collaborative care programs, which are aimed at making primary care a more effective and efficient access point to mental health treatment for problems such as PTSD and depression (Engel et al., 2014; Engel et al., 2016; Engel et al., 2008), will hopefully improve the detection and management of suicidality as well.

Conclusion

The current study provides the most comprehensive picture to date of non-fatal suicidal events among activated Army National Guard and Army Reserve soldiers during the wars in Iraq and Afghanistan. It is clear that improvements in surveillance, research, and prevention will require integration and examination of multiple Army/DoD data systems. Ultimately, new interventions, such as peer-to-peer support programs (Greden et al., 2010), may need to be developed to address the unique needs of the RC's "citizen-soldiers" in order to reduce suicide risk and other adverse mental health outcomes. The next phase of Army STARRS (called STARR-LS for "longitudinal study"; www.starrs-ls.org) will continue to work toward

improved understanding of suicide risk within the RC population by integrating new administrative data from 2010–2015.

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Table 1.

Annual Number of Soldiers and Incidence Rates Within Nonfatal Event Categories Among Activated Reserve Component Soldiers in the Army STARRS 2004–2009 Historical Administrative Data Study (HADS).^a

I. Annual Number of Soldiers by Event Category^b							
Soldiers Within Category Per Year (N)							
Event Category	2004	2005	2006	2007	2008	2009	
Suicide Attempt	160	213	241	294	374	282	
Definite	34	52	71	56	80	60	
Probable	126	161	170	238	294	222	
Suspicious Injury	46	38	50	42	58	59	
Suicide Ideation^c	–	33	379	564	693	865	
Definite	–	–	–	62	88	95	
Probable	–	–	–	502	605	770	

II. Annual Incidence Rate per 100,000 Person-Years by Event Category^d							
Incidence Rate Within Category Per Year							
Event Category	2004	2005	2006	2007	2008	2009	Average Annual Rate
Suicide Attempt	71.1	101.5	141.6	170.2	203.8	138.7	134.3
Definite	15.1	24.8	41.7	32.4	43.6	29.5	30.3
Probable	56.0	76.7	99.9	137.8	160.2	109.2	104.0
Suspicious Injury	20.4	18.1	29.4	24.3	31.6	29.0	25.2
Suicide Ideation^e	–	–	222.7	326.4	377.6	425.4	379.2
Definite	–	–	–	35.9	48.0	46.7	43.8
Probable	–	–	–	290.5	329.7	378.7	335.4

^aThe sample of 72,804 person-months includes all 2,937 Army National Guard and Army Reserve soldiers with a suicide attempt, suspicious injury, or suicide ideation in the administrative records during the years 2004–2009 plus a 1:200 stratified probability sample of all other activated Army National Guard and Army Reserve person-months in the population exclusive of cases (i.e., soldiers with a suicide attempt, suspicious injury, or suicide ideation) and person-months associated with death (i.e., suicides, combat deaths, homicides, and deaths due to other injuries or illnesses). All records in the 1:200 sample were assigned a weight of 200 to adjust for undersampling.

^bSoldiers are unique within each cell (event category by year), but may appear in more than one category and in more than one year within the same category.

^cSome values for definite and probable suicide ideation were omitted due to small Ns. Suicide ideation was not officially introduced in the ASER/DoDSER until 2007 and the V62.84 code was not introduced until late 2005.

^dAnnual incidence rates were calculated based on n_1/n_2 , where n_1 is the unique number of soldiers within each category in each year (see part I above) and n_2 is the annual number of person-years, not person-months, in the population (2004 = 225,032 person-years; 2005 = 209,803; 2006 = 170,190; 2007 = 172,799; 2008 = 183,526; 2009 = 203,346).

^eRates of definite and probable suicide ideation were not calculated for 2004–2006 due to small Ns in some cells. Average annual rates for definite and probable suicide ideation were calculated using the annual rates from 2007–2009.

Table 2.

Hierarchical Classification of First Most Severe Event Among Activated Reserve Component Soldiers in the Army STARRS 2004–2009 Historical Administrative Data Study (HADS).^a

Hierarchical Classification	Unique Soldiers Per Year (N)						Total Unique Soldiers ^c (N)
	2004	2005	2006	2007	2008	2009	
Suicide Attempt	134	174	174	188	235	198	1,103
Definite	34	52	67	53	71	59	336
Probable	100	122	107	135	164	139	767
Suspicious Injury	43	33	43	30	39	42	230
Suicide Ideation^b	–	25	258	372	433	515	1,604
Definite	–	–	–	53	71	85	213
Probable	–	–	–	319	362	430	1,391
Total^c	178	232	475	590	707	755	2,937

^aThe sample of 72,804 person-months includes all 2,937 Army National Guard and Army Reserve soldiers with a suicide attempt, suspicious injury, or suicide ideation in the administrative records during the years 2004–2009 plus a 1:200 stratified probability sample of all other active-duty Army National Guard and Army Reserve person-months in the population exclusive of cases (i.e., soldiers with a suicide attempt, suspicious injury, or suicide ideation) and person-months associated with death (i.e., suicides, combat deaths, homicides, and deaths due to other injuries or illnesses). All records in the 1:200 sample were assigned a weight of 200 to adjust for undersampling.

^bSome values for definite and probable suicide ideation were omitted due to small Ns. Suicide ideation was not officially introduced in the ASER/DoDSER until 2007 and the V62.84 code was not introduced until late 2005.

^cSome totals are larger than the sum of their respective row or column because values were omitted due to small Ns in some cells.

Table 3.

Sociodemographic Characteristics by Hierarchical Classification of First Most Severe Event Among Activated Reserve Component Soldiers in the Army STARRS 2004–2009 Historical Administrative Data Study (HADS).^a

Demographics	Suicide Attempt				Suspicious Injury		Suicide Ideation ^b				Total Sample ^c	
	Definite		Probable		N	(%)	Definite		Probable		N	(%)
	N	(%)	N	(%)			N	(%)	N	(%)		
Gender												
Male	227	(67.6)	516	(67.3)	167	(72.6)	142	(66.7)	1,068	(76.8)	11,812	(84.5)
Female	109	(32.4)	251	(32.7)	63	(27.4)	71	(33.3)	323	(23.2)	2,165	(15.5)
Current Age												
< 21	122	(36.3)	232	(30.3)	87	(37.8)	72	(33.8)	359	(25.8)	1,806	(12.9)
21–24	58	(17.3)	171	(22.3)	41	(17.8)	48	(22.5)	251	(18.0)	2,235	(16.0)
25+	156	(46.4)	364	(47.5)	102	(44.4)	93	(43.7)	781	(56.2)	9,935	(71.1)
Race												
White	246	(73.2)	544	(70.9)	163	(70.9)	150	(70.4)	973	(70.0)	9,644	(69.0)
Black	48	(14.3)	120	(15.6)	39	(17.0)	34	(16.0)	230	(16.5)	2,348	(16.8)
Hispanic	30	(8.9)	72	(9.4)	13	(5.7)	20	(9.4)	119	(8.6)	1,265	(9.1)
Asian ^d	–	–	–	–	–	–	–	–	–	–	476	(3.4)
Other ^d	–	–	–	–	–	–	–	–	–	–	242	(1.7)
Education												
< High School ^e	89	(26.5)	187	(24.4)	68	(29.6)	46	(21.6)	313	(22.5)	1,843	(13.2)
High School	194	(57.7)	494	(64.4)	140	(60.9)	142	(66.7)	879	(63.2)	8,065	(57.7)
Some College	16	(4.8)	26	(3.4)	8	(3.5)	5	(2.4)	60	(4.3)	750	(5.4)
College	37	(11.0)	60	(7.8)	14	(6.1)	20	(9.4)	139	(10.0)	3,319	(23.8)
Marital Status												
Never	192	(57.1)	444	(57.9)	156	(67.8)	127	(59.6)	705	(50.7)	6,398	(45.8)
Previous	7	(2.1)	35	(4.6)	9	(3.9)	5	(2.4)	65	(4.7)	667	(4.8)
Current	137	(40.8)	288	(37.6)	65	(28.3)	81	(38.0)	621	(44.6)	6,912	(49.5)
Rank												
E1–E2	117	(34.8)	248	(32.3)	76	(33.0)	76	(35.7)	358	(25.7)	1,416	(10.1)

Demographics	Suicide Attempt				Suspicious Injury		Suicide Ideation ^b				Total Sample ^c	
	Definite		Probable		N	(%)	Definite		Probable		N	(%)
	N	(%)	N	(%)			N	(%)	N	(%)		
E3	45	(13.4)	112	(14.6)	32	(13.9)	34	(16.0)	187	(13.4)	1,043	(7.5)
E4	78	(23.2)	198	(25.8)	56	(24.4)	50	(23.5)	295	(21.2)	2,857	(20.4)
E5–E8	71	(21.1)	187	(24.4)	57	(24.8)	45	(21.1)	483	(34.7)	6,466	(46.3)
Officer/WO	25	(7.5)	22	(2.9)	9	(3.9)	8	(3.8)	68	(4.9)	2,195	(15.7)

^aThe sample of 72,804 person-months includes all 2,937 Army National Guard and Army Reserve soldiers with a suicide attempt, suspicious injury, or suicide ideation in the administrative records during the years 2004–2009 plus a 1:200 stratified probability sample of all other active-duty Army National Guard and Army Reserve person-months in the population exclusive of cases (i.e., soldiers with a suicide attempt, suspicious injury, or suicide ideation) and person-months associated with death (i.e., suicides, combat deaths, homicides, and deaths due to other injuries or illnesses). All records in the 1:200 sample were assigned a weight of 200 to adjust for undersampling.

^bSuicide ideation was not introduced in the ASER/DoDSER until 2007 and the V62.84 code was not introduced until late 2005.

^cIncludes cases and weighted control person-months. Total N = weighted person-months in thousands in the population.

^dValues omitted due to small Ns in some cells.

^eIncludes General Educational Development credential, home study diploma, occupational program certificate, correspondence school diploma, high school certificate of attendance, adult education diploma, and other nontraditional high school credentials.

WO = warrant officer

Table 4.

Distribution of Risk by Sociodemographic Characteristics and Hierarchical Classification of First Most Severe Event Among Activated Reserve Component Soldiers in the Army STARRS 2004–2009 Historical Administrative Data Study (HADS).^a

Demographics	Suicide Attempt				Suspicious Injury		Suicide Ideation ^b			
	Definite		Probable		Rate ^c	(n ₁ /n ₂) ^d	Definite		Probable	
	Rate ^c	(n ₁ /n ₂) ^d	Rate ^c	(n ₁ /n ₂) ^d			Rate ^c	(n ₁ /n ₂) ^d	Rate ^c	(n ₁ /n ₂) ^d
Gender										
Male	23.1	(227/984)	52.4	(516/984)	17.0	(167/984)	14.4	(142/984)	108.5	(1,068/984)
Female	60.4	(109/180)	139.2	(251/180)	34.9	(63/180)	39.4	(71/180)	179.1	(323/180)
Current Age										
< 21	81.1	(122/151)	154.2	(232/151)	57.8	(87/151)	47.8	(72/151)	238.5	(359/151)
21–24	31.2	(58/186)	91.8	(171/186)	22.0	(41/186)	25.8	(48/186)	134.8	(251/186)
25+	18.8	(156/828)	44.0	(364/828)	12.3	(102/828)	11.2	(93/828)	94.3	(781/828)
Race										
White	30.6	(246/804)	67.7	(544/804)	20.3	(163/804)	18.7	(150/804)	121.1	(973/804)
Black	24.5	(48/196)	61.3	(120/196)	19.9	(39/196)	17.4	(34/196)	117.5	(230/196)
Hispanic	28.5	(30/105)	68.3	(72/105)	12.3	(13/105)	19.0	(20/105)	112.9	(119/105)
Asian ^e	17.6	–	30.2	–	25.2	–	20.2	–	100.7	(40/40)
Other ^e	24.8	–	94.3	–	24.8	–	–	–	143.9	(29/20)
Education										
< High School ^f	58.0	(89/154)	121.8	(187/154)	44.3	(68/154)	30.0	(46/154)	203.9	(313/154)
High School	28.9	(194/672)	73.5	(494/672)	20.8	(140/672)	21.1	(142/672)	130.8	(879/672)
Some College	25.6	(16/62)	41.6	(26/62)	12.8	(8/62)	8.0	(5/62)	96.0	(60/62)
College	13.4	(37/277)	21.7	(60/277)	5.1	(14/277)	7.2	(20/277)	50.3	(139/277)
Marital Status										
Never	36.0	(192/533)	83.3	(444/533)	29.3	(156/533)	23.8	(127/533)	132.2	(705/533)
Previous	12.6	(7/56)	63.0	(35/56)	16.2	(9/56)	9.0	(5/56)	117.0	(65/56)
Current	23.8	(137/576)	50.0	(288/576)	11.3	(65/576)	14.1	(81/576)	107.8	(621/576)
Rank										
E1–E2	99.2	(117/118)	210.3	(248/118)	64.4	(76/118)	64.4	(76/118)	303.5	(358/118)
E3	51.8	(45/87)	128.9	(112/87)	36.8	(32/87)	39.1	(34/87)	215.2	(187/87)
E4	32.8	(78/238)	83.2	(198/238)	23.5	(56/238)	21.0	(50/238)	123.9	(295/238)
E5–E8	13.2	(71/539)	34.7	(187/539)	10.6	(57/539)	8.4	(45/539)	89.6	(483/539)
Officer/WO	13.7	(25/183)	12.0	(22/183)	4.9	(9/183)	4.4	(8/183)	37.2	(68/183)
All Soldiers										
	28.8	(336/1,165)	65.8	(767/1,165)	19.7	(230/1,165)	18.3	(213/1,165)	119.4	(1,391/1,165)
	94.7 (1,103/1,165)				137.8 (1,605/1,165)					

^aThe sample of 72,804 person-months includes all 2,937 Army National Guard and Army Reserve soldiers with a suicide attempt, suspicious injury, or suicide ideation in the administrative records during the years 2004–2009 plus a 1:200 stratified probability sample of all other active-duty Army National Guard and Army Reserve person-months in the population exclusive of cases (i.e., soldiers with a suicide attempt, suspicious injury, or suicide ideation) and person-months associated with death (i.e., suicides, combat deaths, homicides, and deaths due to other injuries or illnesses). All records in the 1:200 sample were assigned a weight of 200 to adjust for undersampling.

^bSuicide ideation was not introduced in the ASER/DoDSER until 2007 and the V62.84 code was not introduced until late 2005.

^cRate per 100,000 person-years.

^d n_1 = the number of soldiers with a suicide attempt, suspicious injury, or suicide ideation; n_2 = the number of person-years, not person-months, in thousands in the population.

^eValues omitted due to small Ns in some cells.

^fIncludes General Educational Development credential, home study diploma, occupational program certificate, correspondence school diploma, high school certificate of attendance, adult education diploma, and other nontraditional high school credentials.

WO = warrant officer

Table 5.

Univariate Associations Between Sociodemographic Characteristics and Hierarchical Classification of First Most Severe Event Among Activated Reserve Component Soldiers in the Army STARRS 2004–2009

Historical Administrative Data Study (HADS).^{a,b}

Demographics	Suicide Attempt				Suspicious Injury		Suicide Ideation ^c			
	Definite		Probable		OR	(95% CI)	Definite		Probable	
	OR	(95% CI)	OR	(95% CI)			OR	(95% CI)	OR	(95% CI)
Gender										
Male	1.0	–	1.0	–	1.0	–	1.0	–	1.0	–
Female	2.6 [*]	(2.1–3.3)	2.6 [*]	(2.3–3.1)	2.0 [*]	(1.5–2.7)	2.6 [*]	(2.0–3.5)	1.6 [*]	(1.4–1.8)
χ^2_1	67.6 [*]		159.0 [*]		23.5 [*]		44.3 [*]		54.1 [*]	
Current Age										
< 21	2.5 [*]	(1.8–3.5)	1.6 [*]	(1.3–2.0)	2.6 [*]	(1.8–3.8)	1.7 [*]	(1.1–2.4)	1.6 [*]	(1.4–1.9)
21–24	1.0	–	1.0	–	1.0	–	1.0	–	1.0	–
25+	0.6 [*]	(0.4, 0.8)	0.5 [*]	(0.4–0.6)	0.6 [*]	(0.4–0.8)	0.4 [*]	(0.3–0.6)	0.7 [*]	(0.6–0.8)
χ^2_2	142.7 [*]		230.1 [*]		113.4 [*]		80.6 [*]		198.0 [*]	
Race ^d										
White	1.0	–	1.0	–	1.0	–	1.0	–	1.0	–
Black	0.8	(0.6–1.1)	0.9	(0.7–1.1)	1.0	(0.7–1.4)	0.9	(0.7–1.4)	1.0	(0.9–1.1)
Hispanic	0.9	(0.6–1.3)	1.0	(0.8–1.3)	0.6	(0.3–1.1)	1.0	(0.6–1.6)	0.9	(0.7–1.1)
Asian	0.6	(0.3–1.2)	0.4 [*]	(0.2–0.8)	1.2	(0.6–2.3)	1.1	(0.5–2.2)	0.8	(0.6–1.1)
Other	0.8	(0.3–1.9)	1.4	(0.9–2.2)	1.2	(0.5–3.0)	–	–	1.1	(0.8–1.7)
χ^2_4	4.0		10.7 [*]		3.8		1.9		3.3	
Education										
< High School ^e	1.0	–	1.0	–	1.0	–	1.0	–	1.0	–
High School	0.5 [*]	(0.4–0.7)	0.6 [*]	(0.5–0.7)	0.5 [*]	(0.3–0.6)	0.8	(0.5–1.1)	0.7 [*]	(0.6–0.8)
Some College	0.5 [*]	(0.3–0.8)	0.3 [*]	(0.2–0.5)	0.3 [*]	(0.1–0.6)	0.3 [*]	(0.1–0.8)	0.5 [*]	(0.4–0.7)
College	0.2 [*]	(0.2–0.3)	0.2 [*]	(0.1–0.2)	0.1 [*]	(0.1–0.2)	0.3 [*]	(0.2–0.4)	0.3 [*]	(0.2–0.3)
χ^2_3	59.7 [*]		142.9 [*]		65.7 [*]		30.0 [*]		178.2 [*]	
Marital Status										
Never	1.5 [*]	(1.2–1.9)	1.7 [*]	(1.4–2.0)	2.6 [*]	(1.9–3.5)	1.7 [*]	(1.3–2.3)	1.3 [*]	(1.1–1.4)
Previous	0.5	(0.2–1.1)	1.2	(0.9–1.8)	1.4	(0.7–2.9)	0.6	(0.2–1.4)	1.0	(0.8–1.3)
Current	1.0	–	1.0	–	1.0	–	1.0	–	1.0	–
χ^2_2	19.7 [*]		47.5 [*]		42.3 [*]		18.6 [*]		18.1 [*]	
Rank										
E1–E2	2.8 [*]	(2.1–3.7)	2.4 [*]	(2.0–2.9)	2.7 [*]	(1.9–3.9)	2.3 [*]	(1.6–3.3)	1.9 [*]	(1.6–2.2)
E3	1.5 [*]	(1.0–2.2)	1.5 [*]	(1.2–1.9)	1.6 [*]	(1.0–2.4)	1.5	(0.9–2.3)	1.4 [*]	(1.2–1.7)
E4	1.0	–	1.0	–	1.0	–	1.0	–	1.0	–

Demographics	Suicide Attempt				Suspicious Injury		Suicide Ideation ^c			
	Definite		Probable				Definite		Probable	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
E5–E8	0.4 *	(0.3–0.5)	0.4 *	(0.3–0.5)	0.4 *	(0.3–0.6)	0.4 *	(0.2–0.5)	0.6 *	(0.6–0.7)
Officer/WO	0.4 *	(0.3–0.6)	0.1 *	(0.1–0.2)	0.2 *	(0.1–0.4)	0.2 *	(0.1–0.4)	0.3 *	(0.2–0.3)
χ^2_4	208.3 *		438.8 *		137.3 *		129.1 *		399.6 *	

^aThe sample of 72,804 person-months includes all 2,937 Army National Guard and Army Reserve soldiers with a suicide attempt, suspicious injury, or suicide ideation in the administrative records during the years 2004–2009 plus a 1:200 stratified probability sample of all other active-duty Army National Guard and Army Reserve person-months in the population exclusive of cases (i.e., soldiers with a suicide attempt, suspicious injury, or suicide ideation) and person-months associated with death (i.e., suicides, combat deaths, homicides, and deaths due to other injuries or illnesses). All records in the 1:200 sample were assigned a weight of 200 to adjust for undersampling.

^bAnalyses included a dummy predictor variable for calendar month and year to control for secular trends.

^cSuicide ideation was not introduced in the ASER/DoDSER until 2007 and the V62.84 code was not introduced until late 2005.

^dOdds ratios for categories with $n < 5$ were excluded.

^eIncludes General Educational Development credential, home study diploma, occupational program certificate, correspondence school diploma, high school certificate of attendance, adult education diploma, and other nontraditional high school credentials.

WO = warrant officer

* $p < 0.05$.