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Risk Factors, Methods, and Timing of Suicide Attempts Among US Army Soldiers

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Abstract

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IMPORTANCE—Suicide attempts in the US Army have risen in the past decade. Understanding the association between suicide attempts and deployment, as well as method and timing of suicide attempts, can assist in developing interventions.

OBJECTIVE—To examine suicide attempt risk factors, methods, and timing among soldiers currently deployed, previously deployed, and never deployed at the time this study was conducted.

DESIGN, SETTING, AND PARTICIPANTS—This longitudinal, retrospective cohort study of Regular Army–enlisted soldiers on active duty from 2004 through 2009 used individual-level person-month records to examine risk factors (sociodemographic, service related, and mental health), method, and time of suicide attempt by deployment status (never, currently, and previously deployed). Administrative data for the month before each of 9650 incident suicide attempts and an equal-probability sample of 153 528 control person-months for other soldiers were analyzed using a discrete-time survival framework.

MAIN OUTCOMES AND MEASURES—Suicide attempts and career, mental health, and demographic predictors were obtained from administrative and medical records.

RESULTS—Of the 9650 enlisted soldiers who attempted suicide, 86.3% were male, 68.4% were younger than 30 years, 59.8% were non-Hispanic white, 76.5%were high school educated, and 54.7% were currently married. The 40.4% of enlisted soldiers who had never been deployed (n = 12 421 294 person-months) accounted for 61.1% of enlisted soldiers who attempted suicide (n = 5894 cases). Risk among those never deployed was highest in the second month of service (103 per 100 000 person-months). Risk among soldiers on their first deployment was highest in the sixth month of deployment (25 per 100 000 person-months). For those previously deployed, risk was highest at 5 months after return (40 per 100 000 person-months). Currently and previously deployed soldiers were more likely to attempt suicide with a firearm than those never deployed (currently deployed: OR, 4.0; 95% CI, 2.9–5.6; previously deployed: OR, 2.7; 95% CI, 1.8–3.9). Across deployment status, suicide attempts were more likely among soldiers who were women (currently deployed: OR, 3.4; 95% CI, 3.0–4.0; previously deployed: OR, 1.5; 95% CI, 1.4–1.7; and never deployed: OR, 2.4; 95% CI, 2.3–2.6), in their first 2 years of service (currently deployed: OR, 1.9; 95% CI, 1.5–2.3; previously deployed: OR, 2.2; 95% CI, 1.9–2.7; and never deployed: OR, 3.1; 95% CI, 2.7–3.6), and had a recently received a mental health diagnosis in the previous month (currently deployed: OR, 29.8; 95% CI, 25.0–35.5; previously deployed: OR, 22.2; 95% CI, 20.1–24.4; and never deployed: OR, 15.0; 95% CI, 14.2–16.0). Among soldiers with 1 previous deployment, odds of a suicide attempt were higher for those who screened positive for depression or posttraumatic stress disorder after return from deployment and particularly at follow-up screening, about 4 to 6 months after deployment (depression: OR, 1.4; 95% CI, 1.1–1.9; posttraumatic stress disorder: OR, 2.4; 95% CI, 2.1–2.8).

CONCLUSIONS AND RELEVANCE—Identifying the timing and risk factors for suicide attempt in soldiers requires consideration of environmental context, individual characteristics, and mental health. These factors can inform prevention efforts.

Suicide attempts (SAs), similar to suicides, have increased in the US Army over the past decade.[1,2] Soldiers who deployed in support of Operation Enduring Freedom/Operation Iraqi Freedom have increased risk of psychiatric morbidity[3,4] and have often,[2,5,6] but not always,[7,8] been found to have increased risk of suicide compared with those who never

deployed (ND).Despite their importance as a gateway to suicide and their associated morbidity and costs, SAs have been less studied in general and in the Army in particular.

Worldwide, about 0.4% of adults report that they have made an SA within the past year.[9] The World Health Organization and the US government have called for increased attention to suicide and SAs.[10,11] Women are at about 50% increased risk of SAs compared with men. Those younger than 50 years of age are at about twice the risk of those who are older.[9] The presence of a mental disorder and the number of disorders substantially increase risk.[12] In the Army, findings based on data from 2004 to 2009 indicate that women and soldiers who are early in their career, younger, and those with a recent mental health diagnosis are at increased risk. Those findings also highlighted the significant role of deployment status (DS), with ND soldiers at highest risk.[13] However, little is known about how risk factors for SA may vary by DS, which can inform the development of interventions.[14,15]

Using a life/career history perspective, we examined risk of Army SAs as a function of DS, individual characteristics, and mental health. We examined method of SA by DS because access to firearms is increased in theater and may contribute to increased suicide deaths during deployment.[5,16]

Methods

This component of the Army Study to Assess Risk and Resilience in Service members)[17] was approved by the institutional review boards of the Uniformed Services University, University of Michigan Institute for Social Research, University of California–San Diego, and Harvard Medical School, which determined that the study did not constitute human participant research because it relied on deidentified secondary data; therefore, informed consent was not obtained. Using a longitudinal, retrospective cohort study design and individual-level person-month records for all soldiers on active duty between January 1, 2004, and December 31, 2009 (N = 1.66 million),[17] we selected our analytic sample from 975 057 Regular Army soldiers (excluding activated Army National Guard/Reserve), 9791 of whom had a documented SA. This study focused on Regular Army–enlisted soldiers, accounting for nearly 99% of SAs from 2004 through 2009.[13] The final analytic sample included all 9650 enlisted soldiers who attempted suicide and 153 528 control person-months. Data were analyzed using a discrete-time survival frame work with person-month as the unit of analysis[18] and each month in the soldier's career treated as a separate observational record. We reduced computational intensity by selecting from the population an equal-probability 1:200 sample of control person-months stratified by sex, rank, time in service, DS at the time of SA (never, currently, or previously deployed), and historical time.[19]

We identified SA using the Department of Defense Suicide Event Report and *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnostic codes E950–E958 (self-inflicted poisoning or injury with suicidal intent) from health care encounter data systems for military and civilian treatment facilities, combat operations, and aeromedical evacuations (eTable 1 in the Supplement). The E959 code (late effects of a self-inflicted injury) was excluded because it confounds the temporal associations between the predictors

and SA.[20] For soldiers with multiple SAs, we selected the first attempt using a hierarchical classification.[1] The Department of Defense Suicide Event Report and *International Classification of Diseases, Ninth Revision, Clinical Modification* E950–E958 diagnostic codes for method of SA were organized into 2 categories: firearms (excluding explosives, n = 1) and other methods (eg, overdose, hanging, and electrocution) (eTable 2 in the Supplement).

Using *International Classification of Diseases, Ninth Revision, Clinical Modification* codes from the Military Health System Data Repository, Theater Medical Data Store, and Transportation Command Regulating and Command and Control Evacuating System records, we identified previous diagnoses of depression, posttraumatic stress disorder (PTSD), and substance use disorder (SUD), and created an indicator for any previous mental health diagnosis that included most *International Classification of Diseases, Ninth Revision, Clinical Modification* codes for mental disorders (eTable 3 in the Supplement). To examine self-reported depression and PTSD following deployment, we used heath screening data from the Post-Deployment Health Assessment (PDHA; administered just prior to or immediately after return) and Post-Deployment Health Reassessment (PDHRA; administered 3–6 months after return) (eAppendix in the Supplement).[21,22] We included soldiers completing both assessments, using a time frame of 1 month before return to 3 months after return (PDHA) and 4 to 6 months after return (PDHRA), capturing most screening data.

Statistical analyses were conducted using SAS version 9.3 (SAS Institute Inc).[23] To examine the association of DS with method of SA, we used an overall data array with separate data files for method of attempt (firearm and other) stacked and distinguished by dummy variables. The stacked sample was modeled with a 2-way interaction between DS and sample that controlled for sociodemographic and service-related variables.

To examine multivariate associations of sociodemographic and service-related variables with SA, separate logistic regression analyses were conducted within groups of soldiers stratified by DS. In separate models, we examined the incremental predictive effects of depression, PTSD, and SUD diagnoses; the number of those diagnoses in previous months and since entering service; and any previous mental health diagnosis. Using the subset of soldiers with 1 previous deployment who completed both the PDHA and PDHRA prior to their person-month record, we examined the effects of PTSD or depression diagnosis either early (PDHA) or late (PDHRA). Logistic regression coefficients were exponentiated to obtain odds ratios (ORs) and 95% CIs. Final model coefficients were used to generate standardized risk estimates (SRE)[24] (number of SAs per 100000 person-years) for each category of each predictor under the model, assuming other predictors were at their samplewide means. Logistic regression models included a dummy predictor for calendar month and year to control for increasing rates of SA from 2004 to 2009.[1] Coefficients of other predictors can be interpreted as averaged within-month associations based on the assumption that effects of other predictors do not vary over time.

To examine the risk of SA as a function of time and DS, we used discrete-time hazard functions and linear spline models. Analyses estimated risk by (1) months since entering

service among ND soldiers, (2) months since deploying among those currently on their first deployment (CD), and (3) months since returning from first deployment among those previously deployed (PD). Splines (piecewise linear functions) were examined using χ^2 tests, deviance, and the Akaike Information Criterion to test whether knots and additional linear segments improved model fit to assess nonlinearities in changes in risk by time in service.

Results

Of the 163 178 enlisted soldiers included in this study, 9650 enlisted soldiers attempted suicide. The 40.4% of ND soldiers (n = 12 421 294 person-months) accounted for 61.1% of enlisted soldiers who attempted suicide (n = 5894 cases) and had the highest rate of attempt (569 per 100000 person-years), followed by the 36.2% (n = 11 120 816 person-months) who were PD (29.2% of soldiers who attempted suicide [n = 2816 cases]; 304 per 100 000 person-years) and the 23.4% (n = 7 173 140 person-months) of CD soldiers (9.7% of soldiers who attempted suicide [n = 940 cases]; 157 per 100 000 person-years) (Figure 1). Firearms were used by 56 (1.0%), 127 (13.6%), and 108 (3.9%) ND, CD, and PD soldiers, respectively (eTable 4 in the Supplement). Overdose was the most common method (52.2%-56.9%) among soldiers who used other methods. Deployment status was associated with SAs by firearm ($\chi^2_2=65.4$; $P<.001$) and by other methods ($\chi^2_2=895.6$; $P<.001$). The interaction of DS by method of SA was significant ($\chi^2_2=222.5$; $P<.001$). Odds of a SA by firearm were higher among CD soldiers (OR, 4.0; 95% CI, 2.9–5.6) and PD soldiers (OR, 2.7; 95% CI, 1.8–3.9) than ND soldiers. Previously deployed soldiers had lower odds of an SA by firearm than CD soldiers (OR, 0.7; 95% CI, 0.5–0.9) (eFigure 1 in the Supplement).

Predictors of Suicide Attempt by Deployment Status

Standardized risk estimates were highest among ND soldiers and lowest among CD soldiers for all sociodemographic and service-related risk factors. Female soldiers had higher odds of SA than male soldiers (CD: OR, 3.4; 95% CI, 3.0–4.0; PD: OR, 1.5; 95% CI, 1.4–1.7; and ND: OR, 2.4; 95% CI, 2.3–2.6). The association of sex differed by DS ($\chi^2_1=80.1$; $P<.001$). Risk of SA decreased with longer time in service in each DS, and associations varied across groups ($\chi^2_6=25.6$; $P<.001$). Soldiers with 1 to 2 years in service had higher odds than those with 5 to 10 years (CD: OR, 1.9; 95% CI, 1.5–2.3; PD: OR, 2.2; 95% CI, 1.9–2.7; and ND: OR, 3.1; 95% CI, 2.7–3.6).Among soldiers with comparable time in service, the SRE was higher among ND soldiers (106–744 per 100 000 person-years) and PD soldiers (114–556 per 100 000 person-years) than among CD soldiers (63–250 per 100 000 person-years) (Table, eFigure 2, and eTable 5 in the Supplement).

History of any mental health diagnosis was associated with SA in all deployment groups, controlling for sociodemographic and service-related variables. Soldiers with a diagnosis in the previous month had the highest odds vs those with no diagnosis (CD: OR, 29.8; 95% CI, 25.0–35.5; PD: OR, 22.2; 95% CI, 20.1–24.4; and ND: OR, 15.0; 95% CI, 14.2–16.0). Odds decreased monotonically as time increased since the most recent diagnosis. Never-deployed soldiers with a diagnosis in the previous month had the highest SRE (4813 per 100 000 person-years), twice that of CD or PD soldiers with a comparably recent diagnosis (2383

and 2340 per 100 000 person-years, respectively) (Figure 2; eTable 6 and eTable 7 in the Supplement).

Odds were highest for more recently recorded diagnoses of depression, PTSD, and SUD. Soldiers with depression in the previous month had the highest odds of SA (CD: OR, 14.1; 95% CI, 10.4–19.1; PD: OR, 10.6; 95% CI, 9.3–12.0; and ND: OR, 10.2; 95% CI, 9.3–11.2). The odds associated with past-month PTSD ranged from 2.4 for PD to 8.1 for CD, and the odds associated with past-month SUD ranged from 4.3 for ND to 5.7 for CD soldiers. Associations of depression ($\chi^2_8=21.2$; $P=.007$), PTSD ($\chi^2_8=37.8$; $P<.001$), and SUD ($\chi^2_8=47.1$; $P<.001$) varied by DS. Never-deployed soldiers with depression, PTSD, or SUD in the previous month were at greatest risk (SREs of 4465, 1566, and 2256 per 100 000 person-years, respectively) (eTable 6 and eTable 7 and eFigure 3 in the Supplement).

The odds of SA increased as number of diagnoses (depression, PTSD, and SUD) in the previous month increased from 1 (CD: OR, 13.2; 95% CI, 10.1–17.2; PD: OR, 9.4; 95% CI, 8.5–10.4; and ND: OR, 8.8; 95% CI, 8.1–9.5) to 2 or more (CD: OR, 37.1; 95% CI,20.2–68.4; PD: OR, 17.0; 95% CI, 13.7–21.1; and ND: OR, 17.1; 95% CI, 13.5–21.6). This association varied by DS ($P=.002$), with the highest odds associated with CD soldiers. The pattern was similar for the total number of mental health diagnoses since entering the Army for each DS. Odds increased from no diagnoses to 1 diagnosis (CD: OR, 3.6; 95% CI, 3.1–4.1; PD: OR, 4.7; 95% CI, 4.3–5.2; and ND: OR, 5.4; 95% CI, 5.0–5.7) and 2 or more (CD: OR, 7.0; 95% CI, 5.5–8.6; PD: OR, 12.3; 95% CI, 11.2–13.6; ND: OR, 11.2; 95% CI, 10.0–12.4) (eTable 6 and eTable 7 and eFigure 3 in the Supplement).

Among soldiers with 1 deployment, those who screened positive for depression or PTSD early (PDHA) had greater risk of SA (OR, 1.4; 95% CI, 1.1–1.8) but odds were highest among those who screened positive later (PDHRA) (OR, 2.7; 95% CI, 2.3–3.1). Standard risk estimates for soldiers with a negative screen, early positive screen only, and late positive screen for depression or PTSD were 259, 370, and 689 per 100 000 person-years, respectively. Examined simultaneously in the same model, depression ($P<.001$) and PTSD ($P<.001$) were significant and continued to independently be associated with SA during the later screen. Soldiers with a late positive depression screen were more likely to attempt suicide (OR, 2.4; 95% CI, 2.0–2.9), whereas the odds among those with an early positive depression screen were not elevated (OR, 1.2; 95% CI,0.9–1.7). Odds were higher among soldiers with a late positive PTSD screen relative to those with a negative screen (OR, 1.7; 95% CI, 1.5–2.1) but not higher among those with only an early positive PTSD screen (OR, 1.3; 95% CI, 0.9–1.7) (eTable 8 in the Supplement).

Monthly Risk of First Suicide Attempt by Deployment Status

Never-deployed soldiers were at greatest risk in the second month of service (103 per 100 000 person-months). Risk in this group increased early in service, followed by a decline, then increased at a gradual and constant rate through the end of the first year of service. The median deployment length was 12 months, with 75% having a deployment 11 to 15 months long. Among soldiers on their first deployment, risk of SA was highest in the sixth month of deployment (25 per 100 000 person-months), followed by a gradual decline in risk over the

remaining months. Among soldiers who had returned from their first deployment, risk of SA increased and peaked around the fifth month after return (40 per 100 000 person-months), followed by a decrease over time (Figure 3).

Hazard functions indicated that monthly risk of SA was highest for those with a late positive screen for depression or PTSD (62–107 per 100 000 person-months). Monthly risk was lower for those with only an early positive screen after deployment (21–66 per 100 000 person-months), and lowest for those who screened negative for both disorders (19–29 per 100 000 person-months). Spline analyses indicated that the risk decreased over the 24 months after deployment but remained elevated for those who screened positive on the PDHRA (Figure 4).

Discussion

To our knowledge, SA has rarely been studied with data as comprehensive as available for these analyses. The findings highlight the importance of life and career history in understanding SAs in soldiers and the complexity of risk and protective factors across contexts. We found the highest rates of SA were among ND soldiers and those in their first years of service. Future research should examine the degree to which this risk is accounted for by those who recently entered service. Prior studies found that female soldiers are more likely than male soldiers to make a medically documented[13,25] or self-reported SA.[26] We found this effect across all deployment contexts, with CD women having the highest odds of SA relative to men. Although men are more likely to die by suicide in any deployment context, this pattern of increased risk among CD women has also been observed for suicide death.[27] Further research is required to understand factors that may contribute to these sex differences: occupational differences among those deployed, variation in social support by DS, the role of sexual assault or harassment,[28] or sex differences in response to deployment-related stressors.

The association of mental health diagnosis with suicidal behaviors is well established.[29] We found that the magnitude of this association across deployment contexts increased with recent diagnosis. This pattern was observed for a history of any mental health diagnosis and specifically for depression, PTSD, and SUD. This finding is consistent with evidence that 75%of service members had contact with the health care system in the month prior to a self-inflicted injury.[30] Although the importance of recent diagnosis may be expected because it is a potential indicator of acuity, it also highlights the challenges of prevention even among soldiers identified as having psychiatric risk. Posttraumatic stress disorder, SUD, and depression each increased risk even after adjusting for the other 2 disorders.

The higher risk among ND soldiers in their second month of service, a stressful time during basic training and Army acculturation, reinforces the importance of developing and evaluating effective risk detection and intervention strategies early in a soldier’s career. Whether this risk pattern was associated with expanded Army recruitment during war or anticipated deployments or is a persistent pattern of risk among soldiers in training remains to be determined.

Although SA by firearm made up a small percentage of attempts, the risk was increased during deployment and after deployment, suggesting that the deployment environment, with high access to firearms, may contribute to the lethality of suicidal behavior. Indirect support for this comes from previous Army Study to Assess Risk and Resilience in Service-members research indicating that CD enlisted soldiers had a higher rate of suicide death than ND soldiers,[5] and nearly all suicides in theater were by firearm.[31] The rate of SA during deployment peaked in the sixth month, the approximate mid-deployment period (often a time of return home and changing anticipation of deployment length). A similar curvilinear relationship for suicide and suicide ideation, peaking at mid-deployment, was observed in early Army reports and was associated with the worst levels of self-reported morale and mental health problems.[32] Information on temporal risk patterns can inform health care professionals so that intervention strategies are available and accessible during high-risk periods. The SA rate during this mid-deployment period remains lower than in ND soldiers during their first year of service. This may be the result of screening prior to deployment, fewer mental health diagnoses among those deployed, or other individual or contextual factors.

Among PD soldiers, risk increased over the first 5 months after deployment. Difficulties with postdeployment readjustment are well documented.[33] The peak risk at 5 months after deployment is consistent with previous research suggesting that self-reported mental health concerns are significantly greater 3 to 6 months postdeployment than immediately on return.[34] This is further supported by our finding that soldiers who screened positive for depression or PTSD during the later assessment (PDHRA) had higher risk than those with a negative screen and those with an early (PDHA) positive screen only. Risk among those with a late positive depression screen decreased over time but remained elevated up to 2 years after deployment. These data suggest that self-report screening, in addition to clinician diagnosis, may be a valuable part of a larger risk detection program. Programs to help soldiers in the months following redeployment may be particularly important;[22] however, the effectiveness of these programs can be hampered by underreporting of difficulties.[35]

Research by Nock et al[26] found increased odds of a past SA among PD soldiers. However, there are important methodological differences.[13] Whereas this study includes ND soldiers who are still in training (a period of greatly increased risk), Nock et al[26] surveyed soldiers in later stages of their careers who were presumably healthy and resilient enough to complete training. In addition, Nock et al[26] studied self-reported first lifetime SA, whereas our study examines first medically documented SA during Army service. Future studies using a combination of Army Study to Assess Risk and Resilience in Service members survey data with linked administrative data can further detail the reasons for these differences.

Several limitations in this study are noteworthy. First, ascertainment of SAs was limited to events captured by the health care system that vary in degree of lethality, particularly attempts by firearm. They are subject to coding errors and changes in policy and procedures (eg, electronic vs paper medical records). Second, findings represent 2004 to 2009. Third, this study examined a limited set of predictors. Fourth, post-deployment health findings may not represent all PD soldiers because they were limited to soldiers who deployed only once and completed both assessments. Finally, differences across DS are not evidence of within-

person changes over time because the composition of these groups is affected by the non-random nature of deployment and Army attrition.[36–38]

Conclusions

Deployment context is important in identifying SA risk among Army-enlisted soldiers. A life/career history perspective can assist in identifying high-risk segments of a population based on factors such as timing, environmental context, and individual characteristics. Our findings, while most relevant to active-duty US Army soldiers, highlight considerations that may inform the study of suicide risk in other contexts such as during the transition from military to civilian life.[39]

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key Points

Question

How does suicide attempt risk vary by deployment, mental health, and timing among US Army–enlisted soldiers?

Findings

In this cohort study of administrative records (individuals who attempted suicide vs control individuals), risk estimates for sociodemographic and mental health predictors were highest among those never deployed, and currently and previously deployed soldiers had the highest risk of attempt by firearm. Risk was highest in the second month of service (never deployed), sixth month of deployment (currently deployed), and fifth month after return (previously deployed).

Meaning

Deployment status, mental health, and timing are important to understanding risk of suicide attempts among soldiers.

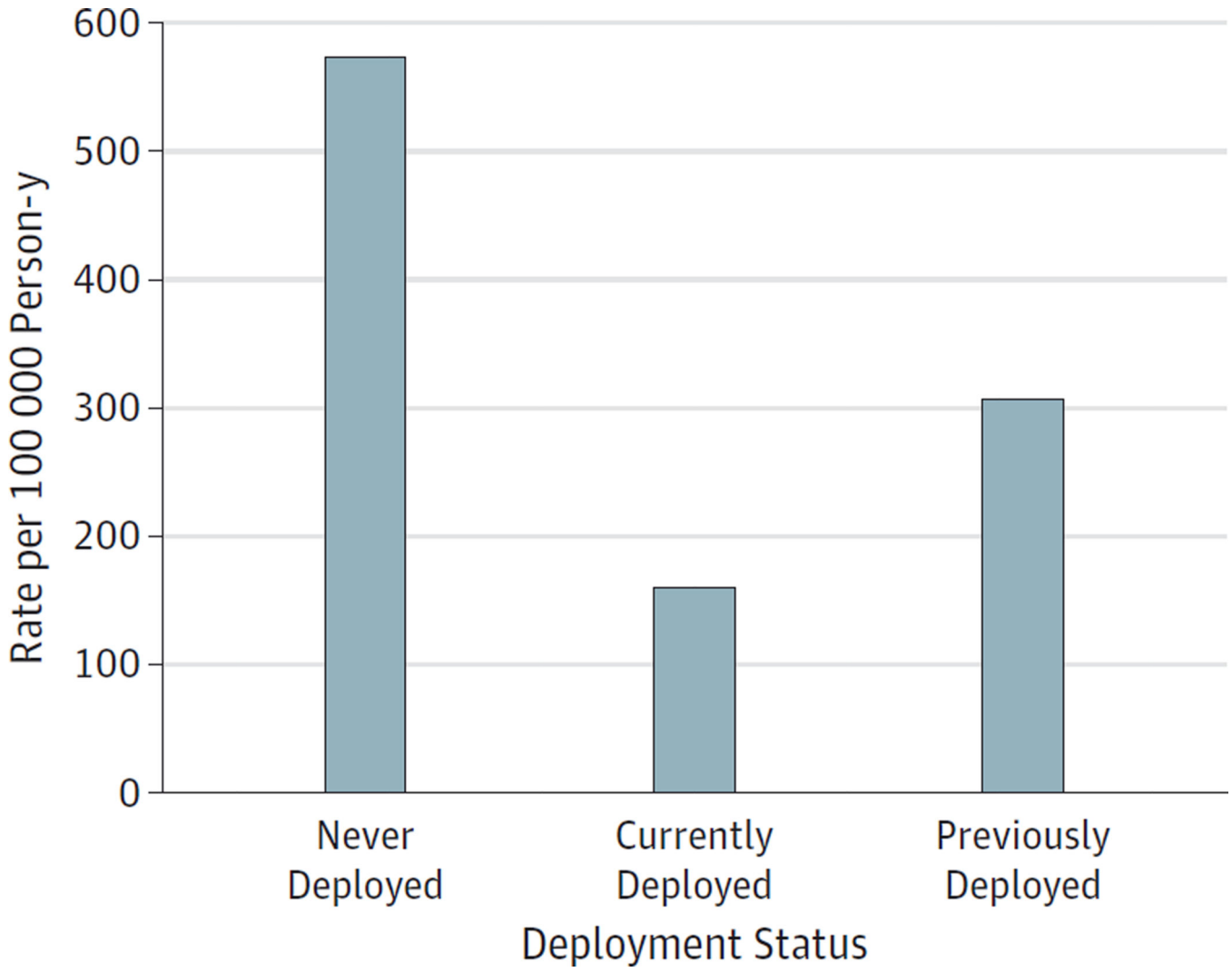

Figure 1. Suicide Attempts by Deployment Status Among Regular Army Enlisted Soldiers

The sample of enlisted soldiers (9650 soldiers who attempted suicide and 153 528 control person-months) is a subset of the total sample (193 617 person-months) from the Army Study to Assess Risk and Resilience in Service members Historical Administrative Data Study. Standardized risk estimates (soldiers who attempted suicide per 100 000 person-years) assume other predictors were at their samplewide means. Estimates were calculated based on logistic regression models that included basic sociodemographic and service-related variables (sex, age at entry into the Army, current age, race/ethnicity, education, marital status, and time in service) and also included a dummy predictor variable for calendar month and year to control for secular trends.

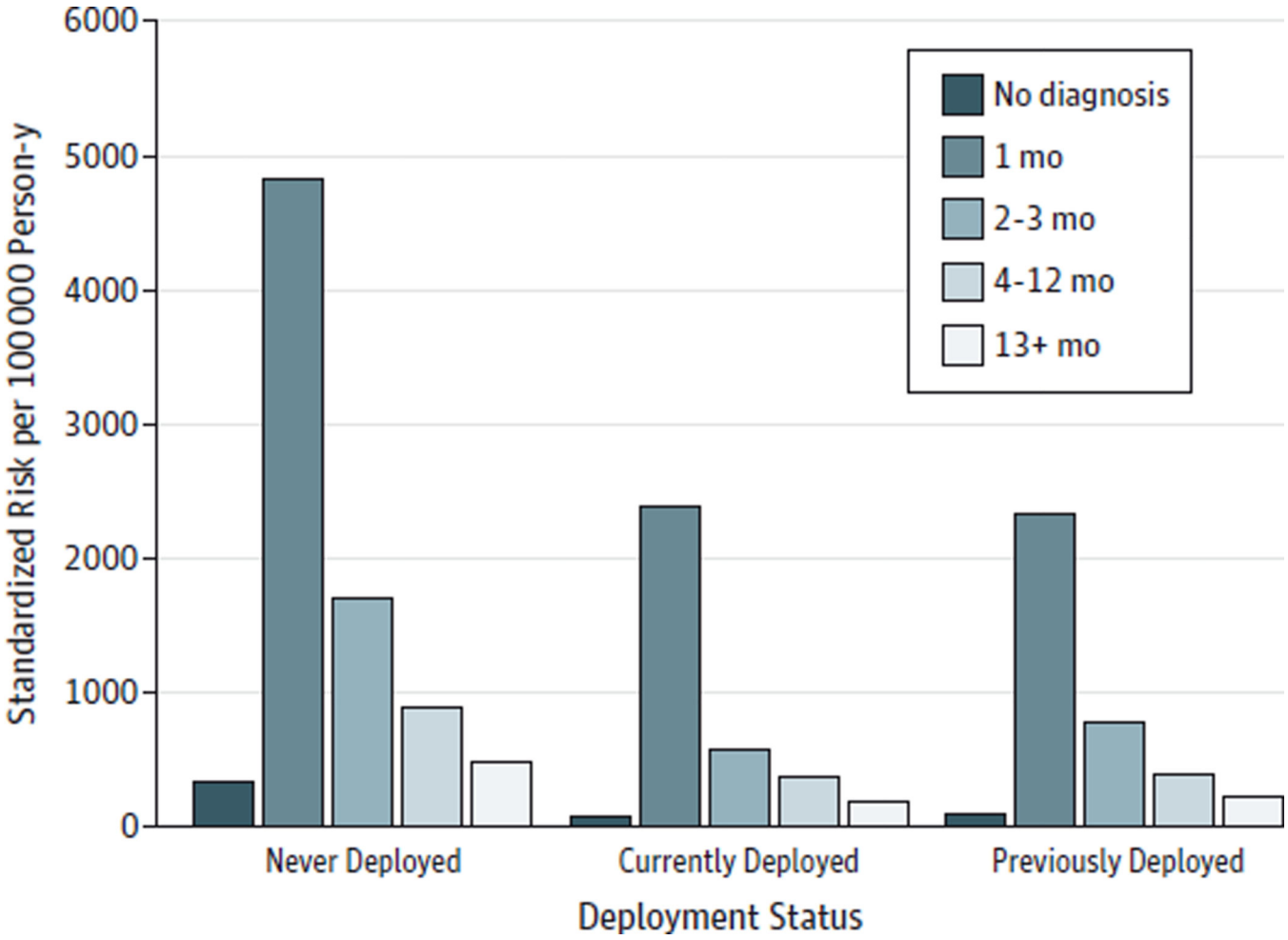

Figure 2. Standardized Risk of Suicide Attempt by Mental Health Diagnosis and Deployment Status Among Regular Army Enlisted Soldiers

The sample of enlisted soldiers (n = 9650 soldiers who attempted suicide and 153 528 control person-months) is a subset of the total sample (n = 193 617 person-months) from the Army Study to Assess Risk and Resilience in Service members Historical Administrative Data Study. Any mental health diagnosis includes most *International Classification of Diseases, Ninth Revision, Clinical Modification* codes for mental disorders (eg, major depression, bipolar disorder, anxiety disorder, and personality disorders), but excludes postconcussion syndrome and tobacco use disorder when those were the only recorded mental health diagnoses. See eTable 3 in the Supplement for a complete list of included and excluded *International Classification of Diseases, Ninth Revision, Clinical Modification* codes. Standardized risk estimates (soldiers who attempted suicide per 100 000 person-years) assume other predictors were at their samplewide means. Estimates were calculated based on logistic regression models that included basic sociodemographic and service-related variables (sex, age at entry into the Army, current age, race/ethnicity, education, marital status, and time in service) and also included a dummy predictor variable for calendar month and year to control for secular trends.

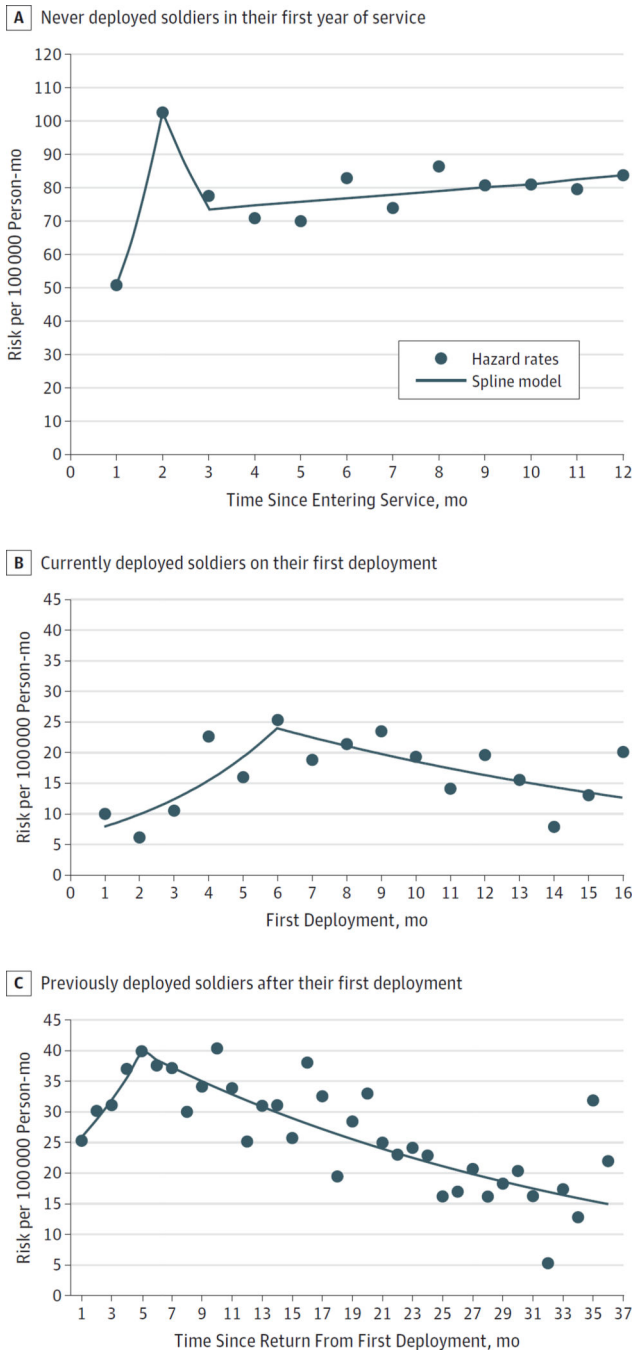

Figure 3. Monthly Risk of Suicide Attempt Risk by Deployment Status Among Regular Army–Enlisted Soldiers[1,2]

The sample of enlisted soldiers (24 741 never-deployed soldiers in their first year of service; 13 833 currently deployed soldiers on their first deployment; and 38 281 previously deployed soldiers after their first deployment) is a subset of the total sample (193 617 person-months) from the Army STARRS Historical Administrative Data Study. Monthly risk based on hazard rates and linear spline models.

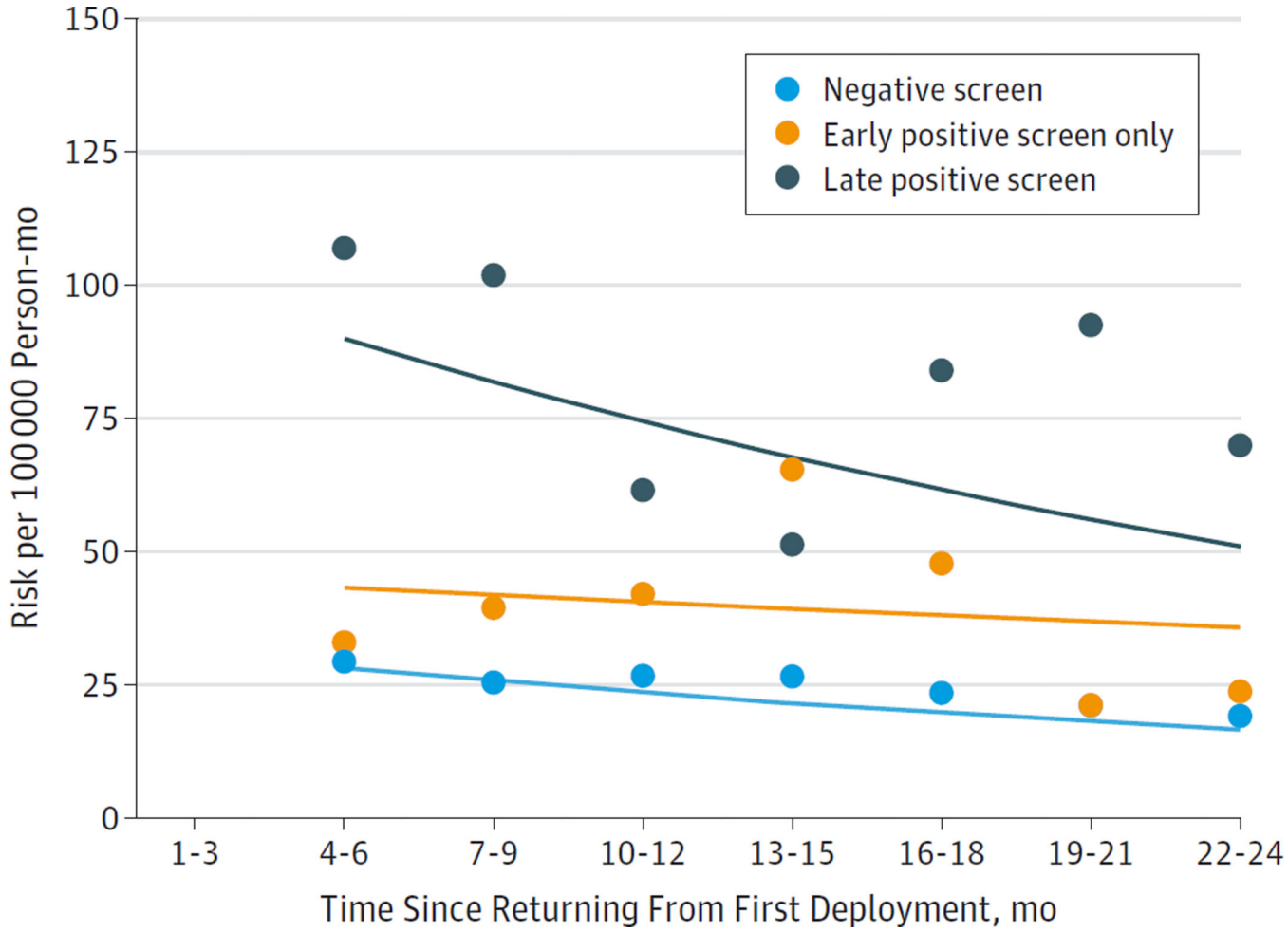

Figure 4. Postdeployment Depression or Posttraumatic Stress Disorder and Risk of Suicide Attempt Among Regular Army–Enlisted Soldiers With 1 Previous Deployment

The sample of 10 378 enlisted soldiers with 1 previous deployment who completed both the Postdeployment Health Assessment (early screen; 1–3 months after deployment) and Postdeployment Health Reassessment (late screen; 4–5 months after deployment) prior to their suicide attempt (cases) or sampled person-month record (controls) is a subset of the total sample (193 617 person-months) from the Army Study to Assess Risk and Resilience in Service members Historical Administrative Data Study. Odds ratios and standardized risk estimates for each diagnostic category were calculated based on logistic regression models that adjusted for the other diagnostic categories and basic sociodemographic and service-related variables (sex, age at entry into the Army, current age, race/ethnicity, education, marital status, and time in service), and which also included a dummy predictor variable for calendar month and year to control for secular trends.

Table

Multivariate Associations of Sociodemographic and Service-Related Variables With Suicide Attempt Among Regular Army Enlisted Soldiers Stratified by Deployment Status[a]

Characteristic	Deployment Status						Predictor by Deployment Status
	Never Deployed (n = 67 971)		Currently Deployed (n = 36 801)		Previously Deployed (n = 58 406)		
	OR (95% CI)	SRE[b]	OR (95% CI)	SRE[b]	OR (95% CI)	SRE[b]	
Sex							
Male	1 [Reference]	466	1 [Reference]	131	1 [Reference]	290	$\chi^2_2=80.1$[c]
Female	2.4 (2.3–2.6)[c]	1129	3.4 (3.0–4.0)[c]	450	1.5 (1.4–1.7)[c]	439	
χ^2_1	930.3[c]	NA	236.2[c]	NA	52.2[c]	NA	
Age at army entry, y							
<21	1.1 (1.0–1.2)	585	1.2 (1.0–1.4)	167	0.9 (0.9–1.1)	299	$\chi^2_4=29.6$[c]
21–24	1 [Reference]	539	1 [Reference]	140	1 [Reference]	311	
≥25	1.0 (0.9–1.2)	541	1.0 (0.7–1.3)	136	1.0 (0.9–1.2)	324	
χ^2_2	2.9	NA	3.1	NA	1.5	NA	
Current age, y							
<21	1.4 (1.2–1.8)[c]	662	1.5 (1.0–2.3)	205	1.8 (1.4–2.3)[c]	404	$\chi^2_{10}=79.5$[c]
21–24	1.2 (1.0–1.4)	535	1.2 (0.8–1.7)	165	1.4 (1.1–1.7)[c]	329	
25–29	1.0 (0.8–1.2)	462	1.0 (0.8–1.4)	143	1.2 (1.0–1.4)[c]	294	
30–34	1 [Reference]	475	1 [Reference]	137	1 [Reference]	249	

Characteristic	Deployment Status: Never Deployed (n = 67 971) OR (95% CI)	SRE[b]	Currently Deployed (n = 36 801) OR (95% CI)	SRE[b]	Previously Deployed (n = 58 406) OR (95% CI)	SRE[b]	Predictor by Deployment Status
35–39	0.8 (0.7–1.0)	412	0.7 (0.4–1.0)	94	0.9 (0.8–1.2)	241	
≥40	0.8 (0.6–1.1)	423	0.5 (0.3–1.0)	78	0.9 (0.7–1.2)	245	
χ^2_5	36.3[c]	NA	11.8[c]	NA	22.0[c]	NA	
Race/ethnicity							
White	1 [Reference]	650	1 [Reference]	169	1 [Reference]	336	
Black	0.7 (0.6–0.7)[c]	420	0.8 (0.7–1.0)[c]	137	0.7 (0.7–0.8)[c]	238	
Hispanic	0.7 (0.7–0.8)[c]	457	0.8 (0.7–1.0)[c]	135	0.8 (0.7–0.9)[c]	271	$\chi^2_8=9.0$
Asian	0.7 (0.6–0.8)[c]	421	0.8 (0.6–1.2)	143	0.7 (0.5–0.9)[c]	230	
Other	1.1 (0.9–1.3)	681	0.9 (0.6–6)	155	0.9 (0.7–1.3)	303	
χ^2_4	166.9[c]	NA	7.9	NA	46.1[c]	NA	
Education							
<High school[d]	1.9 (1.8–2.1)[c]	982	1.8 (1.6–2.1)[c]	260	2.0 (1.8–2.2)[c]	572	
High school	1 [Reference]	485	1 [Reference]	137	1 [Reference]	274	
Some college	0.7 (0.6–0.9)[c]	366	1.5 (1.0–2.1)[c]	208	0.6 (0.4–0.8)[c]	161	$\chi^2_6=22.1$[c]
≥College	0.6 (0.5–0.7)[c]	293	0.8 (0.5–1.3)	115	0.5 (0.4–0.7)[c]	132	
χ^2_3	610.0[c]	NA	62.4[c]	NA	279.3[c]	NA	

Characteristic	Deployment Status: Never Deployed (n = 67 971) OR (95% CI)	SRE[b]	Currently Deployed (n = 36 801) OR (95% CI)	SRE[b]	Previously Deployed (n = 58 406) OR (95% CI)	SRE[b]	Predictor by Deployment Status
Marital status							
Never married	1.0 (0.9–1.1)	567	0.6 (0.5–0.7)[c]	120	0.9 (0.6–1.0)	283	
Currently married	1 [Reference]	577	1 [Reference]	202	1 [Reference]	316	
Previously married	0.9 (0.7–1.2)	540	0.9 (0.6–1.3)	181	1.1 (0.9–1.3)	346	$\chi^2_4=49.5$[c]
χ^2_2	0.4	NA	44.7[c]	NA	5.1	NA	
Time in service, y							
1–2	3.1 (2.7–3.6)[c]	744	1.9 (1.5–2.3)[c]	250	2.2 (1.9–2.7)[c]	556	
3–4	1.8 (1.6–2.1)[c]	429	1.3 (1.1–1.6)[c]	167	1.7 (1.5–1.9)[c]	447	
5–10	1 [Reference]	220	1 [Reference]	129	1 [Reference]	274	$\chi^2_6=25.6$[c]
>10	0.5 (0.4–0.7)[c]	106	0.5 (0.3–0.8)[c]	63	0.4 (0.4–0.5)[c]	114	
χ^2_3	334.5[c]	NA	40.1[c]	NA	185.3[c]	NA	

Abbreviations: NA, not applicable; OR, odds ratio, SRE, standardized risk estimate.

[a] The sample of enlisted soldiers (9650 cases and 153 528 control person-months) is a subset of the total sample (193 617 person-months) from the Army Study to Assess Risk and Resilience in Service members Historical Administrative Data Study.

[b] Standardized risk estimate (suicide attempters per 100 000 person-years) was calculated assuming other predictors were at their samplewide means.

[c] $P < .05$.

[d] Less than high school includes: 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.

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