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Suicide Among Patients in the Veterans Affairs Health System: Rural-Urban Differences in Rates, Risks, and Methods

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Abstract: Using national patient cohorts, we assessed rural-urban differences in suicide rates, risks, and methods in veterans. We identified all Department of Veterans Affairs (VA) patients in fiscal years 2003 to 2004 (FY03-04) alive at the start of FY04 (n = 5 447 257) and all patients in FY06-07 alive at the start of FY07 (n = 5 709 077). Mortality (FY04-05 and FY07-08) was assessed from National Death Index searches. Census criteria defined rurality. We used proportional hazards regressions to calculate rural- urban differences in risks, controlling for age, gender, psychiatric diagnoses, VA mental health services accessibility, and regional administrative network. Suicide method was categorized as firearms, poisoning, strangulation, or other. Rural patients had higher suicide rates (38.8 vs 31.4/100 000 personyears in FY04-05; 39.6 vs 32.4/100 000 in FY07-08). Rural residence was associated with greater suicide risks (20% greater, FY04-05; 22% greater, FY07-08). Firearm deaths were more common in rural suicides (76.8% vs 61.5% in FY07-08). Rural residence is a suicide risk factor, even after controlling for mental health accessibility. Public health and health system suicide prevention should address risks in rural areas.

Full text: Headnote

Objectives. Using national patient cohorts, we assessed rural-urban differences in suicide rates, risks, and methods in veterans.

Methods. We identified all Department of Veterans Affairs (VA) patients in fiscal years 2003 to 2004 (FY03-04) alive at the start of FY04 (n = 5 447 257) and all patients in FY06-07 alive at the start of FY07 (n = 5 709 077). Mortality (FY04-05 and FY07-08) was assessed from National Death Index searches. Census criteria defined rurality. We used proportional hazards regressions to calculate rural- urban differences in risks, controlling for age, gender, psychiatric diagnoses, VA mental health services accessibility, and regional administrative network. Suicide method was categorized as firearms, poisoning, strangulation, or other.

Results. Rural patients had higher suicide rates (38.8 vs 31.4/100 000 personyears in FY04-05; 39.6 vs 32.4/100 000 in FY07-08). Rural residence was associated with greater suicide risks (20% greater, FY04-05; 22% greater, FY07-08). Firearm deaths were more common in rural suicides (76.8% vs 61.5% in FY07-08).

Conclusions. Rural residence is a suicide risk factor, even after controlling for mental health accessibility. Public health and health system suicide prevention should address risks in rural areas. (Am J Public Health. 2012;102:S111-S117. doi:10.2105/AJPH.2011.300463)

Suicide among veterans is a national concern,^{1,2} and suicide prevention is a priority for the US Department of Veterans Affairs (VA) health system, the Veterans Health Administration. The VA provides health services to approximately 5.5 million veterans each year, more than one fifth of all veterans. The VA serves a patient population with important suicide risk factors. Patients are predominantly male and older, and often have substantial physical morbidities, substance use problems, and mental illnesses.³⁻⁵ Also, VA patients are more likely to reside in rural settings than is the general US population. ^{6,7} This trend is expected to continue because rural residents are overrepresented among military recruits. In 2005, although 7.6% of 18- to 24-year-old US residents lived in rural areas, 11.8% of 18- to 24-year-old military recruits were from these areas.⁸ Research is needed to assess whether rural residence is associated with differential suicide rates and risks among the national population of VA patients.

Since the early 1970s, suicide rates among men in rural areas of the United States have exceeded those of urban men, and rural-urban differentials have increased for both genders.^{9,10} Similar trends have been observed outside of the United States.¹¹⁻¹³ Elevated suicide rates in rural areas have been attributed to factors including geographic and interpersonal isolation, economic and social distress, and rural culture.¹⁴ Rural populations are smaller and more dispersed, potentially limiting opportunities for social integration and social support. Geographic accessibility of mental health treatment resources is often diminished, with providers fewer and farther between. Economic declines may affect rural areas more drastically. Further, rural agrarian cultural values, which champion a strong work ethic, independence, and self-reliance, may inhibit treatment-seeking behavior.¹⁵

Previous research on suicide risks associated with veteran status among community residents produced mixed results.¹⁶⁻²⁰ Among male respondents to the US National Health Interview Survey, suicide risks between 1986 and 1997 for male veterans were found to be twice those of male nonveterans (adjusted hazard ratio [HR] for veterans = 2.04; 95% confidence interval [CI] = 1.10, 3.80), controlling for rurality of residence.¹⁹ However, in an analysis of middle-aged and older men who participated in a large prospective cohort study from 1982 to 2004, which did not adjust for rurality, veteran status was not associated with suicide risk.²⁰ In their review, Kang and Bullman noted that "historically the rates of suicide among veterans in general have been lower than that of the US population."¹⁸(p 760) To date, however, few studies have adjusted for rurality,¹⁹ and it is important to consider rural-urban differentials in risks among veterans.

Among VA patients, research suggested that suicide rates were greater than those in the general US population. Before the conflicts in Afghanistan and Iraq, and before recent VA health system initiatives, the standardized mortality ratio for suicides among male VA patients in 2001 was 1.66 compared with men in the general US population; for female patients, it was 1.87.²¹ Elevated risks among VA patients might reflect the fact that they represent a treatment-seeking population with substantial medical and psychiatric morbidities and meeting eligibility requirements means testing, based on income thresholds, or military service-related disability status.²²

Currently, little is known about rural-urban differences in suicide risks among VA health system users. However, if consistent with general trends in the United States,^{9,10,14} suicide risks may well be greater for VA patients residing in rural areas compared with those in urban areas. Studies indicated that VA patients in rural areas had more physical comorbidities and worse health-related quality of life than those in suburban or urban areas,²³ and that they had reduced access to health services and fewer alternatives to VA care.²⁴ Access barriers might limit receipt of needed health services and continuity of care,²⁵ and this might exacerbate suicide risks.

Another factor that may relate to differential suicide risks is access to lethal means of suicide, notably firearms. Among suicide attempt methods, firearms have the highest case fatality rate (suicides/[suicides + nonfatal injuries due to self-harm]): 84% in the United States during 2002 to 2006.²⁶ In non-VA populations, method of suicide differs across rural-urban settings. State-level analyses indicated that higher firearm ownership was associated with increased rates of firearm suicides,²⁶ and suicide deaths among veterans were more likely to involve firearms than those among nonveterans.^{19,28} Between 2002 and 2006, although firearms were the most common method among male suicide decedents in the United States (58%), poisoning was the most common method among female suicide decedents (39%).²⁶ To date, little is known regarding potential rural-urban differences in means of suicide among VA patients, overall or by gender.

The objectives of this study were to examine rural-urban differences in rates, risks, and methods of suicide among the population of individuals receiving services in the VA health system. We hypothesized that VA patients in rural areas and those residing farther from VA mental health facilities were at greater risk for suicide, and that method of suicide differed by rural-urban status. Further, we examined 2 periods of time to assess potential differences over time. Research in this area might inform health services organization and delivery and advance assessments of whether and how veteran status relates to suicide risks.

METHODS

Since 2005, the Veterans Health Administration has substantially expanded mental health services and developed programs designed to prevent suicide. We assessed suicide mortality in 2 periods: fiscal years 2004 to 2005 (FY04-05; October 1, 2003 to September 30, 2005) and FY07-08 (October 1, 2007, to September 30, 2008). Risks were assessed for 2 national patient cohorts. These consisted of: (1) VA patients with observation time in FY04-05, defined as all individuals with VA inpatient or outpatient encounters in FY03-FY04 who were alive at the start of FY04, and (2) VA patients with observation time in FY07-08, defined as all individuals with VA encounters in FY06-FY07 who were alive at the start of FY07. This was based on established approaches to defining VA patient cohorts for health system suicide surveillance,^{4,21} and it assumed that patients seen in VA settings in the previous year continued to be in VA care and part of the at-risk patient population.

The days at risk for an observed suicide were identified as follows.²¹ For individuals who had VA encounters in the FY before the first FY of the cohort observation period, risk time began on the first day of the first FY of the observation period (October 1, 2003, and October 1, 2006, respectively). For those individuals without VA encounters in the preceding year, risk time began on the day of their first use in the first FY of the observation period (i.e., FY04 or FY07, respectively). The risk period ended at death or the end of the cohort observation period (September 30, 2005, and September 30, 2008, respectively), whichever came sooner.

This project was reviewed and approved by the Ann Arbor VA human subjects committee, and a waiver of informed consent was obtained for this secondary data analysis.

Data Sources

The VA's National Patient Care Database (NPCD) was used to identify all individuals with VA inpatient or outpatient service encounters. Indicators of vital status and cause of death were based on National Death Index (NDI) search records. The NDI is regarded as the "gold standard" for mortality assessments,²⁹ including date and causes of death for all decedents in the United States, based on death certificates filed in state vital statistics offices. Using established approaches,²¹ NDI records were searched for all individuals with VA encounters in FY03-04 or in FY06-07 and who did not have VA encounters in FY09 or FY10. That is, to avoid unnecessary searches, we excluded from the NDI searches individuals with health system contacts subsequent to the final suicide risk period. The NDI searches were based on patient social security number, name, date of birth, race/ethnicity, gender, and state of residence. Search results might include multiple records that were potential matches, and "true matches" were identified based on established procedures.³⁰

Measures

Using indicators included in the NPCD, we identified age and gender for the 2 cohorts. Age was calculated as of October 1, 2003, for the FY04-05 risk cohort and as of October 1, 2006, for the FY07-08 risk cohort, using 3 age categories: 18 to 29, 30 to 64, and at least 65 years. Race/ethnicity indicators were not consistently available and were not included.

Psychiatric diagnoses were assessed based on International Classification of Diseases, Ninth Revision, Clinical Modification³¹ diagnostic codes recorded in VA encounters during the baseline year. The psychiatric diagnoses examined were bipolar disorder, depression, posttraumatic stress disorder (PTSD), other anxiety disorders, schizophrenia/schizoaffective disorder, and substance use disorders (SUDs; alcohol use disorders or drug use disorders). These diagnoses were selected based on previously established links to suicide in existing literature.⁴ These indicators were not mutually exclusive, because individuals could have diagnoses recorded for more than 1 condition.

Distance to nearest VA mental health provider was assessed as straight-line miles from the population centroid of the individual's zip code of residence, from their first VA encounter of the baseline year, to that of the nearest VA facility providing substantial mental health services. These facilities were medical centers or community-based outpatient clinics serving at least 500 unique patients and where at least 20% of outpatient visits were mental health visits.³² We also identified the VA regional network (of 21 networks) where each patient had their

last VA encounter in the baseline year. Rurality was assessed by categorizing patients' zip codes of residence as rural or urban based on criteria used by the VA Office of Rural Health, which are based on US Census categories. Veterans were categorized as residing in an urban area if they lived within a censusdefined urban area (having a population density of at least 1000 people per square mile and surrounding areas have a density of at least 500 per square mile). Rural areas were defined as those areas that did not meet these criteria. Using NDI data, we identified dates and causes of death. Suicide deaths were identified using the International Classification of Diseases, Tenth Revision,33 codes X60-X84, Y87.0. Method of suicide was categorized as involving use of firearms (X72-X74); poisoning (X60- X69); hanging, suffocation, or strangulation (X70); and other methods. These categories reflect common methods of suicide in the United States.³⁴

Statistical Analyses

Descriptive statistics were calculated for each risk cohort, overall and by rural-urban status. We used bivariate analyses to compare patient characteristics by rurality status, using t test, χ^2 , and nonparametric median tests, as appropriate. In further bivariate analyses, we examined whether suicide decedents differed from other individuals in the analyses, in terms of distance to nearest VA mental health services, overall and stratified by rural-urban status.

In proportional hazards regression analyses, we evaluated rurality and VA mental health geographic accessibility as predictors of suicide, controlling for patient gender, age, psychiatric morbidities, and VA regional network. Consistent with previous work regarding distance to VA care,³² we included a quadratic distance term to assess potential curvilinear effects of distance on suicide risks. Analyses included covariance sandwich estimators to adjust for the nested nature of the data, with individuals clustered within VA facilities (identified by 3-digit facility prefix codes.) To reduce multicollinearity, because distance and distancesquared are highly correlated, distance measures were centered around their mean. An initial analytic model examined the influence of rurality and distance to nearest VA mental health services. A supplemental analysis included interaction terms between rurality and the distance and the quadratic distance terms.

Also, for each cohort, we used the χ^2 test to assess differences in method of suicide, by rural- urban status and by categories of distance to nearest VA mental health facility (< 15, 15-49, 50-99, [double dagger]100 miles), overall and stratified by gender. All statistical analyses were completed using SAS (version 9; SAS Institute, Cary, North Carolina).

RESULTS

Approximately 35% of VA patients in the FY04-05 risk cohort and 36% of the FY07- 08 risk cohort lived in rural areas (unpublished analyses by the authors indicated that among similarly defined users in FY01-02, rural patients accounted for 34.3% of individuals). By comparison, 21% of the US adult population resided in rural settings.⁷

Table 1 presents information regarding the 2 risk cohorts, overall and by rurality status. For each cohort, rural-urban differences were statistically significant ($P < .001$) for each measure. For the FY07-08 risk cohort, VA patients in rural areas were more likely to be male (93.8% vs 89.1%) and older (mean [SD] age = 62.8 [14.9] vs 60.1 [16.8] years). In the FY07-08 risk cohort, rural patients were less likely than urban patients to have had a diagnosis of bipolar disorder, schizophrenia, or substance use disorders, and they were more likely to have had a diagnosis of depression, PTSD, and other anxieties. Median distance to nearest VA mental health provider was 46.0 miles for the FY04-05 cohort and 37.4 miles for the FY07-08 cohort. Median distance was substantially greater for patients in rural areas (71.1 vs 28.3 miles for the FY04-05 cohort; 54.6 vs 22.8 miles for the FY07-08 cohort); 29.4% of the FY07-08 cohort lived within 15 miles of a VA mental health facility compared with 26.7% of the FY04-05 cohort.

The crude suicide rate was 34.01 per 100 000 person-years for the FY04-05 cohort and 35.01 per 100 000 person-years for the FY07-08 cohort. Crude suicide rates were greater in rural areas than in urban areas (38.76 per 100 000 vs 31.45 per 100 000 person-years in the FY04-05 cohort, and 39.62 per 100 000 vs 32.44 per 100

000 person-years in the FY07-08 cohort).

Table 2 presents results from multivariable proportional hazards regression results for the FY04-05 and the FY07-08 cohorts. These analyses indicated that residence in a rural zip code was associated with an increased risk for suicide mortality (HR = 1.20; 95% CI = 1.11, 1.29 for the FY04-05 cohort; HR = 1.22; 95% CI = 1.12, 1.33 for the FY07-08 cohort). Neither distance nor distance-squared were significant predictors. In separate analyses, we explored potential interactions between distance and rurality. These produced inconsistent results. For the FY04-05 cohort, although the interaction between distance and rurality was nonsignificant, the interaction between distance-squared and rurality was significant ($P < .01$); however, the exponentiated parameter estimate was only 1.0000016. For the FY07-08 cohort, neither interaction term was significant. Race/ethnicity indicators were not included in the main analyses because of the high levels of missing data for these indicators. In sensitivity analyses, we investigated whether study findings differed when including available information for race/ethnicity and indicators of missing or unknown values. Results were consistent with main study findings, with increased risk associated with rural residence (FY04-05: HR = 1.10; 95% CI = 1.03, 1.19; FY07-08: HR = 1.16; 95% CI = 1.06, 1.26).

In separate sensitivity analyses that excluded individuals living more than 800 miles from VA mental health services (primarily VA patients residing in Alaska), distance measures reached statistical significance and were associated with slightly increased risks (FY04-05: HR = 1.002; 95% CI = 1.001, 1.002; $P < .001$; FY07-08: HR = 1.001; 95% CI = 1.000, 1.002; $P = .028$). We did not observe significant interactions with rurality. Of the 3448 suicides for the FY04-05 cohort, 3334 (96.7%) were among men and 114 (3.4%) among women. For the FY07-08 cohort, there were 3745 suicides, with 3620 suicides among men (96.7%) and 125 among women (3.3%). In each cohort, the method of suicide differed significantly by rural-urban status ($\chi^2 = 97.2$; $P < .001$, in FY04-05; $\chi^2 = 107.1$; $P < .001$, in FY07-08) and by gender ($\chi^2 = 69.8$; $P < .001$, in FY04-05; $\chi^2 = 110.1$; $P < .001$, in FY07-08). Among male suicide decedents, method of suicide differed significantly by rural-urban status ($\chi^2 = 89.1$; $P < .001$, in FY04-05; $\chi^2 = 84.4$; $P < .001$, in FY07-08). Among female suicide decedents, we did not observe significant differences in method of suicide by rural-urban status.

Figure 1 shows percentage of categories of suicide methods for the FY07-08 cohort, by rurality and gender. Firearms were the most common method of suicide (68% of all suicides). Firearms were more common in rural than in urban areas (77% vs 61%). Firearm use was most common among male suicide decedents in rural areas (77%) and least common among urban women (35%). Poisoning was substantially more common among female suicide decedents (46%) than among male suicide decedents (13%). For both male and female suicide decedents, the percentage of suicides by firearms was greater in rural than in urban areas. Similar trends were observed for the FY04-05 cohort.

DISCUSSION

VA users were more likely than the general population to live in rural areas, with 35% or more VA users residing in rural areas during the study period. In 2 large national cohorts of individuals receiving services in the VA, residence in rural areas was associated with higher suicide rates and increased suicide risks after adjusting for important individual and contextual factors. Furthermore, rural individuals who died from suicide were more likely than urban decedents to die from firearms. Rural-urban differentials in rates and risks were fairly consistent between FY04-05 and FY07-08.

Study findings were consistent with recent studies that indicated greater suicide risks among individuals in rural settings.⁹⁻¹³ This study contributed to the literature because it was specific to the entire patient population of the largest integrated health system in the United States, which provides care to a patient population that is at elevated risk for suicide,²¹ and it included important demographic, clinical, and health system measures. Moreover, although considerable previous work documented that greater distance to health system providers was associated with decreased health services utilization volume and continuity of care,²⁵ in this study, distance measures were not appreciably related to suicide risks. This finding suggested that elevated suicide

risks observed among rural populations might have little to do with health system accessibility barriers and much to do with endemic contextual factors. Thus, this study demonstrated the need to better understand the nature of rurality as it relates to suicide risks, separate from its frequent association with decreased health system geographic accessibility.

Future studies should consider contextual factors that might underlie the observed rural-urban differentials in suicide risks.¹⁴ For example, there might be unmeasured differences in socioeconomic status across patients residing in rural and urban settings.³⁵ Social environmental factors were associated with suicide risks among VA mental health patients.³⁶ Clearly, further research is needed to better understand rural-urban differences in health service treatment seeking and the sociocultural factors relating to suicide mortality.

Consistent with previous analyses,²⁶ method of suicide differed substantially by gender. Furthermore, rural residence was associated with greater use of firearms among suicide decedents, overall and for both genders. Firearm suicide mortality is a significant public health problem in rural areas.³⁷ Firearm ownership is greater in rural areas, and greater state-level firearm ownership has been associated with greater firearm suicide mortality.²⁷ Among suicide methods, firearms sadly have the highest case-fatality rates.²⁶ As Miller and Hemenway noted, "A suicide attempt with a firearm rarely affords a second chance."³⁸ Thus, greater access to lethal means may in part explain rural-urban differences in suicide mortality. This relationship suggests the importance of gun safety efforts and firearm awareness as part of suicide prevention efforts.

Public health and health care innovations are needed to address the elevated suicide risks in rural areas. The VA has pioneered health system suicide prevention initiatives, including 24-hour and web-based suicide prevention crisis lines (1-800-273-TALK), ongoing national monitoring, and support for development of suicide prevention programs.¹⁶ Study findings suggested the importance of outreach efforts to enhance suicide prevention in rural settings, including access to mobile crisis teams and telehealth services. Health systems should seek to facilitate outreach, services integration, and access to emergency care services in rural settings. Finally, the study findings had implications for future efforts to examine the suicide risks associated with veteran status. Increased risks among rural VA patients might result from unmeasured factors associated with rural residence.¹⁴ Because veterans are disproportionately represented in rural settings and rurality is associated with increased suicide risk, studies examining the influence of veterans status on suicide mortality¹⁸ should include adjustment for rural residence. In the absence of such adjustment, risks that are related to rurality might be misinterpreted as related to veteran status.

This large national multiyear study had several limitations. First, it was not possible to include some patient factors that might be related to suicide and might differ by rural-urban status, including patient income, race/ethnicity, and marital status. Second, it was not feasible to account for residential mobility among VA patients. Consequently, for patients with residential moves during the observation period, this might introduce measurement error in assessing distance to nearest VA mental health provider. Residential moves among VA patients were more common among individuals with psychiatric conditions that were associated with increased suicide mortality.³⁹ Finally, we noted that the recording of suicide deaths by medical examiners might differ systematically across rural and urban areas. Previous work suggested rural-urban variation in the prevalence of deaths of undetermined intent, and this might indicate measurement error in the identification of suicide deaths.⁴⁰

Despite these limitations, the study findings provided substantial timely and important information regarding rural-urban differences in suicide rates, risks, and methods among the population of individuals receiving health care services in the US Department of Veterans Affairs health system. These findings supported continuing development of health care policy and health services and suicide prevention initiatives to address the suicide risks of veterans, with focused attention on rural settings.

References

References

1. Institute of Medicine. *Reducing Suicide: A National Imperative*. Washington, DC: National Academies Press; 2004.
2. US Department of Health and Human Services. *The Surgeon General's Call to Action to Prevent Suicide*. Washington, DC: National Institutes of Health; 1999.
3. Agha Z, Lofgren RP, VanRuiswyk JV, Layde PM. Are patients at Veterans Affairs medical centers sicker? *Arch Intern Med*. 2000;160(21):3252-3257.
4. Ilgen MA, Bohnert ASB, Ignacio RV, McCarthy JF, Valenstein MM, Kim HM, et al. Psychiatric diagnoses and risk of suicide in Veterans. *Arch Gen Psychiatry*. 2010; 67(11):1152-1158.
5. Lambert MT, Fowler DR. Suicide risk factors among veterans: risk management in the changing culture of the Department of Veterans Affairs. *J Ment Health Adm*. 1997;24(3):350-358.
6. Hawthorne K. Statement to the Senate Committee on Veterans' Affairs. February, 26, 2009. Available at: http://veterans.senate.gov/hearings.cfm?action=release.display&release_id=7fd5424b-eac7-4fd3-8e84-dda1a89daf80. Accessed January 1, 2011.
7. US Census Bureau. Geographic Comparison Table: United States-Urban/Rural and Inside/Outside Metropolitan Area. Available at: http://factfinder.census.gov/servlet/GCTTable?_bm=y&-geo_id=01000US&-_box_head_nbr=GCT-P1&-ds_name=DEC_2000_SF1_U&-format=US-1. Accessed January 18, 2011.
8. Kane T. *Who are the recruits? The demographic characteristics of U.S. military enlistment, 2003-2005*. CDA06-09. Washington, DC: The Heritage Foundation.; October 26, 2006.
9. Kapusta ND, Zorman A, Etzendorfer E, Ponocny-Seliger E, Jandl-Jager E, Sonneck G. Rural-urban differences in Austrian suicides. *Soc Psychiatric Psych Epidemiol*. 2008;43:311-318.
10. Singh GK, Siahpush M. Increasing rural-urban gradients in US suicide mortality, 1970-1997. *Am J Public Health*. 2002;92(7):1161-1167.
11. Levin KA, Leyland AH. Urban/rural inequalities in suicide in Scotland, 1981-1999. *Soc Sci Med*. 2005; 60:2877-2890.
12. Middleton N, Gunnell D, Frankel S, Whitley E, Dorling D. Urban-rural differences in suicide trends in young adults: England and Wales, 1981-1998. *Soc Sci Med*. 2003;57:1183-1194.
13. Razvodovsky Y, Stickley A. Suicide in urban and rural regions of Belarus, 1990-2005. *Public Health*. 2009;123(1):27-31.
14. Hirsch JK. A review of the literature on rural suicide: risk and protective factors, incidence and prevention. *Crisis*. 2006;27(4):189-199.
15. Hoyt DR, Conger RD, Valde JG, Weihs K. Psychological distress and help seeking in rural America. *Am J Community Psychol*. 1997;25(4):449-470.
16. Bossarte R, Claassen CA, Knox K. Veteran suicide prevention: emerging priorities and opportunities for intervention. *Mil Med*. 2010;175(7):461-462.
17. Bruce ML. Suicide risk and prevention in veteran populations. *Ann N Y Acad Sci*. 2010;1208:98-103.
18. Kang HK, Bullman TA. Is there an epidemic of suicides among current and former U.S. military personnel? *Ann Epidemiol*. 2009;19(10):757-760.
19. Kaplan MS, Huguet N, McFarland BH, Newsom JT. Suicide among male veterans: a prospective populationbased study. *J Epidemiol :Community Health*. 2007;61(7): 619-624.
20. Miller M, Barber C, Azrael D, Calle EE, Lawler E, Mukamal KJ. Suicide among US Veterans: a prospective study of 500,000 middle-aged and elderly men. *Am J Epidemiol*. 2009;170:494-500.
21. McCarthy JF, Valenstein M, Kim HM, Ilgen M, Zivin K, Blow FC. Suicide mortality among patients receiving care in the Veterans Health Administration health system. *Am J Epidemiol*. 2009;169: 1033-1038.
22. Department of Veterans Affairs. Fact Sheet 164- 10: National Income Thresholds. Available at: <http://www.va.gov/healtheligibility/Library/pubs/VAINcomeThresholds/VAINcomeThresholds.pdf>. Accessed July 4, 2011.

23. Weeks WB, Kazis LE, Shen Y, et al. Differences in health-related quality of life in rural and urban veterans. *Am J Public Health*. 2004;94:1762-1767.
24. West A, Weeks WB. Physical and mental health and access to care among nonmetropolitan Veterans Health Administration patients younger than 65 years. *J Rural Health*. 2006;22(1):9-16.
25. McCarthy JF, Blow FC, Valenstein M, et al. Veterans Affairs Health System and mental health treatment retention among patients with serious mental illness: evaluating accessibility and availability barriers. *Health Serv Res*. 2007;42(3 Pt 1):1042-1060.
26. Centers for Disease Control and Prevention. Case Fatality Rate Among Persons Age 10 and Older, by Mechanism, United States, 2002-2006. Available at: http://www.cdc.gov/violenceprevention/suicide/statistics/case_fatality.html. Accessed January 28, 2011.
27. Price JH, Mrdjenovich AJ, Dake JA. Prevalence of state firearm mortality and mental health care resources. *J Community Health*. 2009;34:383-391.
28. Kaplan MS, McFarland BH, Huguet N. Firearm suicide among veterans in the general population: findings from the National Violent Death Reporting System. *J Trauma*. 2009;67(3):503-507.
29. Cowper DC, Kubal JD, Maynard C, Hynes DM. A primer and comparative review of major US mortality databases. *Ann Epidemiol*. 2002;12(7):462-468.
30. Sohn MW, Arnold N, Maynard C, Hynes DM. Accuracy and completeness of mortality data in the Department of Veterans Affairs. *Popul Health Metr*. 2006;4:2.
31. International Classification of Diseases, Ninth Revision, Clinical Modification. Hyattsville, Md: National Center for Health Statistics; 1980.
32. McCarthy JF, Blow FC. Older patients with serious mental illness: sensitivity to distance barriers for outpatient care. *Med Care*. 2004;42(11):1073-1080.
33. International Classification of Diseases. 10th Revision. Geneva, Switzerland: World Health Organization; 1994.
34. Centers for Disease Control and Prevention. Percentage of Suicides Among Persons Ages 10 Years and Older, by Sex and Mechanism, United States, 2002-2006. Available at: <http://www.cdc.gov/violenceprevention/suicide/statistics/mechanism01.html>. Accessed July 4, 2011.
35. Page A, Morrell S, Taylor R, Dudley M, Carter G. Further increases in rural suicide among Australian adults: secular trends, 1979-2003. *Soc Sci Med*. 2007; 65:442-453.
36. Desai RA, Dausey DJ, Rosenheck RA. Mental health service delivery and suicide risk: The role of individual patient and facility factors. *Am J Psychiatry*. 2005; 162(2):311-318.
37. Branas CC, Nance ML, Elliott MR, Richmond TS, Schwab W. Urban-rural shifts in intentional firearm death: different causes, same results. *Am J Public Health*. 2004;94(10):1750-1755.
38. Miller M, Hemenway D. Guns and suicide in the United States. *N Engl J Med*. 2008;359(10):989-991.
39. McCarthy JF, Valenstein M, Blow FC. Residential mobility among patients in the VA health system: associations with psychiatric morbidity, geographic accessibility, and continuity of care. *Adm Policy Ment Health*. 2007;34(5):448-455.
40. Saunderson T, Haynes R, Langford IH. Urban-rural variations in suicides and undetermined deaths in England and Wales. *J Public Health Med*. 1998;20: 261-267.

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Contributors

All authors contributed to developing the study design and analytic plan. R. V. Ignacio and K. L. Austin executed the analyses. J. F. McCarthy and M. Valenstein interpreted and contextualized the findings and wrote the article. All authors approved the article and take responsibility for the accuracy of the analyses.

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Human Participant Protection

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