# *An Analysis of Hospital Visits During the 12 Months Preceding Suicide Death in Northern Alaska*

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**ABSTRACT**

In 2003 the age-adjusted suicide rate in Alaska (20.2 per 100,000) was the second highest in the country and nearly twice that of the U.S. all races population. The suicide rate among Alaska's Native population (35.1 per 100,000) was 1.7 times greater than the rate among all Alaskans and 3.3 times greater than the U.S. all races rate. This retrospective case-control study examined suicide among Alaska Native males living in a northern Alaska region, in an attempt to identify the frequency and nature of contact with medical staff during the 12 months preceding the cases' suicides. Results show that during the last year of life, cases were 2.75 times as likely to have any contact with medical staff, they were 3.29 times as likely to be treated for an injury, and were 22.18 times as likely to be treated for an alcohol-related event than were the matched controls.

**INTRODUCTION**

In 2003, the latest year for which official data were available nationally, suicide was the ll$^{th}$ leading cause of death in the United States, but it was the sixth leading cause of death in Alaska[1]. Approximately 31,000 people took their own lives in the United States in 2003, and estimates indicate that 13 times that number sought treatment for self-inflicted injuries[1]. An average of 118 people die from suicide each year in Alaska, making it the second leading cause of death for Alaskans under 50 years of age. Alaska had the second highest age-adjusted suicide rate of all the states in 2003 at 20.2 per 100,000 (124 deaths), which is nearly double the U.S. rate of 10.8. The suicide rate for Alaska Natives was even higher at 35.1 per 100,000. The estimated years of potential life lost due to suicide in Alaska in 2003 was a staggering 3,416 years.

Clear progress has been made in the scientific understanding of suicide, mental and substance abuse, and in developing interventions to treat these disorders[2]. Much remains to be learned, however, about the common risk factors for self-directed violence and other forms of violence

including homicide, intimate partner violence, and child abuse. Expanding the base of scientific evidence will help in the development of more effective interventions for these harmful behaviors.

The Healthy People Year 2010 Objective 18-1 states, "Reduce the suicide rate to the target of 6.0 suicide deaths per 100,000 population from the current rate of 10.4."[3] Accurate information on risk and protective factors for specific populations (e.g., age, sex, race, etc.) at the national and local level is critical to achieving this objective. Effective intervention strategies must address potentially modifiable social, behavioral, economic, and educational conditions associated with violence.[4-5] However, interventions are often planned and implemented without a systematic understanding of the forces that underlie high risk behaviors in their target populations. One of the recommendations from *The Surgeon General's Call to Action to Prevent Suicide* is to "enhance research to understand risk and protective factors related to suicide, their interaction, and their effects on suicide and suicidal behaviors."[6] Understanding acute risk factors that medical staff may encounter will provide clues to direct critical interventions in a medical setting.

The purpose of this study was to examine suicide in a rural region of Alaska in an attempt to determine risk factors that distinguish those at highest risk for suicide from among the patients with whom medical staff came in contact. To better understand the local risk and protective factors, we retrospectively examined the frequency and nature of the cases' medical visits during the year preceding their suicide death. These data were then compared to a matched control group.

**METHODS**

This study was conducted in a northern region of Alaska. This region has one hospital that provides medical care and public health services throughout the area. Each of the smaller communities in the region are served by that hospital. The study had 30 cases and 30 controls. To be included as a case, the patient must have been an Alaska Native male between the ages of 15 and 35, a resident of the region in which the study took place, and the suicide must have taken place in that same region. Additionally, the case's suicide must have occurred during the years 1990 and 2001. Race was determined by a review of the case's medical record. The controls were matched for race, age, gender and community of residence. Information on race for the controls was collected from tribal enrollment records maintained by the regional native corporation. Only shareholders, people determined to be Alaska Native by the local tribe, were included as cases and controls.

Medical records were collected from community clinics and the regional hospital. We reviewed the medical records for all of the cases and documented all hospital visits in the 12 months preceding the date of the cases' suicide. The hospital medical records for the controls were examined during the same 12 month period as their matched cases. The type of visit (emergency room or scheduled visit), reason for the visit (illness or injury), and the alcohol-relatedness of

each visit were all recorded. We determined the reason for the visit by reviewing the ICD-9 codes in the patient's medical record. A visit was recorded as alcohol-related only if a positive blood alcohol test result was included in the medical record or if the provider made mention of impairment in the patient's medical record.

Patient information was entered in an MS Excel spreadsheet that was stored in a password-protected computer. To further protect confidentiality, after the data were collected a unique identifier was assigned for each case and each control and the name of the patient was removed. If a patient had multiple visits, each visit was entered separately but under the same identifying number. The data were analyzed using SAS version 9.1 (SAS Institute Inc., Cary, NC).

The odds ratio was calculated for each type of visit, indicating if the patients who later committed suicide (cases) were more likely to have had a certain type of visit versus the matched controls. A chi-squared test was used to determine if each odds ratio was significantly greater than one, using a 0.05 level of significance. The average number of visits per person was also calculated for each variable.

**RESULTS**

Overall, 73 percent (N=22) of the cases and 50 percent (N=15) of the controls received care at the hospital during the 12 months prior to the cases' suicide. The cases were 2.75 times as likely to have visited the hospital as were the controls during the 12 month period, but this difference was not statistically significant (Table 1). The cases made a total of 64 visits to the hospital compared to 47 for the controls. The average number of hospital visits per case was 2.1 compared to 1.6 visits per control. Eight (27%) of the cases did not receive any type of medical care during the 12 months prior to their suicide, compared to 15 (50%) of the controls.

Cases were more likely than controls to receive care both in the emergency department and in the outpatient clinic (during a scheduled appointment), but neither of these differences were statistically significant (Table 1). Twenty (67%) of the cases and 14 (47%) of the controls were treated in the hospital's emergency department (OR=2.28). The cases had an average of 1.8 emergency department visits compared to 1.2 visits per control. Seven (23%) of the cases and five (17%) of the controls were treated in the outpatient department (OR=0.52) for an average of 0.3 and 0.4 outpatient visits, respectively.

During the 12 months preceding their death, the cases were less likely to receive medical care for an illness, but more likely to receive care for an injury than were the controls. Eight of the cases and 11 controls received medical care for an illness (OR=0.41), resulting in 0.6 and 1.0 visits, respectively. Fifteen (50%) of the cases were treated for an injury, compared to seven (23%) of the controls. Overall, cases were 3.29 times as likely to have been treated for an injury as were controls (p=0.03). Ten (30%) of the cases and six (20%) of the controls were treated for unintentional injuries, while seven (23%) of the cases and one (3%) control received treatment for intentional injuries (assault or suicide

attempts).

The greatest difference between the cases and controls was found with alcohol-related hospital visits. Thirteen (43%) of the cases' hospital visits were recorded as alcohol related as compared to one (3%) of the controls. Cases were 22.18 times more likely than controls to be treated for an alcohol-related visit than were controls during the 12 months prior to suicide ($p<0.01$). Most of these alcohol-related visits involved treatment for an injury; ten (33%) of the cases received care for an alcohol-related injury, compared to none of the controls.

**DISCUSSION**

This study found that contact with a primary care provider during the year before suicide was common among Alaska Native males living in the region examined. Nearly three-fourths of the cases in our study had contact with a primary care provider during the year before their suicide. Those patients that eventually committed suicide were more frequent users of the health care system than were those that did not commit suicide. These findings are consistent with data from a systematic review that examined 22 similar studies from the United Kingdom, the United States and Sweden. This review found that the rate of contact with primary care providers within one year of suicide averaged 77 percent for all ages, 62 percent for those less than 35 years of age, and 78 percent for men.[7]

Our findings were different, however, from the only study found in the published literature that was also conducted among a Native American population. This study, conducted on a Plains Indian reservation, found that just 24 percent of American Indians that died from suicide used the reservation clinic or hospital for services during the six months prior to their suicide, compared to 54 percent of the controls.[8] Our study found just the opposite; that the cases were nearly three times as likely to receive care at the local clinic or hospital.

One potential outcome of this study may be to develop an emergency room protocol that includes screening for suicidality when patients are treated for alcohol-related injuries and referral to mental health providers for follow-up care as necessary. Several studies have found that brief screening tools can accurately identify suicidality among children and adults in an emergency department.[9-10] While neither of these studies were conducted among Native Americans, or in a rural emergency department, their results suggest that brief screening tools can be successfully administered by non-mental health clinicians in an emergency department setting. Further research is needed to identify which of the many available suicide screening tools are the most appropriate for rural Alaska Natives.

The results from this study may help us identify opportunities to intervene in a patient's life before that person chooses suicide. The data suggest that, at least among Alaska Native males aged 15-34, presentation in the emergency department for an injury, especially an alcohol-related injury, may be an important indicator of suicide risk. In short, the study highlighted the connection between alcohol, alcohol-related injury, and self-injury in northern Alaska.

Table 1: Frequency and nature of hospital visits among cases and their matched controls during the 12 months prior to suicide.

| Nature of patient encounter | Cases (N=30) | Controls (N=30) | Odds Ratio | p-value |
|---|---|---|---|---|
| **Hospital Visits** | | | | |
| At least one visit | 22 | 15 | 2.75 | 0.06 |
| Average visits per person | 2.1 | 1.6 | | |
| **Emergency Room Visits** | | | | |
| At least one visit | 20 | 14 | 2.28 | 0.12 |
| Average visits per person | 1.8 | 1.2 | | |
| **Scheduled Outpatient Visits** | | | | |
| At least one visit | 7 | 5 | 1.52 | 0.52 |
| Average visits per person | 0.3 | 0.4 | | |
| **Illness-related Visits** | | | | |
| At least one visit | 8 | 11 | 0.63 | 0.41 |
| Average visits per person | 0.6 | 1.0 | | |
| **Injury-related Visits** | | | | |
| At least one visit | 15 | 7 | 3.29 | **0.03** |
| Average visits per person | 0.9 | 0.3 | | |
| **Alcohol-related Visits** | | | | |
| At least one visit | 13 | 1 | 22.18 | **<0.01** |
| Average visits per person | 0.5 | 0.03 | | |

*Bold values indicate significance at the 0.05 level.*

**REFERENCES**


1. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2005) [cited 20 September 2006]. Available from URL: www.cdc.gov/ncipc/wisqars.
2. Stoff DM, Mann JJ. Suicide Research. Overview and Introduction. Ann N Y Acad Sci. Dec 29;836:1-11, 1997.
3. U.S. Department of Health and Human Services. *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office, November 2000.
4. Gunnell D, Frankel S. Prevention of Suicide: aspirations and evidence. BMJ. May 7;308(6938):1227-33, 1994.
5. Rosenman SJ. Preventing Suicide: what will work and what will not. Med J Aust. Jul 20;169(2):100-2, 1998.
6. National Strategy for Suicide Prevention: Goals and Objectives for Action. U.S. Department of Health and Human Services, Public Health Service, 2001. Rockville, MD.
7. Luoma JB, Martin CE, Pearson JL. Contact with Mental Health and Primary Care Providers Before Suicide: A Review of the Evidence. AM J Psychiatry. 159:909-916, 2006.
8. Mock CN, Grossman DC, Mulder D, et al. Health care utilization as a marker for suicidal behavior on an American Indian Reservation. J Gen Intern Med. Sep;11(9):519-524, 1996.
9. Horowitz LM, Wang PS, Koocher GP, et al. Detecting suicide risk in a pediatric emergency department: development of a brief screening tool. Pediatrics. May;107(5):1133-7, 2001.
10. Folse VN, Eich KN, Hall AM, et al. Detecting suicide risk in adolescents and adults in an emergency department: a pilot study. J Psychosoc Nurs Ment Health Serv. Mar;44(3):22-9, 2006.



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