

ORIGINAL ARTICLE

EPIDEMIOLOGICAL AND FOLLOW-BACK STUDY OF SUICIDES IN ALASKA

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ABSTRACT

Objectives. To conduct an in-depth analysis of all suicides occurring in Alaska between September 1, 2003 and August 31, 2006, and to conduct follow-back interviews with key informants for select cases.

Study design. Suicide data were gathered from the Alaska Bureau of Vital Statistics, law enforcement agencies and the Alaska medical examiner's office. Trained counsellors administered the 302 branching-question follow-back protocol during in-person interviews with key informants about the decedents.

Methods. Suicide death certificates, medical examiner's reports and police files were analysed retrospectively. Key informants were contacted for confidential interviews about the decedents' life, especially regarding risk and protective factors.

Results. There were 426 suicides during the 36-month study period. The suicide rate was 21.4/100,000. Males out-numbered females 4 to 1. The age-group of 20 to 29 had both the greatest number of suicides and the highest rate per 100,000 population. Alaska Natives had a suicide rate that was three times higher than the non-Native population. Follow-back interviews were conducted with 71 informants for 56 of the suicide decedents.

Conclusions. This research adds significant information to our existing knowledge of suicide in Alaska, particularly as it affects the younger age groups among the Alaska Native population and the role of alcohol/drugs.

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Keywords: suicide, follow-back, Alaska, epidemiology, Alaska Native

INTRODUCTION

In 2005, the latest year for which official data are available nationally, suicide was the eleventh leading cause of death in the United States for all ages and was third among the young (ages 15–24). During the same period in Alaska, suicide was the sixth leading cause of death for all ages and second for the young (1). In 2005, there were 131 suicides in Alaska, which was the third highest rate in the U.S. The suicide rate for Alaska was 19.8/100,000 population, nearly double the U.S. rate of 11.3/100,000. The estimated years of potential life lost from suicide in Alaska in 2005 was a staggering 3,547 years (1).

Follow-back studies are conducted to characterize those who complete suicide by identifying risk and protective factors associated with the death. Suicide risk and protective factors and their interactions form the empirical base for suicide prevention. Risk factors are associated with a greater potential for suicide and suicidal behaviour while protective factors are associated with reduced potential for suicide. Suicide researchers have begun to analyse the unique contributions of individual risk and protective factors as they pertain to specific populations (2). Protective factors can include a group's attitudinal and behavioral attributes and the characteristics of the environment (3). Measures that enhance resilience or protective factors are as essential as risk reduction programs in preventing suicide.

Clear progress has been made in the scientific understanding of suicide, mental health and substance abuse disorders and in developing interventions to treat these disorders (4). Much remains to be learned, however, about those risk factors associated with suicide and other

forms of violence including homicide, intimate partner violence and child abuse, including those that differentiate these behaviours. Expanding the base of scientific evidence may help guide in the development of more effective interventions for these harmful behaviours and methods to promote protective factors.

The Healthy People (HP) 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 (5). Accurate information on risk and protective factors for specific populations (e.g., age, sex, ethnicity, etc.) at the national and local level is critical to achieving this objective. Effective intervention strategies must address potentially modifiable social, behavioural, economic and educational conditions associated with suicide (6). However, prevention activities are often planned and implemented without a systematic understanding of the forces that underlie high risk behaviours in their target populations. One of the recommendations from the Surgeon General's National Strategy (2001) to prevent suicide was “...increase the proportion of jurisdictions that regularly collect and provide information for followback studies on suicides”(7).

The main objectives of the Alaska research as outlined by the state's original request for proposals were to (1) summarize the current epidemiology of suicide in Alaska, (2) learn what risk and protective factors may have been influential in the decedents' lives by conducting personal interviews, (3) develop a better understanding of the use of follow-back interviews in Alaska suicide research, and (4) provide an opportunity for families, friends and loved ones of the decedents to find answers and support for healthy grieving.

MATERIAL AND METHODS

Institutional review board approval

The project methods and procedures were outlined in formal applications to the Institutional Review Boards (IRB) of the Alaska Native Medical Center (ANMC) and the University of Alaska Anchorage (UAA). The follow-back study received approval from both of these IRBs. Additional permissions were requested and received from 5 of the 6 regional Alaska Native Health Corporations. Approval was also received from the National Institutes of Health for a Certificate of Confidentiality.

Approval for the ANMC IRB took nearly 6 months and the UAA IRB took almost 2 months. An additional ANMC stipulation was that each regional Native Health Corporation had to provide written approval before any Alaska Native residing in their region could be interviewed. Ultimately, the approval to participate in an interview had to be voluntarily given by the person identified as a key informant for the decedent.

Case identification and survivor contact

Case identification for the suicide decedents was provided by the Alaska State medical examiner's (ME) office, and included all deaths from suicide occurring from September 1, 2003 through August 31, 2006. Exclusions were made if, after receiving a death certificate, the death was ruled to be other than suicide or was listed as "equivocal" by the state medical examiner's office. Death certificates which were generated for deaths that occurred within the State of Alaska, and which were determined to be suicides, were copied and forwarded to the Alaska Injury

Prevention Center (AIPC) for inclusion in the study by the state ME's office.

We hoped to secure a random sample of the suicide deaths from which to conduct interviews, but this was not possible because of financial constraints and the difficulty of finding willing interviewees. We also wanted to obtain interviews with 2 key informants for each decedent, but this turned out to be impractical for a variety of reasons, including our inability to obtain contact information for next of kin (NOK). Some NOK lived in another state, NOK moved after the death, no NOK were detected or they chose not to participate. Most of the NOK who chose not to participate did not give a reason, but some of the reasons that were given included "Don't want the kids to know it was suicide," "Too painful to talk about" and "We don't believe it was suicide."

Each case was entered into a database at AIPC and given a unique case identifier. Information provided on the death certificate, the medical examiner's report and the police reports was used to contact survivors for permissions regarding potential interviews.

After reviewing several follow-back interview protocols (8–11), which used an interval between date of death and date of interview ranging from contact of key informants immediately after the suicide to up to 3 months or more before contact was made, we decided on a 6-week interval. Waiting for 6 weeks before contacting the key informants with requests for interviews was ideal for the Alaska study because of the religious beliefs of the Russian and Greek Orthodox religions, which are prevalent among the Native population of Alaska. These religions believe the deceased person's spirit stays in the pres-

ence of the survivors for 42 days. Many times the contact information for next of kin took more than 6 weeks to obtain. An initial letter was sent to each key informant with condolences and an invitation to sit down with our trained interviewers to talk about the decedent's life. Each request for an interview contained a stamped, self-addressed return envelope, so the survivor only had to check a box for "yes" or "no," provide her/his contact information and send it back to AIPC. When we were able to make an initial request based on contact information but not receive a response, we sent follow-up letters and made telephone calls in order to increase the number of successful contacts.

Major data sources and elements

Death certificate: Including patient identifiers (later redacted), demographics, time and location of death, autopsy involvement, primary/contributory causes of death and manner of death.

Medical examiner's report: Including patient identifiers (later redacted), age, sex, race, mechanism of injury, address and specific location of death, next-of-kin identification, description of death scene, toxicology and blood alcohol levels if taken.

Autopsy transcript: Including co-morbid factors, quantification of injuries, detailed description of injuries, factors identified which contributed to death.

Law enforcement report: Including a description of events leading up to the incident, description of the event, type of weapon or other mechanism of injury and where patient was pronounced dead.

This information was documented based on investigative summaries prepared by Alaska State Troopers and law enforcement agencies.

Other data sources: The original research plan called for the acquisition and analysis of additional data sources, including medical, mental health, court records, employment and educational records when available. The medical, mental health and school records were very difficult to obtain but were included in the database when the police or medical examiner's reports included them. Approximately 3% of the records contained these additional data sources.

Follow-back interview data: The follow-back interview tool contained 302 questions and took an average of 90 minutes to complete. The research team sought to conduct follow-back interviews with at least 2 key informants for approximately one-third of the suicide decedents.

Statistical analyses

All records were entered into Microsoft Excel for administrative record tracking. A more detailed database, inclusive of all data elements, was constructed and analyzed using SPSS (Statistical Program for Social Science v.15) software. Data were abstracted from each case record using a standardized checklist before computer entry. All data entry into the SPSS database was completed by a single researcher for uniformity. Descriptive (t-test) and non-parametric (chi-square) analyses were used, and where appropriate to the statistical test, level of significance was established at .05.

RESULTS

During the 3-year study period from September 1, 2003 to August 31, 2006, there were 426 suicides identified in Alaska. The 156 suicide deaths in 2004 represented the largest number of deaths from suicide in more than a decade with the previous high of 135 suicides occurring in 2000. The suicide rates per 100,000 population for Alaska were 23.0 in 2004, 19.9 in 2005 and 20.3 in 2006.

We were able to contact 217 next of kin (NOK), of which 92 (42%) agreed to be interviewed and 70 (32%) actually completed an interview. Data from the 70 follow-back interviews, which involved 56 suicide cases (13%), were entered into a separate database for analysis. Table I shows

the comparison between the 56 interviewed cases and the remaining sample of 370 non-interviewed cases. The 2 groups were very similar except for their racial breakdown and the corresponding urban/rural living environment.

Monthly and seasonal variation

A monthly distribution of suicides was compiled using the 36 months of data from the study period. Tests of significance confirmed no monthly variation ($\chi^2=4.282$, $df=11$, $n=426$, $p=0.961$). When the monthly data were collapsed into seasonal groupings (Winter = December, January, February; Spring = March, April, May; Summer = June, July, August; Fall = September, October, November) no seasonal variation emerged ($\chi^2=1.2$, $df=3$, $n=426$, $p=0.75$).

Table I. Comparison of results from interviews and all cases.

Criteria	Interviewed cases (56)	Non-interviewed cases (370)
Gender		
Male	80%	79%
Female	20%	21%
Race		
Native	20%	40%
non-Native	80%	60%
Mechanism		
Firearm	66%	63%
Asphyxiation	25%	24%
Drugs	7%	8%
Type of firearm		
hand gun	34%	34%
long gun	32%	26%
Location		
Urban	79%	54%
Rural	21%	46%
Alcohol/drug use		
positive	18%	24%

Age/age groups

During the 3-year reporting period the greatest number and the highest rates of suicide occurred in the younger age groups, a major contrast from national data which show the highest rates in the 80+ age group. Suicide in the 20–29 year old age group (n=117) represented 28% of the total Alaska suicides for the study period. The suicide rate by age group for the 20–29 year group was 47.8/100,000, followed by the 30–39 group with 30.8/100,000, and then the 80+ group at 28/100,000. Alaska Natives (mean age 29.8) were younger at the time of death than the Caucasian (mean age 40.8) suicide decedents (t=7.28, n=403, p=0.001).

Race

Race was indicated for 421 cases, with 58% Caucasian, 38% Alaska Native/American Indian, 4% all others. The distribution of suicide by race shows a greater proportion of Alaska Natives dying by suicide than Caucasian or “other” racial categories. Although Alaska Natives comprise 16% of the total Alaska population, they accounted for 38% of the 426 suicides. There is a difference in the suicide death rate per population for Alaska Natives when compared to either the Caucasian or “other” racial sample ($\chi^2 = 93.4$, df=2, n=421, p<0.001).

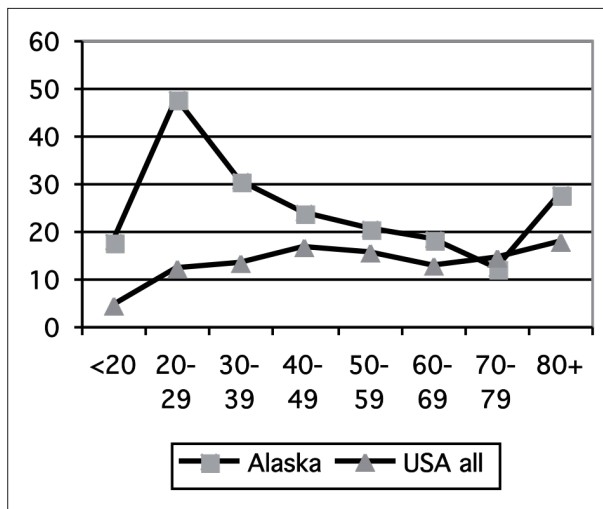


Figure 1. Age group suicide rates for Alaska and U.S.

Table II. Mechanism used in suicide, by race.

Mechanism used	Native	Non-Native	AK-all races	U.S.-all races
Firearms	60% (93)	65% (172)	63% (270)	54%
Suffocation	32% (55)	17% (44)	23% (99)	21%
Poisoning	6% (7)	15% (39)	11% (46)	17%
Other	2% (4)	3% (7)	3% (11)	8%
Total Cases	100% (159)	100% (262)	100% (426)	31,484

Mechanism of suicide

The selected mechanisms of suicide were divided into groups, consistent with national nomenclature. Therefore, hanging, plastic bags and other forms of suffocation were grouped into “suffocation.” Drug overdoses, toxic substances and carbon monoxide deaths were grouped as “poisons.” Other types of suicide where very small numbers were involved, such as jumping, cutting, drowning, etc., were grouped as “other.” The 3 leading mechanisms of suicide were firearms, suffocation and poisoning, with firearms accounting for 63% of all suicides.

The primary mechanism of suicide varied significantly between Alaska Natives and non-Natives. Mechanism was reported for 426 cases, that is, all cases, while race was reported for 421 of the cases. Of those 421 cases, 262 were non-Native and 159 were Alaska Native. There is a difference between Natives and non-Natives with regard to the mechanism used ($\chi^2=24.095$, $df=3$, $n=421$, $p<0.001$).

Regional differences

During this 3-year study period there were great variations in suicide rates by region of the state. Rates were calculated using the number of suicides per 100,000 population for each region, but the small number of suicides in some regions made this calculation subject to error. The regions identified in the Alaska Native Claims Settlement Act, enacted by the U.S. Congress in 1971, were used as the standard for dividing the state into 12 regions. Data from our research showed that generally the north-western regions of the state had the highest rates of suicide and the Aleutian Islands/Alaska Peninsula and the south-eastern regions had the lowest rates (see recommendations).

Alcohol/drug use

The cases involving alcohol and/or drug use at the time of death were combined into a single “substance abuse” category. Toxicology tests were requested and samples were collected for 195 of the deaths, but only 133 (31%) of the 426 decedents had toxicology results in their files. Of the 133 toxicology tests performed, 61 (46%) had a measurable alcohol level in their blood at the time of death. Of these 61 decedents, 40 (66%) had a blood alcohol level equal to or greater than .08 mg/dl. Sixty-seven (67) (50%) decedents tested positive for one or more non-prescription or illegal drugs. We excluded drugs from this category which were non-addictive prescription or over-the-counter drugs (anti-depressants, Tylenol, etc.) or addictive prescription drugs within therapeutic levels (Oxycodone, Ambien, etc.). THC (marijuana) was found in 21 (31%) of the toxicology tests that were positive for drugs.

When the toxicology results were stratified by race of the decedent, we found no difference in positive alcohol or non-prescription/illegal drug results between the Alaska Native sample and the non-Native sample.

Using the federal subsistence guidelines that identify Alaskan communities having over 7,000 residents as being urban, we found that 58% of the suicides were from the urban communities. These same communities included 57% of the statewide total population.

Another urban/rural comparison was made for alcohol and/or drug use by race. Alcohol/drug use was positive on 133 of the toxicology tests. Urban Natives had 80% (12/15) positive toxicology tests, while rural Natives had 67% (14/21) positives. For non-Natives, the toxicology results were essentially the same for urban as for rural at 71% and 74%, respectively.

Data specific to the follow-back interviews

Of the 217 NOK contacted for interviews, 15% were fathers, 15% were mothers, 18% were other family, and 13% were spouse/significant other. The relationship to the decedent of the 70 people who completed interviews included 24% spouse/significant other, 20% mother, 8% father, 18% other family. Data from the follow-back interviews were entered into a separate database for analysis. A sample of the important findings discovered from the 56 cases where an interview was completed with the decedent's next of kin or loved one are shown below:

- 78% were reportedly not getting the mental health care they needed.
- 78% of those who had a firearm readily available to them, used a firearm to take their life.
- 62% were reportedly taking prescription medications for mental health problems.
- 60% were active smokers.
- 59% were reportedly experiencing an event that caused a great deal of shame.
- 54% stopped working in the past year.
- 54% were reportedly marijuana users.
- 54% had an illness or disability that made normal daily routines difficult.
- 46% of the decedents were reportedly intoxicated by drugs or alcohol at the time of death.
- 43% drank alcohol daily and the same numbers were reportedly binge drinkers.
- 43% had made previous attempts.

DISCUSSION

In contrast to national U.S. data for suicide, the age group with the highest suicide rate in Alaska was the 20–29 year group at 47.8/100,000 followed by the 30–39 group with 30.8/100,000, and then the 80+ group at 28/100,000. For the years 2004–2006 nationally, suicide rates were highest in the 80+ age group, followed by the 40–49 group. Nationally, the 20–29 age group ranked seventh overall at 12.3/100,000 (1).

A common misconception about suicide in Alaska is that it is related to the long hours of darkness and cold weather during the extended winter months. Our research found no significant monthly or seasonal variation during the 36-month study. Since the number of suicides was relatively low during the 3-year study, we conducted a 14-year analysis of suicides in Alaska by month which also revealed no significant variation by month, confirming our findings (12).

The age differences for suicide between Alaskan Natives and their neighbouring Caucasian counterparts are consistent with other research on Native and Aboriginal peoples. Sanddal (13) found a similar mean age disparity between American Indians of the northern plains. Likewise, the Alaskan Native death rates in our study were similar to those of First Nations suicide death rates in Canada (14,15). The Aboriginal suicide rates for youth ages 15–24 are more than five times higher than the national rates, while the all-age suicide rate is only three times the national rate. The age group of 20–29 years had the highest rate of suicide, the lowest rate of firearm use, and the highest rate of suffocation of all the age groups.

The earlier deaths by suicide for Alaska Natives have not only been an immense personal and cultural burden, but there also have been clear fiscal ramifications that are measured by the years of productive life lost. Many hypotheses have been proposed relative to the higher rates of suicide among some American Indians, Alaska Natives and First Nations people of Canada. Among these are generational grief over the European invasion and subsequent confiscation of lands, forced acculturation and associated loss of traditional spiritual and cultural values, lack of educational and employment opportunities for youth, socio-economic disparities between a subsistence and capitalistic culture, high rates of alcohol and drug use and dependence and lack of mental health support. The exploration of these hypotheses was, clearly, beyond the scope of this project but does not diminish the need for additional refinement of these working theories.

The lower rate of suicide among the very old in the Native Alaskan culture is, also, consistent with findings from research conducted on various tribes of American Indians. It has been postulated that this reduction may be due, in part, to a revered position for elders within these cultures. Certainly, if protective factors associated with these lower rates of suicide could be transferred across races and ethnic populations, it would have a remarkable effect on elder suicide rates.

Of additional note is the regional variation of suicide rates during the study period of this project. Each of the regions is largely represented by a specific tribe, band or clan of Alaska Natives. The fact that this variation exists confirms previous work by May and Van Winkle (16) concerning the varia-

tion of suicide between various tribes, bands and clans of south-west American Indians. Identifying differences between these regions may hold a key to promoting the development of protective factors among other segments of Alaska Natives. It also reminds future researchers that collapsing all Alaska Natives into a single ethnic category is fraught with variability within the group.

The proportion of suicides by firearms was consistent between the racial groups in Alaska, but the deaths using suffocation (hanging) was nearly twice as high (1.8:1) for Alaska Native compared to the non-Native decedents. The rates for these 2 mechanisms (firearms and suffocation) were again consistent between the Alaskan Natives in this study and previously reported rates for American Indians of the northern plains (3). Poisoning, primarily drug overdoses, showed the opposite results with non-Natives accounting for more than twice (2.5:1) the occurrence of Alaska Natives.

The relationship between firearms and suicide is well established in the literature (17,18). This is particularly true if firearms are readily accessible to youth who have a much shorter time distance between choosing death by suicide and completion of the event. Higher rates of suffocation among American Indians have been noted (13). American Indian survivors of near suicide from suffocation have reported that the method was chosen because they wanted to have an open casket viewing for their friends to say goodbye.

When comparing alcohol/drug use for the 426 cases, we found 325 cases where the investigating officers or the medical examiner's office reported the use of alcohol and/or drugs by the decedent at the time of death.

This “reported” use was positive for 200 cases, negative for 125 cases. These anecdotal reports could not be corroborated by toxicology reports because there were only 195 toxicology tests requested and 133 received. According to the National Violent Death Reporting System (NVDRS), of the 13 states collecting data on suicides, only 1 state (Oregon) had a lower toxicology testing frequency than Alaska. The states with the highest testing frequency were Virginia (97.7%) and Rhode Island (96.5%). In the NVDRS report, Alaska reported toxicology samples being tested for 41.1% of the decedents (19). The disparity between rates of 41.1% noted in NVDRS and the 31% associated with this study cannot be explained.

According to the NVDRS study mentioned above, marijuana tested positive in 7.7% of the cases, whereas in the present study, marijuana was positive in 16% of all the toxicology screens and 31% of the positive drug screens. Of the Alaskan cases where follow-back interviews were conducted, 54% were reported to be marijuana users and 43% were binge drinkers. The Alaska Behavioral Risk Factor Survey (ABRFS) in 2005 showed a self-reported binge-drinking rate of 17.5% for all Alaskans (20).

No interviewee quit an interview, once it was initiated. In fact, one of the greatest successes of this research was the nearly unanimous positive effect the interviews had on NOK. They were grateful to be able to talk with someone at length about all the different facets of their loved one’s life. Most survivors said they appreciated the interviewer being a stranger and that the discussion was confidential. Many were suffering from guilt, remorse, sorrow and other deeply

held personal feelings that they appreciated being able to share with someone. These findings were consistent with previous reports in the literature (8–11).

Limitations

The Alaska Suicide Follow-back Project was conceived and funded by the state of Alaska and the Alaska Mental Health Trust Authority. AIPC was contracted to do the research and as such was limited by funding and time constraints. Approvals from the Institutional Review Boards (IRBs) and the Alaska Native groups took almost a year to obtain, and one Regional Native Health Corporation chose not to participate. The key informants who agreed to be interviewed may or may not have been the person who knew the decedent the best. For example, a spouse may have known the decedent’s current life events better than anyone else, but a grandparent was the only person willing to be interviewed.

There was a high degree of variability in the suicide information available to the researchers. Many death certificates, and a few of the medical examiner’s (ME) reports, could not be supplied to AIPC. Other ME reports had missing data, including race, military service, occupation, education and marital status, at the time they were transmitted to AIPC. Alcohol use and drug use at the time of death are fields on the Anchorage Police Department’s Death Investigation Report and on the Department of Public Safety reports but were not always completed. The face sheet for the ME’s office does not have a field for suspected alcohol or drug use. Details about a person’s mental health or altered mental state are important and should be routinely gathered by death

investigators for all suicides. The medical, mental health and school records were very difficult to obtain but were included in our database when the police or medical examiner's reports included them. Only about 3% of the records contained these additional data sources.

Attempts were made to obtain records from the decedents' schools, mental health treatment, court cases and medical records. While some records were obtained, the majority were not provided, with federal privacy restrictions being cited as the reason, that is, the Family Educational Rights and Privacy Act and the Health Insurance Portability and Accountability Act.

Alaska Natives were under-represented in the interview process, making it difficult to apply follow-back interview results to Alaska Native suicide cases in general. There may also have been some racial differences in the likelihood of toxicology samples being collected. Alaska Natives typically live in remote locations where blood or vitreous samples are logistically and culturally more difficult to obtain.

Interviews with a matched control group were impractical within the scope and budget of this research, but would have added a great deal of comparative information.

Recommendations

Death scene investigations can reveal important information about the circumstances of a suicide and the decedent's current situation. This information can be useful in understanding the decedent's state of mind and enhancing prevention efforts. Emergency response personnel, police and medical examiners can all contribute to the collec-

tion of these data. The processes, procedures and reporting forms for death scenes should be standardized to include items essential to furthering our understanding of suicide. Toxicology screens should be included in all suicide deaths to the degree practical in an isolated state like Alaska. Suspicions of drug or alcohol use at the time of death should be noted as "suspicions" until confirmed or refuted by toxicology results which, when completed, should become part of the medical examiner's record for the case.

Suicide rates should be analysed by ethnic origins for the Alaska Native decedents to determine if protective or risk factors are associated with various Native cultures. Our 3-year research project determined suicide rates by geographic region but the numbers were too small to draw conclusions. In looking at 14 years of State Bureau of Vital Statistics suicide data by region, we found very high rates (70–90/100,000) for some of the north-west Arctic and western Alaska regions and very low rates (14–18/100,000) for the Alaska Peninsula, Aleutian Islands and south-east Alaska. These differences require further study to determine the possible protective and/or risk factors associated with the various ethnic groups that inhabit these regions.

Members of Institutional Review Boards should be educated to recognize the limited risk and the positive therapeutic value of follow-back interviews and to streamline access to substantiating databases, including health care and mental health care records. Ongoing follow-back interviews should be conducted because they increase our understanding of suicide and because they have very positive therapeutic effects on the survivors.

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