

Demographic, Clinical, and Service Utilization Factors Associated with Suicide-Related Visits among Alaska Native and American Indian Adults

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Alaska Native and American Indian people (AN/AIs) are disproportionately affected by suicide. Within a large AN/AI health service organization, demographic, clinical, and service utilization factors were compared between those with a suicide-related health visit and those without. Cases had higher odds of a behavioral health diagnosis, treatment for an injury, behavioral health specialty care visits, and opioid medication dispensation in the year prior to a suicide-related visit compared to gender-, age-, and residence- (urban versus rural) matched controls. Odds of a suicide-related visit were lower among those with private insurance and those with non-primary care ambulatory clinic visits.

Many people who die by suicide seek health care just prior to their death. Nationally, 77% of suicide decedents contact a primary care provider in the year before death; 32% see a behavioral health (BH) provider (Luoma, Martin, & Pearson, 2002). The U.S. Surgeon General recommends screening for suicide risk in health care settings (U.S. Public Health Service, 1999); however, understanding the most efficient and effective way to assess and intervene remains an

important area for investigation (U.S. Preventive Services Task Force, 2014).

The average annual suicide death rate among Alaska Native and American Indian people (AN/AIs) in Alaska's southcentral region is more than 50% higher than the U.S. all races rate. Indeed, suicide is the leading cause of injury death among AN/AIs aged 15 to 24 in Alaska. Moreover, significant morbidity has been incurred: 17.7 versus 5.3 per 10,000 were hospitalized after suicide attempts for AN/AIs in the southcentral region versus non-Native people statewide, respectively (Injury Prevention Program and the Alaska Native Epidemiology Center, 2014).

Two Alaska-wide studies of service utilization associated with suicide have been conducted with mixed samples of non-Native people and AN/AIs. In one, most people (64%) sought health care from a doctor in the 6 months prior to their death. Thirty-nine percent saw a BH counselor or therapist in the last year of life (Perkins,

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Sanddal, Howell, Sanddal, & Berman, 2009). In the second, a greater proportion of people attempting suicide were single, unemployed, and had less than a high school education as compared to the 2000 U.S. Census general population. Fatal versus nonfatal attempts were more likely among males, people 25 years of age or older, and people with a substance abuse history (Wexler, Hill, Bertone-Johnson, & Fenaughty, 2008). The only comprehensive investigation of service utilization specific to AN/AIs occurred in one rural northern region (Hill, Perkins, & Wexler, 2007). In the year prior to death by suicide, AN males ($n = 30$) were 2.8 times more likely to receive hospital treatment and 22.2 times more likely to be treated for an alcohol-related injury than controls ($n = 30$).

To better understand how the tribal health care system in Alaska could respond to this increased risk of suicide, we retrospectively examined the demographic, clinical, and service utilization characteristics of AN/AIs with a suicide-related visit.

METHOD

Setting

Southcentral Foundation (SCF), a tribally owned and operated health care facility in Anchorage, Alaska, provides primary health care services to more than 65,000 AN/AIs residing in southcentral Alaska. The primary care clinic (PC) is staffed by 36 clinical workgroups, each composed of a lead physician, advanced nurse practitioner or physician assistant, a registered nurse, and one or more Certified Medical Assistants or Licensed Practical Nurses. A master's level Behavioral Health Consultant (BHC) is shared among several PC workgroups and supports routine screening and management for depression and substance abuse, including interventions when questions about suicide potential arise.

In addition to PC services, SCF offers other specialty care including outpa-

tient and residential BH services. SCF BH services are also offered to the Alaska Native Medical Center (ANMC) emergency/urgent care and inpatient units. Comanaged by SCF and the Alaska Native Tribal Health Consortium, ANMC is 150-bed hospital providing secondary and tertiary services for approximately 136,000 AN/AIs in all regions of Alaska. Inpatient psychiatry services are provided at private hospitals or a state-run public facility.

Project approval was granted by the Alaska area institutional review board and governing tribal organizations. Both SCF and ANMC used the Resource and Patient Management System (RPMS) as the electronic medical record and SIGNATURE as their billing software package at the time of the study (Gartner, 2002; Indian Health Service, 2015).

Participants

Cases comprised all AN/AIs seen at an SCF clinic or ANMC between January 1, 2005, and December 31, 2009, with a diagnostic code for a self-inflicted injury or death (ICD-9-CM codes e-950 to e-959). The sample was restricted to adults because of special considerations for research involving children and because only adults receive depression and substance abuse screening in the SCF PC clinics. As explained later, data were abstracted for a year before the index visit; thus, only those 19 and older at this visit were included. Cases were matched with AN/AIs who were the same age in years on the date of the suicide-related index visit, gender, and residence type (urban vs. rural). The most recent visit was used as the index visit if more than one suicide-related visit was present.

Measures

For all cases and controls, additional demographic, clinical, and service use factors were extracted and then categorized according to the distribution, with particular attention to the avoidance of small cell sizes

that could inadvertently identify individual AN/AIs.

Other demographic factors included marital status, insurance status, religious affiliation, and zip code to estimate median income.

Assessed the year prior to and 6 months after index visit, the clinical factors included depression and substance abuse screening score(s); ICD-9-CM diagnostic codes for number of BH conditions, physical conditions, and injuries; and medications dispensed. Depression screening was conducted with the Patient Health Questionnaire-2 (PHQ-2; i.e., depressed mood and anhedonia) with a cutoff score of 3, immediately followed by the PHQ-9 when cutoff was reached. Substance abuse screening was conducted with a modified Alcohol Use Disorders Identification Test (AUDIT) with a cutoff score of 7 for women and 8 for men. The score closest to the date of the suicide-related index visit was used when more than one depression or substance abuse screening score was recorded. ICD-9-CM BH diagnostic codes included mood, anxiety, impulse control, pain, psychotic, personality, and substance abuse disorders. Psychotropic medications included antidepressants, benzodiazepines, mood stabilizers, and antipsychotics. Injuries included fractures, dislocation, sprain, and other. Physical conditions encompassed acute myocardial infarction, angina, congestive heart failure, chronic obstructive pulmonary disorder, dementia, diabetes, malignancy, osteoarthritis, spine disorder, and stroke.

Service utilization included number and type of visits within PC clinics, BH care, emergency/urgent care, and other ambulatory clinics like women's health. For PC visits involving a BHC as well as BH specialty care visits, number of visits was categorized as none, one, or two or more visits. Both PC visits and other ambulatory visits were categorized as none, one or two, three to six, and seven or more. Number of ANMC inpatient days was quantified as none, or one or more.

Among cases only, means of self-harm were categorized into highly and less lethal

levels. Highly lethal means included firearms or suffocation and less lethal included poisoning, cutting, other means such as drowning and falling, and sequelae (e.g., liver disease after poisoning). Limited, easily accessible data were also assembled for all adult AN/AIs seen at a SCF clinic or ANMC to depict how cases and controls compared to the broader service population (referred to as total service population).

Statistical Analyses

Descriptive analyses of demographic, clinical, and service utilization data were conducted for cases, controls, and the total service population. Fisher's exact tests investigated potential differences by degree of lethality, comparing high and less lethal means among cases.

Univariable conditional logistic regression estimated the odds ratio (OR) and 95% CI for a suicide-related visit by demographic, clinical, and service utilization factors in the year prior among cases and controls. All factors with a univariable association of $p < .25$, with the exception of marital status and religion, were included in the multivariable models and interactions investigated (Hosmer & Lemeshow, 2000). Cases and controls missing values on one or more factors were excluded from subsequent multivariable models.

RESULTS

Most of the 890 cases were female (58%), the mean age was 31.9 years ($SD = 11.4$), and 65% lived in urban areas (Table 1). Cases were younger ($p < .0001$) and more urban ($p < .0001$) than the total service population. A substantial proportion of cases ($n = 165$, 19%) had more than one suicide-related visit.

As shown in Table 2, 75% of cases were not married (never married, divorced, separated, or widowed) compared to 68% of matched controls. More than half of cases (56%) and controls (54%) lived in an

TABLE 1
Gender, Age, and Residence Characteristics of Cases and Total Service Population

| | Cases ^a (N = 890) | | Total Service Population ^b (N = 64,528) | | p |
|---------------------------|---------------------------------|----|---|----|--------|
| | N | % | N | % | |
| Gender | | | | | |
| Female | 520 | 58 | 36,225 | 56 | .17 |
| Male | 370 | 42 | 28,303 | 44 | |
| Age in years ^c | | | | | |
| 19–24 | 310 | 35 | 13,106 | 20 | <.0001 |
| 25–34 | 279 | 31 | 13,883 | 22 | |
| 35+ | 301 | 34 | 37,539 | 58 | |
| Residence | | | | | |
| Rural | 315 | 35 | 30,280 | 47 | <.0001 |
| Urban ^d | 575 | 65 | 34,248 | 53 | |

^aAlaska Native/American Indian adults with a diagnostic code for a self-inflicted injury between 2005 and 2009.

^bAlaska Native/American Indian adults with any visit between January 1, 2005, and December 31, 2009.

^cAs of most recent suicide-related visit.

^dIncludes Anchorage, Eagle River, Chu-
giak, Palmer, Wasilla, and Willow.

area with a median income of \$49,999 or less. Twenty-one percent of cases received Medicaid/Medicare compared to 11% of controls. Most cases (79%) and controls (75%) had a religious affiliation recorded in their electronic medical record. In comparison, 55% of the total service population was not married, 42% received Medicaid/Medicare, and 76% had a recorded religious affiliation. Of cases, 75% had one or more BH conditions compared to 7% of controls. Most cases (75%) and controls (84%) were not screened for depression or substance abuse in the year prior. Of AN/AIs screened, 25% and 9% of cases and 10% and 9% of controls were positive for depression and substance abuse, respectively. One or more physical conditions was present among 24% of cases; 42% of cases had a health care visit with an injury-related diagnosis. Psychotropic medication was over seven times more likely among cases

versus controls; opioid use four times more likely among the former. By way of context, 27% of the total service population had a BH condition, 26% had a physical condition, 38% had an injury-related visit, 60% had an opioid medication dispensed, and 2% had a psychotropic medication dispensed. All ambulatory service utilization and inpatient service utilization was greater among cases than among controls. For context, the mean number of visits, by clinic type, for the total service population was as follows: BH specialty 7.3 (*SD* = 11.4), other ambulatory 12.5 (*SD* = 18.8), and emergency/urgent care 4.6 (*SD* = 6.3). Twenty-eight percent of the total service population had at least one inpatient stay; comparable percentages were 18% and 10% for cases and controls, respectively.

All demographic, clinical, and service utilization factors were statistically significant in univariable analyses ($p \leq .01$) comparing cases to controls (Table 3) except religious affiliation ($p = .056$). A total of 877 cases (96%) and 886 controls (> 99%) were included in multivariable models. Income ($p = .332$), depression ($p = .684$), substance abuse screening ($p = .410$), physical conditions ($p = .514$), psychotropic medication ($p = .198$), PC visits ($p = .188$), BHC visits ($p = .818$), emergency/urgent care visits ($p = .642$), and inpatient stays ($p = .648$) were not statistically significant in the multivariable model. Multivariable results presented exclude marital status and religious affiliation given missing data for a large number of individuals, low statistical significance ($p = .71$ and $p = .57$, respectively) in univariable models, and no change in multivariable estimates, significance, or direction when included.

When compared to those with private insurance, AN/AIs receiving Medicaid or Medicare benefits had approximately three times the odds and AN/AIs with no insurance had about two times the odds of a suicide-related visit ($p = .013$). Those with a BH condition ($p < .001$) and those treated for an injury ($p < .001$) were more likely to have a suicide-related visit. In addition,

TABLE 2

Demographic, Clinical, and Service Utilization Factors in the Year Prior to a Suicide-Related Visit among Cases, Matched Controls, and Total Service Population

| Factor | Missing | Suicide-related Visit (N = 890) | | No Suicide-related Visit (N = 890) | | Total Service Population (N = 64,528) ^a | |
|---|---------|------------------------------------|----|---------------------------------------|----|---|----|
| | | N | % | N | % | N | % |
| Demographic ^b | | | | | | | |
| Marital status ^c | | | | | | | |
| Single | 145 | 630 | 75 | 546 | 68 | 33,129 | 55 |
| Married | | 141 | 17 | 226 | 28 | 21,731 | 36 |
| Divorced/separated/widowed | | 69 | 8 | 23 | 3 | 5,626 | 9 |
| Estimated Income ^d | | | | | | | |
| 0–39.9 K | 7 | 190 | 22 | 162 | 18 | — | — |
| 40–49.9 K | | 302 | 34 | 320 | 36 | — | — |
| 50–59.9 K | | 199 | 23 | 230 | 26 | — | — |
| 60 K+ | | 192 | 22 | 178 | 20 | — | — |
| Insurance status | | | | | | | |
| None | | 599 | 67 | 657 | 74 | 37,315 | 58 |
| Medicaid/Medicare | | 185 | 21 | 97 | 11 | 10,885 | 17 |
| Any private insurance | | 106 | 12 | 136 | 15 | 16,328 | 25 |
| Religious affiliation ^e | | | | | | | |
| None | 164 | 177 | 21 | 196 | 25 | 13,575 | 24 |
| Any | | 667 | 79 | 576 | 75 | 42,822 | 76 |
| Clinical | | | | | | | |
| One or more behavioral health conditions ^f | | 668 | 75 | 58 | 7 | 17,258 | 27 |
| Depression screening score(s) ^g | | | | | | | |
| Absent in year prior | 10 | 664 | 75 | 747 | 84 | — | — |
| Negative in year prior | | 165 | 19 | 125 | 14 | — | — |
| Positive in year prior | | 55 | 6 | 14 | 2 | — | — |
| Substance abuse screening score(s) ^h | | | | | | | |
| Absent in year prior | | 669 | 75 | 749 | 84 | — | — |
| Negative in year prior | | 201 | 23 | 128 | 14 | — | — |
| Positive in year prior | | 20 | 2 | 13 | 1 | — | — |
| One or more chronic physical condition | | 211 | 24 | 32 | 4 | 16,979 | 26 |
| One or more injury | | 378 | 42 | 54 | 6 | 24,280 | 38 |
| Opioid medication dispensed | | 394 | 44 | 100 | 11 | 38,415 | 60 |
| Psychotropic medication dispensed | | 346 | 39 | 44 | 5 | 1,290 | 2 |
| Service utilization | | | | | | | |
| Primary care visits | | | | | | | |
| None | | 313 | 35 | 464 | 52 | — | — |
| One or two | | 190 | 21 | 224 | 25 | — | — |
| Three to six | | 214 | 24 | 146 | 16 | — | — |
| Seven or more | | 173 | 19 | 56 | 6 | — | — |
| Behavioral health consultant visits | | | | | | | |
| None | | 732 | 82 | 839 | 94 | — | — |
| One | | 65 | 7 | 33 | 4 | — | — |
| Two or more | | 93 | 10 | 18 | 2 | — | — |

(continued)

TABLE 2
(continued)

| Factor | Missing | Suicide-related Visit (N = 890) | | No Suicide-related Visit (N = 890) | | Total Service Population (N = 64,528) ^a | |
|---|---------|------------------------------------|----|---------------------------------------|----|---|----|
| | | N | % | N | % | N | % |
| Primary care provider change | | 72 | 8 | 71 | 8 | — | — |
| Behavioral health specialty care visits | | | | | | | |
| None | | 686 | 77 | 846 | 95 | 60,130 | 93 |
| One | | 43 | 5 | 20 | 2 | — | — |
| Two or more | | 161 | 18 | 24 | 3 | — | — |
| Other ambulatory visits | | | | | | | |
| None | | 280 | 31 | 362 | 41 | 11,402 | 18 |
| One or two | | 220 | 25 | 227 | 26 | — | — |
| Three to six | | 193 | 22 | 153 | 17 | — | — |
| Seven or more | | 197 | 22 | 148 | 17 | — | — |
| Emergency or urgent care visits | | | | | | | |
| None | | 291 | 33 | 509 | 57 | 24,590 | 38 |
| One or two | | 252 | 28 | 261 | 29 | — | — |
| Three or more | | 347 | 39 | 120 | 13 | — | — |
| One or more inpatient stays | | 160 | 18 | 88 | 10 | 18,227 | 28 |

^aAlaska Native/American Indian adults with any visit between January 1, 2005, and December 31, 2009.

^bAs of date of electronic query.

^cMissing 4,042 values for Total Service Population.

^dBased on average income per zip code of residence.

^eMissing 8,131 values for Total Service Population.

^fIncludes mood, anxiety, impulse control, pain, psychotic, personality, and substance abuse disorders.

^gScreening with Patient Health Questionnaire, scores of 10 or above positive.

^hPrimary care screening with modified Alcohol Use Disorders.

AN/AIs with opioid medication dispensation ($p < .001$) and those with a higher number of BH specialty visits ($p = .021$) had higher odds of a suicide-related visit. AN/AIs with increased ambulatory visits outside of PC ($p = .002$) had lower odds of a suicide-related visit after adjustment for demographic, clinical, and service utilization factors, but higher odds in the univariable model. A forward stepwise conditional logistic regression examined performance of this odds ratio. The odds became less than one as number of BH conditions was added to income and insurance status.

As seen in descriptive statistics for the 6 months after the index visit (Table 4), 28% of cases were seen in a PC one or two times

and another 26% were seen three or more times. Of cases, 18% saw a BHC and 22% had a BH specialty visit. Roughly a quarter (26%) of cases had an inpatient stay and 80% had one or more emergency/urgent care visit(s).

Among cases, documented means of attempt at the index visit were 58.3% poisoning, 22.7% cutting, 5.3% firearms, 3.3% suffocation, 8.5% other means, and 1.9% sequelae of attempts. AN/AIs with index visits involving highly lethal means ($n = 76$) were more likely than less lethal cases ($n = 814$) to have been men (76% vs. 38%; $p < .001$), rural dwellers (66% vs. 33%; $p < .001$), low income (61% under 39k vs. 18%; $p < .001$), and have a BH condition

TABLE 3

Univariable and Multivariable Conditional Logistic Regression Estimating Odds of a Suicide-Related Visit According to Demographic, Clinical, and Service Utilization Factors in the Year Prior

| Factor | Univariable | | Multivariable ^{a,b} | |
|---|------------------|----------|------------------------------|----------|
| | OR (95% CI) | <i>p</i> | OR (95% CI) | <i>p</i> |
| Demographic | | | | |
| Marital status (ref. married) ^c | | | | |
| Single | 1.8 (1.4–2.3) | <.001 | — | — |
| Divorced/separated/widowed | 4.5 (2.6–7.9) | | — | |
| Income (reference 60K or higher) | | | | |
| 0 to 39.9K | 1.7 (1.1–2.7) | .009 | 2.0 (0.7–5.4) | 0.332 |
| 40 to 49.9K | 0.9 (0.7–1.2) | | 1.0 (0.5–1.9) | |
| 50 to 59.9K | 0.8 (0.6–1.0) | | 1.0 (0.5–2.1) | |
| Insurance (ref. private insurance) | | | | |
| None | 1.2 (0.9–1.6) | <.001 | 2.2 (1.2–4.0) | 0.013 |
| Medicaid/Medicare | 2.5 (1.8–3.7) | | 3.1 (1.4–6.5) | |
| Any religious affiliation ^c | 1.3 (1.0–1.6) | .056 | — | — |
| Clinical | | | | |
| Any behavioral health condition (ref. none) | 44.6 (26.2–75.7) | <.001 | 33.8 (17.1–70.0) | <0.001 |
| Depression screening (ref. negative) | | | | |
| Absent | 0.6 (0.4–0.8) | <.001 | 1.5 (0.6–3.7) | 0.684 |
| Positive | 2.8 (1.5–5.4) | | 1.0 (0.2–4.5) | |
| Substance abuse screening (ref. negative) | | | | |
| Absent | 0.5 (0.4–0.7) | <.001 | 1.9 (0.7–4.6) | 0.410 |
| Positive | 0.9 (0.4–2.0) | | 2.0 (0.2–17.2) | |
| Any physical condition | 7.6 (5.1–11.4) | <.001 | 0.8 (0.4–1.7) | 0.514 |
| Any injury | 10.5 (7.4–15.0) | <.001 | 4.8 (2.6–8.8) | <0.001 |
| Opioid medication dispensed | 6.8 (5.0–9.1) | <.001 | 2.8 (1.6–4.8) | <0.001 |
| Psychotropic medication dispensed | 13.6 (9.0–20.6) | <.001 | 1.6 (0.8–2.3) | 0.198 |
| Service utilization | | | | |
| Primary care visits (ref. none) | | | | |
| One or two | 1.6 (1.2–2.1) | <.001 | 1.3 (0.7–2.5) | 0.188 |
| Three to six | 2.9 (2.2–4.0) | | 1.8 (0.9–3.7) | |
| Seven or more | 6.8 (4.6–10.2) | | 3.1 (1.1–9.2) | |
| Behavioral health consultant visits (ref. none) | | | | |
| One | 2.9 (1.8–4.7) | <.001 | 1.4 (0.5–4.2) | 0.818 |
| Two or more | 6.6 (3.8–11.3) | | 1.1 (0.2–4.5) | |
| Behavioral health visits (ref. none) | | | | |
| One | 2.5 (1.4–4.4) | <.001 | 0.8 (0.3–2.3) | 0.021 |
| Two or more | 9.8 (5.8–16.4) | | 5.4 (1.6–18.1) | |
| Other ambulatory visits (ref. none) | | | | |
| One or two | 1.3 (1.0–1.6) | <.001 | 0.6 (0.3–1.0) | 0.002 |
| Three to six | 1.7 (1.3–2.3) | | 0.4 (0.2–0.7) | |
| Seven or more | 1.9 (1.4–2.6) | | 0.3 (0.1–0.6) | |
| Emergency or urgent care visits (ref. none) | | | | |
| One or two | 1.7 (1.3–2.2) | <.001 | 1.2 (0.7–1.8) | 0.642 |
| Three or more | 5.5 (4.1–7.3) | | 1.3 (0.7–2.4) | |
| Any inpatient stay | 2.0 (1.5–2.6) | <.001 | 1.2 (0.6–2.1) | 0.648 |

^aListed variables with univariable *p* < .25 included in multivariable analysis, except marital status and religious affiliation.

^bMissing 17 values among variables included in multivariable regression analysis, missing more likely to be women (*p* = 0.049).

^cDue to missing more than 15% of values, variables were excluded from multivariable model.

TABLE 4

Clinical and Service Utilization Characteristics in the 6 Months after a Suicide-Related Visit among Cases and Controls

| | | Suicide-related visit (<i>N</i> = 890) | | No suicide-related visit (<i>N</i> = 890) | |
|--|---------|--|----|---|----|
| Factor | Missing | <i>N</i> | % | <i>N</i> | % |
| Clinical | | | | | |
| One or more behavioral health conditions | | 615 | 69 | 172 | 19 |
| Depression screening score(s) | | | | | |
| Absent | 2 | 752 | 85 | 851 | 96 |
| Negative | | 108 | 12 | 34 | 4 |
| Positive | | 28 | 3 | 5 | 1 |
| Substance abuse screening score(s) | | | | | |
| Absent | | 757 | 85 | 856 | 96 |
| Negative | | 119 | 13 | 32 | 4 |
| Positive | | 14 | 2 | 2 | 0 |
| One or more physical conditions | | 168 | 19 | 91 | 10 |
| One or more injury | | 289 | 32 | 134 | 15 |
| Opioid medication dispensation | | 311 | 35 | 238 | 27 |
| Psychotropic medication dispensation | | 312 | 35 | 110 | 12 |
| Service utilization | | | | | |
| Primary care visits | | | | | |
| None | | 418 | 47 | 613 | 69 |
| One or two | | 245 | 28 | 261 | 29 |
| Three or more | | 227 | 26 | 16 | 2 |
| Primary care provider change | | 48 | 5 | 50 | 6 |
| Behavioral health consultant visits | | | | | |
| None | | 733 | 82 | 870 | 98 |
| One or more | | 157 | 18 | 20 | 2 |
| Behavioral health visits | | | | | |
| None | | 697 | 78 | 868 | 98 |
| One | | 193 | 22 | 22 | 2 |
| Other ambulatory visits | | | | | |
| None | | 371 | 42 | 475 | 53 |
| One or two | | 240 | 27 | 328 | 37 |
| Three to six | | 180 | 20 | 59 | 7 |
| Seven or more | | 99 | 11 | 28 | 3 |
| Emergency or urgent care visits | | | | | |
| None | | 177 | 20 | 621 | 70 |
| One or two | | 470 | 53 | 255 | 29 |
| Three or more | | 243 | 27 | 14 | 2 |
| One or more inpatient stays | | 234 | 26 | 84 | 9 |

(43% vs. 23%; $p < .001$). AN/AIs with index visits involving highly lethal means were less likely than those with less lethal means to have PC visits (33% vs. 68%; $p < .001$) or emergency/urgent care visits (43% vs. 70%; $p < .001$).

DISCUSSION

This is the first large-scale examination of demographic, clinical, and service utilization factors associated with suicide-related visits among AN/AIs in a tribally

operated, urban health care organization. Slightly more than 1% of the total service population ($n = 890$ of 64,528 adults) had at least one diagnostic code for a self-inflicted injury over a 5-year period; 19% of cases had two or more suicide-related visits.

Those with a suicide-related visit were more likely to be women, living in urban settings, and averaging 32 years of age. Increased risk of suicide among these AN/AIs was also associated with not being married, being of poorer socioeconomic status, experiencing BH distress (one or more BH diagnoses including substance abuse, prescribed psychotropic medication), being diagnosed with chronic physical health conditions, seeking care for a physical injury, and being dispensed opioid medication. These results mirror those of other studies.

In northern Alaska, breakups and interpersonal strife have been associated with nonfatal suicide attempts, and alcohol has been strongly linked to fatal suicide attempts. Further, income and active engagement, whether through school, work, or personal relationships, were associated with lower risk of suicide (Wexler et al., 2008). In another study, injury-related visits in northern Alaska were more common in cases than in controls, and alcohol-related visits per provider notations and elevated blood alcohol levels significantly differentiated cases from controls (Hill et al., 2007). Although not assessed in this study, cultural spirituality has been associated with reductions in attempted suicide with no effect for AI commitment to Christianity (Garrouette et al., 2003).

The relationships of service utilization to suicide risk found here deserve discussion. As expected, any type of visit in the year prior was associated with increased odds of a suicide-related visit. However, the absolute percentage of cases receiving care in the year prior and 6 months after was low. Very few cases had a BH specialty visit (23%) in the year prior; even fewer saw a PC-based BHC (17%). Cases involving highly lethal means (i.e., firearms and suffo-

cation) were even less likely than all cases to use BH specialty or BHC services in the year prior. In addition, 35% of all cases had no PC visits, 33% had no emergency/urgent care visits, 31% had no visits to other ambulatory clinics, and 82% did not have an inpatient stay. Obviously, a health care system cannot respond to the suicide-related needs of AN/AIs who seldom or never use services. Rates of low service utilization prior to suicide attempts appear common in the literature for Plains Indians (Mock, Grossman, Mulder, Stewart, & Koepsell, 1996) and ANs (Wexler et al., 2008) compared to the rates for all of the United States and Europe (Luoma et al., 2002). Hill et al. (2007) did not find significant differences with respect to inpatient visits, emergency room visits, or scheduled outpatient visits in rural northern Alaska where services are significantly more limited than in this particular urban setting. Whether our findings reflect differences in service availability, particularly compared to rural Alaska, or other factors like reticence to use predominantly Western approaches is unknown.

Service use within 6 months after the index visit was also low among cases. Although an increase may be expected based on referral protocols, the proportion with BH specialty and BHC visits remained stable (22% and 18%, respectively), as did the proportion of cases without outpatient visits or inpatient stays (47% PC, 42% other ambulatory, and 74% inpatient). However, 80% of cases had an emergency/urgent care visit within 6 months after the index visit.

Considered simultaneously, the following demographic and clinical factors had the strongest effect sizes in descending order: any BH condition, two or more BH visits, physical injury, Medicaid/Medicare versus private insurance, opioid medication dispensation, and no insurance versus private insurance. Three or more visits to other ambulatory clinics were protective when factors were considered simultaneously. How other ambulatory services may

be protective is not fully understood. Some aspect of specialist care may be especially protective, as may the addition of more services.

The value of screening in PC for depression and substance abuse in identifying cases was of particular interest. In univariable analyses, positive depression screening was associated with increased likelihood of a suicide-related attempt. However, among cases screened for depression in the year prior, the sensitivity of the PHQ to identify those that would have a suicide-related visit was only 25%. Although the PHQ-2 and PHQ-9 are sensitive in detecting major depression in PC (Kroenke, Spitzer, & Williams, 2003), these measures may be inadequate to predict suicide-related risk among AN/AI adults. Low overall rates of screening plus prior work showing systematic variation in depression screening by patient and provider factors complicates interpretation of these findings (Dillard, Muller, Smith, Hiratsuka, & Manson, 2012).

Beyond supporting existing recommendations to incorporate suicide-related screening and interventions into PC (Luoma et al., 2002), to screen those with chronic pain (Tang & Crane, 2006), and to screen young AN/AI men presenting with alcohol-related injuries (Hill et al., 2007), our study suggests those with physical injuries, regardless of any involvement with alcohol, should be screened. PC, emergency/urgent care, and other ambulatory clinics appear the most promising venues for suicide screening per visit frequencies. Emergency/urgent care clinics appear to be the most common service setting for AN/AIs after a suicide-related visit. Targeted screening strategies could be adapted for specific AN/AI subpopulations (e.g., by age and gender) to increase their sensitivity and specificity (Gaynes et al., 2004). Less than optimal screening numbers plus the small number of AN/AIs seen by BHCs suggest that—even among organizations with expressed institutional commitment—BH needs are likely underestimated and available resources may be underutilized.

This study used available electronic medical record information. These sources do not contain information about other potentially important factors like education level, employment, spirituality, family history of suicide, alcohol involvement at suicide-related visit, sleep, sexual orientation, and psychosocial stressors such as relationship discord. Others could not be used to differentiate between fatal and nonfatal suicide-related visits given very low cell sizes. Due to a large number of missing values (15%), it was not possible to measure the full effect of marital status and religious affiliation on risk of suicide. Additionally, records did not contain the endorsement of the PHQ-9 item specific to suicidality among those screened. Self-inflicted injury data relied on ICD codes, whereas other studies included additional contextual information that may be important (e.g., previous attempts, contributing psychosocial stressors, location of act; Wexler et al., 2008). Average income per zip code area and insurance status served as proxy measures of economic status. Service utilization outside of the SCF and ANMC systems such as inpatient psychiatric hospitalization could not be assessed. Future research should explore the nature of injury types (e.g., interpersonal, accidental, and chronic) and their association with personal consequences (e.g., loss of function) and treatment consequences (e.g., opioid dispensation), and consider the impact of demographic variables such as age and gender that were controlled in this effort.

CONCLUSIONS

Considering all factors simultaneously, AN/AIs with BH conditions, those who received care for injuries, were dispensed opioid medication, or were uninsured or had Medicaid/Medicare were at elevated risk for a suicide-related visit. PC, emergency room/urgent care, and other ambulatory clinics offer the most useful opportunities for screening and detecting, especially when BH services remain

underutilized. These settings could employ suicide risk detection algorithms to signal need for a thorough suicide risk assessment. Emergency and urgent care settings

should be prepared to address ongoing suicide risk given low rates of other service use in the 6 months after a suicide-related visit.

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