

ALASKA

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Violent Death in Alaska: Who Is Most Likely To Die?

By Matthew Berman and Linda Leask

Alaskans die by accident and commit suicide far more often than the national averages. They die in homicides at near the national rate. But when you look beyond the averages, it's plain that some Alaskans are at much higher risk than others.

This *Review* describes how rates of violent death—by which we mean deaths from accidents, suicides, and homicides—vary among Alaskans by race, sex, age, marital status, and place of residence.

Differences in age and other factors don't explain all the variation, but they give us a start in better understanding why violent death strikes some groups and places much more than others. Some of the variation includes:

- **Alaska Natives are at especially high risk of dying in accidents, suicides, and homicides.** Not only are they several times more likely to die violently than the average American, they are much more likely than other Native Americans to commit suicide and to be killed.
- **Violence kills men more often than women.** But Native women die by homicide more often than non-Native men.
- **Women in Alaska face a much higher risk of homicide than women nationwide.** Non-Native women are killed 1.5 times more often than the average for U.S. women, and Native women 4.5 times more often.

- **By contrast, homicide rates among non-Native men in Alaska are below the national average.**
- **Young, single Native men are the likeliest** victims of violence. A Native man aged 20 who never marries has a 25 percent chance of dying violently before age 60.
- **Married Alaskans are less prone to die** by violence than those who are unmarried.
- **Many Native villages in Alaska are particularly high-risk places,** but some are much more violent than others.
- **Natives in small communities** in the interior and southwest regions see more violent deaths than those in other areas of Alaska.
- **Homicide rates are lowest** in small and medium-sized towns in southeast Alaska.

The detailed analysis that follows is based on a computer file—provided by the Alaska Bureau of Vital Statistics—of death certificates of Alaskans who died between 1980 and 1990.¹ This file includes recently revised statistics analyzed here for the first time. We calculated average death rates for that 11-year period, allowing us to see trends and to feel confident that rates for small towns don't just reflect unusual circumstances in a single year.

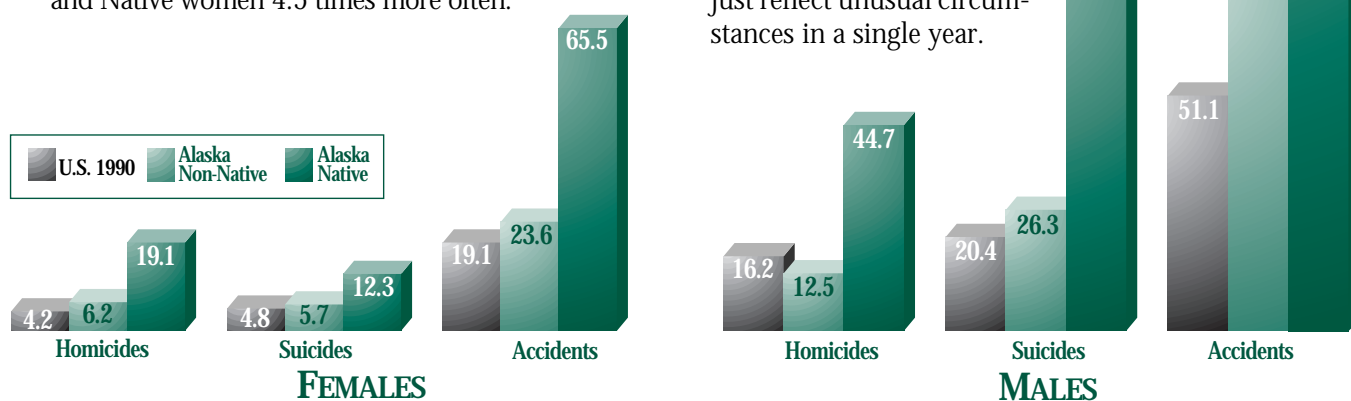


Figure 1. Violent Death Rates, U.S. 1990 and Alaska Average Annual 1980-1990 (Deaths per 100,000, age-adjusted)

We know that alcohol contributes to Alaska’s high rates of violent death, but the computer file doesn’t include enough information to allow us to systematically examine how many victims had been drinking before they died.

We look at both *numbers* of violent deaths and *rates* of violent death—deaths per 100,000 population.² Actual numbers of deaths provide useful information, but calculating death rates compensates for changes in population over time and allows us to make comparisons among groups of Alaskans and with national averages.

To improve the comparisons of Alaska and U.S. average death rates, we adjusted the Alaska figures for differences in age and sex distributions between Alaska and the country as a whole. This is an especially important adjustment, because observers sometimes attribute Alaska’s higher violent death rates to the fact that young men (who have the highest rates of violent death) make up a bigger percentage of the population in Alaska. The adjusted rates measure what the death rate would be, if the age and sex distributions in Alaska were the same as they were nationally in 1990.³

Numbers of Deaths

Accidents kill far more Alaskans than suicides and homicides. As you would expect in a state where the road system is limited and many residents travel by boat or small plane, boating and airplane accidents kill more Alaskans—and auto accidents kill fewer Alaskans—than in the U.S. as a whole. About 35 percent of Alaskans who died in accidents in the 1980s were killed in car accidents, compared to 51 percent in the U.S. in 1990.⁴

Figure 2 shows the numbers and patterns of annual violent deaths in Alaska from 1980 through 1990.

- There was no discernible trend in accidental deaths.

- About one third of those who died by accident were Alaska Natives— even though Natives make up only about 15 percent of the state population.
- The number of suicides appears to have risen from about 90 per year in the early 1980s to about 110 by the end of the decade.
- More Natives and non-Natives alike committed suicide in the later years of the decade.
- The number of homicides rose from 44 in 1980 to a peak of 83 in 1985 before dropping back to around 50 by the end of the decade.
- The bulge in homicides was entirely among non-Natives. The number of Native homicides stayed relatively constant at around 20 per year during the entire period. Homicides among non-Natives increased greatly during the economic boom of the early 1980s, decreasing again as the economy cooled off.⁵

Figure 3 shows the seasonal pattern of violent death. It is widely believed that violence accelerates in Alaska during the winter, when long nights and cold temperatures lead to “cabin fever,” particularly in rural areas. That theory seems to be unfounded, at least when it comes to deadly violence:

- Accidents kill 72 percent more Alaskans in summer than in winter—which we would expect, since more people are out boating, flying, driving, and taking part in other activities during the warmer weather.
- The numbers of suicides and homicides do not increase in the winter either. Native suicides and homicides rise strongly in the summer, while suicides among non-Natives peak in September and homicides in May. (Figure 3 shows combined patterns for all Alaskans.)

Figure 2. Annual Violent Deaths in Alaska 1980-1990

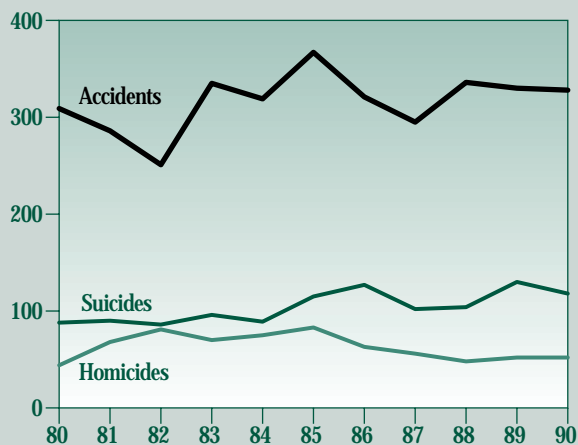
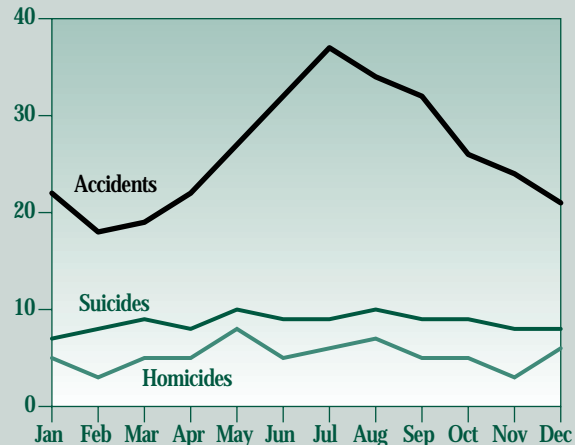


Figure 3. Monthly Average Violent Deaths in Alaska 1980-1990



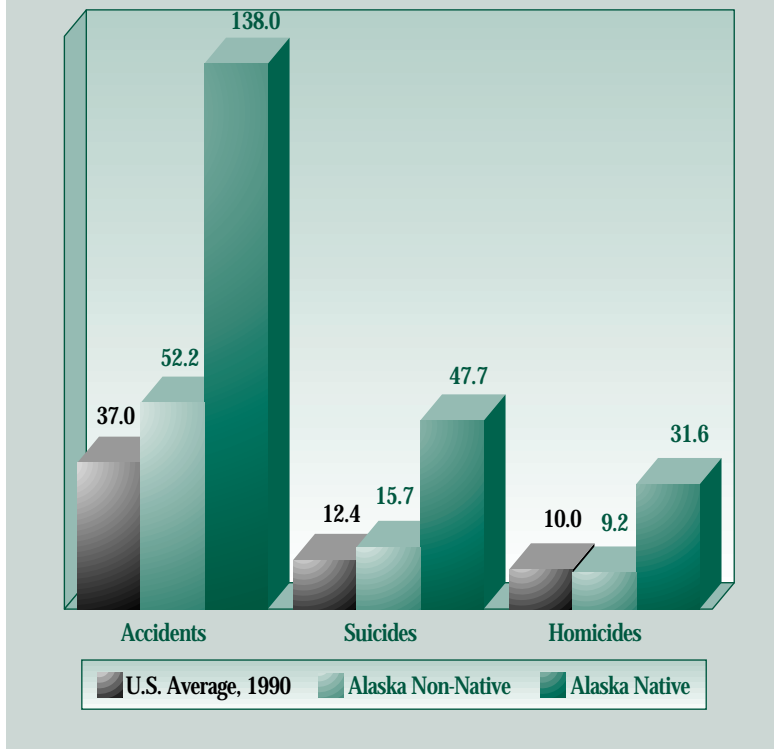
Native and Non-Native Average Death Rates

In Alaska both Natives and non-Natives die violent deaths more often than the U.S. average, and Natives die much more often than non-Natives.

Figure 1 on the front page shows rates of violent death for Native and non-Native men and women from 1980 through 1990. Figure 4 combines the statistics for men and women, to give us a picture of the overall differences in death rates for all Americans, Alaska Natives, and Alaska non-Natives. The U.S. figures are averages for 1990.

- Alaska Natives die in accidents at a rate 3.7 times the U.S. average. That high accidental death rate—138 per 100,000 population—translates to about 117 Native deaths each year in a 1990 Native population of roughly 85,000.
- Natives are more than four times as likely to die by suicide and 3.5 times as likely to die by homicide as the average U.S. resident.
- Alaska Natives also have higher rates of suicide and homicide than other Native Americans. Alaska Natives were more than twice as likely to die by suicide in the 1980s than the average Native American living in nine Indian Health Service (IHS) areas in the Lower 48, and 75 percent more likely to die by homicide.⁶
- The accidental death rate among Alaska Natives is not significantly higher than the average for other Native Americans.
- Non-Natives in Alaska die in accidents 40 percent more often than the U.S. average. Deaths from motor vehicle accidents occur at approximately the same frequency among Alaskans as among the U.S. population as a whole—so the entire difference in accident rates is due to the fact that other kinds of accidents occur more frequently in Alaska.
- Suicide rates among non-Natives are about 27 percent higher than national rates.
- Homicide rates among non-Natives are close to the national average.
- The pattern of higher violent death rates among men holds for both Natives and non-Natives in Alaska and for Americans on the whole.

Figure 4. Violent Death Rates, U.S. 1990 and Alaska Average Annual, 1980-1990 (Deaths Per 100,000, Age-Adjusted)



- Rates of accidental death and suicide among Native males are more than four times as high as among all U.S. males. The accidental death rate of 214 per 100,000 among Native males suggests that approximately 2.4 percent of Native males died by accident over the period 1980-1990.
- Homicide rates among Native males are close to three times the national average. Native male homicide rates of 45 per 100,000 over the decade were, however, still substantially lower than the 1990 U.S. rate for black males of 69 per 100,000. (See note 3.)
- Rates of accidental death and suicide for Native females are about three times higher than the U.S. average for females. For non-Native females, age-adjusted suicide and accidental death rates were 18 and 25 percent higher than the national averages.
- Alaska Native females are 4.5 times as likely to be murdered as the average U.S. female. Homicide death rates for Native females of 19.1 per 100,000 between 1980 and 1990 were higher than those of U.S. black females—13.5 per 100,000 in 1990—and for U.S. males as a whole. (See note 4.)

Differences by Age

Another commonly held belief is that younger adults are more likely to die violently than are children or older people. This proposition, as it turns out, is true only part of the time. Table 1 shows average Alaska accident, suicide, and homicide rates by age, sex, and race over the period 1980-1990.

- Accident, suicide, and homicide death rates are indeed highest among young Native men (ages 15 to 34). Death rates for all types of violence peak among those 20 to 24 years old.
- Among non-Native men, only homicides are most frequent among the young. Accidental deaths and suicides are often as high among older men.
- Young women (both Native and non-Native) ages 20 to 24 also have the highest suicide rates—although rates among Native women are four times higher.
- Native men of any age are anywhere from four to eight times more likely than Native women of the same age to commit suicide.
- Accidental death rates are highest for older non-Native men and for older women in both racial groups.
- Native women are somewhat more likely to be killed when they are 30 to 34 years old than when they are younger.

Did the high accident, suicide, and homicide rates for young Native men decrease or increase during the decade of the 1980s? Figure 5 shows trends in death rates for Native men aged 15 to 34. The numbers are expressed as moving ave-

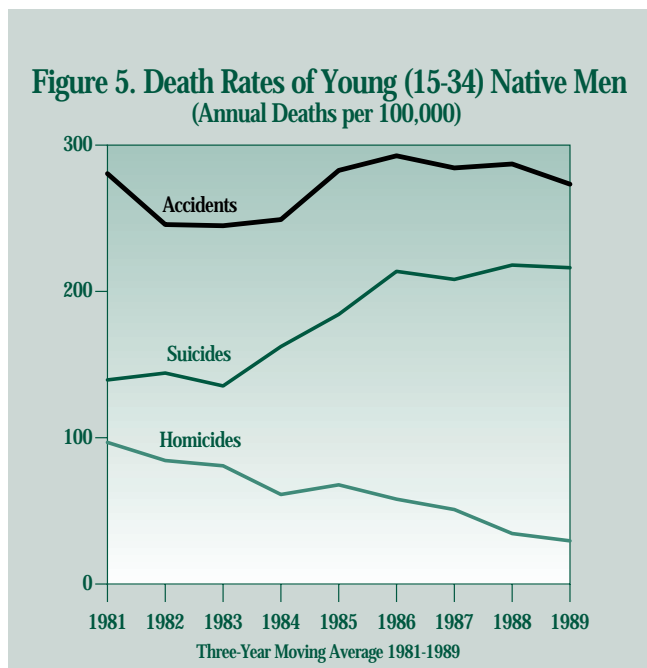


TABLE 1. DEATH RATES BY AGE, SEX, AND RACE
(ANNUAL AVERAGES, 1980-1990, PER 100,000)

	ALASKA NATIVE		NON-NATIVE	
	MALES	FEMALES	MALES	FEMALES
ACCIDENT RATES				
<10	62.9	39.2	21.2	13.0
10-14	51.6	18.0	31.0	14.0
15-19	166.0	60.9	98.6	26.1
20-24	332.6	58.9	94.9	25.5
25-29	290.7	73.9	110.0	23.2
30-34	297.4	61.3	104.1	18.0
35-44	285.1	76.0	90.8	17.1
45-59	230.3	85.2	90.0	21.3
60+	226.7	80.5	114.8	39.4
Total	214.2	65.5	82.9	23.0
SUICIDE RATES				
<10	0.0	0.0	0.0	0.0
10-14	14.4	0.0	5.1	0.0
15-19	122.3	37.1	32.0	6.5
20-24	274.4	44.7	43.6	9.8
25-29	178.1	29.0	32.6	9.2
30-34	140.0	9.1	30.2	4.4
35-44	74.9	8.4	25.5	8.7
45-59	62.5	9.3	26.8	8.6
60+	28.7	3.5	46.0	4.3
Total	85.0	12.3	26.3	5.7
HOMICIDE RATES				
<10	9.1	7.3	4.2	2.8
10-14	0.0	2.5	1.5	2.5
15-19	25.6	20.0	12.9	7.8
20-24	88.1	36.2	18.1	9.1
25-29	83.6	24.5	17.0	8.4
30-34	63.3	41.5	15.7	9.2
35-44	67.1	26.3	16.8	5.7
45-59	40.6	20.8	13.0	6.3
60+	35.7	7.3	13.4	6.2
Total	44.7	19.1	12.5	6.2

rages, to smooth out random fluctuations from year to year.

- There is no clear trend in accident rates.
- Suicide rates went up by 50 percent.
- Homicide rates declined by two-thirds.

We don't know why suicide rates among young Native men went up so sharply in the 1980s, or why homicide rates dropped so much.

Effects of Marital Status

Overall, married Alaskans—both Natives and non-Natives—are (with a few exceptions) less likely to die violent deaths than single, widowed, or divorced Alaskans. The main exception is that widowed Native women are less likely than married Native women to kill themselves or to be killed.

For most Alaskans, marital status indicates risk of violent death more than age does. In general, the higher rates of death for younger adults appear to be mainly due to a higher proportion being unmarried (Figure 6). Of course, we don't know to what degree married persons have lower death rates because they are married, and to what degree those who are at lower risk of dying violently are better able to marry.

Table 2 shows rates of violent death among single, married, widowed, and divorced Alaskans over the period from 1980 through 1990. Figures 7 and 8 show the differences in violent death rates among married and unmarried (combining single, widowed, and divorced) Alaskans at different ages. The small numbers of widowed and divorced persons in younger age groups make calculations of death rates unreliable.⁷

- Native violent death rates exceed those of non-Natives—usually by two to three times—for both married and unmarried persons of both sexes in all age groups. The one exception is that suicide rates are higher for older (over age 60) non-Native men than those for older Native men.
- Among adults aged 20 through 59 who have never married, Native men are dying from all violent causes at astounding rates. Combining the risk of death by accident, suicide, and homicide, a 20-year-old Native man who never marries has a 25 percent chance of dying violently before age 60—assuming he does not die first

of natural causes. A Native woman who never marries has a 9 percent chance of dying by violence over those same four decades.

- Non-Native married women have the lowest probability of dying violent deaths.
- Accidental death rates are high among older unmarried men and women—both Native and non-Native.
- Older Native men and women are much less likely than younger people to commit suicide, but the risk of dying by homicide remains relatively high among older Natives.

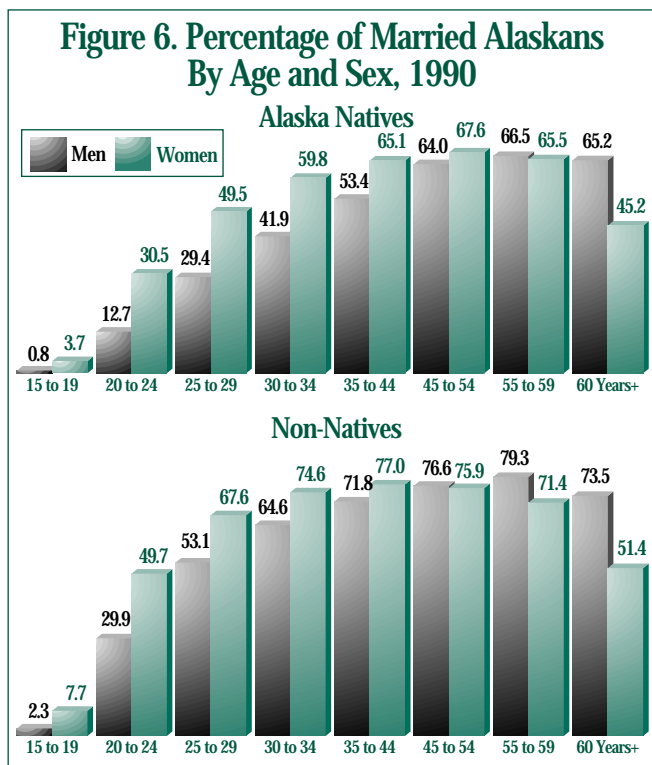
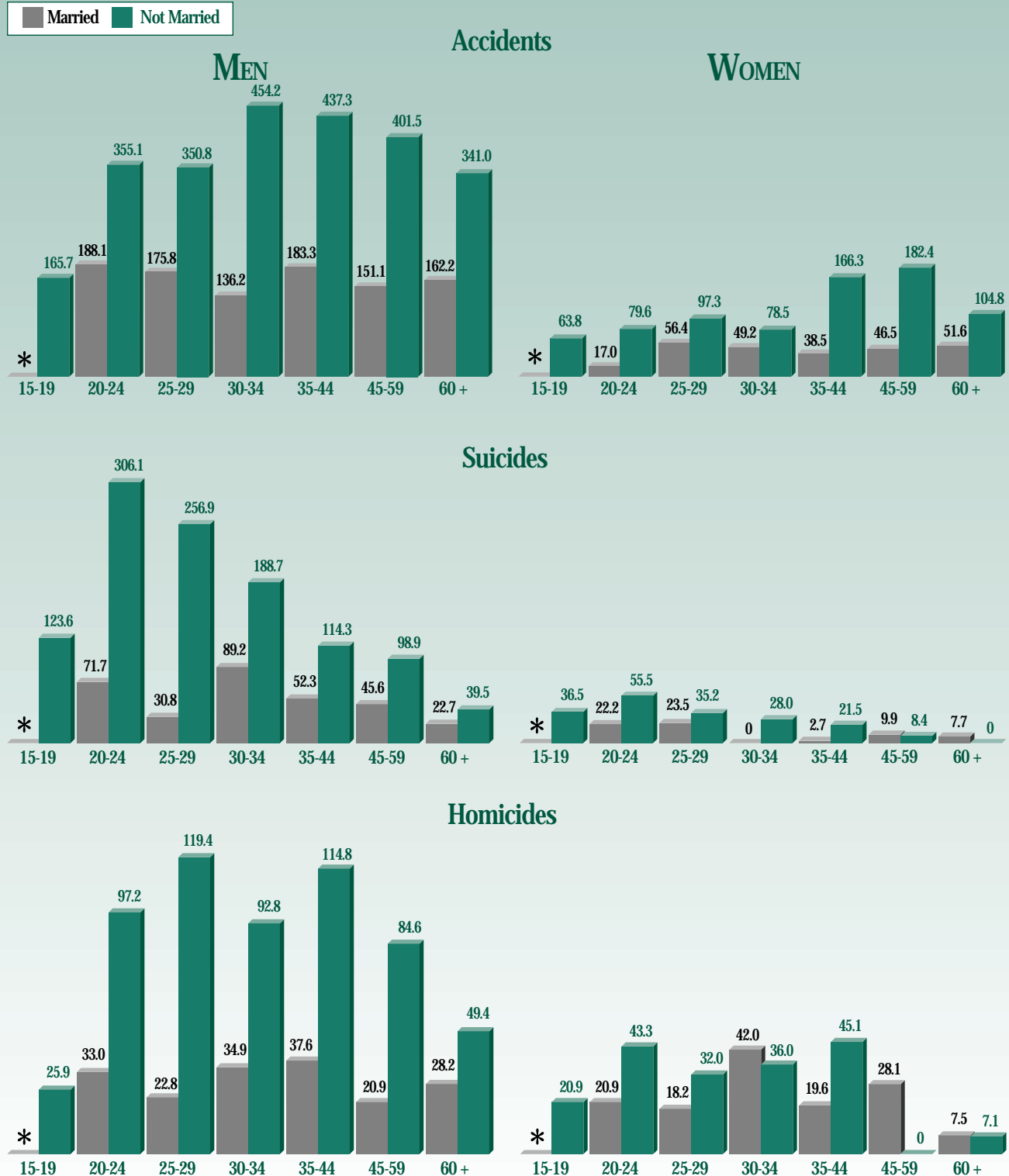


TABLE 2. VIOLENT DEATH RATES OF ADULTS, BY SEX, AND MARITAL STATUS
(ANNUAL AVERAGE RATES, 1980-1990, PER 100,000)

	MEN					WOMEN					
	ALASKA NATIVE	SINGLE*	MARRIED	WIDOWED	DIVORCED	TOTAL	SINGLE*	MARRIED	WIDOWED	DIVORCED	TOTAL
Accident Rates	326.5	163.5	317.3	322.0	214.2	95.7	45.1	99.2	157.3	65.5	
Suicide Rates	200.8	46.5	68.2	77.2	85.0	31.0	8.8	2.2	27.5	12.3	
Homicide Rates	77.5	29.1	52.7	98.6	44.7	26.9	22.0	8.0	30.6	19.1	
NON-NATIVE											
Accident Rates	122.3	76.4	167.0	187.3	82.9	28.1	15.9	59.9	43.2	23.0	
Suicide Rates	45.0	21.6	84.3	70.1	26.3	14.0	5.1	5.5	13.2	5.7	
Homicide Rates	21.5	8.3	27.6	42.7	12.5	9.0	4.5	9.5	17.1	6.2	

*Never married

Figure 7. Violent Death Rates, Alaska Natives, By Sex, Age, and Marital Status
(Deaths per 100,000, Average Annual 1980-1990)



*Population too small to compute a rate

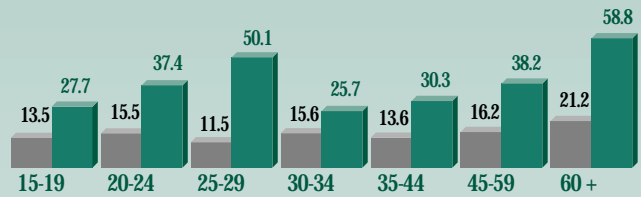
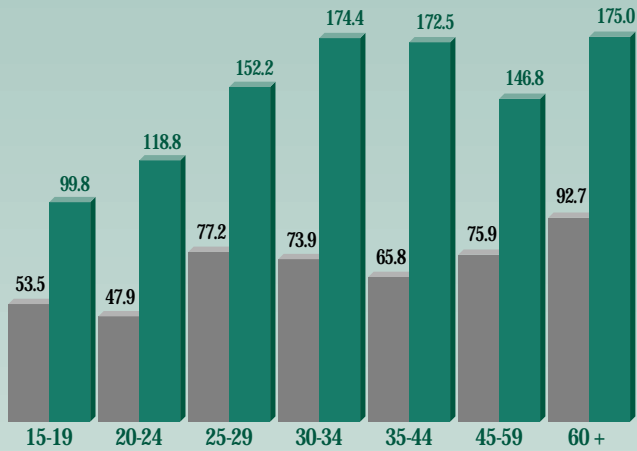
Figure 8. Violent Death Rates, Non-Natives, By Sex, Age, and Marital Status
 (Deaths per 100,000, Average Annual 1980-1990)

■ Married ■ Not Married

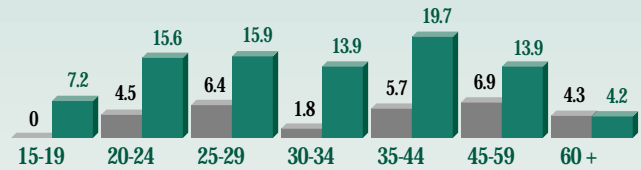
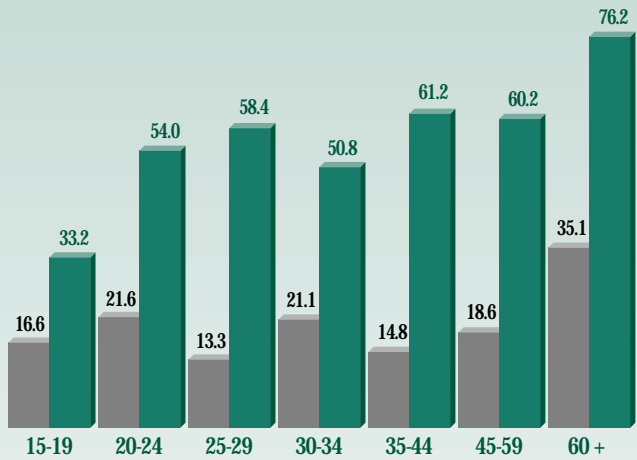
Accidents

MEN

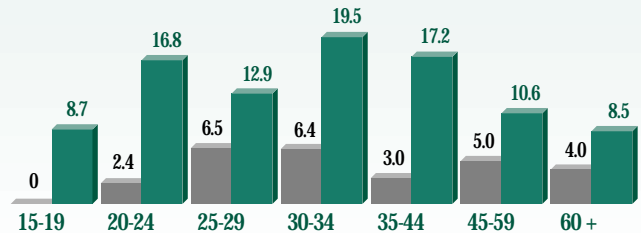
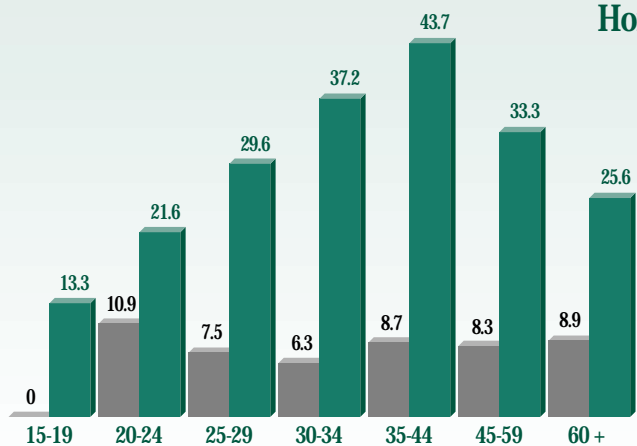
WOMEN



Suicides



Homicides



Death Rates by Community

Violent death is much more prevalent in some Alaska communities than others. This section looks at annual average violent death rates among residents of Alaska cities and towns over the period 1980 through 1990.

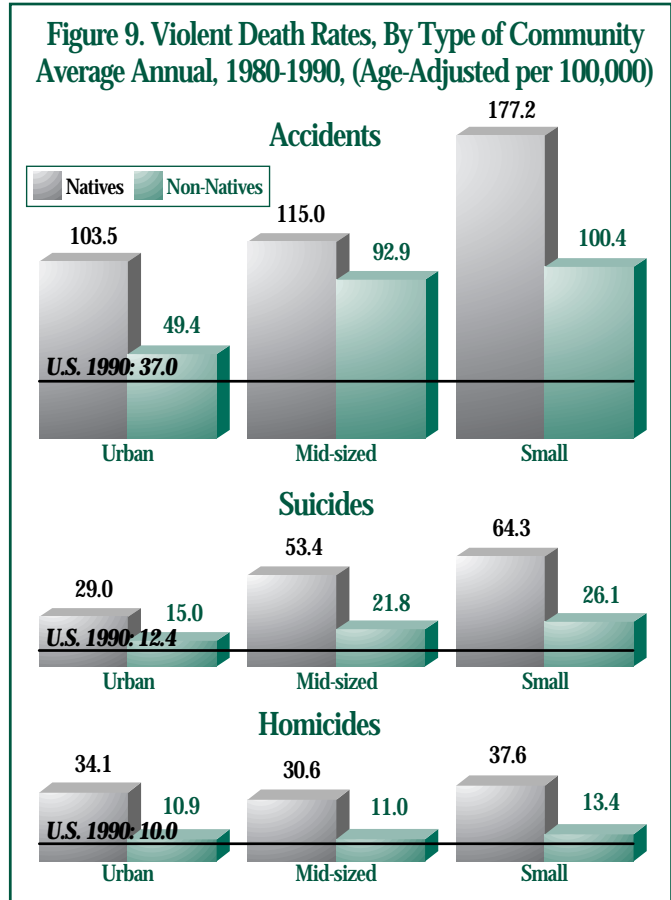
Using 1980 and 1990 census figures, we computed death rates for Natives and non-Natives in each Alaska community with a 1990 population of at least 25 Native and non-Native residents. Since we know that some Alaskans—most obviously young men—have higher death rates, a certain amount of variation among small communities could be due simply to the fact that there are more young men or other high-risk people in some communities. We adjusted for that problem by using the age and sex distribution of the 1990 U.S. population to compute age-by-sex-adjusted death rates in communities.⁸

Because there are many very small Alaska communities, we do not believe that death rates for individual communities—even age-adjusted rates over an 11-year period—are necessarily reliable indicators of death risks for the community. However, statistics derived from communities grouped according to various characteristics include data on many more people, and are therefore more reliable indicators. We grouped communities three ways for our analysis: by size; by size and region; and by size and racial mix.

Death Rates by Size of Place

We divided Alaska places into three sizes. Small communities are those with fewer than 1,000 residents as of 1990. Urban communities have populations of at least 10,000. In Alaska there are only three communities with more than 10,000 residents—Anchorage, Fairbanks, and Juneau. Mid-sized communities are those with at least 1,000 but fewer than 10,000 persons. Table 3 shows the 1990 distribution of the Native and non-Native populations by community size.

Figure 9 shows rates of accidental death, suicide, and homicide for Natives and non-Natives living in small, mid-sized, and urban communities. The figures are average age-sex-adjusted rates among the communities in the category, weighted by the community population of the racial group.



- For all types of violent death, in all sizes of communities, Natives die at rates significantly higher than non-Natives.
- Death rates are higher on average for both Natives and non-Natives in small communities than in mid-sized ones, and higher in mid-sized ones than in urban places.
- Natives living in small places are three times as likely to commit suicide as those living in cities.
- Natives are less likely to be killed in accidents or commit suicide in urban and mid-sized communities than in small communities, but just about as likely to be victims of homicide in communities of all sizes.
- Non-Natives are about one-third as likely to become homicide victims as are Natives in all sizes of communities. In mid-sized and large communities, non-Native homicide rates are not significantly higher than the national average.

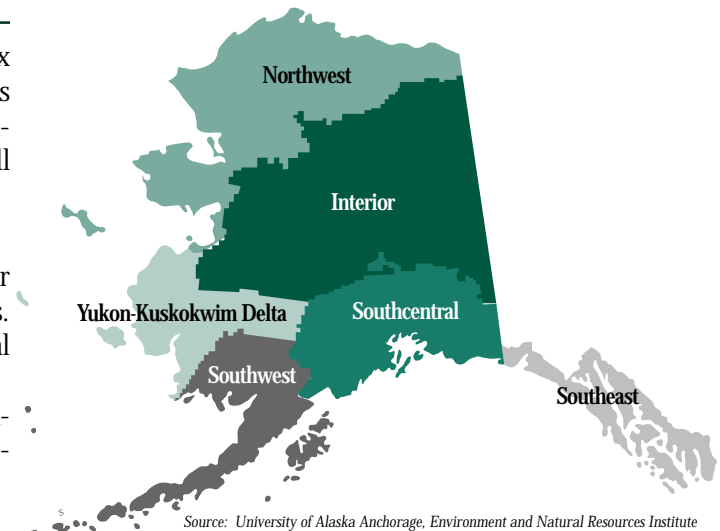
TABLE 3. DISTRIBUTION OF NATIVE AND NON-NATIVE POPULATIONS, BY COMMUNITY SIZE, 1990

	NUMBER WITH AT LEAST 25 NATIVES	TOTAL NATIVE POPULATION	PERCENTAGE OF NATIVE POP.	NUMBER WITH AT LEAST 25 NON-NATIVES	TOTAL NON-NATIVE POPULATION	PERCENTAGE OF NON-NATIVE POP.
Small	194	39,228	49%	166	29,715	8%
Medium	32	19,615	24%	34	92,463	23%
Large	3	21,763	27%	3	273,037	69%

Death Rates by Size and Region

The adjacent map shows the boundaries of the six regions we use in our analysis of differences in death rates by region. Table 4 shows death rates for the urban communities of Anchorage, Fairbanks, and Juneau and for small and mid-sized communities in the six regions.

- Smaller rural communities in all regions have higher violent death rates for both Natives and non-Natives. Rates in small places are often many times the national averages.
- Even among the smaller communities, there is tremendous variation, with some communities much less violent than others.
- Accidental death rates are highest for Alaska Natives in small communities in the interior and southwest regions. Southeast Alaska communities have lower accidental death rates.



Source: University of Alaska Anchorage, Environment and Natural Resources Institute

TABLE 4. VIOLENT DEATH RATES, BY SIZE OF COMMUNITY AND REGION
(AVERAGE ANNUAL 1980-1990—AGE-ADJUSTED RATE PER 100,000)

COMMUNITY GROUP	ACCIDENTS		SUICIDES		HOMICIDES	
	NATIVE	NON-NATIVE	NATIVE	NON-NATIVE	NATIVE	NON-NATIVE
LARGE COMMUNITIES						
Anchorage	116.5	48.1	28.7	14.6	31.8	11.2
Fairbanks	84.2	62.4	40.4	16.2	29.6	11.5
Juneau	70.4	40.0	18.0	17.3	48.6	7.3
All urban	103.5	49.4	29.0	15.0	34.1	10.9
MEDIUM-SIZED COMMUNITIES						
Northwest	146.4	85.9	88.2	24.0	44.2	9.0
Yukon-Kuskokwim Delta	105.5	52.7	36.8	5.8	58.3	4.6
Interior	*	15.3	*	4.5	*	12.9
Southwest	119.9	76.8	16.2	15.8	10.2	7.8
Southcentral	103.2	120.8	65.7	27.2	35.5	14.8
Southeast	91.4	82.0	32.3	23.0	6.8	5.8
Alaska	115.0	92.9	53.4	21.8	30.6	11.0
SMALL COMMUNITIES						
Northwest	140.0	27.9	66.4	5.5	39.1	2.0
Yukon-Kuskokwim Delta	154.4	31.0	50.1	0.0	29.3	0.0
Interior	272.8	83.8	82.3	25.0	60.0	16.5
Southwest	241.5	71.9	69.3	8.2	45.0	1.0
Southcentral	155.7	141.3	66.7	38.4	33.3	22.9
Southeast	119.4	73.7	79.8	20.7	20.0	1.2
Alaska	177.2	100.4	64.3	26.1	37.6	13.4
U.S. average	37.0	37.0	12.4	12.4	10.0	10.0
IHS 9 area average	125.8		22.3		18.1	

*Population too small to compute a rate

- For non-Natives, communities in the southcentral region have the highest accidental death rates. Part, but not all, the explanation for that difference is that southcentral Alaska has more roads (and therefore more traffic deaths) than other regions.
- Suicides occur less frequently, and homicides more frequently, among Natives living in Juneau than among those living in other Alaska cities. Among non-Natives, homicide rates are higher in Anchorage and Fairbanks and suicide rates lower than in Juneau.
- Suicide and homicide rates in small and medium-sized communities seem to vary randomly. The differences within the groups are quite large.

Death Rates by Size and Racial Mix

We also looked at how violent death rates in communities vary by the racial mix of the population (Figure 10). Communities with less than 10 percent Alaska Natives (as of 1990) are classified as non-Native communities, those with 10 to 50 percent Alaska Natives are mixed communities, and Native communities are those where more than 50 percent of the 1990 population was Native. These are population-weighted averages. (Anchorage and Fairbanks, which are non-Native communities, and Juneau, which is a mixed community, are excluded from these figures.)

- Accident rates for both Natives and non-Natives are highest in small mixed communities.
- Suicide rates among non-Natives are highest in mixed communities, but are lowest among Natives.
- Homicide rates for Natives are at their lowest and for non-Natives at their highest in small mixed communities.
- Native homicide rates are highest in mid-sized Native communities—such as Barrow, Dillingham, and Nome.

Death Rates Exceeding National Average

Any time we examine death rates for very small populations, we have to look at the results with caution—because even one death in a very small population can significantly increase the death rate. We dealt with the problem by analyzing deaths over an 11-year period, by grouping communities, and by adjusting for differences in demographic characteristics of Alaskans. We also constructed statistical confidence intervals to help us determine whether differences we see are statistically significant—that is, whether the differences are due to something other than chance. We calculated a 95 percent confidence interval. This means that there is a only a 5 percent probability that the differences we see are due just to chance.⁹

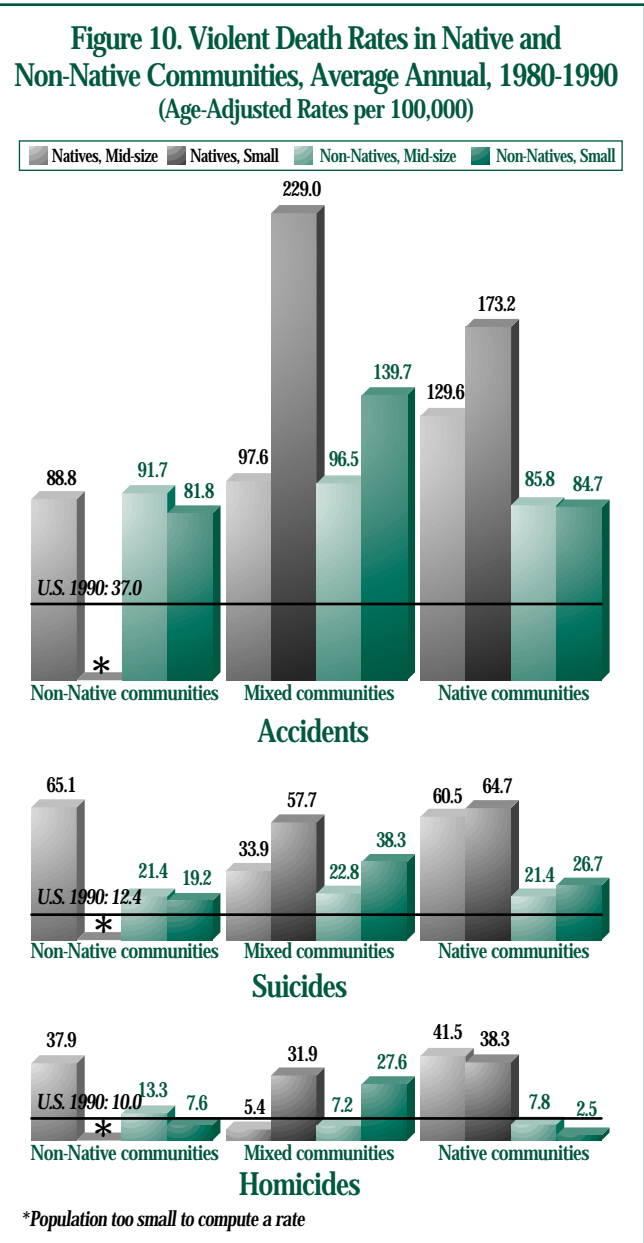


Table 5 shows the percentage of Alaska communities that significantly exceed the national death rates for accidents, suicides, and homicides. Since we use a 95 percent confidence interval to determine statistical significance, we might expect that up to 5 percent of the communities would exceed the expected number of deaths just by chance, if the underlying death rate were really the national rate.¹⁰

- Unlike in the U.S. as a whole, in Alaska there is less violence in the cities and more in the rural areas.
- Among Natives, accidental death rates significantly exceed national rates in anywhere from 13 to 100 percent of communities in each region and in urban, medium-sized, and small communities.

- Among non-Natives, death rates from accidents significantly exceed the national average in from 6 to 71 percent of communities, except in Juneau and the communities in the Yukon-Kuskokwim Delta.
- Despite very high overall Native suicide rates, the Native suicide rate significantly exceeds the national rate in only around one-fourth of communities in most of the categories. In fact, suicide rates for non-Natives in mid-sized communities significantly exceed the national average more often than do Native death rates.
- Homicide rates among Natives significantly exceed the national average in small communities in all regions. Homicide rates among non-Natives exceed the average most frequently in mid-sized interior communities.

Conclusion

Alaskans overall have a much higher risk of dying by accident and by suicide than Americans as a whole. Homicide, suicide, and accidental death rates are all particularly high for Alaska Natives; indeed, their suicide and homicide rates are substantially higher than those for other Native

Americans. Many Native villages in all regions of Alaska are particularly high-risk places.

However, the results in Table 5 suggest that only some Alaska communities—probably a minority—are very violent places. Those violent places appear to exist—in varying degrees—in all regions of Alaska, in all sizes of communities, and in non-Native, mixed, and predominantly Native communities. Size, location, and racial composition do not explain the differences in death rates among communities.

This publication gives us a start in understanding the factors contributing to the high rates of violent death in some Alaska places and among some groups of Alaskans. But there are clearly other factors—yet to be discovered—at work.

Matthew Berman is an associate professor of economics at ISER. Linda Leask is ISER's editor. The authors thank Teresa Hull, Monette Dalsfoist, and Jim Kerr of ISER for their help with this publication. The Bureau of Vital Statistics in the Alaska Department of Health and Social Services provided data for the analysis and valuable

TABLE 5. PERCENTAGE OF ALASKA COMMUNITIES WITH DEATH RATES SIGNIFICANTLY EXCEEDING NATIONAL AVERAGES

COMMUNITY GROUP	ACCIDENTS		SUICIDES		HOMICIDES	
	NATIVE	NON-NATIVE	NATIVE	NON-NATIVE	NATIVE	NON-NATIVE
LARGE COMMUNITIES						
Anchorage	yes	yes	yes	yes	yes	yes
Fairbanks	yes	yes	yes	yes	yes	yes
Juneau	yes	no	no	no	yes	no
All urban	100	67	67	67	100	67
MEDIUM-SIZED COMMUNITIES						
Northwest	100	33	100	33	67	0
Yukon-Kuskokwim Delta	100	0	0	0	100	0
Interior	0	33	0	33	0	33
Southwest	60	40	0	20	0	0
Southcentral	27	47	13	20	0	13
Southeast	67	71	17	29	0	0
Alaska	47	47	22	24	9	9
SMALL COMMUNITIES						
Northwest	42	6	36	12	21	6
Yukon-Kuskokwim Delta	13	0	20	0	22	0
Interior	62	21	24	9	16	3
Southwest	45	19	19	5	12	5
Southcentral	13	23	17	10	9	6
Southeast	38	8	23	3	15	0
Alaska	44	16	28	7	16	4

Endnotes

1. We analyzed just deaths of Alaska residents who died in Alaska. We excluded nonresidents who died in Alaska. We did not have the necessary data to include information on Alaska residents who died in other states; those deaths accounted for about 6 percent of all deaths. The Alaska Bureau of Vital Statistics 1990 *Annual Report* contains further information about Alaska death certificates and statistics for all causes of death in Alaska. A 1991 publication by the Alaska Department of Health and Social Services, *Causes of Death in Alaska: 1950, 1980-1989*, summarizes information on all deaths, including those of nonresidents, in Alaska between 1980 and 1989. Because of slightly different procedures used to code causes of death, statistics in this latter publication may not be exactly comparable to those based on Bureau of Vital Statistics data.
2. Violent deaths include deaths that result from complications of intentional or unintentional injuries. Coroners determine causes of most violent deaths. Deaths that were either from unknown causes or for which the causes were improperly coded are not included. That omission may lead to some undercounting of violent deaths, before the Bureau of Vital Statistics hired a trained nosologist in 1988.
3. The age-sex-adjustment procedure is broadly similar to that used for age-adjusted rates published by the National Center for Health Statistics (NCHS), but differs in three specific ways. First, we adjust state and local populations over time for differences in the ratio of males to females, while NCHS adjusts only for age differences. This added adjustment is important for comparing Alaska death rates because of significant differences in the sex ratio between Alaska—especially in certain communities—and the United States, and because of changes in the sex ratio over time. Second, we adjust male age-specific death rates to the U.S. age distribution for males, and female age-specific rates to the U.S. distribution of females. NCHS adjusts rates for both sexes to the same standard age distribution representing the total population. This adjustment is necessary in Alaska because of the relatively large number of adult non-Native males in Alaska in certain age categories. Third, we use the 1990 U.S. population instead of the 1940 population as the base. Since our adjustments are not strictly comparable to the NCHS adjustments, we felt that it would be better to be able to compare the Alaska death rates to a more contemporary population. So our age-sex-adjusted rates are directly comparable to crude death rates for the United States population in 1990. This difference in the base year represents a relatively small adjustment to the national death rates. The 1990 U.S. crude death rates for accidents, suicides, and homicides, were 37.0, 12.4, 10.0, while the age-adjusted (1940 base year) rates were 32.5, 11.5, and 10.2, respectively.
4. U.S. death rates are taken from *Vital Statistics of the United States, 1990*, published by the U.S. National Center for Health Statistics, and from unpublished data from the same agency. National homicide death rates include executions.
5. These numbers differ slightly from those cited in "Homicide in Alaska: 1975-1992," *Alaska Justice Forum* 10(3), Fall 1993, pp. 7-8. The figures in that article represent homicide cases in Alaska, and therefore include deaths of nonresidents.
6. The 1987-1989 average death rates for Indian Health Service (IHS) areas are 126, 22, and 18 per 100,000, for accidents, suicides, and homicides, respectively (Regional Differences in Indian Health, Indian Health Service, 1993). The nine areas include Alaska, and represent IHS service areas that the agency maintains do not under report Indians on death certificates. These numbers are not strictly comparable to the numbers we calculated for Alaska because they have been age-adjusted to the 1940 U.S. population, while ours are adjusted to the 1990 U.S. population (see note 3).
7. We used estimates of Native and non-Native population of Alaska by age and sex provided in *Alaska Population Overview*, published annually by the Alaska Department of Labor. The population by age, sex, and marital status is only available in the census years, 1980 and 1990, however. We estimated the proportion of the population in each five-year age, sex, and racial cohort in the years between the censuses by interpolation.
8. We estimated the population by age, sex, and race for each community in each year based on the 1980 and 1990 U.S. censuses. We estimated the population distribution for years between the censuses using community five-year age cohorts by sex and race (obtained from census summary tape files STF2 and STF3a).
9. For example, if there were 22 accidental deaths over the 11-year period for a group of communities with a population of 3,000, the estimated annual death rate would be 100 per 100,000. The 95 percent confidence interval for the death rate would be 100 plus or minus 42—a fairly wide range. However, we could still conclude that the death rate for this group was significantly higher than a national accidental death rate of 37, because 37 lies below the lower range for the 95 percent confidence interval. The Alaska Bureau of Vital Statistics 1990 *Annual Report*, Appendix B, p. 51, contains formulas for constructing confidence intervals for death rates.
10. These confidence intervals are constructed using the Poisson distribution for the number of deaths given an expected number equal to the population size times the benchmark death rate times the number of years of data.

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