

Serious and Fatal Firearm Injuries Among Children and Adolescents in Alaska: 1991-1997

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Abstract

Study Objective: To describe demographics, causal factors, intent, and incident locations of serious and fatal firearm injuries among children and adolescents in Alaska, for the years 1991 through 1997.

Methods: Data from the Alaska Trauma Registry plus Vital Statistics death certificates were reviewed for a seven-year period (1991 – 1997). Data elements included are: intent (ICD 9–CM E–Codes and narratives); age group; region of incident; place of occurrence; alcohol or drug involvement; type of firearm used; and perpetrator.

Results: During the seven-year study period, 222 children and adolescents (ages 0-19 years) were admitted to a hospital for a non-fatal firearm injury, plus 165 others received fatal firearm injuries. Of these 387 serious and fatal injuries, 34.9% (135) were determined to be unintentional, 36.4% (141) were suicides or suicide attempts, 23.3% (90) were homicide/assaults, 0.5% (2) were legal intervention, and for 4.9% (19) intent was unknown. Rates of serious and fatal firearm injuries per 100,000 youth for the six year study period ranged from 14 in the Fairbanks North Star Borough and the Kenai Peninsula to 105 in the Yukon-Kuskokwim Region. The statewide average for this period was 27.1 per 100,000 children and adolescents.

Conclusions: Firearm injuries are the leading cause of serious and fatal injuries to children and youth in Alaska. This study suggests that many children and adolescents in Alaska who were injured by firearms, or who caused injury to other children or youth by firearms, had easy access to them.

Efforts should be made to convince adults not to let children or at risk teenagers have unsupervised access to firearms, and to promote safe storage of firearms.

Introduction

Many children in Alaska are killed or seriously injured by firearms each year. In fact, as a mechanism of fatal injury, firearms exceeded any other category in Alaska for children and teenagers, during the seven-year study period (see Figure 1).

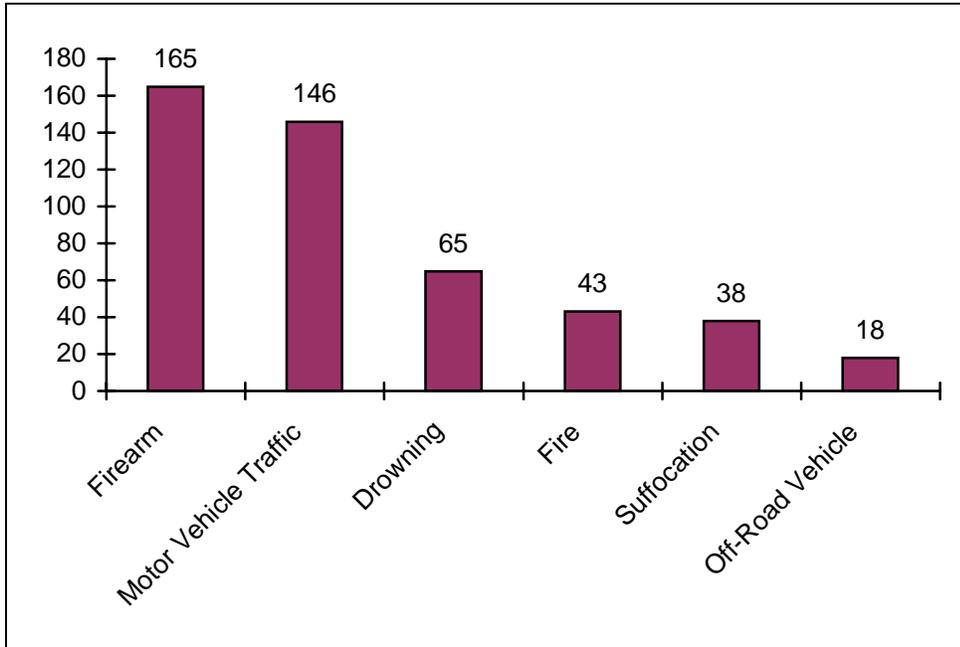


Figure 1. Fatal Injuries, Age 0-19, 1991-1997, Top Six Causes

Source: Alaska Bureau of Vital Statistics

The purpose of this study is to describe serious (hospitalized) and fatal firearm injuries among children and youth (ages 0-19) in Alaska, for the years 1991 through 1997. Data were obtained from: the Alaska Trauma Registry (ATR), which includes all injury admissions and deaths at every hospital in the state; and death certificates from the Alaska Bureau of Vital Statistics. A separate review of Behavioral Risk Factor Surveillance Survey (BRFSS) data for 1996 is included, showing what percent of Alaskans reported having loaded unlocked firearms in or around the home, and what percent of them also had children under 18 years old living in the home. No attempt was made to correlate BRFSS data with ATR data or Vital Statistics data.

This study describes such factors as: intent (e.g. unintentional, suicide, homicide/assault); age groups; alcohol or illicit drug involvement; region of injured person; place of occurrence; perpetrator; type of firearm used; and sex and race of the victim. It also describes trends over the seven-year study period.

Materials and Methods

Mortality data were obtained from the Alaska Bureau of Vital Statistics, in the Division of Public Health, for the seven-year study period (1991-1997).

Morbidity data were obtained from the Alaska Trauma Registry defined by International Classification of Diseases, 9th Edition, Clinical Modification (ICD-9-CM) external cause of injury codes (E922, E955.0-E955.4, E965.0-E965.4, E970, and E985.0-E985.4), for every child and adolescent (ages 0-19) who was admitted to a hospital or declared dead in the emergency department due to a firearm injury.¹ ATR data elements are collected by each hospital's designated trauma registrar, usually an emergency department nurse or medical records person. The data are entered onto a worksheet and into a hospital or state computer. Data elements for this study included patient demographics, presence or absence of alcohol or illicit drugs (based on blood alcohol or drug screening tests or other evidence in the medical record that drugs or alcohol were involved), and a brief narrative on each case describing the circumstances of the injury. In many cases, the narratives described type of firearm used and perpetrator.

Finally, information was obtained from the Alaska Behavioral Risk Factor Surveillance Survey (BRFSS) for 1996, on the percent of Alaskan adults reporting firearms in or around the home, the percent of adults reporting loaded, unlocked firearms in or around the home, and the percent of adults reporting loaded unlocked firearms in or around the home and the presence of children less than 18 years of age in the home.

Population data were obtained from the state demographer in the Alaska Department of Labor.²

Results

I. Intent

Table 1 shows the number of serious and fatal child and adolescent firearm injuries in Alaska, by intent, for the seven-year study period. Although there were a similar number of unintentional firearm injuries compared to suicidal firearm injuries (135 and 141, respectively), there were only 24 unintentional firearm injury deaths compared to 95 suicides. The percent of cases that were fatal among the unintentional firearm injuries was 18%, compared with the percent fatalities among suicide attempts at 67%. For 19 cases (4.9%) intent was unknown, but only one of these was a fatality.

Table 1

Serious and Fatal Firearm Injuries by Intent, Age 0-19, 1991-1997, N=387

	# Serious (Non-Fatal Hospitalized)	# Fatal	Total	% of Total
Intent:				
Unintentional	111	24	135	34.9%
Suicide/Attempt	46	95	141	36.4%
Homicide/Assault	45	45	90	23.3%
Legal Intervention	2	0	2	0.5%
Intent Unknown	<u>18</u>	<u>1</u>	<u>19</u>	<u>4.9%</u>
Total	222	165	387	100.0%

Sources: Alaska Trauma Registry, Alaska Bureau of Vital Statistics

II. Age Groups

Table 2 shows the number of serious and fatal firearm injuries for each of four age groups in Alaska, and percentages are shown in Figure 2. Among children 0 through 4 years of age, there were 7 serious or fatal injuries (an average of 1 per year); for children ages 5 through 9 years, there were 12 serious or fatal injuries (averaging nearly 2 per year); for children 10 through 14 years of age, there were 79 serious or fatal injuries (averaging about 11 per year); and for adolescents 15 through 19 years of age, there were 289 serious or fatal injuries (averaging about 41 per year). For children ages 0 through 14 years old, the majority of the injuries were unintentional. However, for youth ages 15 through 19 years, the largest percentage of serious or fatal injuries were suicides or suicide attempts (44.3%), followed by unintentional injuries and homicide/assaults (25.3% in each category). For children 0 through 14 years of age, 28.6% of the serious firearm injuries resulted in fatalities. For youth ages 15 through 19 years, over 47.4% of the serious firearm injuries were fatal. Of the 137 fatal injuries for this age group during the seven-year study period: 89 (65%) were suicides; 35 (25.5%) were homicides; and 13 (9.5%) were unintentional.

Table 2

Serious and Fatal Firearm Injuries by Age Group and Intent, Age 0-19, 1991-1997, N=387

Age Group	0-4 (# Fatal)	5-9 (# Fatal)	10-14 (# Fatal)	15-19 (# Fatal)	All (# Fatal)
Intent:					
Unintentional	5 (1)	9 (4)	48 (6)	73 (13)	135 (24)
Suicide/Attempt	0	0	13 (6)	128 (89)	141 (95)
Homicide/Assault	2 (1)	2 (2)	13 (7)	73 (35)	90 (45)
Legal Intervention	0	0	0	2	2
Intent Unknown	0	1	5 (1)	13	19 (1)
Total (No. Fatal)	7 (2)	12 (6)	79 (20)	289 (137)	387 (165)

Sources: Alaska Trauma Registry, Alaska Bureau of Vital Statistics

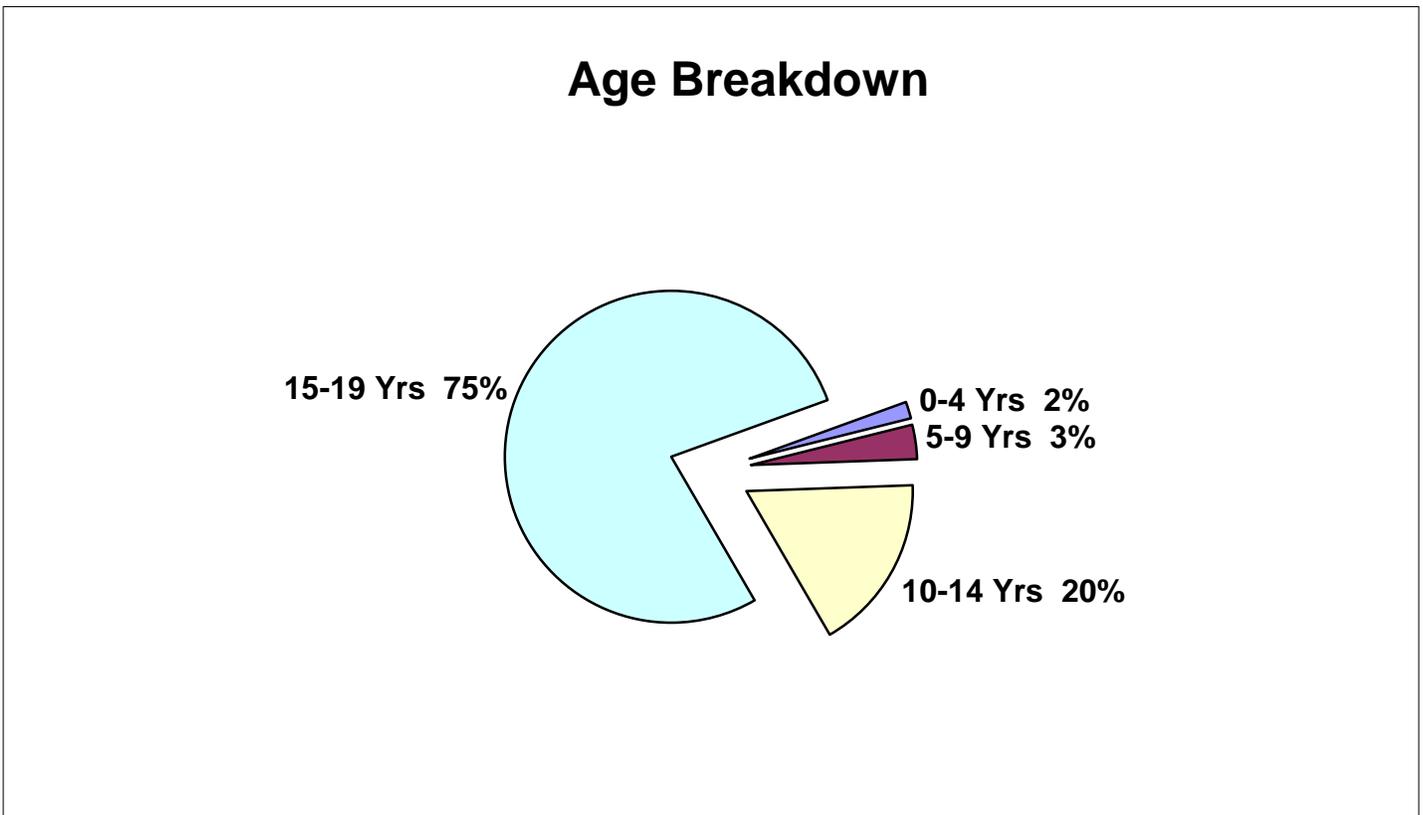


Figure 2 Serious and Fatal Firearm Injuries, Age 0-19, 1991-1997

Sources: Alaska Bureau of Vital Statistics, Alaska Trauma Registry

III. Alcohol or Drug Involvement

Table 3 includes only the Alaska Trauma Registry (ATR) cases and shows the presence or absence of alcohol or illicit drug involvement as recorded in the hospital medical record. Of these 258 cases, 200 (77.5%) had no information in the medical record that alcohol or drugs were involved. In 39 cases (15.1%), alcohol was involved. In 13 cases (5%), illicit drugs were involved, and in 6 cases (2.3%) both alcohol and at least one illicit drug were involved. The additional 128 cases were out-of-hospital deaths recorded by the Bureau of Vital Statistics.

Of the 258 ATR cases: 13 of 117 unintentional injuries (11.1%) had involvement of either alcohol, an illicit drug, or both; 19 of 60 (31.7%) of suicides/attempts had evidence of alcohol and/or illicit drug involvement; 20 of 60 homicides/assaults (33.3%) had evidence of alcohol and/or illicit drug involvement; and 1 of 2 legal intervention cases (50%) had evidence of alcohol involvement. For cases with unknown intent, 5 of 19 cases (26.3%) had alcohol or illicit drug involvement.

Table 3

Serious and Fatal Firearm Injuries by Substance Abuse, Age 0-19, 1991-1997, N=258*

Age Group	No Alcohol/Drug	Alcohol Only	Other Drug Only	Both	Totals
Intent:					
Unintentional	104	10	2	1	117
Suicide	41	16	2	1	60
Homicide/Assault	40	8	8	4	60
Legal Intervention	1	1	0	0	2
Intent Unknown	14	4	1	0	19
Total	200	39	13	6	258

***Source: Alaska Trauma Registry, out-of-hospital deaths not included**

❖ Note: Alcohol or Illicit Drug Involvement, in this study, relates only to the patient. In many instances, someone else pulled the trigger, but the Trauma Registry generally does not record information on others who may have been involved in the incident.

Vital statistics death certificates contain information on the chain of events leading directly to death, proceeding from the immediate cause of death to the underlying cause of death. Other significant conditions contributing to death but not resulting in the underlying cause of death may also be recorded on the certificate. Physicians are instructed to report the use of alcohol or other substance abuse on the death certificate if he or she feels that the use caused or contributed to death.

On the vital statistics death certificates for this study population, no presence of alcohol or drugs was recorded for the 15 out-of-hospital unintentional injury deaths. Of the 72 out-of-hospital

suicides, 5 had presence of alcohol reported on the death certificate, and 1 had presence of an illicit drug reported. Of the 23 out-of-hospital homicides, 2 had presence of alcohol reported, and 1 had presence of an illicit drug.

IV. Incidence by Region (of Residence)

Table 4 shows the incidence of occurrence of serious and fatal firearm injuries in 14 different regions in Alaska. Rates per 100,000 children and youth varied from a low of 14 in the Fairbanks North Star Borough and the Kenai Peninsula Borough to a high of 105 in the Yukon-Kuskokwim Region. The average rate statewide was 27.1 per 100,000 for the seven-year study period. Rates and frequencies are mapped geographically in Figure 3.

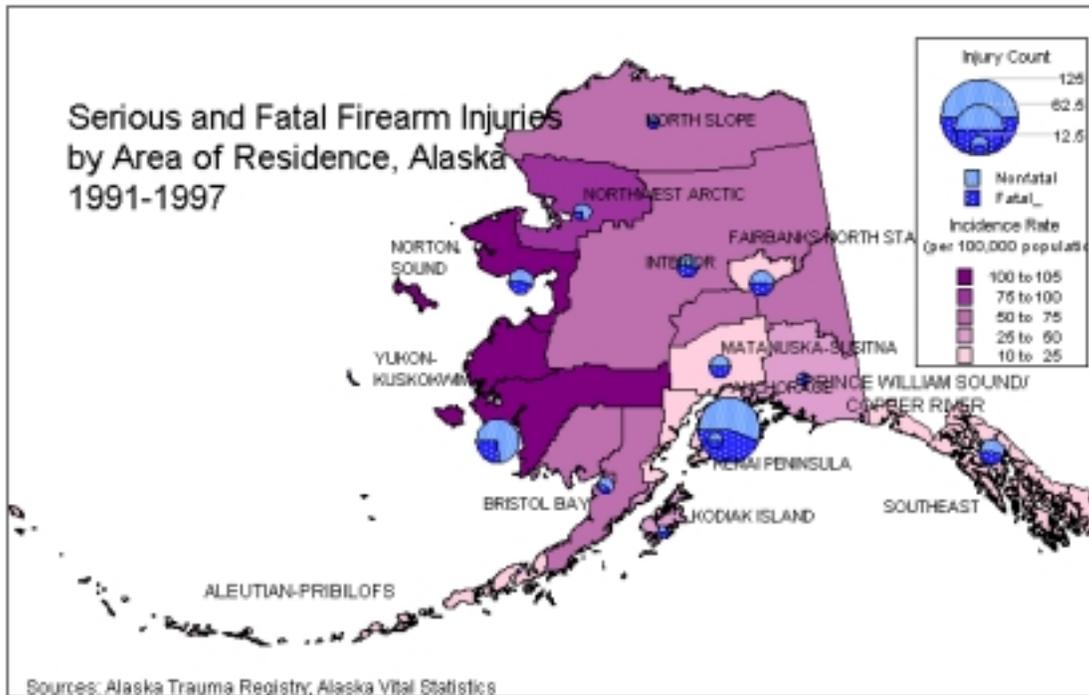
Table 4

Serious and Fatal Firearm Injuries by Region, Age 0-19, 1991-1997, N=387

Region	# Serious (Non-Fatal Hospitalized)	# Fatal	# Total	Population (7 years 91-97)	Rate/100,000 Youth
Anchorage	69	56	125	569,990	22
Interior (not incl. FNSB)	11	9	20	37,475	53
Fairbanks North Star Borough (FNSB)	15	13	28	198,084	14
Kenai Peninsula	7	8	15	107,664	14
Norton Sound	15	11	26	25,943	100
Yukon-Kuskokwim	50	21	71	67,690	105
Bristol Bay	7	4	11	20,458	54
Southeast	16	12	28	161,089	17
Kodiak	4	5	9	35,094	26
Aleutian-Pribilofs	0	3	3	21,002	*
Prince William Sound/Copper River	1	5	6	22,935	26
Matanuska-Susitna	10	9	19	119,449	16
North Slope	5	5	10	19,827	50
Northwest Arctic	12	4	16	21,216	75
Total	222	165	387	1,427,916	27
Average Per Year	(31.7)	(23.6)	(55.3)	(203,988)	(27.1)

Sources: Alaska Trauma Registry, Alaska Bureau of Vital Statistics
Population Figures were obtained from the State Demographer, Alaska Department of Labor

* Rates are not calculated for fewer than five events, since the addition or deletion of a few event can dramatically affect the size of the rate. These small numbers produce rates that are unstable and inherently unreliable.



Prepared by Section of Community Health and BMS, DHSS, State of Alaska
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Figure 3. Serious and Fatal Firearm Injuries by Area of Residence, Age 0-19, 1991-1997, N=387

V. Place of Occurrence

Table 5 shows the numbers and percent of injuries recorded in the Alaska Trauma Registry by place of occurrence and intent. One hundred nineteen (46.1%) of these injuries occurred at home. For 40 cases (15.5%) place of occurrence was not recorded. Except for the “other” category (38 cases, or 14.7%), no other place of occurrence exceeded 8.1%. Forty-nine of 117 unintentional injuries (41.9%) occurred at home, as well as 44 of 60 (73.3%) suicides/attempts, 15 of 60 (25%) homicide/assaults, and 2 of 2 (100%) legal intervention injuries. Of 19 cases with intent unknown, 9 (47.4%) occurred at home.

Table 5

Serious and Fatal Firearm Injuries by Place of Occurrence and Intent, Age 0-19, 1991-1997, N=258*

Location	Unintentional	Suicidal	Assault	Legal Intervention	Intent Unknown	Total	% of Total
Home	49	44	15	2	9	119	46.1%
Boat/Water	4	0	0	0	0	4	1.6%
Wilderness/Offroad	16	1	0	0	0	17	6.6%
Recreation/Sports	2	0	0	0	0	2	0.8%
Highway	1	2	12	0	1	16	6.2%
Public Place	5	0	13	0	3	21	8.1%
School	0	0	1	0	0	1	0.4%
Other	21	6	10	0	1	38	14.7%
Unknown	19	7	9	0	5	40	15.5%
Total	117	60	60	2	19	258	100.0%

***Source: Alaska Trauma Registry, out-of-hospital deaths not included**

VI. Perpetrator

Table 6 shows the perpetrator for serious and fatal firearm injury, by age group. In 218 cases (56.3%), the child or adolescent was determined to have shot himself or herself (either intentionally or unintentionally). In 30 cases (7.8%), the young person was determined to have been shot by another child or adolescent. In 98 cases (25.3%), the child or adolescent was shot by an adult or someone whose age was not recorded. In 41 cases (10.6%), it was not clear, from the information available in this study, who shot the victim (Figure 4).

Table 6

Serious and Fatal Firearm Injuries, 1991-1997 by Perpetrator and Age Group, Age 0-19, 1991-1997, N=387

Age Group	Self-Inflicted		Shot by Another Child/Adolescent		Shot by Adult or Age Unknown		Unknown	
	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-fatal	Fatal
0-4	0	0	1	0	1	1	2	1
5-9	0	0	1	0	1	2	4	4
10-14	20	8	13	2	12	5	12	3
15-19	85	105	11	2	43	32	14	1
Unknown	0	0	0	0	1	0	0	0
Total	105	113	26	4	58	40	32	9
Percentage	27.1	29.2	6.7	1.0	15.0	10.3	8.3	2.3
Combined Fatal/Non-Fatal Total	218		30		98		41	
Combined Fatal/Non-Fatal Percent	56.3		7.8		25.3		10.6	

Sources: Alaska Trauma Registry, Alaska Bureau of Vital Statistics

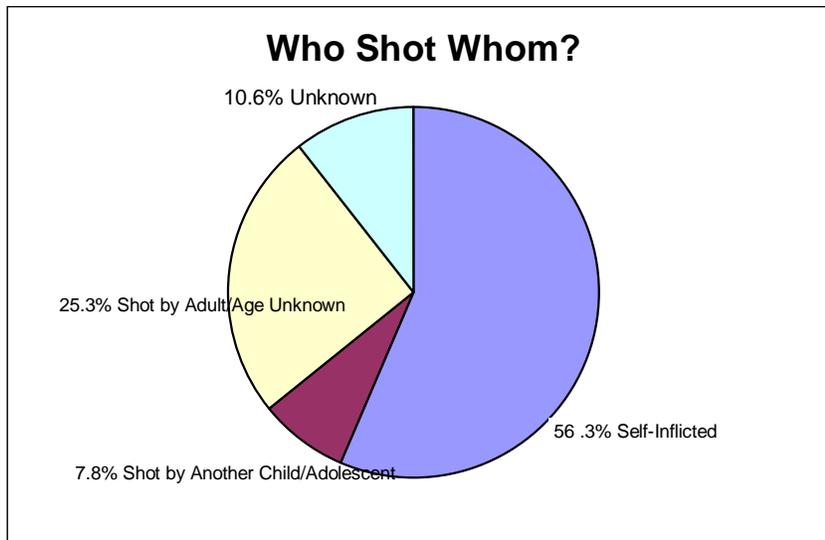


Figure 4. Serious and Fatal Firearm Injuries, Age 0-19, 1991-1997

Sources: Alaska Bureau of Vital Statistics, Alaska Trauma Registry

VII. Type of Firearm Used/by Intent

Table 7 shows the types of firearms used, by intent, and whether the injury was non-fatal or fatal. A total of 114 (29.5%) serious and fatal injuries were from handguns, 25 (6.5%) were from shotguns, 92 (23.8%) were from rifles, and for 156 (40.3%) of the injuries, the type of weapon used was not recorded in the medical record or on the death certificate.

Table 7

Serious and Fatal Firearm Injuries by Type of Firearm, Age 0-19, 1991-1997, N=387

Type of Firearm	Intent										Total
	Unintentional		Suicide/Attempt		Homicide/Assault		Legal Intervention		Unknown		
	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	Non-Fatal	Fatal	
<u>Handgun</u>											114
22 Caliber	13	0	6	1	4	0	0	0	1	0	25
Larger Caliber	12	1	4	1	5	0	0	0	0	0	23
Unk. Caliber	20	0	5	15	19	5	0	0	2	0	66
<u>Shotgun</u>	6	1	3	6	2	4	0	0	3	0	25
<u>Hunting Rifle</u>											92
22 Caliber	21	1	19	3	2	0	0	0	6	0	52
Larger Caliber	0	0	0	0	0	0	0	0	1	0	1
Unk. Caliber	20	2	5	10	1	0	0	0	1	0	39
<u>Military Firearm</u>	0	0	0	0	0	0	0	0	0	0	0
Type of firearm unknown	19	19	4	59	12	36	2	0	4	1	156
Total	111	24	46	95	45	45	2	0	18	1	387
Percent	28.7	6.2	11.9	24.5	11.6	11.6	0.5	0.0	4.7	0.3	100.0

Sources: Alaska Trauma Registry Narrative Reports and E-codes, Alaska Bureau of Vital Statistics E-codes

VIII. Race, Sex and Intent

Table 8 shows the numbers of serious and fatal firearm injuries by race, sex and intent. Although Alaska Natives represented about 16% of the statewide population during the seven year study period, they accounted for 198 (51.2%) of the serious and fatal firearm injuries. Seventy-five (55.6%) of 135 unintentional injuries occurred to Alaska Natives; 87 of 141 (61.7%) suicides and suicide attempts involved Alaska Natives; and 24 of 90 (26.7%) homicides and assaults occurred to Alaska Natives.

Of 387 total serious and fatal firearm injuries, 319 (82.4%) of the victims were male and 65 (16.8%) were female. One hundred eleven of the 135 (85.9%) unintentionally injured were male, 117 of 141 (83%) suicides/suicide attempts were by males, and 70 of 90 (77.8%) homicide/assault victims were males. During this seven-year study period, male children and youth in Alaska had nearly five times the risk of being seriously injured or killed by firearms than female children and youth. Sex and race are illustrated graphically in Figure 5.

Table 8

Serious and Fatal Child and Adolescent Firearm Injuries, 1991-1997, by Sex and Race, Alaska Statewide, Age 0-19, N=384 (3 Unknown)

	White				Black				AK Native				Pacific Island/Asian			
	Male		Female		Male		Female		Male		Female		Male		Female	
	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate
Unintentional (N=132)	39	8	8	2	1	*	2	*	66	43	9	6	7	23	0	0
Suicide/Attempt (N=141)	43	8	7	1	1	*	0	0	71	46	16	11	2	*	1	*
Homicide/Assault (N=90)	25	5	9	2	15	42	4	*	19	12	5	3	11	37	2	*
Legal Intervention (N=2)	0	0	0	0	1	*	0	0	1	*	0	0	0	0	0	0
Intent Unknown (N=19)	7	1	1	*	0	0	0	0	10	7	1	*	0	0	0	0
Total	114	22	25	5	18	51	6	18	167	109	31	21	20	66	3	10

Sources: Alaska Trauma Registry, Alaska Bureau of Vital Statistics

*Rates are not calculated for fewer than five events, since the addition or deletion of a few events can dramatically affect the size of the rate. These small numbers produce rates that are unstable and inherently unreliable.

Sex and Race

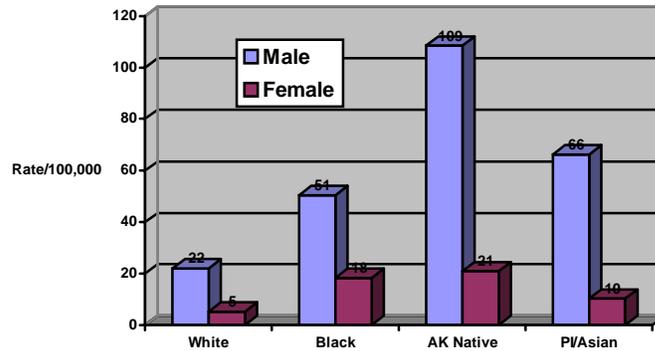


Figure 5. Serious and Fatal Firearm Injuries, Age 0-19, 1991-1997, N=384 (3 Unk)

Sources: Alaska Bureau of Vital Statistics, Alaska Trauma Registry

IX. Year and Intent

Table 9 shows the numbers of serious and fatal firearm injuries by year and intent. There were 46 serious and fatal firearm injuries in 1991, increasing to 66 in 1994 and dropping off to 50 in 1997. The average was 55.3 for the seven-year study period. The rate per 100,000 children and adolescents was 23.8 in 1991 and 23.8 in 1997. The average rate during the seven-year study period was 27.1 per 100,000 youth in Alaska.

Table 9

**Serious and Fatal Child and Adolescent Firearm Injuries, 1991-1997
By Year and Intent, Alaska Statewide, Age 0-19, N=387**

Year	1991	1992	1993	1994	1995	1996	1997	Total
Population (0-19)	193,717	199,933	203,929	206,205	206,610	207,745	209,777	1,427,916
Intent:								
Unintentional	14	29	17	20	19	21	15	135
Suicide/Attempt	21	18	24	25	13	19	21	141
Homicide/Assault	9	11	9	12	20	16	13	90
Legal Intervention	0	0	1	1	0	0	0	2
Intent Unknown	2	1	3	8	2	2	1	19
Total	46	59	54	66	54	58	50	387
(Rate/100,000)	(23.8)	(29.5)	(26.5)	(32.0)	(26.1)	(27.9)	(23.8)	(27.1)

Sources: Alaska Trauma Registry, Alaska Bureau of Vital Statistics

X. Firearms in the Home (% with loaded, unlocked firearms).

This analysis shows the number of Alaskan adults who reported having firearms and loaded unlocked firearms in or around the house. The source of this information is the Alaska Behavioral Risk Factor Surveillance Survey (BRFSS), 1996. Additionally, since interviewees were asked if there were children age 17 or younger in the house, the survey showed how many adults reported having children and loaded unlocked firearms in or around the house.

Overall, 59.9% of adults reported having firearms in or around the house (Table 10). Since the 95% confidence intervals for males and females overlap, men and women were equally likely to report having firearms in or around the house.

Table 10

Prevalence of Alaskan Adults Reporting Firearms in or Around the House, 1996				
	N ^a	Percent ^b Reporting Firearms	Weighted N ^c	95% Confidence Interval
Male	508	63.1	143,952	(57.5, 68.6)
Female	476	56.3	116,109	(51.2, 61.4)
Total	984	59.9	260,061	(56.1, 63.6)

Source: Alaska Behavioral Risk Factor Surveillance Survey, 1996

^a N = the number of survey respondents in this demographic subgroup.

^b Percent = the weighted (adjusted) percentage, based on the survey data.

^c Weighted N = the weighted sample number, generalized to 1996 intercensal population estimates for Alaska.

Table 11 shows the percentage of adults who reported having loaded unlocked firearms in or around the house. Males were more likely to report having loaded unlocked firearms in or around the house.

Table 11

Prevalence of Alaskan Adults Reporting Firearms in or Around the House and at Least One Firearm is Kept Loaded and Unlocked Alaska BRFSS, 1996				
	N ^a	Percent ^b Reporting Firearms	Weighted N ^c	95% Confidence Interval
Male	128	15.7	35,920	11.9, 19.5
Female	52	6.8	13,991	4.1, 9.5
Total	180	11.5	49,911	9.1, 13.9

Source: Alaska Behavioral Risk Factor Surveillance Survey, 1996

^a N = the number of survey respondents in this demographic subgroup.

^b Percent = the weighted (adjusted) percentage, based on the survey data.

^c Weighted N = the weighted sample number, generalized to 1996 intercensal population estimates for Alaska.

Table 12 shows the percentage of adults who reported at least one firearm was kept loaded and unlocked in or around the house and also reported children (<18 years old) living in the house. Of the adults who reported having loaded unlocked firearms in the house, 22.6% also had children under age 18 living in the house.

Table 12

Prevalence of Alaskan Adults Reporting at Least One Firearm is Kept Loaded and Unlocked in or Around the House and Have Children Living in the House				
	N ^a	Percent ^b Reporting Loaded Unlocked Firearms and Children in the House	Weighted N ^c	95% Confidence Interval
Total	45	2.6	11,320	.4, 4.8

Source: Alaska Behavioral Risk Factor Surveillance Survey, 1996

^a N = the number of survey respondents in this demographic subgroup.

^b Percent = the weighted (adjusted) percentage, based on the survey data.

^c Weighted N = the weighted sample number, generalized to 1996 intercensal population estimates for Alaska.

XI. Conclusions

Based on the findings of this study, the authors have concluded that many firearm related deaths and injuries among children and youth in Alaska could be prevented if adults would take more precautions to prevent unsupervised access to firearms among children and adolescents, including safer storage of firearms and ammunition. Also, if older youth have access to firearms, they may need more firearm safety training.

¹ “Alaska’s Statewide Trauma Registry: A Useful Surveillance Tool for Injury Prevention Planning and Evaluation,” Mark S. Johnson and Martha Moore; *Journal of Public Health Management and Practice*, November 1997, Vol. 3, No. 6 PP 1-7.

² Alaska Population Overview (1991, 1992, 1993, 1994, 1995, 1996, 1997 Estimates) Alaska Department of Labor.