

# Cardiovascular Deaths among Alaskan Natives, 1980–86

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**Abstract:** Average annual, age-adjusted death rates from cardiovascular diseases and atherosclerosis from 1980–86 among Alaskan Natives were lower than rates among other Alaskans (162.0 vs 242.1; RR = 0.67), while death rates from other causes were higher

(954.4 vs 618.6; RR = 1.54). These suggest that Alaskan Natives have less cardiovascular disease than other populations. Additional research on the role of marine omega-3 fatty acids is needed. (*Am J Public Health* 1990; 80:282–285.)

## Introduction

Numerous reviews on the role of diets rich in omega-3 fatty acids and the incidence of atherosclerosis and coronary artery disease recently have been published, reflecting widespread interest and enthusiasm over the potential beneficial health effects of omega-3 fatty acid consumption.<sup>1–13</sup>

Careful review of published literature reveals that the epidemiologic studies that show a low incidence of atherosclerosis and cardiovascular disease in arctic peoples, particularly, rest on fragile evidence.<sup>6–9,14,15</sup> For example, earlier works in Alaska to investigate causes of deaths were based on a limited number of autopsies conducted by non-pathologists using no standardized protocols without histopathology, and the two studies reached opposite conclusions about incidence of atherosclerosis among Alaskan Natives.<sup>8,9</sup> A study of death records for 1955–65 found lower mortality rates from heart disease among Alaskan Natives than the US population.<sup>15</sup> This study presents additional data based on death certificates on the causes of death among Alaskan Natives.

## Methods

All Alaskan death certificates for 1980 through 1986 (N = 13,534) were reviewed. The underlying cause of death and all other conditions that contributed to the death as recorded on the death certificate were coded using the *Ninth International Classification of Diseases—Ninth Revision* (ICD-9). As a validation of the accuracy of coding, for deaths occurring during 1980–82, we manually verified our codes against those furnished by the National Center for Health Statistics (NCHS). Population estimates were obtained from the Alaska Department of Labor and the US Bureau of Census.<sup>16</sup> Alaskan Natives, consistent with designations of the Alaska Department of Labor and the US Bureau of Census, included Eskimo (Inupiaq and Yu'pik), American Indian (Athebaskan, Tlingit, Haida, Tsimshian and other North American tribes), and Aleut.

We compared average annual death rates between Alaskan Natives and others according to major causes of death, using age-adjusted rates calculated by the direct method using the 1980 US Census as the standard. We compared cause-specific, age-adjusted death rates using the underlying cause of death, only, and by using contributory causes. Groupings of ICD codes are shown in Table 1 and the

Appendix. Statistical analyses were done using Epi Info, Version 3, Division of Surveillance and Epidemiologic Studies, Epidemiology Program Office, Centers for Disease Control, Atlanta, Georgia.

## Results

Alaskan Natives had a lower age-adjusted mortality rate from atherosclerosis and cardiovascular disease compared to other Alaskans (162.0 vs 242.1; RR = 0.67). Because the differences in death rates between underlying cause and multiple cause were so similar, only data for underlying cause are presented (Table 1). The only major difference in cardiovascular death rates by sex was for the comparison of ICD code 410, acute myocardial infarction, for underlying cause only, where female Natives had a slightly higher average annual, age-adjusted death rate than other females. For all other comparisons of cardiovascular disease-related groups, using underlying cause of death only, multiple causes, male, female, or total population, Alaskan Natives had consistently about 60 percent of the death rate of others.

In contrast, the death rates from infections, respiratory diseases, and neoplasms were all higher among Alaskan Natives than in others. The death rate from cardiovascular disease rose strikingly with age for both Natives and others (Figure 1) and was consistently present among the various cardiovascular-related disease, ICD code groups, by underlying cause and multiple cause, and in both males and females.

Interestingly, there was only one Native death due to aortic aneurysm (ICD code 441) compared to 88 deaths among others (RR = 23.8). The death rate due to all cerebrovascular disease (ICD codes 430–438) was slightly higher among Natives (RR = 1.08) and were primarily related to a higher rate of deaths due to cerebrovascular hemorrhage (ICD codes 430–432; RR = 1.36).

## Discussion

This analysis of death certificate data provides additional evidence that arctic indigenous people have strikingly lower death rates from cardiovascular disease than others. The death rate due to cerebrovascular hemorrhage was slightly higher among Alaskan Natives than others, and similar to the overall difference in mortality rates between Natives and others. Other investigators have reported a high rate of cerebrovascular hemorrhage among Eskimos<sup>14,17</sup> and Japanese<sup>18</sup> who consumed high quantities of fish, raising concerns that increased use of dietary consumption of fish oils may lead to the unwanted consequence of cerebral hemorrhage. Our data do not support this concern.

Limitations of death certificates are well known.<sup>19–22</sup> No data exist about their accuracy in Alaska or the correlation of recorded causes of death with autopsy results. Autopsy

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TABLE 1—Causes of Death in Alaskans, 1980–86

Cause of Death ICD-9 Codes	Gender	Number of Deaths		Rate*		RR**	95% Confidence Interval
		Native	Other	Native	Other		
Cardiovascular Diseases and Atherosclerosis 410	Male	74	323	54.3	60.6	0.90	0.55,1.44
	Female	42	106	43.4	32.8	1.32	0.76,2.35
	Total	116	429	50.2	49.5	1.01	0.71,1.46
410–414	Male	205	1,339	154.1	245.7	0.63	0.47,0.82
	Female	87	448	90.8	140.0	0.65	0.45,0.94
	Total	292	1,787	127.9	203.0	0.63	0.51,0.79
401–404, 410–414, 429.2, 440	Male	245	1,483	186.2	279.3	0.67	0.52,0.86
	Female	118	568	125.9	182.1	0.69	0.50,0.95
	Total	363	2,051	162.0	242.1	0.67	0.55,0.81
Cerebrovascular Diseases 431	Male	6	24	3.6	3.8	0.95	0.09,5.98
	Female	11	24	6.9	6.2	1.11	0.22,4.38
	Total	17	48	5.1	4.9	1.04	0.41,3.51
430–432	Male	14	46	8.4	5.8	1.45	0.42,5.30
	Female	24	59	16.1	12.5	1.29	0.44,3.06
	Total	38	105	12.1	8.9	1.36	0.60,2.79
430–438	Male	58	180	43.7	38.7	1.13	0.63,1.90
	Female	65	194	60.0	58.0	1.03	0.63,1.63
	Total	123	374	52.0	48.2	1.08	0.75,1.53
Aneurysm 441	Male	1	68	0.8	15.5	0.05	0.02,1.33
	Female	0	20	0	6.5	—	—
	Total	1	88	0.5	11.9	0.04	0.02,0.87
Infections 001–139	Male	21	59	12.7	7.0	1.81	0.53,4.81
	Female	18	29	11.9	5.6	2.13	0.67,6.82
	Total	39	88	12.5	6.5	1.92	0.92,4.19
Respiratory 460–519	Male	139	270	97.1	61.9	1.57	1.07,2.27
	Female	100	214	83.9	61.4	1.37	0.92,2.08
	Total	239	484	93.2	63.3	1.47	1.13,1.95
Neoplasms 140–239	Male	300	1,051	223.6	198.4	1.13	0.89,1.44
	Female	243	823	216.3	182.5	1.19	0.92,1.53
	Total	543	1,874	224.8	195.7	1.15	0.97,1.36
Intentional Injuries E950-E969	Male	302	572	124.6	40.8	3.10	2.13,4.40
	Female	86	158	34.5	13.6	2.50	1.29,5.11
	Total	388	730	79.6	28.5	2.80	2.02,3.85
Unintentional Injuries E000-E949, E970-E999	Male	615	1,829	266.3	133.3	2.00	1.58,2.52
	Female	201	400	93.4	43.5	2.10	1.44,3.26
	Total	816	2,229	180.3	92.7	1.90	1.59,2.38
All except Cardiovascular	Male	1,990	5,203	1,071.6	665.4	1.64	1.46,1.83
	Female	1,173	2,684	817.4	553.0	1.48	1.30,1.69
	Total	3,163	7,887	954.4	618.6	1.54	1.42,1.68
All Causes	Male	2,235	6,686	1,257.8	934.7	1.35	1.21,1.49
	Female	1,291	3,252	943.3	735.1	1.28	1.14,1.45
	Total	3,526	9,938	1,116.4	860.8	1.30	1.20,1.40

\*Average annual age-adjusted rate per 100,000 by direct method to 1980 U.S. population.  
 \*\*Native rate/Other rate

results, if available, were not routinely used to determine cause of death that was recorded on the death certificate by the attending physician. ICD coding was done by physician epidemiologists who were not trained nosologists but for another study and prior to involvement with work on diet and atherosclerosis—therefore, potential bias in coding cardiovascular related disease was minimized. We coded all death certificates because previous studies revealed many incorrectly coded certificates and because only the underlying cause of death had been coded. We analyzed our data using

our codes; results using multiple cause coding were similar to results using underlying cause only. An analysis of NCHS codes using underlying cause only also showed similar results.

Many recent studies have focused on health effects of fish consumption.<sup>1–5,13,23</sup> Bang emphasized the role of Eskimo diet rich in marine mammal fatty acids, especially seal and whale, and these foods generally were eaten raw.<sup>24</sup> Whether the same health benefits can be anticipated from raw fish and from cooked fish is less clear. Consumption of

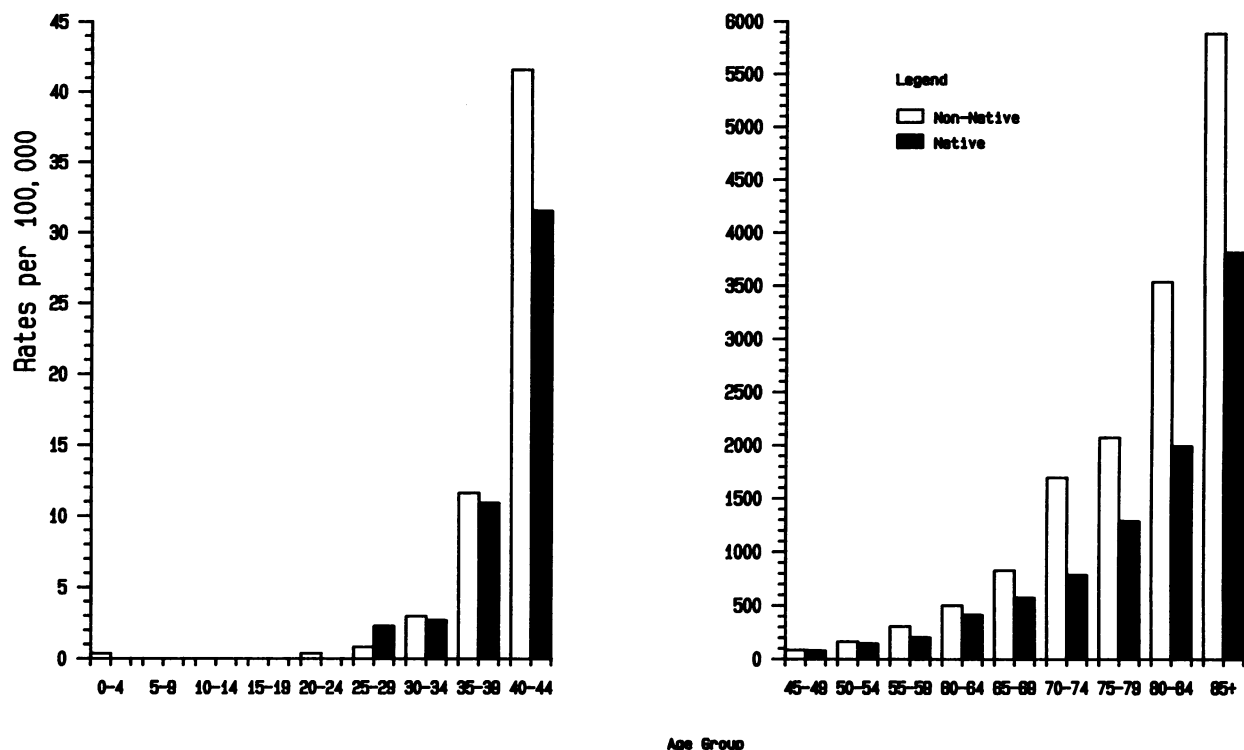


FIGURE 1—Cardiovascular Deaths in Alaska 1980-86 (average annual rate per 100,000 population by age group and race)

salmon remains high and seal, walrus, and whale consumption, both raw and cooked, remains an important part of Alaskan Natives' subsistence diet.

As early as 1900, diet changes among Alaskan Natives were documented as a result of contact with whalers and later with missionaries.<sup>1</sup> Since the 1950s, there has been a dramatic increase in smoking and alcohol consumption. Since the 1960s, western diets increasingly have become available. Since the 1970s, use of snuff has increased.<sup>25</sup> In view of these many life-style changes, it is even more remarkable to find such striking differences in cardiovascular mortality.

The evidence presented here does not establish that the cause of the difference in cardiovascular mortality rates is due to dietary intake of omega-3 fatty acids from marine mammals and fish. It is possible that the differences could be due to genetic factors, or that the observed differences are a result to the effect of competing risks<sup>21,22</sup> acting disproportionately on Natives, or to inaccuracies inherent in death certificate studies. For example, Alaskan Natives may have differences from other Alaskans in the nature and frequency of medical system contacts, the likelihood of receiving care from physicians of similar background and training, availability of diagnostic services, death certification practices in rural compared to urban areas, classification of race on the death certificate, and differences in accuracy of census data. Additional research is needed to pursue accumulating evidence of the beneficial effects that may exist from consumption of omega-3 fatty acids.

#### ACKNOWLEDGMENTS

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#### APPENDIX

ICD Code	Specific Diagnosis
401	Essential hypertension
402	Hypertensive heart disease
403	Hypertensive renal disease
404	Hypertensive heart and renal disease
410	Acute myocardial infarction
411	Other acute and subacute forms of ischemic heart disease
412	Old myocardial infarction
413	Angina Pectoris
414	Other forms of chronic ischemic heart disease
429.2	Cardiovascular disease, unspecified
440	Atherosclerosis

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**ERRATA**

*In:* Wells JK, Williams AF, Fields M: Coverage gaps in seat belt use laws. *Am J Public Health* 1989; 79:332-333. Table 1 which appeared on page 333 last year is in error. In the listing of all the states, Utah was inadvertently omitted and the wrong data presented for Tennessee and Texas. All other states and data were correct. Printed below are the correct figures for Tennessee, Texas, and Utah. We regret the error.

**TABLE 1—Correction**

State	Total Deaths	Not Subsequently Covered		Total Not Covered	
		Rear Seat Occupants	Light Truck Van Occupants	N	%
Tennessee	3,013	111	0	111	4
Texas	12,564	784	0	784	6
Utah	882	71	0	71	8

\* \* \*

*In:* Popkin BM, Akin JS, Flieger W, Wong EL: Breastfeeding trends in the Philippines, 1973 and 1983. *Am J Public Health* 1989; 79(1):32-35. The authors wish to call attention to an error in the coding manual for a data set they used in that paper. Although the error does not change the substantive results, it does change slightly the results presented in their Table 2 (page 34) under the subheading of "Mother's Education (years)," lines 4 and 5 for "7-9" years and "10± years". The corrected results show a slightly greater decline among those with 7-10 years of schooling and with more than 11 years of schooling, as shown in the two lines in the table correction below.

**TABLE 2—Correction**

Characteristics	Average Sample Size	Incidence		Unadjusted Difference <sup>a</sup>	95% Confidence Interval of Difference	
		1973	1983		Lower Limit	Upper Limit
7-10	783	86.7	81.2	-5.5	-9.1	-1.9
11±	1058	86.2	72.6	6.4	1.0	11.8