Mortality Due to Heart Disease Among Alaskan Natives, 1955-65

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EFFECTIVE centralized responsibility for birth and death registration in Alaska has been achieved only in the last 16 years. Although vital records have been filed since 1913, Alaska was not admitted to the National Birth and Death Registration area until 1950 (*1*). The bureau of vital statistics of the Alaska Department of Health and Welfare was established in 1949 when the Uniform Vital Statistics Act transferred responsibility for vital registration to the department from the Office of the Territorial Auditor (*2*).

As early as 1950, however, examination of crude mortality for Alaska Natives (here defined as Aleuts, Eskimos, and Indians, members of the three indigenous cultural and linguistic groupings) revealed striking dissimilarities in comparison with death rates for white persons in the United States. Whereas diseases of the heart were the leading cause of death for the white persons with a crude rate of 360.8 per 100,000 population, heart disease ranked seventh of the leading causes of death for Alaska Natives with a crude rate of 82.7 per 100,000 population. Tuberculosis, accidents, influenza-pneumonia, congenital malformations, early diseases of infancy, and acute infectious diseases, in stated order, each caused more deaths among these people (*2a*).

By 1960 tuberculosis ranked sixth as a cause of death for Alaska Natives. However, accidents and influenza-pneumonia continued to exceed diseases of the heart in importance as leading causes of death. Whereas the crude death rate for diseases of the heart for the United States as a whole was 369.0 per 100,000 population in 1960, the rate among Alaska Natives still remained low at 80.4 per 100,000 population. In 1962 Kester (*3*) calculated age-sex adjusted death rates by cause for Alaska nonwhites. The adjusted mortality rate for diseases of the heart among Alaskan nonwhites, 1.79 deaths per 1,000 population, was less than the rate of 3.38 deaths per 1,000 for the United States as a whole.

There is a widespread clinical impression that heart disease is uncommon in certain segments of the Alaska Native population, and the results of limited mortality analysis have been consistent with this impression. It was therefore decided to examine death records of Natives more extensively in an attempt to verify further this impression.

Materials and Methods

For purposes of this study, all deaths for Alaskan Aleuts, Eskimos, and Indians age 40 and over, certified as due to diseases of the heart, were reviewed for the period 1955–65. These diseases comprised categories 410–443,

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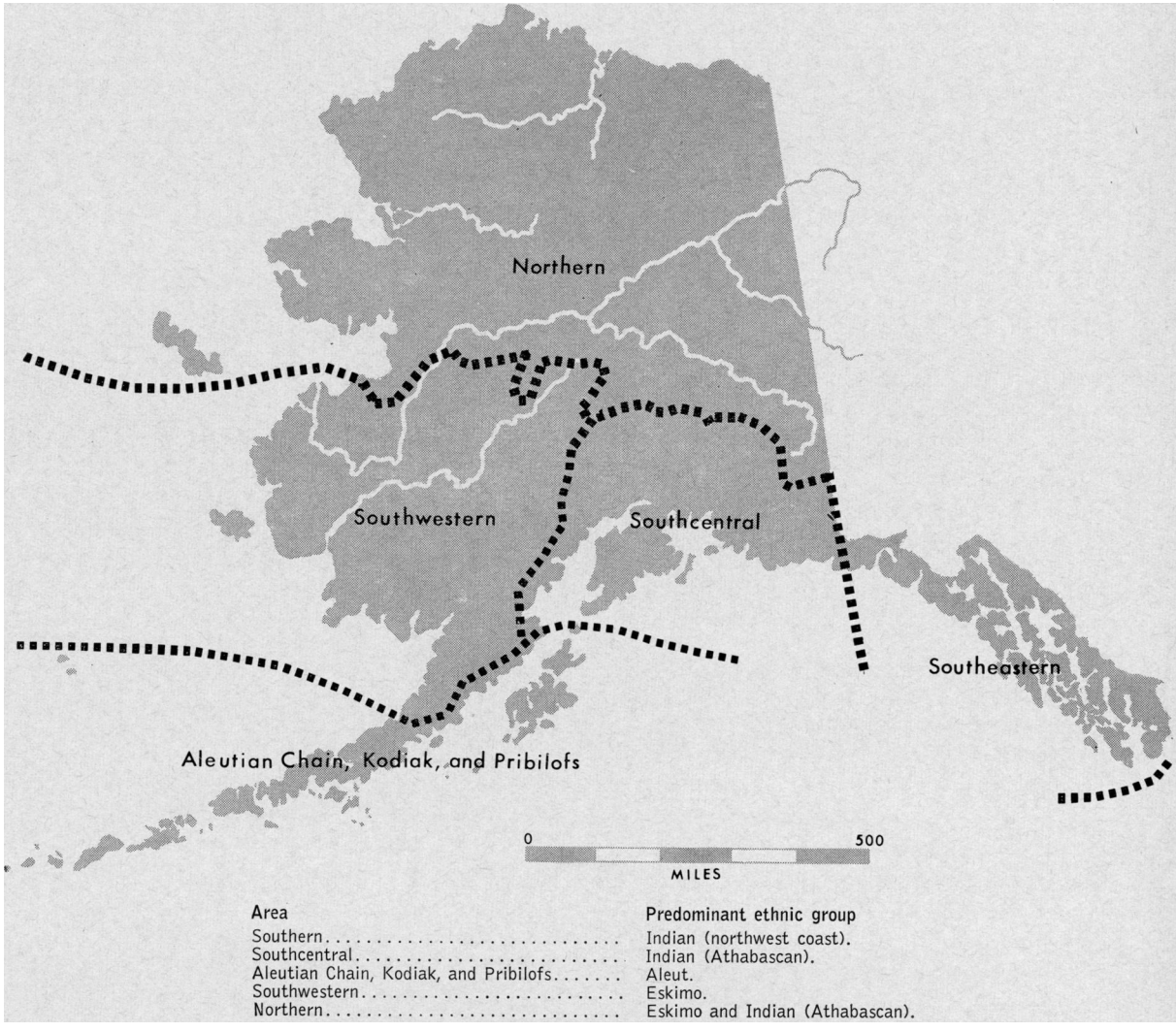
sixth and seventh revisions of the World Health Organization's International Classification of Diseases. These codes excluded rheumatic fever (400–402), but included chronic rheumatic heart disease (410–416), arteriosclerotic and degenerative heart disease including coronary disease (420–422), other diseases of the heart (430–434), and hypertensive heart disease (440–443).

Deaths occurring in 1955–57 were classified according to the sixth revision of the International Classification, and deaths thereafter according to the seventh. However, data for diseases of the heart as a whole were considered comparable for the entire period since a coding study conducted by the Public Health Service's National Center for Health Statistics (*4*) showed a comparability ratio of 1 for codes 410–443. Because of the small population and small number of deaths in the age group 40 years and above, age-specific mortality analysis was limited to two age groupings only, 40–64 years and 65 years and over.

For the purpose of geographic analysis by place of residence, the State was divided into five areas (see map) based upon the election districts existent in 1960. The predominant cultural and linguistic composition of the Native population in these areas is also given.

There are two distinct groupings of Indians in Alaska: the Indians of the southeast, who

Geographic areas of Alaska



Area	Predominant ethnic group
Southern	Indian (northwest coast).
Southcentral	Indian (Athabascan).
Aleutian Chain, Kodiak, and Pribilofs	Aleut.
Southwestern	Eskimo.
Northern	Eskimo and Indian (Athabascan).

Table 1. Relation of medical to total certifications for all nonviolent deaths and deaths due to diseases of the heart among Alaska Natives 40 years and over, by area, 1955–65

Area of State	Deaths due to heart diseases			All nonviolent deaths		
	Total number	Medically certified		Total number	Medically certified	
		Number	Percent		Number	Percent
Total	378	255	67	1,538	979	64
Southcentral	39	36	92	128	109	85
Southeastern	127	101	80	414	337	81
Aleutian Chain, Kodiak, and Pribilofs	46	32	70	146	88	60
Northern	107	56	52	488	277	57
Southwestern	59	30	51	362	168	46

belong to the northwest coast group, and the interior Athabascan Indians of the southcentral and part of the northern areas. Alaskan death certificates record race of deceased for only three Native groups, Aleut, Eskimo, and Indian, and do not differentiate between the two Indian cultural and linguistic groups. Forty-seven certificates reported the deceased only as Native. These were assigned to one of the three ethnic categories by age according to the distribution of the rest of Native deaths for which specific ethnic group was reported.

Data are presented for medical (physicians) and nonmedical certifiers. Nonmedical certifiers were mainly local magistrates and other lay persons including relatives. A few deaths were certified by nurses, who are considered nonmedical certifiers.

Denominators for all rate calculations were derived from the 1960 census, and rates have been expressed as 11-year annual averages. Since the 1960 census data do not include age distributions of the Native population by election district, final area estimates were derived by applying the statewide age distributions of the small number of persons in other specified nonwhite groups (Negro, Chinese, Japanese, and Filipino) to the total of these groups in each election district and subtracting from the total nonwhite population by age. The residual constituted the Native population in the two age groups by area.

Analysis of heart deaths among white residents of Alaska and comparison of death rates from diseases of the heart in white and Native persons by age, sex, and area was not attempted because of the highly mobile nature of the white population and its tendency to be concentrated in only the urban areas of the State.

Results

During 1955–65, 1,806 Natives in Alaska aged 40 years and over died, 268 from violent causes. Of the 1,538 nonviolent deaths, 979 (64 percent) were certified by physicians and 559 (36 percent) by nonphysicians. Because of the large proportion of nonmedically certified deaths, an attempt was made to determine the possible effect of nonmedical certification on overall mortality rate calculations and comparisons by area.

Table 1 shows medical certifications as a percent of total certifications for both deaths due to heart diseases and all nonviolent deaths by area. Ratios of medical to total certifications varied considerably by area with highest proportions attained in the southcentral region and lowest in the southwestern region.

Table 2 shows the relative frequency of nonviolent deaths by cause and certification status. Nonmedically certified deaths were recorded under symptoms, senility, and ill-defined (codes 780–795) relatively more frequently than were medically certified deaths. This excess relative frequency occurred, however, at the expense of the categories for neoplasms (140–239) and the categories included in the table under the heading "all other." The relative frequency of reporting deaths from heart diseases was essentially the same for both medical and nonmedical certifiers. Review of deaths from heart

diseases as percent of total nonviolent deaths by certification status for each of the 11 years revealed that this similarity of relative frequency in reporting for both types of certifiers remained relatively constant.

By geographic area the proportions of deaths from heart diseases to total nonviolent deaths were roughly comparable for both types of certification (table 3). The apparent differences for the southcentral and Aleutian areas were not statistically significant. Thus, although large numbers of nonmedically certified deaths did occur during the study period and differences in proportion of medical certifications by area were found, the inclusion of nonmedically certified deaths in mortality rate calculations based upon ICD codes 410–443 should not predispose to over- or underestimation of these rates, either in total or, with the possible exception of the Aleutian and southcentral areas, by geographic area.

An attempt to determine whether certification status could materially influence the specificity of rate calculations for mortality within codes 410–443 was made by comparing the relative frequency of recording, by certification status, of arteriosclerotic and degenerative heart disease including coronary heart disease (ICD code 420) and other and unspecified diseases of the heart (ICD code 434). Of 255 medically certified deaths due to diseases of the heart, 173 (68 percent) were recorded as code 420 and 23 (9 percent) as code 434. Of 123 nonmedically certified deaths, 21 (17 percent) were recorded as code 420 and 92 (75 percent) as code 434.

It was therefore concluded that mortality rate calculations for specific types of heart disease within the ICD codes 410–443 would be influenced by the lack of specificity in recording of nonmedically certified deaths used in these calculations, and that differences in proportion of nonmedical certifications to total nonviolent certifications by area could influence

Table 2. Distribution of nonviolent deaths in Alaska Natives aged 40 years and over, by cause and certification status, 1955–65

Cause and ICD code number	Medical certification		Nonmedical certification		Total	
	Number	Percent	Number	Percent	Number	Percent
All nonviolent (001–799)	979	100	559	100	1, 538	100
Infectious (001–138)	120	12	54	10	174	11
Neoplasms (140–239)	209	21	63	11	272	18
Heart (410–443)	255	26	123	22	378	25
Respiratory (470–527)	78	8	81	14	159	10
Symptoms, senility, and ill-defined (780–795)	15	2	138	25	153	10
All other	302	31	100	18	402	26

Table 3. Deaths due to diseases of the heart as percent of nonviolent deaths for Alaska Natives aged 40 years and over, by certification status and geographic area, 1955–65

Area of State	Medically certified deaths			Nonmedically certified deaths		
	Total nonviolent	Heart disease	Percent	Total nonviolent	Heart disease	Percent
Southwestern	168	30	18	194	29	15
Northern	277	56	20	211	51	24
Southcentral	109	36	33	19	3	16
Southeastern	337	101	30	77	26	34
Aleutian Chain, Kodiak, and Pribilofs	88	32	36	58	14	24

Table 4. Average annual death rates due to diseases of the heart by sex and age, Alaska Natives, 1955–65, and United States total, 1960

Age group (years)	Rate per 1,000, Alaska	Rate per 1,000, United States [1]
Males:		
40–64	2. 4	5. 6
65 and over	15. 8	33. 1
Females:		
40–64	1. 4	2. 1
65 and over	14. 7	24. 2

[1] References 6 and 7.

specific rate comparisons by area. For this reason, rate calculations and comparisons were limited to codes 410–443 as a whole.

Table 4 shows the average annual death rates in Natives due to diseases of the heart for the years 1955–65 in the age groups 40–64 years and 65 years and over, by sex, in comparison with the U.S. rates for 1960. An excess in deaths of males was noted in the age group 40–64, with rates in Native females more closely approximating those for Native males in the age group 65 and over. Comparison with rates for the United States in 1960 indicates that in all four sex and age categories the rates in Natives were significantly lower ($P<0.01$) than those for the U.S. population, although the sharp increase in rates with age and excess mortality of males in the younger age group was similar in both instances.

Data by geographic area in table 5 shows that for both age groups, the lowest rates were recorded for the southwestern and northern areas of the State which contain the bulk of the Eskimo population. Death rates were significantly higher in the southeastern area, where the Native population consists almost exclusively of Indians of the northwest coast cultural and linguistic grouping, and in the Aleutian Chain and Kodiak Island where the bulk of the Native population is Aleut.

Rates for the southcentral area must be viewed with some caution since denominators, particularly for the 65 and over age group, are small and subject to instability due to major Native in and out migrations into the urban Anchorage area. In 1960, 49 percent of the total Native population of the southcentral region was in the Anchorage area. The differences in rates between areas in both age groups are significant at the 5 percent level even if the southcentral region is excluded from the comparison.

A comparison of rates by age and ethnic group is shown in table 6. The lowest rates in both age groups occurred among Eskimos. In the 40–64 year age group rates among the ethnic groups differed significantly at the 1 percent confidence level. The rates in the age group 65 and over did not differ significantly.

Table 5. Death rates in Alaska Natives for diseases of the heart, by age and area, 1955–65 average

Age group and area of State	Number of deaths	Population	Average rate per 1,000
40–64 years:			
Southwestern	23	1, 625	1. 3
Northern	32	1, 918	1. 5
Southcentral	14	606	2. 1
Southeastern	40	1, 428	2. 5
Aleutian Chain, Kodiak, and Pribilofs	23	524	4. 0
65 years and over:			
Southwestern	36	311	10. 5
Northern	75	508	13. 4
Southcentral	25	70	32. 5
Southeastern	87	465	17. 0
Aleutian Chain, Kodiak, and Pribilofs	23	110	19. 0

Table 6. Average annual death rates in Alaska Natives for diseases of the heart, by age and ethnic group, 1955–65

Age and ethnic group	Number of deaths	Population in 1960	Average annual rate per 1,000
40–64 years:			
Eskimo	52	2, 997	1. 6
Indian	50	2, 181	2. 1
Aleut	30	841	3. 2
65 years and over:			
Eskimo	103	659	14. 2
Indian	116	638	16. 5
Aleut	27	159	15. 4

Discussion

In mortality rate calculations, use of 11-year averages based upon a single midpoint census denominator can lead to instability and error, particularly if the denominator is subject to rapid change over time. The Alaska Native population since 1950 has been increasing at an average rate of almost 3 percent per annum (*5*). Alaska Native in and out migration over the last 16 years, however, has been insignificant, and population input has been limited to births within the State. Further, the high birth rate among these people, averaging 48 live births per 1,000 population in 1960 (*5a*), would serve to cause relatively greater increases in population in the age group under 40 years than in the older ages. It is therefore unlikely that this older age segment of the Native population has varied greatly during the study period.

That the differences in U.S. and Alaska Native death rates by sex and age due to diseases of the heart relate specifically to codes 410–443 and not to overall nonviolent mortality rate differences is evident from the fact that the proportion of deaths due to diseases of the heart to total nonviolent deaths for Alaska Natives was significantly less than that for the U.S. population. Thus, although the average total nonviolent death rate for Alaska Natives in the age group 40 and above of 18.7 per 1,000 was somewhat lower than a rate of 22.0 (*6*, *7*) for the U.S. population in 1960 in the same age group, deaths from heart disease accounted for only 25 percent of the total among Natives as compared to 47 percent among the U.S. population.

Another source of bias in comparing Alaska Native heart death rates with U.S. rates relates to the wide age spans selected for the age-specific comparisons, dictated in this study by paucity of numbers. However, age adjustment of the heart death rate in Natives of Alaska aged 40–64 years, using the direct method, 5-year age intervals, and the 1960 U.S. population within these intervals as standard, increases the Native rate by only 10 percent from 2.0 to 2.2 deaths per 1,000 population. This adjusted rate is still considerably lower than the 1960 rate of 3.8 per 1,000 for the U.S. population in the age group 40–64 (*6*, *7*). Also the frequency distributions of populations by sex in 5-year age groupings for the age group 65 years and over for the U.S. and Alaska Native populations were similar in 1960. Therefore, the rate differences for the two age groups considered cannot be completely attributed to differences in age distributions within these groups.

Since ethnic classification is not independent of geographic area for Native residents of the State, the significant mortality rate differences by area found in this study invite a genetic hypothesis with ethnic group as a determinant for differences in heart disease mortality experience. However, only a simple unverified statement of race is required for death certification, and the racial background of large numbers of Alaska Natives, particularly those classified as Aleuts, is not homogeneous. Further, there is wide variability in patterns of Native nutrition, as well as differences in urbanization and acculturation status by area.

It would not, therefore, be possible to separate environmental from genetic correlates of Native heart mortality without more specific descriptive and analytic field studies of specific components of this mortality. The data presented here, however, indicate that differences in Native mortality for diseases of the heart both in comparison with U.S. rates and in relation to geographic areas within the State of Alaska do exist. Determination of reasons for these differences must be predicated upon further more specific epidemiologic and clinical studies.

Summary

The 378 deaths among Alaskan Aleuts, Eskimos, and Indians aged 40 years and over due to diseases of the heart (ICD codes 410–443) for the period 1955–65 were analyzed regarding certification status, sex, geographic area, and ethnic classification. Mortality rate comparisons were made both in relation to the overall U.S. rates for 1960 and to geographic area and ethnic designation within the State. Although nonmedical certifications accounted for 36 percent of the total death certifications for nonviolent deaths reviewed, they did not influence rate calculations or mortality comparisons by area for the codes 410–443 as a whole.

Alaska Native mortality rates for diseases of

the heart per 1,000 population were 2.4 for males 40–64 years of age, 15.8 for males 65 years and over, 1.4 for females 40–64, and 14.7 for females 65 and over. For the U.S. population, corresponding rates were 5.6 and 33.1 for males and 2.1 and 24.2 for females. Statistically significant differences in rates by race and geographic area within the State were observed. Lowest rates occurred in the southwestern and northern regions of the State among Eskimos, while the highest rates were found in the southcentral, southeastern, and Aleutian Chain, Kodiak, and Pribilof areas among Aleuts and Indians. Determination of the reasons for these differences must await further epidemiologic and clinical investigation.

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Safety Glass Needed in Doors and Panels

An alarming increase in accidents caused by persons walking or falling into glass doors and panels emphasizes the need for builders to use more safety glass. Every year about 100,000 Americans, one-third of whom are between 5 and 14 years old, are disfigured or killed in accidents involving glass. A good part of the time, people simply walk into a glass patio door, storm door, or large fixed panel, or fall into the glass of a tub enclosure.

The Public Health Service is requesting State and local officials to support a proposal to require builders to install more safety glass in private homes and commercial structures. Information on glass standards and guidelines for building codes, prepared by the Service's Injury Control Program within the National Center for the Urban and Industrial Health, the National Safety Council, the Glass Door Safety Committee of the Architectural Aluminum Manufacturers Association, and the United States of America Standards Institute, has been sent to State officials, municipal code officers, and safety and health agencies.

The three types of safety glass used today are laminated, wired, and tempered. Laminated and wired glass consist of two pieces of ordinary glass with a core of either plastic or wire, which reduces the hazard of impalement by holding the broken pieces together. Tempered glass is four times as strong as ordinary glass, costs less than the other two kinds of safety glass, and, if broken, it breaks safely into small pieces resembling rock salt.