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Cancer Incidence, Survival, and Mortality among American Indians and Alaska Natives

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INTRODUCTION

It is difficult to profile the American Indian population, because there are 511 federally recognized tribes and villages, each of which has its own unique culture and history. This report must be considered a discussion of the "average American Indian," which of course does not exist, but we are limited by available data sources and space.

The 1980 United States census identified a total of 1,364,033 American Indians and 278 American Indian reservations (excluding Alaska Natives) where approximately one-fourth of all American Indians lived in that year [1]. The majority of Indian people (estimated 54 percent) live in urban areas; 46 percent live in rural and reservation areas. The American Indian population residing in historic areas and tribal trust lands of Oklahoma (excluding urban areas) numbered 116,000, comprising 9 percent of the total American Indian population.

Generally, American Indians had a significantly lower median family income ($13,768) in 1979 than that for the entire country

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($19,917). The income of American Indian families living on reservations ($9,924) was even lower [1]. Twice as many American Indians (27.5 percent compared to 12.4 percent) lived at or below the poverty level in 1980 as the total population. Unemployment rates are very high: In comparison to unemployment rates for the entire country, the rate for all American Indians combined is twice as high, and over four times as high for Indians living on reservations. Fifty-six percent of all American Indians were high school graduates in 1980, as were 43 percent of reservation Indians and 66 percent of the total United States population. The median age of American Indians was 23.4, according to the 1980 census, which is almost seven years younger than the overall United States figure of 30.0. Indians living on reservations were even younger, with a median age of 19.7.

In 1980, the census identified 209 Alaska Native villages and counted 64,103 Eskimo, Aleut, and American Indians living in Alaska [1,2]. Approximately one-seventh of Alaska's population is native. Over one-half (34,144) of these are Eskimo. There were also 21,869 American Indians and 8,090 Aleut living in Alaska. As is true of other Native American groups, the socioeconomic condition of Alaska Natives is poor. In 1980, more than 18 percent of the Alaska Natives aged twenty-five and older had less than five years of elementary school education compared to 2.6 percent of United States whites.

The Indian Health Service (IHS) makes estimates of the Native American population for the purpose of identifying the number of people who are eligible to receive medical care from IHS. In 1980, the number of eligible persons was about 850,000; by 1990, the IHS service population was approximately 1.1 million [3].

Because this report does not deal with access to medical care and is based on United States Census Bureau estimates of American Indians and Alaska Natives, these statistical analyses use 1980 census data and denominators.

METHODS

Incidence refers to the number of new cases of a disease that are diagnosed each year. The incidence analyses in this report are based on American Indian residents in the states of New Mexico and Arizona only. Population-based comprehensive cancer registries do not exist in other areas. These two states contain about 19

percent of the American Indian population, but these data are not representative of American Indians elsewhere. It is likely that cancer risk factors and the actual cancer experience vary significantly among different tribes and different geographic areas. The major tribes represented in these two states are the Navajo, Apache, Tohono O'Odham (formerly Papago), Hopi, Pueblo, and Zuni. These tribes are quite different from one another and are different from other tribes such as the Klamath, Sioux, and Cheyenne. These data cannot be used to generalize to other tribal communities.

The cancer mortality data are for the entire United States. These data are based on death certificate underlying-cause-of-death codes from user tapes supplied annually by the National Center for Health Statistics. The racial identification is as listed on the death certificate by the person certifying the death, who may not be a physician and may not have known the decedent.

Survival

The survival data in this report are also based on American Indian residents in the states of New Mexico and Arizona only. The survival rates in this report are relative rates. The relative survival rate compares the observed survival rate for a set of cancer patients to that observed for a group of normal persons of a similar age, race, and sex distribution. This mathematically adjusts for noncancer causes of death such as accidents and heart disease. Thus it is important to note that the relative survival rate does not provide an estimate of the percent of the cancer patient population alive five years after diagnosis. Rather, the relative survival rate is an estimate of the percent of the cancer patient population which would be alive five years after diagnosis if there were no other causes of death operating. It is important to note that the scenario of no other causes of death operating is extremely unlikely.

A tumor registry was begun in Alaska in 1969 to monitor cancer among the native groups but ceased operations in 1983 [4]. This registry collected cancer incidence data on the native populations. Since there were only about one hundred cancers per year diagnosed among the native populations, reporting on each of the native subgroups separately was not possible.

A new cancer registry was started recently in Alaska to assess more completely the cancer burden among the native populations. This registry will be collecting information on cancer inci-

dence, follow-up information for survival analyses, stage at diagnosis information, and treatment information. It will be several years before information is available from this registry, but, when available, it will enable us to better understand the cancer risk of Alaska Natives. The effects of low socioeconomic status on diagnosis and treatment will be studied as well as the effects caused by the vast distances the people have to travel and the length of time away from friends and families needed to receive state-of-the-art treatment and diagnosis. These effects could range from late diagnosis to noncompliance with treatment regimens.

The incidence and mortality rates are presented as cases/deaths per 100,000 population and have been age-adjusted by the direct method to the age distribution of the total United States population in 1970. Age-adjusting is a statistical technique that allows for intergroup comparisons without concern for the effects of different age distributions among the groups. Rates may be compared to provide an estimate of varying risks between sexes and of cancer sites for developing/dying of cancer.

The incidence and mortality tables in this report have the number of cases diagnosed/dying during 1977 to 1983 to provide an indication of the stability of the rates and allow for an approximate statistical comparison of the rates among races and/or between sexes. To improve the readability of the tables, the standard errors of the incidence and mortality rates are not included but may be estimated as follows. The relative standard error for the incidence and mortality rates is approximately equal to the inverse of the square root of the number of cases/deaths. One standard error is the rate multiplied by the relative standard error. The 95 percent confidence interval then is the rate plus and minus 1.96 times the standard error. Statistical significance of the rates at the $p \leq 0.05$ level may be approximated by comparing the confidence intervals of the two rates. If the two confidence intervals do not overlap, the differences are statistically significant.

Since many participants at this conference are being initiated into the field of cancer research, an example is provided below of how the incidence and mortality tables should be interpreted. The following data is an excerpt from table 3, "Average Annual Age-Adjusted (1970 U. S. Standard) Cancer Mortality Rates per 100,000 Population, United States, 1977–83":

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
Colon & rectum						
American Indian	509	8.9	261	10.1	248	8.0
Anglo	348,085	21.4	167,104	25.7	175,981	18.4

The *number* is the actual number of deaths with colon or rectal cancer listed as the cause of death on the death certificate for the indicated race. The numbers of new cases/deaths are useful for developing estimates of needed medical services. The *rate* is the number of deaths per 100,000 people of that race. Using the data in this chart, one can compare the mortality rates of American Indians and whites for colon and rectum cancer. It is apparent that whites have a higher number of deaths than American Indians have from colon-rectum cancer, but this is to be expected solely because of the difference in the numbers of people at risk, and it is not particularly enlightening. The rate, on the other hand, is indicative of the risk of dying from colon or rectum cancer. One can see that whites have an approximately 2.4 times greater risk of dying from colon-rectum cancer than do Native Americans.

RESULTS

American Indians

Although American Indians would seem to be a high-risk group on the basis of socioeconomic status (SES), they actually have very low cancer incidence rates (table 1). Their incidence rate for all cancer sites combined is less than one-half that of whites, i. e., 137.6 compared to the white rate of 314.5. Reasons for this are not entirely clear.

Until recently, cancer has not been acknowledged as a major public health problem for American Indians. Researchers around the turn of the century had difficulty documenting the existence of cancer among American Indians [5], and some claimed that American Indians were immune to cancer. By the end of the 1930s, more cases of cancer were being reported among American Indians; it became clear that American Indians did indeed suffer from cancer and that the disease had become more prevalent [6].

There are indications that cancer incidence is becoming a significant public health problem among American Indians today.

This may be attributed to a number of causes: Risk factors such as smoking are increasing, and other causes of death are decreasing, resulting in increased longevity. Use of tobacco products varies significantly among tribes. In those areas where smoking is a common practice, the lung cancer rates are higher than in areas of low tobacco usage. Diet also may be involved. Alcohol abuse is and has been a serious problem among American Indians. Although alcohol is a risk factor for a number of cancer sites, it has also resulted in early alcohol-related deaths from noncancer causes. Another possibility for the apparent increase in the disease is that American Indians may now be receiving better diagnostic care than they did in the past and disease reporting may be more efficient.

On a site-specific basis, as indicated in table 1, the only cancer sites for which American Indians, both sexes combined, have higher incidence rates than whites are for cancers of the stomach (15.1 cases per 100,000 compared to 5.8 cases per 100,000); primary liver (2.1 compared to 1.9); gallbladder (with a tenfold excess of 10.0 cases per 100,000 over a rate of 1.0 for whites); cervix uteri (with more than a twofold risk at a rate of 19.9 compared to 8.6 for white females); and multiple myeloma for both sexes combined (3.4 cases per 100,000 compared 3.0). The lung cancer rates for these American Indians are currently quite low, with a male incidence rate of 9.4 and a female rate of only 3.6. These compare favorably with the white rates of 73.2 and 26.7 for males and females, respectively, but there is some evidence that smoking is a recently acquired habit among these American Indians and that lung cancer rates are sure to rise in the future unless intervention strategies are initiated now. However, lung cancer incidence varies markedly by area, with the Southwestern Indians having the lowest rates [7]. The low lung cancer rate in Southwestern Indians is probably due to a combination of factors. One of these is that cigarette smoking is a relatively recently acquired habit by the native population. Dietary content (high beta-carotene) may be another associated factor.

In contrast to the favorable outlook that American Indians currently have with respect to cancer incidence, their survival experience once they are diagnosed with cancer is abysmal (see table 2). Their five-year survival rates are among the lowest of any racial group. For all cancer sites combined and both sexes combined, the five-year relative survival rate is 33.4 percent, which is 18 percentage points lower than the white rate of 51.4 percent. Even with this generally dismal picture, there are a few cancer sites

TABLE 1

Average Annual Age-Adjusted (1970 U. S. Standard) Cancer Incidence Rates per 100,000 Population, Malignant Cases Only, New Mexico, 1977–83.*

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
All sites						
American Indian	1,605	137.6	730	133.3	875	140.8
Anglo	17,004	314.5	8,800	367.9	8,204	280.8
Oral cavity & pharynx						
American Indian	22	2.1	16	3.0	6	1.3
Anglo	664	12.3	482	19.7	182	6.3
Other oral cavity**						
American Indian	17	1.7	13	2.5	4	1.0
Anglo	362	6.7	224	9.7	138	4.8
Nasopharynx						
American Indian	3	0.3	2	0.3	1	0.2
Anglo	14	0.3	11	0.4	3	0.1
Esophagus						
American Indian	10	1.0	8	1.6	2	0.4
Anglo	109	2.0	70	2.9	39	1.3
Stomach						
American Indian	164	15.1	97	19.2	67	11.7
Anglo	310	5.8	187	7.9	123	4.0
Colon & rectum						
American Indian	102	9.6	53	10.4	49	9.1
Anglo	2,091	38.6	1,042	44.2	1,049	34.2
Liver						
American Indian	25	2.1	18	3.2	7	1.1
Anglo	102	1.9	66	2.8	36	1.2
Gallbladder						
American Indian	99	10.0	27	5.9	72	13.6
Anglo	52	1.0	16	0.7	36	1.1
Pancreas						
American Indian	53	3.7	30	5.2	23	2.2
Anglo	476	8.7	258	10.7	218	7.2
Lung & bronchus						
American Indian	67	6.3	46	9.4	21	3.6
Anglo	2,570	47.1	1,785	73.2	785	26.7
Melanoma of skin						
American Indian	20	1.9	12	2.4	8	1.6
Anglo	667	12.3	333	13.1	334	11.8
Breast						
American Indian	130	11.3	0	–	130	21.3
Anglo	2,374	44.6	23	1.0	2,351	82.3

TABLE 1 (cont'd)

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
Cervix uteri						
American Indian	120	10.5	–	–	120	19.9
Anglo	248	4.5	–	–	248	8.6
Corpus uteri						
American Indian	47	3.9	–	–	47	7.2
Anglo	597	11.0	–	–	597	20.5
Ovary						
American Indian	47	4.0	–	–	47	7.5
Anglo	359	6.7	–	–	359	12.5
Prostate gland						
American Indian	158	14.9	158	31.0	–	–
Anglo	1,874	34.0	1,874	81.5	–	–
Urinary bladder						
American Indian	13	1.4	11	2.8	2	0.2
Anglo	781	14.3	584	24.4	197	6.5
Kidney & renal pelvis						
American Indian	71	5.7	36	6.2	35	5.3
Anglo	364	6.9	238	9.9	126	4.3
Brain & nervous system						
American Indian	25	1.2	16	1.6	9	0.8
Anglo	256	4.9	148	6.1	108	3.9
Hodgkin's disease						
American Indian	4	0.2	2	0.2	2	0.3
Anglo	129	2.4	73	2.8	56	2.1
Non-Hodgkin's lymphoma						
American Indian	30	2.8	14	2.6	16	3.2
Anglo	539	10.2	278	11.7	261	8.9
Multiple myeloma						
American Indian	32	3.4	15	3.1	17	3.7
Anglo	164	3.0	86	3.6	78	2.6
Leukemias						
American Indian	71	4.6	40	5.2	31	4.1
Anglo	547	10.4	322	13.7	225	7.7
Lymphocytic						
American Indian	34	2.3	18	2.4	16	2.3
Anglo	263	5.1	166	7.1	97	3.4
Myelocytic						
American Indian	27	1.6	17	2.0	10	1.3
Anglo	214	4.0	113	4.9	101	3.4

* The data in this table for whites are from the state of New Mexico only. Data on American Indians from the state of Arizona have been added to those of New Mexico.
** "Other oral cavity" is the total oral cavity and pharynx excluding lip and salivary glands.

for which the survivorship of American Indians is equal to or better than that of whites, although statistical significance is not achieved because of the small numbers of cases. These sites include ovary, with rates of 45.7 in Indians and 40.2 for whites; brain and nervous system (34.8, 24.1); and myelocytic leukemia (17.4, 9.6).

Mortality data for the total United States is available and has been analyzed in table 3. The only ethnic group with a lower mortality rate than American Indians is Filipinos (not shown). During the 1977–83 time period, the age-adjusted cancer mortality rate per 100,000 population for American Indians was 89.3, 45 percent lower than the white rate of 164.2. However, American Indians have higher than expected mortality rates for cancers of the stomach, gallbladder, and cervix uteri. Cancer of the cervix uteri generally is highly preventable, through screening with the Pap test; such screening could significantly reduce the high risk American Indian women have of dying from this cancer.

Alaska Natives

As is seen in other economically deprived groups, low-income/education status is associated with increased cancer risk factors. According to a 1981 smoking survey, 56 percent of the adult Alaska Native population smoked cigarettes, as did 41 percent of the youth aged twelve to eighteen. The same survey determined that 21 percent of the children in grades 4 to 6 chewed tobacco or used snuff, more than twice the comparable figure for the United States, which is less than ten percent for both males and females [8,9].

The cancer incidence data are in table 4. These are average annual rates per 100,000 population for the time period 1969 through 1983. Cancer incidence on SEER whites from all nine registries are used as the comparison group, because a geographically local comparison group is not available. A survival analysis is not presented, because collecting follow-up information was not a part of the registry function.

The cancer incidence data reported here are the same data as those used by Lanier and associates in their previous reports [10,11]. However, as a comparison group, we have used United States whites diagnosed during 1974 through 1978, the midpoint of the 1969–83 Alaska Native data.

TABLE 2
Five-Year Relative Survival Rates (%) for Cases Diagnosed from 1975 to 1984, Malignant Cases Only, New Mexico*

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
All sites						
American Indian*	2,192	33.4	980	26.6	1,212	38.6
Anglo	21,715	51.4	11,169	46.3	10,546	56.2
Oral cavity & pharynx						
American Indian	34	32.5	25	25.8	9	–
Anglo	789	62.9	562	66.2	227	55.6
Other oral cavity**						
American Indian	26	24.8	21	–	5	–
Anglo	438	43.3	268	42.6	170	44.3
Nasopharynx						
American Indian	7	–	6	–	1	–
Anglo	18	–	12	–	6	–
Stomach						
American Indian	210	8.7	125	4.9	85	14.1
Anglo	396	10.4	239	8.8	157	13.2
Colon & rectum						
American Indian	136	37.8	64	34.0	72	41.0
Anglo	2,616	48.0	1,307	47.4	1,309	48.6
Liver						
American Indian	37	0.0	23	–	14	–
Anglo	117	0.7	77	1.6	40	0.0
Gallbladder						
American Indian	141	3.6	39	3.2	102	3.6
Anglo	71	1.0	22	–	49	1.5
Pancreas						
American Indian	73	0.0	40	0.0	33	0.0
Anglo	593	2.0	324	1.5	269	2.5
Lung & bronchus						
American Indian	92	3.0	59	0.0	33	10.5
Anglo	3,240	11.6	2,258	10.6	982	13.6
Breast						
American Indian	183	46.5	1	–	182	46.3
Anglo	3,125	75.4	35	69.4	3,090	75.5
Cervix uteri						
American Indian	159	64.1	–	–	159	64.0
Anglo	364	69.7	–	–	364	69.7

TABLE 2 (cont'd)

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
Corpus uteri						
American Indian	65	83.9	–	–	65	83.9
Anglo	813	85.4	–	–	813	85.4
Ovary						
American Indian	61	45.7	–	–	456	40.2
Anglo	456	40.2	–	–	456	40.2
Prostate gland						
American Indian	213	50.0	213	50.0	–	–
Anglo	2,431	76.2	2,431	76.2	–	–
Kidney & renal pelvis						
American Indian	94	38.9	55	38.6	39	38.6
Anglo	444	50.0	287	51.5	157	47.5
Brain & nervous system						
American Indian	37	34.8	25	38.2	12	–
Anglo	321	24.1	188	22.3	133	26.3
Hodgkin's disease						
American Indian	5	–	3	–	2	–
Anglo	174	79.9	103	80.1	71	79.7
Non-Hodgkin's lymphoma						
American Indian	46	33.7	23	–	23	–
Anglo	702	49.9	365	48.4	337	51.4
Multiple myeloma						
American Indian	44	25.5	20	–	24	–
Anglo	221	29.9	118	22.7	103	38.0
Leukemias						
American Indian	99	21.0	54	12.4	45	31.8
Anglo	695	35.0	408	35.4	287	34.5
Lymphocytic						
American Indian	50	24.7	25	8.8	25	42.7
Anglo	331	60.4	203	57.7	128	64.6
Myelocytic						
American Indian	36	17.4	23	–	13	–
Anglo	270	9.6	148	8.9	122	10.4

* The data in this table for whites are from the state of New Mexico only. Data on American Indians from the state of Arizona have been added to those of New Mexico.

– Too few cases for a reliable estimate of the five-year survival rate.

**"Other oral cavity" is the total oral cavity and pharynx excluding lip and salivary glands.

The incidence rates for Alaska Natives are similar to those for United States whites for all cancer sites combined. Rates of cancer for both sexes combined are 314.3 for Alaska Natives and 335.7 for whites per 100,000 population. The rates for females are 300.6 per 100,000 Alaska Natives, slightly less than the United States white female rate of 308.9. The rate of 329.7 for Alaska Native males is 14 percent less than the United States white male rate of 384.9. The rates of cancer for males are much more divergent than the rates for females. The cancer incidence rates for Alaska Natives, both sexes combined, while similar to those of United States whites, are over twice as high as the incidence rates for American Indians living in the Southwestern United States (table 1). Those cancer sites for which Alaska Natives are at the greatest risk compared to American Indians of the Southwest are as follows: oral cavity and pharynx, eight times higher; colon plus rectum, over six times higher; and lung and bronchus, over seven times higher. Reasons for these differences are not known and may be the subject of future investigations. In the incidence comparisons with United States whites, the Alaska Native rates are higher for oral cavity and pharynx, nasopharynx, esophagus, stomach, colon plus rectum, liver, gallbladder, cervix uteri, and kidney and renal pelvis.

The observed high incidence rates for cancers of the oral cavity and pharynx are due to high rates of nasopharyngeal cancer (NPC), a subsite of the oral cavity and pharynx. The incidence rate of NPC among Alaska Natives was 9.8 cases per 100,000 persons, compared to a rate of 0.4 found among the white comparison group (table 4). Epidemiologic studies have indicated an increased risk of NPC in patients with Epstein-Barr virus. The Epstein-Barr virus is the cause of infectious mononucleosis and has been associated with two tumors, Burkitt's lymphoma and NPC. Studies of Alaska Natives have found the prevalence of the Epstein-Barr virus among NPC cases to be increased by as much as 90 percent when compared to control groups [12,13]. This suggests that screening for the Epstein-Barr could lead to early detection of patients with NPC and an enhanced survival outlook. Other environmental factors that could explain the high incidence of NPC in Alaska Natives were not found.

The significantly high incidence of primary hepatic cancer (PHC) among Alaska Natives as compared to United States whites, 6.4 cases per 100,000 persons and 1.9 cases per 100,000 persons, respectively, is probably related to the high proportion of the Alaska Native population infected with the hepatitis B virus [14].

Some success at early detection of PHC has been noted by serological screening semiannually for elevated alpha-fetoprotein levels [15]. A program of immunization with hepatitis B vaccine has been undertaken in hopes that this may lead to a future reduction in the incidence of PHC among Alaska Natives.

The lung cancer incidence rates, while not higher than the rates found in United States whites, are seven times greater than those observed for the American Indians of the Southwest. This rate, as elsewhere, is directly related to smoking and, as noted above, over one-half of the adult Alaska Native populations smoked in the early 1980s.

Mortality among Alaska Natives

Cancer mortality rates among Alaska Natives for the time period 1960 to 1969 have been reported by Blot et al. [16] elsewhere and have not been reproduced here. The mortality rates were not significantly higher than American Indians resident in the continental United States. Alaska Natives were found to have elevated mortality rates for cancer of the nasopharynx, esophagus, kidneys, and salivary glands.

DISCUSSION

Racial/ethnic variations in risk may be environmentally and/or genetically influenced. Socioeconomic status has been linked to cancer risk, with an inverse association consistently noted for cancers of the esophagus, stomach, lung (males), and cervix uteri, in contrast to positive trends for cancers of the breast and corpus uteri. Socioeconomic status as indicated by income, education, or poverty measures may reflect lifestyle patterns, environmental impacts, high occupational risks, diet, sexual and child-bearing practices, and the use/nonuse of preventive medical services.

Explanations for the excessive incidence rates among American Indian and Alaska Native groups for cervix uteri cancer, a cancer which is close to 100 percent curable when detected in an early state through screening with the Pap smear, are not clear.

Stomach cancer rates are high among all the Native American groups. These differences in rates are suspected to be related to diet, but the specific factors have remained elusive.

TABLE 3
Average Annual Age-Adjusted (1970 U. S. Standard) Cancer Mortality Rates per 100,000 Population, United States, 1977–83.*

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
All sites						
American Indian	5,282	89.3	2,794	105.9	2,488	76.4
Anglo	2,562,285	164.2	1,376,734	209.8	1,185,551	133.5
Oral cavity & pharynx						
American Indian	105	1.8	64	2.3	41	1.3
Anglo	50,326	3.3	34,093	5.2	16,233	1.8
Other oral cavity**						
American Indian	96	1.6	60	2.1	36	1.1
Anglo	45,467	3.0	30,885	4.7	14,582	1.6
Nasopharynx						
American Indian	31	0.5	20	0.6	11	0.3
Anglo	3,796	0.2	2,533	0.4	1,263	0.2
Esophagus						
American Indian	117	2.0	91	3.4	26	0.8
Anglo	41,224	2.6	29,821	4.5	11,403	1.2
Stomach						
American Indian	338	5.8	198	7.5	140	4.4
Anglo	83,687	5.2	49,438	7.6	34,249	3.6
Colon & rectum						
American Indian	509	8.9	261	10.1	248	8.0
Anglo	348,085	21.4	167,104	25.7	175,981	18.4
Liver						
American Indian	135	2.0	85	3.1	50	1.1
Anglo	33,059	1.9	19,222	2.7	13,837	1.3
Gallbladder						
American Indian	148	2.6	37	1.5	111	3.6
Anglo	15,097	0.9	3,901	0.6	11,196	1.2
Pancreas						
American Indian	264	4.6	132	5.3	132	4.2
Anglo	132,131	8.4	68,304	10.4	63,827	6.8
Lung & bronchus						
American Indian	1,040	18.1	746	28.7	294	9.4
Anglo	638,827	41.6	461,377	69.6	177,450	21.0
Melanoma of skin						
American Indian	17	0.3	13	0.5	4	0.1
Anglo	32,714	2.2	19,153	2.8	13,561	1.6
Breast						
American Indian	313	4.8	1	0.0	312	9.0
Anglo	227,823	15.0	1,580	0.2	226,243	26.8

TABLE 3 (cont'd)

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
Cervix uteri						
American Indian	188	2.9	–	–	188	5.5
Anglo	26,088	1.7	–	–	26,088	3.2
Corpus uteri						
American Indian	58	1.0	–	–	58	1.8
Anglo	25,295	2.2	–	–	2,295	3.9
Ovary						
American Indian	107	1.8	–	–	107	3.2
Anglo	69,559	4.6	–	–	69,559	8.1
Prostate gland						
American Indian	268	5.1	268	11.7	–	–
Anglo	133,675	8.0	133,675	21.1	–	–
Urinary bladder						
American Indian	57	1.0	40	1.6	17	0.5
Anglo	62,882	3.8	43,775	6.8	19,107	1.9
Kidney & renal pelvis						
American Indian	161	2.7	96	3.4	65	2.0
Anglo	48,778	3.2	30,314	4.6	18,466	2.1
Brain & nervous system						
American Indian	96	1.3	53	1.6	43	1.1
Anglo	61,061	4.2	33,689	5.0	27,372	3.4
Hodgkin's disease						
American Indian	23	0.3	18	0.5	5	0.1
Anglo	13,158	0.9	7,539	1.1	5,619	0.7
Non-Hodgkin's lymphoma						
American Indian	124	2.1	66	2.4	58	1.8
Anglo	81,393	5.2	41,764	6.3	39,629	4.4
Multiple myeloma						
American Indian	101	1.8	51	2.1	50	1.6
Anglo	38,186	2.4	19,494	3.0	18,692	2.0
Leukemias						
American Indian	213	2.9	129	3.6	84	2.2
Anglo	103,736	6.7	58,084	8.9	45,652	5.2
Lymphocytic						
American Indian	68	0.9	40	1.0	28	0.7
Anglo	29,978	2.0	17,456	2.7	12,522	1.4
Myelocytic						
American Indian	91	1.3	62	1.9	29	0.8
Anglo	46,622	3.0	25,351	3,8	21,271	2.4

* The data in this table are from the total United States.

** "Other oral cavity" is the total oral cavity and pharynx excluding lip and salivary glands.

TABLE 4
Average Annual Age-Adjusted (1970 U. S. Standard) Cancer Incidence Rates per 100,000 Population, Alaska, 1969–83 and Nine Areas, 1974–78

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
All sites						
Alaska Native	1,475	314.3	756	329.7	719	300.6
SEER Anglo	301,900	335.4	148,662	384.9	153,238	308.9
Oral cavity & pharynx						
Alaska Native	87	16.5	47	17.2	40	15.7
SEER Anglo	10,015	11.2	6,956	17.6	3,059	6.2
Nasopharynx						
Alaska Native	51	9.8	35	13.1	16	6.4
SEER Anglo	393	0.4	267	0.6	126	0.3
Esophagus						
Alaska Native	25	6.1	18	8.9	7	3.4
SEER Anglo	2,694	3.0	1,867	4.8	827	1.6
Stomach						
Alaska Native	71	15.5	52	22.4	19	8.4
SEER Anglo	7,725	8.4	4,732	12.4	2,993	5.5
Colon & rectum						
Alaska Native	261	62.6	128	61.0	133	65.2
SEER Anglo	44,631	49.1	21,815	57.3	22,816	43.3
Liver						
Alaska Native	37	6.4	31	10.8	6	2.0
SEER Anglo	1,682	1.9	1,055	2.7	627	1.2
Gallbladder						
Alaska Native	41	10.6	12	6.7	29	14.7
SEER Anglo	1,289	1.4	359	1.0	930	1.7
Pancreas						
Alaska Native	45	9.9	24	10.1	21	9.6
SEER Anglo	8,366	9.2	4,441	11.6	3,925	7.4
Lung & bronchus						
Alaska Native	211	46.9	158	69.7	53	23.2
SEER Anglo	41,662	46.8	30,315	77.9	11,347	23.4

TABLE 4 (cont'd)

	Both sexes		Male		Female	
	Number	Rate	Number	Rate	Number	Rate
Breast						
Alaska Native	116	21.7	1	0.4	115	44.2
SEER Anglo	43,058	48.4	300	0.8	42,758	88.3
Cervix uteri						
Alaska Native	83	–	–	–	83	28.0
SEER Anglo	5,020	–	–	–	5,020	10.5
Ovary						
Alaska Native	25	–	–	–	25	9.5
SEER Anglo	6,915	–	–	–	6,915	14.4
Prostate gland						
Alaska Native	65	–	65	34.5	–	–
SEER Anglo	26,001	–	26,001	70.5	–	–
Urinary bladder						
Alaska Native	25	6.1	18	8.9	7	3.4
SEER Anglo	14,874	16.4	10,960	28.7	3,914	7.4
Kidney & renal pelvis						
Alaska Native	53	11.2	26	11.4	27	11.0
SEER Anglo	5,894	6.6	3,760	9.6	2,134	4.4
Brain & nervous system						
Alaska Native	18	2.1	11	2.8	7	1.5
SEER Anglo	5,018	5.8	2,808	6.9	2,210	4.8
Lymph nodes						
Alaska Native	29	5.7	21	8.3	8	3.2
SEER Anglo	11,524	12.6	6,025	14.8	5,499	11.1
Hematologic						
Alaska Native	42	7.5	29	10.7	13	4.3
SEER Anglo	13,146	14.6	7,303	18.9	5,843	11.5
Other						
Alaska Native	173	39.6	80	34.7	93	44.1
SEER Anglo	48,243	51.6	18,620	42.4	29,623	59.8

Low survival rates among American Indians and Alaska Natives are, in many instances, the result of a poorer stage distribution at diagnosis and perhaps the result of delays in seeking or accepting treatment. Language problems and a fatalistic attitude (e. g., the translation of the word *cancer* in several native tongues as "the disease for which there is no cure") about the outcome of a cancer diagnosis, as well as preference for medical assistance from traditional healers rather than Western medicine, may be significant barriers to seeking medical help.

The reader should bear in mind that the cancer experience in other areas may vary significantly from that of Southwestern American Indians as reported here. There are likely to be exposure differences such as differential smoking rates, environmental and occupation differences, social and cultural differences, proximity to medical care, and other differences that may affect the cancer burden.

Numerous opportunities exist for reducing the cancer burden of these native populations. Programs can be designed to reduce incidence by decreasing the prevalence of risk factors through prevention, smoking cessation, and education. Mortality can be decreased through early detection/screening programs such as mammography, breast self-examination/clinical examination, and Pap testing for cervix cancer.

Education programs can help patients seek medical care earlier. Interventions targeted to these native population groups, with appropriate sensitivity to and emphasis on their cultural, socioeconomic, literacy, and language requirements, can greatly assist in reducing cancer mortality rates.

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