# Cancer in Alaska Native Women

## INTRODUCTION

This chapter sums up what is known about cancer in Alaska Native women for use by health care providers, planners, educators, researchers, community health representatives, and others interested in improving the health of Alaska Natives. It begins with a brief description of the historical events that have helped shape the present health and social conditions of Alaska Natives, and a summary of presently available demographic data. Then, it presents cancer data and a description of the health risks and socioeconomic factors that bear on cancer incidence and outcomes. The chapter concludes with a brief description of health services currently available to Alaska Natives and suggestions for future directions for cancer prevention, treatment interventions, and research most likely to improve the management of cancer in Alaska Native women.

To understand the health status of Alaska Natives, it is first necessary to understand the unique history of the country's northernmost indigenous peoples. It is that history that underlies many of the social and behavioral ills that put Alaska Natives at a high risk for disability and death. Alaska Natives today suffer deeply from the undermining or disappearance of many traditional activities and beliefs, the disruption of family and community, and the loss of self-esteem that accompanies social disruption. In modern times, chronic despair combined with unhealthful behaviors (brought about by changes in culture, work, housing, diet, and modes of transportation) are proving almost as destructive as the infectious diseases introduced to the peoples' land more than a century ago (McNabb, 1990).

Before the arrival of European culture in the state of Alaska, the state's Native people had adapted successfully to the region's harsh environment for more than 500 generations. Out of necessity, they developed an awareness of the requirements for survival and marshaled considerable technological

inventiveness, physical endurance, and mental resilience to meet them. The Europeans found Alaska Natives to be capable, independent, and strong—a sharp contrast to the image of helplessness that many Native villages project today (Alaska Natives Commission, 1994).

After Russia sold Alaska to the United States in 1867, traders and explorers poured into the area, bringing with them both material goods and infectious diseases. Massive epidemics spread illness and death throughout Native society. By 1894, most Native Alaskans had been removed from their traditional homes. Farmers were forced onto reservations where the land was poor and farming was limited, and formerly migratory tribes were expected to remain in one place. Indigenous nations were not permitted to hunt, fish, or gather their food freely. These factors combined resulted in extreme changes in diet, activity levels, and health.

In a society where existence is tied to the spiritual realm, yet where traditional medicine could not cure the newly introduced illnesses, many lost faith in their spiritual and social leaders. As the Native communities' basic social infrastructure collapsed, their culture became subordinated to Western belief systems.

The widespread introduction of Western commerce to Alaska, which required centralized areas of economic activity, had a profound effect on the state's Native peoples, who traditionally had a subsistence economy that involved migrating to follow available food sources. Commercial sale of fish and wildlife decreased the stock available for Native peoples, further undermining the viability of the migratory way of life (Alaska Natives Commission, 1994). Finally, explorers and traders who bought and sold goods for currency introduced notions of individualism and materialism that undercut the Alaska Native ideals of self-discipline and working for the communal good.

For the past century, as non-Native settlers have continued to pour into the State, the quality of Native nutrition has fallen while the incidences of disease and land disputes have burgeoned—all adding to

Native peoples' suffering. As Alaska Natives have lost control of their environment, they have become less self-sufficient and more dependent. For those who moved to more commercial areas, for instance, subsistence living is no longer an option; for those who stayed on the land, the supply of wildlife is dwindling (Langdon, 1993).

Urban-based Native Alaskans today embrace a complex variety of traditional and Western practices and beliefs. Although housing has improved and many modern amenities have been imported into Native villages over the past two decades, these improvements have done little to enhance Native communities' economic, physical, and spiritual health. Alaska Natives continue to struggle to integrate traditional activities and values with the demands of their current environment.

Women's roles, too, have changed over the years. Many Alaska Native women today head households and provide for their children alone, in stark contrast to the supportive communal arrangements of the past. Therefore, these women have had to make many adjustments—both to survive and to find their place in their own culture and the world of Alaska today (Cecelia Bird, personal communication, July 1993).

**DEMOGRAPHICS**

The population defined as "Alaska Native" includes three distinct ethnic and linguistic groups: Indians, Eskimos, and Aleuts. Indians can be further divided into three Southeast coastal tribes (the Haida, Tlingit, and Tsimshian) and 11 Athabascan groups scattered across the state's interior. All Indian groups share many cultural traits, but significant differences also have developed over years of geographic separation.

Alaska Native villages combine to constitute the tribes, bands, clans, groups, villages, communities, and associations recognized pursuant to the Alaska Native Claims Settlement Act of 1971. Alaska Native Regional Corporations (ANRCs) are corporate entities established under that act to oversee both the

business and nonprofit affairs of Alaska Natives. There are 14 ANRCs, each including Natives with a common heritage and common interests, whose boundaries were established by the U.S. Department of the Interior in cooperation with Alaska Natives.

Because the village areas do not have legally designated boundaries, the U.S. Census Bureau cooperated with ANRC officials and other knowledgeable parties to establish Alaska Native Village Statistical Areas (ANVSAs) for the 1990 Census that encompass the areas associated with each Alaska Native village. ANVSAs are located within ANRCs and do not cross ANRC boundaries.

**Population**

Although the number of Alaska Natives more than doubled in the last century, the proportion of Natives in the state's general population shrank from 98 percent of the total to just over 15 percent, primarily because the rate of non-Native immigration has far exceeded the Native birth rate (Alaska Federation of Natives, 1989). The 2000 Census recorded a total Alaskan population of 626,932, of whom only about 106,000—up from 42,500 in 1960—were Alaska Natives (U.S. Census Bureau, 2000; Indian Health Service [IHS], 2001).

Eskimos (with a population of 44,401) account for 42 percent of all Alaska Natives, whereas American Indians (population 31,245) account for 30 percent and Aleuts (with 10,052) for a total of 10 percent (Lanier et al., 1996; IHS, 2001). Of the Alaska Native female population of approximately 43,000, 57 percent (24,500) are aged 20 or older (Lanier et al., 1996) (see Table 1). Alaska Native women have a median age of 24 years, far younger than other Alaskan females (median age 30 years) and U.S. women in general (median age 32 years).

In summary, the Alaska Native population constitutes a small percentage of the overall state population. It is a relatively young population, most of whom live in rural villages with as few as 25 residents. Many Native villages are isolated from the outside world by both distance and, for much of the year, extreme

weather conditions.

**Geographical Distribution**

The largest group of Alaska Natives is Eskimos, who can be roughly divided into three linguistic and geographical subgroups: the Inupiat (northern), Yupik (southern), and Pacific (along the northern Gulf of Alaska). Thousands of years ago, Eskimos and Aleuts may have spoken the same language, but long isolation has resulted in changes in both language and culture. Today, permanent Aleut villages exist on only a few islands.

Southeast coastal Indians, Athabascans, Eskimos, and Aleuts inhabit Alaska's arctic, interior, and coastal regions. Eskimos live in the Pacific coastal region from Barrow to Prince William Sound, whereas Athabascans can be found primarily in the interior. Tlingit, Haida, and Tsimshian Indians occupy the islands and mainland of southeast Alaska, and Aleuts live chiefly on the Aleutian Islands (Ivey et al., 1991) (see Figure 1).

Alaska covers one fifth of the total land mass of the United States—an area equal to the states of Washington, Oregon, California, Arizona, and New Mexico combined. Alaska's 586,000 square miles include deserts, plains, swamps, forests, glaciers, ice fields, fjords, river systems, volcanoes, thousands of islands, and six major mountain ranges. Temperatures in Alaska can vary from -78°F to 95°F.

Great distances separate most Native communities; in some, the nearest medical facility is no closer than New York is to Chicago. Yet despite its astonishing size, Alaska has only 13,323 miles of road and 2,229 ferry miles, for a total transport system of 15,552 miles. (Only the comparable systems in Delaware, Hawaii, Rhode Island, and the District of Columbia are smaller.) As a result, more than 200 Alaskan communities are not linked to roads. Air transport is used out of necessity; however, because of distance and weather, it is both unreliable and expensive. Telephone service and other communications in remote villages are also costly and undependable because of inclement weather, huge distances, and insufficient

numbers of trained personnel. Citizen band radios are common in villages, providing a link within the community and with boats at sea. The same conditions that restrict transport and communications also restrict Native Alaskans' access to health care.

Despite these hardships, except for a small rural-to-urban movement, the geographical distribution of the Native population has remained relatively stable in recent years—a fact that can be attributed in large part to Alaska Natives' desire to preserve their traditional culture and lifestyle. There are more than 200 rural villages within Alaska's ANRCs. Approximately 49,300 (58 percent) of all Alaska Natives still living in the state live in rural communities of 25 to 4,000 inhabitants (see Table 2) (U.S. Census Bureau, 1992a). Another 36,000 Alaska Natives live in large urban centers such as Anchorage, Fairbanks, and Juneau.

Alaska Natives living in each of the ANRCs are served by one or more health service organizations. Most Alaska Natives live in ANRCs in the western region of the State and are served by the following health service organizations: Arctic Slope Native Association, Norton Sound Health Corporation, Bristol Bay Area Health Corporation, Yukon-Kuskokwim Health Corporation, and Maniilaq Association. These organizations serve areas with more than 60 percent Alaska Native populations, predominantly Eskimos.

**Education**

Alaska Natives are less likely to have high school diplomas or college degrees than are other Alaskans. In 1970, only 28 percent of Alaska Native women 25 years and older had high school diplomas (U.S. Census Bureau, 1974). The 1990 Census found that 63 percent of all Alaska Natives in this age range had completed high school, but only 4 percent had earned a bachelor's degree (U.S. Census Bureau, 1993a). In comparison, 87 percent of all Alaskans completed high school, and 23 percent have a bachelor's degree or higher. In recent years, Alaska Natives have had better access to education, but the number of high school and college graduates remains far below statewide rates.

**Socioeconomic Variables**

Like many other Native American groups, Alaska Natives are poor. The average incomes of Alaska Natives are far lower than the state or national averages. In 1989, annual per capita income was $17,610 for residents of Alaska—among the highest in the Nation—and $14,420 for all U.S. residents, whereas the level for Alaska Natives was only $7,816 (U.S. Census Bureau, 1992b, 1998b).

In 1989, 27 percent of Alaska Natives had incomes below the poverty level, compared with 9 percent of the total Alaskan population (U.S. Census Bureau, 1992b).

The economic situation is even more difficult for those living in rural areas, where salaries are low and expenses are high. Alaska Natives living in the five most rural ANRCs, each with at least 55 percent of all residents classified as rural in the 1990 Census, had among the lowest 1989 per capita incomes, ranging from $5,589 to $9,388 (U.S. Census Bureau, 1992b) (see Table 3).

In addition, Alaska Native families tend to be larger than the state and national averages. Alaska Native households have 3.4 people on average (specifically, 3.0 for Indians, 3.8 for Eskimos, and 3.1 for Aleuts), compared with 2.8 people per household for all Alaskans and 2.6 for all Americans (U.S. Census Bureau, 1998a, 1993b).

The number of single-parent households headed by women is also extremely high among Alaska Natives. In the 1990 Census, only 58 percent of Alaska Native families were married couples, and 29 percent were headed by women with no husband present, compared to 80 percent and 14 percent, respectively, for all Alaskan families (U.S. Census Bureau, 1993a). In 1990, the number of Alaska Native women over age 15 who had been married but were separated, widowed, or divorced was 63 percent among Eskimos, 70 percent among Indians, and 74 percent among Aleuts (U.S. Census Bureau, 1993b).

In summary, Alaska Natives are more likely than other Alaskans to have limited education and to live in large, single-parent households with more children, and in geographically isolated rural communities

where unemployment is high and salaries are low.

**Work**

Some Alaska Native families continue to eke out a subsistence lifestyle by hunting and fishing. Others have found work in the lumber and fishing industries. Alaska Native women are well represented in these industries and in other areas of the economy. Nearly 1 in 3 of all employed Alaska Native women works as a secretary or clerk; 1 in 4 works in the service sector, primarily in the food preparation and custodial fields (U.S. Census Bureau, 1993c). Although all Alaska Natives are severely underrepresented in managerial and professional-specialty occupations, Native women are about 60 percent more likely than Native men to hold such jobs. A number of Native women are employed in the health care system, and many are talented artisans.

In areas served by ANRCs where most Alaska Natives live, unemployment rates are high. Unemployment rates may be a poor indicator of Native participation in the labor force, however, because employment statistics do not reflect subsistence living. In 1990, unemployment in ANRC areas was from 10.7 to 54.4 percent for Native workers aged 16 and older (U.S. Census Bureau, 1992b) (see Table 3), compared with a statewide unemployment rate of 8.8 percent (U.S. Census Bureau, 1998b). In 1980, only 41.4 percent of Alaska Native women aged 20 to 64 were employed, compared with 45.8 percent of women of the same age in the national Indian Health Service (IHS) population and 56.4 percent of women in the total U.S. population (Alaska Natives Commission, 1994).

**Medical Insurance**

All American Indians and Alaska Natives in 34 “reservation” states (of which Alaska is one) are eligible to receive free comprehensive health services from the Indian Health Service. Such service is not limited to reservation-based Native people, although IHS clinical facilities are usually located on or near reservations.

**PREVALENT HEALTH ISSUES**

In 1991 through 1993, life expectancy at birth for Alaska Natives was 68.9 years, considerably lower than the life expectancy both for IHS populations as a whole (73.2 years) and for the U.S. general population (75.8 years) (IHS, 1996). Over time, the diseases that affect the Alaska Native population have shifted from infectious etiologies toward more chronic illnesses. From 1981 to 1998, the three leading causes of death among Alaska Natives were cancer, heart disease, and accidents (National Center for Health Statistics, 2000) (see Table 4). While the percentage of deaths caused by accidents almost halved and the percentage due to heart disease remained close to 16 percent over the years, cancer became the number one cause of death for Alaska Native women. The number of women who died of cancer increased from 17 percent to 24 percent within 17 years.

In addition to cancer, heart diseases and accidents, other important health issues for Alaska Native populations include alcohol and other drug abuse, injury, suicide, diabetes, cardiovascular and liver disease, chronic lung disease, tuberculosis, and obesity. Alcohol misuse and its consequences are of great concern in Alaska Native communities (Alaska Federation of Natives, 1989). The death rates from injuries and suicide among Alaska Natives are nearly three times that of the general U.S. population and are the highest among IHS populations (IHS, 1996). Suicide has increased steadily since the mid-1950s, and is especially common among Alaska Natives 15 to 24 years old (Alaska Natives Commission, 1994). The homicide rate for Alaska Natives is also considerably greater than the national average (IHS, 1996). With a panoply of health problems rooted in socioeconomic ills, the health status of Alaska Natives has deteriorated and is today far inferior to that of the state's non-Native population.

Prior to contact with the Europeans, Alaska Natives were primarily healthy and relatively well nourished. They gathered and fished and hunted for their food, then prepared it by boiling, steaming, drying, smoking, or roasting over a fire. The diet of Natives on the coast consisted primarily of large marine animals and game acquired through mixed hunting, whereas inland Natives ate mostly fish and caribou.

All groups gathered wild berries, vegetables, and herbs when available and used fish or seal oil for fat (Burhansstipanov and Dresser, 1993).

After contact with the Europeans, however, the diet of most Alaska Natives changed dramatically. As traditional subsistence has become less feasible, more and more Native people have begun eating commercially processed and prepared foods. Instead of cooking their food over slow fires, they pan-fry or cook in deep fat. Moreover, food distribution programs frequently have only limited quantities of nutritious foods, and the remote geographical location of many Alaska Native communities makes it difficult to supply more healthful foods. High transportation costs make fruit and vegetables expensive to import, and villagers are forced to rely on less expensive high-fat and high-sugar foods. Traditional foods are less available than in former times, although many Native people continue to consume large amounts of fish. The change to a diet low in vegetables and fruit and high in fat and sugar has contributed to the increased rate of many diseases formerly rare among Alaska Natives.

**CANCER STATISTICS**

The primary source of data on cancer among Alaska Natives is the Alaska Native Tumor Registry. Information about Alaska Natives diagnosed with invasive cancer who were residents of Alaska at the time of diagnosis has been entered into the registry since 1979. Data gathered from 1969 to 1979 were entered retrospectively.

Data collected include age at time of diagnosis, sex, ethnicity, primary cancer site, histology, and basis of diagnosis (Lanier et al., 1976). Data on Alaska Native mortality (including community name, age, sex, race, service unit, year, and a brief description of cause of death) were derived from death certificates for the years through 1990. Population figures for the Alaska Native population were derived from the U.S. census results for 1980 and 1990 and have been used here to calculate both incidence and mortality rates.

In 1973, the National Cancer Institute initiated the Surveillance, Epidemiology, and End Results (SEER) Program to collect cancer data on a routine basis from designated population-based cancer registries in various parts of the country. With technical assistance from SEER, NCI in 1989 began funding a cancer registry that collects information on cancer cases among Alaska Native populations residing in Alaska. Supported by an interagency agreement among NCI, IHS, and the national Centers for Disease Control and Prevention's (CDC) Arctic Investigations Laboratory, a 5-year program was begun in 1989 to collect accurate data on cancer incidence, mortality, and survival rates in Alaska Native populations. The effort continues, with data being collected and entered in accordance with NCI SEER standards.

**Database Limitations**

Although data on incidence rates for cancers in Alaska Natives are available from 1969 to the present, data on staging, treatment, and follow-up have been included in the registry only since 1989 (Lanier, 1993). As with data on other underserved populations, the quality of the data in the Alaska Native Tumor Registry suffers to varying degrees from problems of racial misclassification, undercounting, coding errors, insufficient sampling numbers from which to draw conclusions, and the limited geographical scope of survey data that cannot be generalized to populations elsewhere.

However, where Alaska Natives are able to designate their own racial classification in their IHS records (as Indian, Eskimo, or Aleut) and where hospital services are provided primarily by the IHS Alaska Native Medical Center, classification is probably fairly accurate (Frost et al., 1992). Racial misclassification is perhaps more of a problem in urban areas, where physicians who may have no knowledge of the racial or ethnic identity of patients fill out death certificates.

With regard to Alaska Natives, researchers and statisticians must frequently deal with numbers of cases that are too small to analyze. Where cases are grouped to obtain a statistically meaningful sample, inaccuracies can arise, particularly in a population so ethnically and geographically varied as Alaska

Natives (Burhansstipanov and Dresser, 1993).

The relationship of incidence rates to mortality rates must be interpreted cautiously because these data frequently are derived from different sources, each of which has particular biases that can result in underreporting of cases, deaths, or the size of the population at risk. In some cases, distribution of cancers by site may vary or show a mortality rate out of proportion to the reported incidence.

**Age-Adjusted Incidence Rates**

Overall patterns of cancer incidence among Alaska Natives differ considerably from those of other U.S. population groups and resemble more closely the patterns found among Eskimos from other circumpolar countries. The overall Alaska Native population is younger than the general U.S. population, yet in both populations the risk of cancer increases rapidly after age 40. More than half of all cancers in Alaska Natives are diagnosed in patients aged 50 or older. It was once thought that cancer was rare among Alaska Natives in comparison with other Americans, but when the data are adjusted for age distribution, it is clear that the incidence rates are similar if not higher. Among the studies of Alaska Natives and cancer, some studies have concluded that Eskimo and Athabascan women had higher-than-average cancer rates (Nutting et al., 1993); that lung, colon/rectum, and breast cancer account for half of all cases diagnosed in Native American women; and that tobacco is a risk factor for a third of all cancers (Lanier, 1993; Brown et al., 1998).

Table 5 shows age-adjusted incidence and mortality rates (1992 to 1998) and 5-year relative survival data (1988 to 1997) for Alaska Native populations and for U.S. Whites from combined SEER registries. When adjusted for age distribution, the total incidence of cancer among Alaska Natives was significantly higher than that for the U.S. White population. Cancers of the esophagus, colon/rectum, liver and intrahepatic bile duct, stomach, and lung and bronchus appear significantly more frequently in Native Alaskans. On the other hand, Native Alaskans seem less prone than U. S. Whites to get melanomas, leukemias, non-Hodgkin's lymphomas, and cancers of the uterus and bladder. Cancer survival rates for all cancers were

significantly lower for Alaska Natives than for U.S. Whites (see Table 5).

Table 6 displays incidence and mortality trends for Alaska Native women as well as U.S. Whites for select primary cancers from 1992 to1998. Alaskan Natives experienced a 4.3 percent annual increase in incidence rates for all cancer sites combined. This increase was significantly higher than the 0.3 percent annual increase experienced by U.S. Whites in the same period. Compared to U.S. Whites, whose incidence rates decreased for a majority of cancer sites, Alaska Natives had increased incidence of cancers including those of the digestive system (10.1 percent), breast (7.9 percent), colon-rectum (7.9 percent), and uterus (4.1 percent). Incidence rates for Alaska Natives declined over the period for leukemia (-5.3 percent) and cancer of the ovary (-2.8 percent).

Analysis of the trend data reveals an increase in the incidence of lung cancer and shows that cancers that were already occurring at unusually high rates in this population do not appear to be decreasing (Lanier, 1993). Moreover, data from the Alaska Native Tumor Registry suggest that the rate of new invasive cancers among Native women has increased steadily in recent years, rising from 281 per 100,000 in 1969 to 1973 to 351 per 100,000 in 1989 to1993 (Lanier et al., 1996). More than 25 percent of the new cases in the latter period were breast cancer, and there was a dramatic increase in annual breast cancer incidence (34.7 per 100,000 to 86.5 per 100,000), which may be attributable to better detection and reporting.

Table 7 shows age-adjusted cancer incidence rates for all Alaska Native women and by ethnic group, for each cancer type from 1969 to1993 (Lanier et al., 1996). Cancer incidence rates among women in different Native Alaskan ethnic groups vary somewhat. Most notable was a difference among all three groups in breast cancer incidence, with American Indian women experiencing a rate more than twice as high as Eskimo women (95.2 versus 46.7 per 100,000). The rate for Aleut women is between the two (68.6 per 100,000). American Indian women also had higher rates of uterine cancer, but they experienced the lowest risk of colorectal cancers. Aleut women had higher rates of lung cancer and

lymphoma, while Eskimo women had the lowest rates of thyroid cancer (Lanier et al., 1996).

To compare age-adjusted incidence rates for Alaskan Native ethnic groups with those of the U.S. White population, Alaska-to-U.S. ratios can be calculated (see Table 8). A ratio of 1.0 indicates that the incidence of cancer among the Alaska Native group is the same as that for the SEER population of White Americans. In comparison, a ratio of 4.0 indicates that the incidence of cancer among Alaska Natives is four times that of the SEER sample, and a 0.5 ratio indicates an incidence rate among Alaska Natives that is only half of the SEER rate. These comparisons were based on data, from 1989 to 1993. With the exception of breast, colorectal, and lung cancers, the distribution of most cancer types is similar to that of Whites in the Alaska Native population. However, in recent years, Alaska Native women have had a higher-than-average incidence of several cancers. At 70.1 per 100,000, the incidence rate for colon and rectal cancers in Alaska Native women is twice that of U.S. White women. Although not statistically significant, gallbladder cancer is estimated to be nearly three times as likely to occur among Alaska Native women than among U.S. White women. The incidence of kidney and cervical cancers also is higher for Alaska Native women than for the White population, whereas incidence rates for breast and uterine cancers are relatively low (Lanier et al., 1996).

**Mortality Rates**

In 1993, cancer became the leading cause of death among Alaska Native women (Lanier, 1993). Boedeker and Butler (1990) reported that Alaska Native women younger than 65 have a higher age-specific mortality rate than U.S. women overall. For women younger than 44, death from cancer ranks third, whereas cancer is the leading cause of death among women aged 45 to 65. However, for women older than 65, the age at which death rates are by far the highest, cancer was second to circulatory disease as a cause of death.

According to the IHS, the age-adjusted cancer mortality rate for the Alaska Area considerably exceeds that for the United States as a whole (151 per 100,000 and 133 per 100,000, respectively) (IHS, 1996). Between 1992 and 1998, Alaska Native women's cancer mortality rate was 30 percent higher than that of

U.S. White women (181.4 versus 138.0 per 100,000) (Table 5). As with cancer incidence rates, the Alaska Native women's cancer mortality rates are significantly higher compared with U.S. White women for the following cancers: stomach (7.6 versus 2.4 per 100,000), colon and rectum (30.4 versus 13.9 per 100,000), pancreas (12.6 versus 7.0 per 100,000), lung (44.2 versus 34.6 per 100,000), and esophagus (4.2 versus 1.3 per 100,000) (see Table 5) Alaska Native women have the highest mortality rate of any ethnic group for all cancers combined, as well as for colorectal and lung cancers (American Cancer Society, 1997).

Data from 1992 to 1998 (see Table 5) and from 1989 to 1993 (see Table 9) show that Alaska Native women have higher mortality rates from cancers of the cervix than U.S. White women (Lanier et al., 1996) Mortality from nasopharyngeal cancer, quite rare in the general U.S. population, is relatively much higher among Alaska Natives. The mortality rate for cervical cancer among Alaska Native women (5.8 per 100,000) is more than twice the rate for U.S. women of all races (2.5 per 100,000) (see Table 9). On the other hand, breast cancer mortality among Alaska Native women is about 88 percent that of U.S. White women (21.5 versus 24.3 per 100,000) (see Table 5). Although IHS data indicate stable breast cancer mortality in Alaska (IHS, 1994, 1996), increases in reported breast cancer incidence among Alaska Native women suggest that breast cancer mortality should be watched closely.

**Survival Rates and Stage at Diagnosis**

Until recently, there was little information on either cancer survival rates or stage at diagnosis for the Alaska Native population. The Alaska Native Tumor Registry collected data from 1969 until 1983, but the project lost its funding because fewer than 100 new cancer cases a year were being reported. Funding for the registry resumed in 1989. The registry collected information on cancer incidence, follow-up, stage at diagnosis, and treatment in the Native Alaskan population. Analyses of data from 1969 to 1993 showed that colorectal cancer survival rates among Alaska Natives were similar to those observed for the western section of the Washington state population (Brown et al., 1998). The 5-year relative survival

rates for most cancers in Alaska Native women from 1988 to1997 were similar to those for U.S. White women. However, for cancer of the uterus, Alaska Natives had a significantly higher 5-year survival rate (100 percent versus 86.4 percent) (see Table 5).

## OVERALL CANCER RISK FACTORS

The primary risk factors for cancer in Alaska Native women include high rates of tobacco and alcohol use, a diet high in fat and sugar, a sedentary lifestyle, and chronic obesity. Major risk factors affecting cancer outcomes among Alaska Native women include societal attitudes toward disease (for female cancers in particular) and difficulties in delivering health care services to poor, scattered, and remote populations, which often have a shortage of trained staff and of accessible health care facilities.

### Tobacco Use

Habitual use of tobacco is thought to be responsible for about 30 percent of cancers in people of all races, including Alaska Natives. To help gauge the health impact of tobacco use and other risk factors, Alaska participates in CDC's Behavioral Risk Factor Surveillance System (BRFSS), a nationwide telephone interview survey (Owen et al., 1996). BRFSS data suggest that use of both cigarettes and smokeless tobacco products in Alaska are among the highest in the country, and rates among Alaska Natives are even higher. A recent review of the BRFSS and other data sources revealed the smoking prevalence among Alaska Native women is twice that of non-Native women in Alaska (Kaplan et al., 1997). This relationship held true even for pregnant women: 36 percent of Alaska Native women reported smoking during their last trimester of pregnancy compared to 19 percent of non-Native Alaskan women (Kaplan et al., 1997).

Combined data from 1987 and 1991 show that smoking prevalence among Alaska Native and American Indian women nationwide was 35.6 percent, compared with 26.3 percent in the U.S. White female population (Giovino et al., 1994). From 1991 to 1993, data from the Alaska BRFSS found that an even greater percentage of Alaska Native women were current smokers (39.3 percent) (Owen et al., 1996).

Smokeless tobacco use among Alaska Natives (11.3 percent from 1991 to 1993) was higher than among all Alaskans (8.4 percent), with the highest use (14.0 percent of men and 9.5 percent of women) occurring in the Bush area.

Information on smokeless tobacco use by Alaska Native children and youth comes from a 1986 IHS survey, which collected data from nearly 5,000 schoolchildren in eight rural regions of Alaska (Schlife, 1987). Of children aged 5 to 18, nearly half had tried smokeless tobacco (43 percent of girls, 45 percent of boys) and about one third (28 percent of girls and 34 percent of boys) were still using smokeless tobacco. Use of these products begins at very early ages. Among the 5-year-olds surveyed, 17 percent of girls and 10 percent of boys reported using either snuff or chewing tobacco.

Because tobacco use is a well-known risk factor for lung cancer, it is likely that tobacco use has played a role in the increasing incidence of lung cancer among Alaska Native women. Heavy tobacco use also may contribute to the increasing incidence of oral, esophageal, pancreatic, and stomach cancers, and recent research has confirmed that women who smoke are at higher risk for developing cervical cancer (Burhansstipanov and Dresser, 1993; Sood, 1991; Winkelstein, 1990).

Smoking also has been suggested as a possible risk factor for nasopharyngeal cancer in the United states, although primarily among men (Zhu et al., 1995). There is limited evidence that Alaska Natives with nasopharyngeal cancer are more likely to have smoked cigarettes than are Alaska Natives without cancer (Lanier et al., 1980). Other factors reported slightly more often by these patients are consumption of salted fish in childhood and exposure to noxious fumes.

Smoking is a major risk factor for cancers of the oral cavity (Miller et al., 1996). Tobacco and alcohol, especially when consumed together, are important risk factors for esophageal and pharyngeal cancers. Alaska Natives also consume alcohol at greater than the national rate. It is likely that alcohol use is another important factor in the disproportionately high incidence of pharyngeal and upper gastrointestinal

cancers in Alaska Natives, although this has not been well studied to date.

**Diet, Obesity, and Disease**

There is evidence to suggest that diets low in fiber, fruit, and vegetables and high in fat, salt, and pickled or smoked foods can contribute to the development of cancer. Data suggest that consuming adequate amounts of fruit and vegetables protects against cancers of the esophagus, oral cavity, larynx, pancreas, stomach, colon and rectum, and bladder, and may protect against cancers of the cervix, ovary, and breast (Block et al., 1992). Although the traditional Native Alaskan diet once may have offered some protection against cancer, many Natives today consume the traditional smoked meats and fish in addition to more high-fat foods typical of modern Western diets. Moreover, those who depend primarily on government-provided commodities as their sole source of food may consume insufficient amounts of the fresh fruit and vegetables that are high in chemopreventative nutrients (Burhansstipanov and Dresser, 1993).

A 1987-88 study, during which 873 Alaska Natives were interviewed dietary intake found that Alaska Natives tended to consume less calcium and more protein, fats, carbohydrates, iron, and vitamins A and C than did the general U.S. adult population (Nobmann et al., 1992). The Alaska Native diet contained six times more fish than that of other Americans, but fewer fruits and vegetables. Food intake, particularly sources of protein, varied by season, with more fish consumed in summer and fall and more game eaten in winter. For both women and men, protein and fat intake were significantly lower in the spring than in other seasons. Moreover, Alaska Natives rarely ate dark green, deep yellow, or cruciferous vegetables. Their diet also was low in fiber and averaged only two servings of fruit and vegetables per day rather than the recommended five or more. Therefore, dietary factors may account in part for the higher incidence of several types of cancer among Alaska Native women.

Obesity and diabetes also may be important risk factors for the development of specific cancers. For example, pancreatic cancer has been linked with heavy smoking and diabetes, and for postmenopausal

women, obesity is an important risk factor for breast and endometrial cancers (Miller et al., 1996). For all women, relatively high body weight and caloric intake are significantly associated with an increased risk for postmenopausal cancers of the breast, colon and rectum, endometrium, kidney, and gallbladder.

In 1957, noninsulin-dependent diabetes mellitus (NIDDM) was rare among Alaska Natives. However, by 1988, the prevalence of clinically recognized NIDDM among Aleuts and Alaskan Indians had exceeded that of all races in the United States. A 1995 study of 15 Alaska Native villages found significantly higher rates of obesity and NIDDM than had been noted 15 years earlier (Murphy et al., 1995). Between 1990 and 1997, the number of Native Americans and Alaska Natives diagnosed with diabetes increased from 43,262 to 64,474, with women being 1.4 times more likely to be diagnosed than men (Burrows et al., 2000). However, the rate of diabetes in Alaska (3.0 percent) was lower than the nationwide prevalence for Native Americans and Alaska Natives (5.4 percent) (Burrows et al., 2000). In a recent study, the rate of diabetes was found to vary greatly among Native Alaskan populations, from 9.6 percent among the Siberian Yupik to 2.8 percent among the Central Yupik (Ebbesson et al., 1998).

High dietary fat intake appears to be an important risk factor for obesity and NIDDM (Murphy et al., 1995). Today, many Native Alaskans consume a diet high in nontraditional foods, including many high-fat, high-carbohydrate, low-nutrient foods (e.g., white bread, rice and potatoes, and soda or other beverages), and foods low in complex carbohydrates (e.g., berries and seasonal wild greens). However, Eskimos report more frequent consumption of salmon and other fish, and seal oil, whereas Indians more often eat moose and caribou meats. Alaska Natives with glucose intolerance tend to be more overweight than others, and they also report more frequent consumption of milk products and beef and pork and less frequent consumption of seal oil. A recent study of Alaskan Eskimo women found that 27.9 percent were overweight and 32.8 percent were obese (Risica et al., 2000).

**Extent of Physical activity**

Current evidence suggests that physical activity may have an effect on lowering overall cancer incidence

and mortality rates (Thune and Furberg, 2001). The strongest evidence is for colon cancer, where physical activity seems to have a beneficial effect (Thune and Furberg, 2001). Although the traditional, active Native Alaskan lifestyle may have offered some protection against cancer, today many Natives are not nearly as active. National data sets do not report separately for Alaska Natives—instead, estimates are combined with American Indians (U.S. Department of Health and Human Services [USDHHS], 2000) The prevalence of no leisure-time physical activity is 46 percent for American Indians/Alaska Natives compared to 38 percent for Whites. The percentage of American Indians/Alaska Natives that meet the lifestyle physical activity recommendation (accumulate 30 minutes of moderate-intensity physical activity at least 5 days of the week) is lower than the percentage of Whites (13 percent versus 15 percent). Similarly, the proportion of American Indians/Alaska Natives who meet the structured physical activity recommendation (do 20 minutes of moderate to vigorous physical activity at least 3 days of the week) is lower than for Whites (25 percent versus 32 percent). Finally, fewer American Indians/Alaska Natives engage in vigorous physical activity (19 percent versus 24 percent).

### Occupational and Environmental Risk Factors

Exposure to occupational carcinogens—such as asbestos, radon, mustard gas, chloromethyl ethers, chromium, nickel, and inorganic arsenic—has been found to be a contributing factor for lung cancer. Many Alaska Natives work in lumber and chemical plants and are therefore at risk for exposure to carcinogens in the workplace, but no studies have been conducted. Although many Alaska Natives are concerned about possible exposure to global radioactive fallout from atmospheric nuclear weapons testing, there is no evidence that fallout is a significant factor in causing cancer (Stutzman et al., 1986).

## SITE-SPECIFIC CANCER RISK FACTORS

### Risk Factors for Breast Cancer

Alaska Native women exhibit high rates of some lifestyle factors that have been associated with breast cancer, including high alcohol consumption, obesity and high-fat diets, and a sedentary lifestyle.

Other risk factors for breast cancer, such as not having borne children or childbearing late in life, high income level, and family history of breast cancer (Harvard Center for Risk Analysis, 1998), are not common among Alaska Native women, many of whom are young at the time of their first pregnancy and are of low socioeconomic status.

**Risk Factors for Cervical Cancer**

Until recently, little was known about the association between sexually transmitted diseases (STDs) and cervical cancer in Alaska Native women. The average reported lifetime number of sexual partners for an Alaska Native woman was three, yet the incidence of STDs in this population was the highest in the Nation. For example, a 1988-90 study of 1,126 Alaska Native women (average age 28.3 years) found that 70.6 percent tested positive for a present or previous STD (Alaska Natives Commission, 1994). Data collected between 1979 and 1990 suggest that the gonorrhea rate for Alaska Natives may be declining; yet in 1990, it was still nearly three times as high as among the general U.S. population (624 per 100,000 versus 221 per 100,000).

Recent studies have demonstrated that risk factors such as young age at first intercourse, multiple sex partners, or a history of STDs influence the risk of developing cervical cancer through the acquisition or maintenance of specific strains of human papillomavirus (HPV) infection (Ley et al., 1997; Cuzick et al., 1992; Schiffman, 1992; Hisada et al., 2001; Schifman et al., 1993; Schlecht et al., 2001). In a study of Alaska Native women recruited from colposcopy clinics, through routine gynecologic or prenatal care, or from population lists, 21 percent were infected with the HPV (Davidson et al., 1994). Not surprisingly, HPV infection was highest among women treated at the colposcopy clinic (43.4 percent), followed by women receiving routine gynecologic care (10.6 percent) and the population sample (6.0 percent). In all three samples, HPV infection rates were higher among women with more than one lifetime sex partner and with a younger age at first intercourse. HPV DNA testing has been suggested as a screening tool for cervical cancer, both alone and as an adjunct to the Pap test (Manos et al., 1999; Schiffman et al., 2000), although the incremental cost-effectiveness is dependent on screening frequency and age of cessation of

testing (Mandelblatt et al., 2002). Recent results from a clinical trial of HPV vaccine (Koutsky et al., 2002) indicate this may be a promising cervical cancer control strategy in HPV-negative women.

More recently, a study of 1,126 Inupiaq (northern Eskimo) women who had sought routine care and colposcopy or who were recruited from population-based lists found that 21 percent had been infected with the human papillomavirus, certain genotypes of which are a necessary but insufficient factor for cervical cancer (Davidson et al., 1994). Not surprisingly, HPV prevalence tended to increase with sexual activity and cigarette smoking and to decrease with age. However, HPV prevalence was found to be unrelated to the use of oral contraceptives or condoms or to being infected (previously or presently) with other STDs. These findings suggest that screening for the presence of strain-specific HPV could identify Native Alaskan women at highest risk for cervical cancer.

In summary, it is not known precisely to what degree cancer risk factors for Alaska Native women differ from those for U.S. women in general. However, preliminary data on Alaska Natives and American Indians, currently being compiled, should guide the development of needed studies of potentially differential risk factors.

**SOCIETAL ATTITUDES AND PRACTICES**

There is little documented information on Alaska Native women's knowledge about and attitudes toward cancer. Traditional Alaskan healing practices tend to emphasize the emotional and spiritual aspects of a disease in addition to its physical manifestations. Cancer is feared by Alaskan Natives, as it is by most people, yet most Alaskan Native languages have no word for the disease. Therefore, attempts to translate can result in misunderstanding. The Yup'ik Eskimos, for example, refer to cancer as "a sore that does not heal" (Joe and Young, 1993)—a view that does little to promote understanding of, or encourage screening for, cancer.

Some Alaska Natives, moreover, believe that illness results from events in childhood or that it can be prevented by the use of herbal medicines or the ministrations of tribal medicine men. Those who hold to such traditional views tend to see Western medical doctors as concerned with physical symptoms only, and therefore unable to cure disease. Such beliefs clearly work against efforts to change current behaviors, including efforts toward Alaska Natives' adoption of known preventive practices (Burhansstipanov and Dresser, 1993).

Because the family is the focal point of most activities and practices in Native society, its needs take precedence over those of the mother or wife, traditionally the family's caretaker. Nor are Alaska Natives typically open to sharing family-related feelings and events with outsiders, influencing their willingness to make use of health care services.

One survey that evaluated Alaska Natives' knowledge, attitudes, and behaviors regarding cervical cancer screening recently reported its findings. Of 481 women polled, 62 percent reported having had a Pap test within the previous 3 years, but only 15 percent reported annual Pap screening for the 3 years before the survey. Among women who stated that they had a gender preference for a health provider, 96 percent preferred a female (Lanier et al., 1999b).

Another study evaluated barriers to cervical screening among Native Indian women in British Columbia (Deschamps et al., 1992). The main barriers mentioned were: lack of awareness; feelings of embarrassment, shame, and shyness; lack of confidence in the efficacy of the procedure; and lack of continuity of care, due to a high turnover rate of physicians in the Native community. In addition, women in this population reported that they rarely discussed their cervical cancer screening experiences with other women or encouraged them to go for testing. Although awareness of the importance of cervical cancer screening seems to be greater among Alaska Native than among British Columbia Native women, the two populations appear to share many of the same reasons for not following through with regular Pap tests. These reasons should be considered in the development of cancer prevention interventions.

It is also important to look at what Alaska Natives believe causes cancer. In one survey (Sprott, 1988), 74 percent felt that water contamination and smoking cigarettes caused cancer, 30 percent believed cancer arose from nuclear fallout from testing in China or Russia, and 17 percent believed cancer was the result of the change from a traditional to a Western diet. Such beliefs have important implications for the design of cancer information and prevention programs.

## BARRIERS TO CANCER CONTROL SERVICES

Barriers to cancer prevention and control efforts targeted to Alaska Native women include, but are not limited to, culturally inappropriate recruitment protocols; lack of culturally appropriate cancer prevention and control materials and programs; underrepresentation of Alaska Natives in the medical and health care community; poor knowledge of English; poverty, low education levels, and inadequate and expensive transportation and communications facilities; and traditional beliefs and attitudes about the causes and treatment of cancer and disease; a shortage of Native health providers, and a scarcity of health care facilities. These and other barriers make it difficult to meet the health and medical needs of Native women. One study of health aides in native clinics found a trend toward improved access to women's health services in remote Alaska villages with trained community health aides (Sox et al., 1999).

### Cultural Attitudes Toward Cancer and Health Care

In a culture where family is often the top priority and traditional beliefs are passed down from generation to generation, cancer materials and recruitment protocols must be culturally appropriate. Native women, for example, value modesty and privacy and may be uncomfortable sharing information with health care providers. Because their culture emphasizes responsibility to the family above all, it is often difficult for Alaska Native women to take the time to care for themselves. Differences in communication styles also must be taken into account. Alaska Natives typically speak little, slowly, and softly, and may perceive White health providers as impolite in that they speak too much, too fast, and too loudly. Finally, although

most Indian people today accept the Western health care system, many Alaska Natives continue to use traditional healing practices.

**Accessibility of Health Care Services**

In 1954, responsibility for all Native American health care services was transferred from the Bureau of Indian Affairs to IHS. As a consequence, the U.S. Department of Health and Human Services became responsible for providing health services to Native Americans.

In 1975, the Indian Self-Determination and Education Assistance Act (amended in 1988, 1990, and 1994) granted tribes the right to contract out for services and to staff, manage, and control their own health programs. Under the 1971 Alaska Natives Claims Settlement Act, 12 regional nonprofit corporations were developed to administer health and social programs for Alaska Natives.

Today, IHS is required to enter into contracts with tribal organizations for the provision of health care services. Alaska contains nine service units, each with one or more Native- or tribe-operated health corporations that have entered into contracts with the Alaska Area Native Health Service (IHS area office serving all of Alaska) and with other public or private agencies to provide health care for their regions (Ivey et al., 1991). These service units provide comprehensive health services to all Alaskans—Natives and non-Natives—in remote areas.

Alaska presently has 24 health centers and 176 village clinics (IHS, 2001), reflecting a substantial increase in the late 1990s. The Alaska Native Medical Center in Anchorage, with 170 beds, is the major referral hospital for other service units. Private hospitals and practitioners supplement these facilities, and each village has at least one community health aide who is often the community's principal health care provider. Aides are chosen by the village council and trained to meet the basic health needs of the rural community. They are responsible for giving first aid in emergencies, examining the ill, reporting symptoms to a physician by telephone, carrying out recommended treatment, instructing the family in

giving nursing care, and conducting health education programs in the villages. IHS also manages a safe-water program that designs and constructs water and sewage systems in remote villages.

### Utilization of Health Services

At present, no health services statistics are available on Alaska Native women's utilization of health care services. Women's responses to the BRFSS surveys suggest that Alaska Native women underutilize cancer screening services (Coughlin et al., 1999). Statistics for Alaska Natives as a whole, however, show that the outpatient workload in the IHS Alaska Area has grown considerably over the past 30 years, rising from 65,719 visits in 1959 (Ivey et al., 1991) to 614,986 visits in 1994 (IHS, 1996). This dramatic increase was largely the result of population growth, an expansion of the outpatient procedures offered, and better reporting by health care facilities. In 1992, health aides in the IHS Alaska Area reported 272,071 visits (Boedeker et al., 1993).

From 1980 to 1992, the number of hospital inpatient admissions to Alaska Area Native Health Service hospitals increased only 5.8 percent—from 10,640 to 11,257 recorded admissions—and the average length of hospital stay declined (Boedeker et al., 1993). In 1980, Alaska Natives admitted to hospitals stayed an average of 7.1 days; compared to 5.7 days in 1992. Hospital stays continue to be longest at the Alaska Native Medical Center, which provides specialty and tertiary care, and at the Mt. Edgecumbe Hospital, which offers long-term alcohol and mental health treatment programs.

## RESEARCH, PREVENTION, AND CONTROL

Since 1988, NCI has supported a variety of culturally sensitive cancer prevention and cancer control outreach projects that either focus on, or significantly involve, Native American women.

### Cervical Cancer Prevention

The Alaska Native Women's Health Project (supported by NCI) and the Alaska Native Women's Wellness Project (supported by CDC) targeted women aged 15 and older in urban, rural, and remote village

settings (Lanier et al., 1999a; Stillwater, 1999). The Alaska Native Women's Health Project used a culturally sensitive intervention that included an educational brochure and video, specific to Alaska Natives, about the Pap test. After the intervention, there was an increase in cervical cancer screening among participants compared to a nonrandomized control group. There were also documented improvements in women's knowledge about cervical cancer screening, cancer risks, and risk reduction methods (Lanier et al., 1999a).

The long-term objective of the Alaska Native Women's Wellness Project is to reduce both morbidity and mortality from invasive cervical cancer among the Native population. In Anchorage, 500 Alaska Native women were selected from a random sample of 5,000 eligible Native residents. In St. Paul, all adult Alaska Native women (approximately 125) were eligible to participate.

Specific goals include: promoting awareness of and knowledge about cervical cancer risk factors, symptoms, and screening programs; enhancing the efficacy of existing screening services; and improving followup on precancerous lesions. Participants must agree to complete face-to-face interviews before and after the intervention.

In an attempt to address previously identified obstacles to successful health care for Native women, the wellness project is testing a special demonstration women's health clinic offering evening hours, longer appointments, female providers, nurse practitioners, comprehensive health surveillance, Pap test tracking services, individual patient education, tobacco cessation classes, and mammography services (Stillwater, 1999). One of the first activities of this project involved the development of a cervical cancer prevention video for Alaska Native women. This video was shown to be effective in increasing women's postviewing knowledge about cervical cancer (Stillwater et al., 1995). Other interventions are under development.

**Cancer Statistics and Tracking**

IHS clinics now have a comprehensive health surveillance tracking service, which produces

computer-based records of the results of Pap tests, breast examinations, mammograms, blood pressure measurements, and serum cholesterol tests for each patient visit. The service is designed to improve the continuity of care and encourage better screening services and follow-up. Many community health aides are undergoing additional training on how to perform routine Pap tests and breast examinations, and many villages are offering tobacco cessation classes.

As discussed above, in 1989 IHS began a collaboration with NCI and CDC on a 5-year program to collect data on cancer incidence, mortality, and survival among Alaska Natives, following the standards set by NCI's SEER Program. Each case report includes demographic data and the basis for and stage at diagnosis, treatment, and follow-up. The agreement is designed to maintain active cancer surveillance of the Native Alaskan population and to document each newly diagnosed case of invasive cancer, as well as all in situ cancers. This system has been in place since 1990.

**Community Involvement**

Cancer control interventions that have proved most successful among the American Indian population have tended to emphasize personal empowerment and responsibility to family and community. There are almost no data regarding the success of efforts to detect cancer early, curtail smoking, or change unhealthful behaviors, but it is well documented that acceptance of interventions by Native communities is critical for participation and follow-up. For example, Alaska Native women are more likely to submit to regular Pap tests or breast cancer screenings if they believe they are helping their families and community by doing so.

Programs are most likely to have broad health improvement effects if they address behavior changes that can reduce the risk of cancer, as well as other health problems such as cardiovascular disease, obesity, and diabetes. If intervention projects seek to benefit the health status of the Native community as a whole rather than of any one segment, the entire community may come to view the projects in a positive light. Ideally, behavioral interventions should include trained indigenous personnel and be integrated with

the cultural beliefs of individual tribes. One strategy that has proved successful is to include Native traditional healers on a project's advisory board, which increases its legitimacy in the community and helps to ensure that committee decisions are acceptable to and representative of the target population (Burhansstipanov and Dresser, 1993).

It is important for researchers and program planners to actively involve Alaska Natives in identifying health care problems and solutions within their own communities. To be successful, solutions must strike a balance between what Alaska Native communities can do for themselves and what requires outside support (Alaska Native Health Board, 1989). Therefore, all proposed interventions and projects should seek to support Native efforts and provide guidance to communities seeking to develop or improve health care programs, prevention services, and medical research.

**FUTURE DIRECTIONS**

In trying to devise a health care program that makes the best use of finite resources, it is first necessary to determine which interventions are likely to achieve the most benefit for the cost. No one strategy can be applied uniformly across populations without regard for baseline disease rates or risk behaviors. Areas of major concern that health officials in Alaska may wish to target, for example, are cervical and lung cancers—two major killers of Native women. At the same time, the reported incidence of breast cancer among Alaska Native women is steadily increasing (Lanier et al., 1996), and there appears to be a need to expand screening for breast cancer.

Collecting accurate data on cancer in different Native populations is a first step toward setting realistic health priorities and developing a rational health care strategy. Yet relatively few papers on this topic have been published (Mahoney and Michalek, 1995). To expand the descriptive epidemiology of cancer in Alaska Natives, national, state, and local health communities need to support the Alaska Native Tumor Registry's efforts to collect data on cancer stage at diagnosis and cancer survival rates among Alaska

Natives. In addition, a thorough analysis of existing methods for health statistics compilation is needed to determine possible ways of improving the efficacy of cancer surveillance and the quality and quantity of information about cancer among Alaska Natives. More data are needed on the incidence of colorectal, gallbladder, nasopharyngeal, stomach, cervical, liver, and kidney cancers, which occur in Alaska Native populations at rates above the national averages. It is important to track cancer survival and mortality rates among Alaska Natives over time to determine outcome trends by geographic area, risk factor, tribe, and rural or urban environment.

Improving the epidemiological database, assessing the socioeconomic characteristics of the target communities, devising prevention and treatment programs that are culture-specific, and using local people to organize and carry out cancer prevention and control services, as well as data collection, should increase the efficacy of these services and thereby reduce cancer morbidity and mortality rates among Alaska Natives.

Researchers also need to explore genetic and environmental risk factors (smoking, dietary components, lack of physical activity, and other possible factors to be determined through further analysis of regional clustering) known or suspected to play a part in the development of cancers and cancer screening behavior in both tribal and urban Native Alaskan groups. Tobacco use prevention, cervical cancer screening and follow-up, diet, increased physical activity, and screening for liver cancer all are likely to be important focuses in future interventions.

## CONCLUSION

Over the years, Alaska Natives have undergone many cultural and lifestyle changes. Cancer in Native Alaskans was once thought to be rare, but as health data have been collected and analyzed over the past 25 years, it has become clear that such is no longer the case. The incidence of cancer among Alaska

Native women has been increasing steadily and is similar today to that of the general U.S. population. In fact, cancer is now the leading cause of death for Alaska Native women.

Although information on survival rates is not complete at this time, Native women who develop cervical cancer appear to have almost double the risk of dying from it compared with other American women. The reported incidence of breast cancer also has doubled in recent years, and the increasing incidences of—and poor rates of survival from—many cancers in Alaska Native women are cause for alarm. More systematic data collection and analysis and more effective programs for cancer prevention and treatment are clearly needed.