

## 9 Cancer: Epidemiology and Prevention

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This chapter provides an overview of the cancer morbidity and mortality experience of the approximately 8,000 Hawaiians and 177,000 Part-Hawaiians (grouped under the term "Native Hawaiians") living in Hawaii (Office of Technology Assessment, 1987), their exposure to the major known or suspected cancer risk factors, and their use of health services related to cancer prevention and treatment.

### CANCER RATES AMONG NATIVE HAWAIIANS

A comparison of 1978-1981 incidence data from the Hawaii Tumor Registry with those for the United States (Table 9-1) shows that Native Hawaiians have the second highest cancer rates in the nation (National Cancer Institute, 1986a). Moreover, an international comparison has recently shown that cancer rates of Native Hawaiians are among the highest in the world (Muir and Waterhouse, 1982). Among the five main ethnic groups living in Hawaii, Native Hawaiians rank second in both sexes for total cancer incidence (Table 9-2).

**Table 9-1 Age-Adjusted (1970 U.S. Standard) Overall Annual Cancer Incidence Rates (per 100,000) by Ethnic Group, U.S., 1978-81**

ETHNIC GROUP	RATE
Black	372.5
Native Hawaiian	357.9
White	335.0
Chinese	252.9
Japanese	247.8
Hispanic	246.2
Filipino	222.4
Native American	164.2

SOURCE: National Cancer Institute (1986a).

**Table 9-2 Age-Adjusted (1970 U.S. Standard) Overall Average Annual Cancer Incidence Rates (per 100,000) by Sex and Race, Hawaii, 1978-1981**

ETHNIC GROUP	MALE	FEMALE
Caucasian	444.9	351.3
Native Hawaiian	390.9	336.5
Japanese	300.4	214.5
Chinese	258.9	227.7
Filipino	235.2	191.6

SOURCE: National Cancer Institute (1984).

**Table 9-3 Age-Adjusted (1970 U.S. Standard) Cancer Incidence Rates(per 100,000) for Males, Hawaii, 1978-1981**

CANCER SITE	NATIVE				
	HAWAIIAN	CAUCASIAN	JAPANESE	CHINESE	FILIPINO
Esophagus	12.6	4.1	4.7	2.1	5.8
Stomach	48.3	16.9	41.3	11.6	8.7
Colon	20.9	37.4	43.0	30.3	23.6
Rectum	19.9	18.5	22.0	17.4	18.9
Pancreas	8.6	10.1	9.4	9.5	6.8
Lung	100.9	80.2	46.6	45.8	33.5
Prostate	57.9	83.0	46.1	32.4	51.6
Bladder	10.9	32.3	10.7	17.4	7.2
Thyroid	6.8	2.3	6.4	9.2	6.6
Lymphomas	12.3	14.4	9.7	9.7	11.5
Leukemia	8.0	12.2	5.8	7.4	5.3

SOURCE: National Cancer Institute (1984).

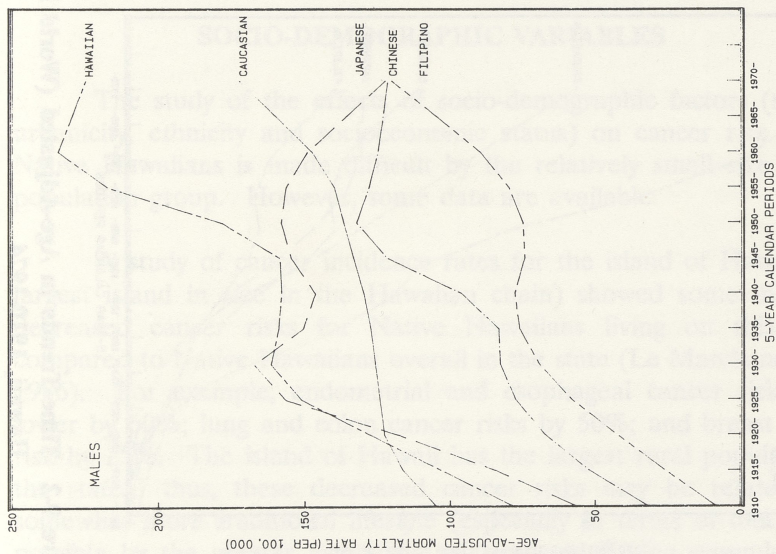
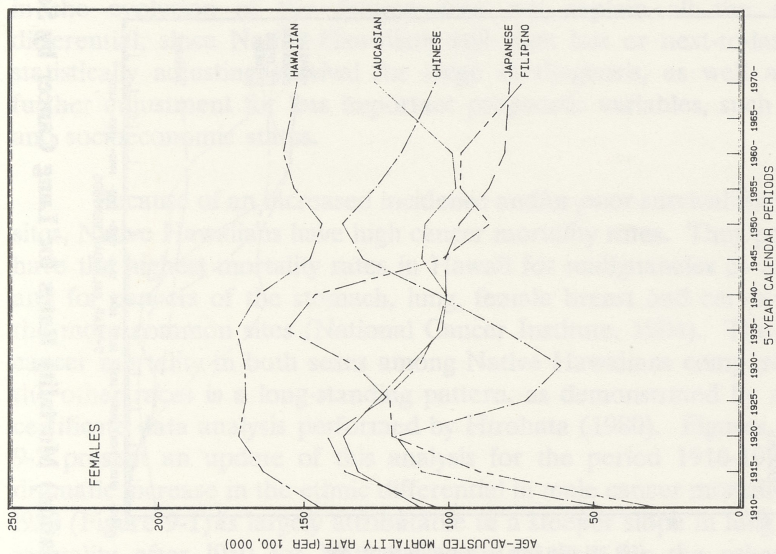
**Table 9-4 Age-Adjusted (1970 U.S. Standard) Cancer Incidence Rates (per 100,000) for Females, Hawaii, 1978-1981**

CANCER SITE	NATIVE				
	HAWAIIAN	CAUCASIAN	JAPANESE	CHINESE	FILIPINO
Esophagus	1.9	1.8	0.6	0.0	1.4
Stomach	21.0	8.5	18.6	9.0	6.3
Colon	14.7	30.4	26.7	28.3	13.0
Rectum	9.2	9.0	11.3	8.0	5.3
Pancreas	10.6	11.5	6.4	10.4	4.7
Lung	38.6	38.5	14.0	22.2	20.1
Breast	111.1	97.4	52.8	66.1	38.9
Cervix Uteri	14.1	10.3	7.8	7.7	7.3
Corpus Uteri	27.1	29.2	18.2	22.6	13.5
Ovary	13.5	12.0	9.1	9.9	9.5
Bladder	6.2	4.7	5.4	1.2	6.0
Thyroid	11.3	6.2	6.4	5.6	20.1
Lymphomas	7.9	11.0	6.9	5.3	7.3
Leukemia	4.6	8.8	4.0	4.8	3.0

Source: National Cancer Institute (1984).

Site-specific comparisons indicate (Tables 9-3 and 9-4) that Native Hawaiians have the highest or the second to the highest incidence rate for all but five (colon, rectum, male pancreas, male bladder and female leukemia) of the 15 most common cancer sites (National Cancer Institute, 1984). They are at particularly high risk for cancers of the esophagus, stomach, lung, female breast and cervix uteri.

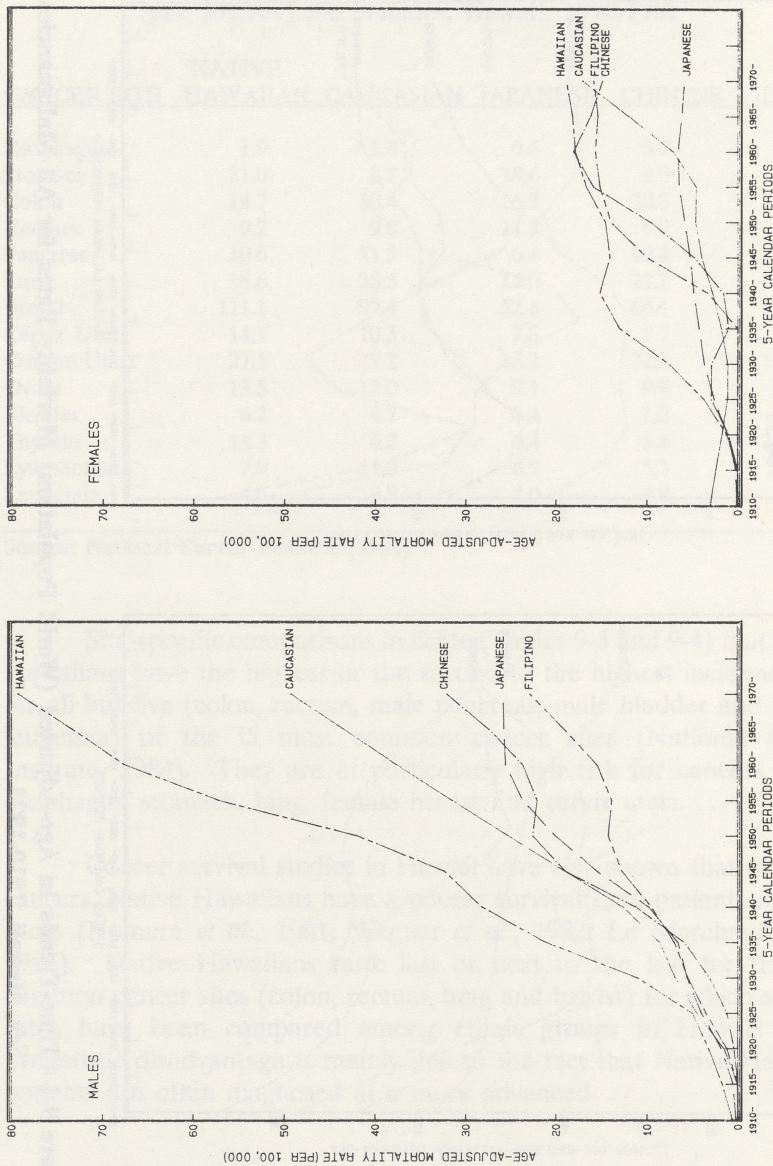
Cancer survival studies in Hawaii have also shown that for some cancers, Native Hawaiians have a poorer survival than patients of other races (Nomura *et al.*, 1981; Wegner *et al.*, 1982; Le Marchand *et al.*, 1984). Native Hawaiians rank last or next to the last for the four common cancer sites (colon, rectum, lung and breast) for which survival rates have been compared among ethnic groups in Hawaii. This prognostic disadvantage is mainly due to the fact that Native Hawaiian patients are often diagnosed at a more advanced



**Figure 9-1 Time-Trends in Age-Adjusted (World Population) Mortality Rates for All Malignancies by Sex, Hawaii, 1910-1974.**

HAWAIIAN  
 ce Rates  
 FILIPINO  
 1.4  
 6.3  
 13.0  
 5.3  
 4.7  
 20.1  
 38.9  
 7.3  
 13.5  
 9.5  
 6.0  
 20.1  
 7.3  
 3.0

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**Figure 9-2 Time-Trends in Age-Adjusted (World Population) Mortality Rates for Lung Cancer by Sex, Hawaii, 1910-1974**

stage than patients of other races. However, diagnosis at a later period in the evolution of the disease does not explain all the survival differential, since Native Hawaiians still rank last or next-to-last after statistically adjusting survival for stage at diagnosis, as well as after further adjustment for less important prognostic variables, such as age and socioeconomic status.

Because of an increased incidence and/or poor survival for several sites, Native Hawaiians have high cancer mortality rates. They presently have the highest mortality rates in Hawaii for malignancies as a whole, and for cancers of the stomach, lung, female breast and cervix among the more common sites (National Cancer Institute, 1984). This higher cancer mortality in both sexes among Native Hawaiians compared with the other races is a long-standing pattern, as demonstrated by a death certificate data analysis performed by Hirohata (1980). Figures 9-1 and 9-2 present an update of this analysis for the period 1910-1974. The dramatic increase in the ethnic differential in male cancer mortality since 1950 (Figure 9-1) is largely attributable to a steeper slope in lung cancer mortality after 1950 for Native Hawaiians than for the other races (Figure 9-2).

### SOCIO-DEMOGRAPHIC VARIABLES

The study of the effects of socio-demographic factors (such as urbanicity, ethnicity and socioeconomic status) on cancer risk among Native Hawaiians is made difficult by the relatively small size of this population group. However, some data are available.

A study of cancer incidence rates for the island of Hawaii (the largest island in size in the Hawaiian chain) showed some markedly decreased cancer risks for Native Hawaiians living on this island compared to Native Hawaiians overall in the state (Le Marchand *et al.*, 1986). For example, endometrial and esophageal cancer risks were lower by 60%; lung and colon cancer risks by 50%; and breast cancer risk by 25%. The island of Hawaii has the largest rural population in the state; thus, these decreased cancer risks may be related to a somewhat more traditional lifestyle (especially in terms of diet) made possible by the greater availability of land and fishing grounds. The implications of this finding are limited, however, since 74% of the Native Hawaiian population in the state was classified as urban (living in places

of 2,500 or more inhabitants) in the 1980 census, a proportion which is expected to keep increasing. Nevertheless, this decreased cancer risk on the island of Hawaii does suggest that environmental influences are primarily responsible for the unusually high rates of cancer in Native Hawaiians.

A comparison of cancer rates among Native Hawaiians by self-reported degree of ethnic purity suggested that Hawaiians may have higher rates of cancer (in particular, lung, breast, prostate and cervix) than Part-Hawaiians (Burch, 1984). These results may reflect differences in genetic characteristics as well as in lifestyle.

**Table 9-5 Percent Distribution of a Representative Sample of 50,000 Subjects by Current Smoking and Drinking Status, Sex and Race, Hawaii, 1975-1980**

SMOK- DRINK-		CAUCASIAN	HAWAIIAN	JAPANESE	FILIPINO	CHINESE
ING	ING					
<b>MALES</b>						
No	No	32.8	40.0	45.1	49.0	61.3
Yes	No	17.8	22.2	19.1	25.3	14.8
No	Yes	25.2	16.6	18.1	10.4	14.0
Yes	Yes	24.2	21.2	17.7	15.3	19.8
Total		100.0	100.0	100.0	100.0	99.9
<b>FEMALE</b>						
No	No	49.5	56.5	9.3	78.0	84.2
Yes	No	20.5	29.6	14.9	18.1	9.6
No	Yes	17.4	5.2	3.2	1.6	4.9
Yes	Yes	12.6	8.6	2.5	2.3	1.3
Total		100.0	99.9	99.9	100.0	100.0

SOURCE: Le Marchand *et al.* (in press).

### EXPOSURE OF NATIVE HAWAIIANS TO RISK FACTORS

In parallel with their increased cancer risk, Native Hawaiians have a very high prevalence of some of the exposures most strongly associated with cancer. Smoking, which is thought to be responsible for about 30% of all cancers and 80% of all lung cancers in the U.S. (Doll and Peto, 1981) is as frequent in Native Hawaiians as in Caucasians (Table 9-5). A similar pattern exists for alcohol consumption

(Table 9-5), which is thought to play a major role (in combination with smoking) in the etiology of cancers of the mouth, pharynx and esophagus (Doll and Peto, 1980).

**Table 9-6 Percentage\* of Smokers and Drinkers Among Native Hawaiians by Degree of Self-Reported Ethnic Purity,\*\* Hawaii, 1975-1980**

	SEX	100% HAWAIIAN	75% HAWAIIAN	50% CAUCASIAN	50% CHINESE
Percent					
Current or	Male	61.1	56.3	49.2	53.7
Ex-Smoker	Female	47.1	49.7	45.6	38.2
Percent					
Drinker	Male	32.6	36.1	35.7	34.4
	Female	10.2	13.8	16.1	12.8

SOURCE: Le Marchand *et al.*, in press, and unpublished.

\*Adjusted for age by the direct method to the World Standard Population.

- \*\* 100% Hawaiian: subjects of unmixed Hawaiian descent;
- 75% Hawaiians: one parent unmixed Hawaiian, the other parent of two or more ethnic origins, one being Hawaiian;
- 50% Caucasian: one parent pure Caucasian, the other parent unmixed Hawaiian;
- 50% Chinese: one parent pure Chinese, the other parent unmixed Hawaiian.

A comparison of risk factors by degree of Hawaiian heritage claimed by the subject (Table 9-6) suggests that the prevalence of smoking, but not that of drinking, is greater for pure or mostly pure Hawaiians. Obesity, which has been associated with a higher risk for cancer of the breast and endometrium in females and possibly cancer of the prostate in males (Lew and Garfinkel, 1979) is more frequent among Native Hawaiians than among the other races in Hawaii, as shown in Table 9-7.

Finally, Native Hawaiians have relatively high intakes of some suspect dietary risk factors for cancer such as salt, protein and fat (see Table 9-8), and high concentrations of mutagens have been identified in some Hawaiian foods (dry/salted fish, kalua pig) (Ichinotsubo and Mower, 1982).



**Table 9-7 Mean Quetelet Index (kg/m<sup>2</sup>) by Sex and Race, Hawaii, 1975-80**

ETHNIC GROUP	MALE	FEMALE
Native Hawaiian	26.6	25.4
Caucasian	24.4	22.5
Filipino	23.8	22.5
Japanese	23.6	21.9
Chinese	23.1	21.1

SOURCE: Lee *et al.* (1982).

**Table 9-8 Age-Adjusted\* Mean Daily Intake of Selected Nutrients by Race and Sex, Hawaii, 1975-1980**

	PRO- TEIN (g)	TOTAL FAT (g)	SATU- RATED FAT (g)	UNSATU- RATED FAT (g)	CHOLES- TEROL (mg)
<b>MALE</b>					
Native Hawaiian	69.1	75.2	26.7	40.5	397.0
Caucasian	69.9	83.3	29.8	44.4	367.9
Japanese	65.6	67.6	23.4	37.7	329.6
Chinese	63.8	70.1	24.9	39.1	320.7
Filipino	61.5	58.1	21.2	31.2	330.9
<b>FEMALE</b>					
Native Hawaiian	53.3	58.7	20.9	31.9	302.1
Caucasian	54.2	62.5	21.9	34.3	276.0
Japanese	51.1	52.5	18.1	29.6	250.1
Chinese	53.3	55.9	19.7	31.1	267.6
Filipino	51.2	47.6	17.2	25.8	282.7

SOURCE: Results from a dietary survey conducted during 1977-1979 among a random sample of approximately 5,000 Oahu residents by the Epidemiology Program of the Cancer Research Center of Hawaii.

\*Age-Adjusted rates computed by analysis of covariance.

However, the high exposure of the Native Hawaiians to known or suspected carcinogens does not seem to adequately explain their increased risk for certain cancers. For example, despite similar ethanol consumption, Native Hawaiian males have an esophageal cancer rate which is three times that of Caucasian males. Similarly, Native Hawaiian and Japanese males have comparable life-time cigarette use, yet the lung cancer incidence rate is twice as high among the Native Hawaiians. Furthermore, the rise in lung cancer mortality observed in Hawaii in the first half of the century, after the introduction of manufactured cigarettes, occurred a decade earlier for the Native Hawaiians than for the other races (Figure 9-2), possibly indicating a greater susceptibility of the Native Hawaiians to the carcinogenic effect of cigarette smoking. Such susceptibility could be genetic in origin or could result from the adverse effects of exposure to additional lifestyle factors.

#### **USE OF HEALTH SERVICES BY NATIVE HAWAIIANS**

In the last two decades, it has become apparent that most cancers (possibly as much as 90%) are due to environmental factors and are, therefore, largely avoidable (Doll and Peto, 1981). It is also known today that prevention of exposure to the risk factors which cause the greatest number of cancer deaths and which are the most controllable (such as tobacco, certain dietary components and carcinogens in the workplace) can substantially reduce cancer incidence. Wider use of early detection practices and of available state-of-the-art therapies has also been demonstrated to extend patient survival and decrease cancer mortality (National Cancer Institute, 1986b). The following is an overview of the utilization of health services by Native Hawaiians in the area of cancer prevention and treatment.

Although health education and health promotion services regarding cancer prevention have been provided by different public and private institutions in the state, few race-specific data are available to evaluate the accessibility and acceptability of these services to Native Hawaiians.

The Cancer Information Service (CIS), which is a federally-funded telephone "hotline" providing free information about cancer prevention, detection, treatment and rehabilitation, has been in operation in Hawaii

since 1978. Data on ethnicity are collected from first-callers to the service. An overview of call patterns in 1983-1984 shows that Native Hawaiians constituted 7% of all callers compared to 39% for Caucasians, 12% for Japanese and 2% for Filipinos (Brannon, 1984). Since Native Hawaiians account for approximately 20% of the state population, use of CIS by this ethnic group is disproportionately low.

Surveys conducted in 1978, 1980 and 1982 by the Community Cancer Program of Hawaii among random samples of the state population have provided useful information on knowledge, beliefs and detection practices for the different ethnic groups with regard to breast, lung, colorectal and cervical cancers (Community Cancer Program of Hawaii, 1982a). In these surveys, Native Hawaiians ranked next-to-last on their mean knowledge score (proportion of correct answers to questions on risk factors, symptoms and methods of early detection). As a group, they also had the lowest proportion of women practicing breast self-examination or having had at least one Pap test in the past (Table 9-9). Native Hawaiians of both sexes also had the lowest proportion of subjects having asked their physician for an examination for colorectal cancer. One possibility suggested by these data is that the information provided by health education programs aimed at the general community does not reach the Native Hawaiian population to the same extent as other ethnic groups.

**Table 9-9 Percent\* of Female Respondents Having Had at Least One Pap Test**

	CAUCASIAN	JAPANESE	NATIVE HAWAIIAN	CHINESE	FILIPINO
Had at least one pap test	79.2	73.2	65.6	72.4	66.9

SOURCE: Community Cancer Program of Hawaii, 1982.

\*Weighted average from three surveys (1978, 1980, 1982).

Additional information about use of health services by Native Hawaiians is provided by data collected during past screening programs in Hawaii. The Hawaii arm of the Breast Cancer Detection Demonstration Project (BCDDP), a multicenter study which compared the relative efficacy of two modes of breast cancer detection (mammography and palpation) was conducted from March 1974 to March 1980. Out of the 10,031 women screened, only 7.3% were of Hawaiian origin (Goodman

*et al.*, 1982). This underrepresentation of Native Hawaiian women is of special interest because of their very high rates of breast cancer.

Other screening programs, such as a statewide cervical cancer screening program conducted by the Hawaii State Department of Health, and the Neighbor Island Breast Cancer Detection Projects conducted by the Community Cancer Program from 1979-1982 on the islands of Maui and Kauai (Community Cancer Program of Hawaii, 1982b), also experienced lower than expected participation from Native Hawaiians. These programs showed that Native Hawaiian women were difficult to recruit by the usual methods of media campaigns, use of doctors' offices, and centralized screening facilities. It was concluded that proportionate numbers of Native Hawaiian women could be recruited in future programs by special mechanisms, such as: 1) Use of Hawaiian field workers; 2) Assistance with physical and emotional support for the trip out of the Hawaiian community and into the business or hospital setting dominated by Caucasians; 3) Shifting recruitment and testing geographically into Hawaiian neighborhoods (Hall, 1985).

Since all ethnic groups in Hawaii share the same medical care system and since 90% of the population has some sort of health insurance (Johnson *et al.*, 1981), it is usually assumed that cancer patients of all races in the state receive comparable treatment and rehabilitation care. Limited data are available to substantiate such a claim.

The Hawaii Tumor Registry collects information on the treatments (surgery, chemotherapy, radiotherapy, hormonotherapy) received by cancer patients within four months of initiation of therapy and during follow-up. Analysis of these data for breast cancer patients showed that patients of the five main ethnic groups (Caucasian, Japanese, Native Hawaiian, Chinese and Filipino) had equal access to therapy (Le Marchand *et al.*, 1984). However, data were not available for ethnic comparisons on: delay between diagnosis and treatment; types, doses and completeness of treatment regimens; recruitment into clinical trials; follow-up care especially in an outpatient setting; and rehabilitation services. It is the impression of some clinicians in the community that Native Hawaiian patients have a poorer compliance with treatment regimens than do patients of other races.

## CONCLUSIONS

Native Hawaiians clearly experience high rates of cancer, particularly cancers of the esophagus, stomach, lung and female breast. Much of this increased risk appears to be due to known environmental risk factors for cancer such as smoking, alcohol consumption and obesity. The observation that the cancer risk in rural Hawaiian communities is decreased relative to that in urban populations is encouraging, in that it supports the contention that cancer risks can indeed be reduced in Native Hawaiians. Thus, successfully implemented programs of primary prevention should be able to substantially reduce the cancer rates in this ethnic group. However, at present, Native Hawaiians appear to have limited knowledge about cancer risk factors, symptoms and detection practices. They tend to be diagnosed with their cancers at a more advanced stage and to have a poorer survival than patients of other ethnic origins in Hawaii. Much of this prognostic disadvantage could be reduced by early detection and optimal treatment. However, in the past, available services have been under-utilized by Native Hawaiians, probably because these services failed to recognize cultural differences and therefore lacked acceptability. As discussed in several chapters of this report, future efforts in prevention should better utilize existing social networks, where individuals can benefit from the social support of peers, and should focus on lifestyle changes within the framework of traditional Hawaiian values. Finally, additional epidemiologic and experimental research is needed, in order to explain the apparent increased susceptibility of Native Hawaiians to certain cancers and thereby develop additional methods of prevention.

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