

Life and Death in Hawaii: Ethnic Variations in Life Expectancy and Mortality, 1980 and 1990

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Life expectancy in Hawaii is among the highest in the nation. Past research, however, found significant ethnic differences in longevity. This study presents life expectancy estimations for 1980 and 1990, along with ethnic differences in mortality rates for specific causes of death. The findings suggest that ethnic differences continue, with Chinese and Japanese having the longest life expectancy and Native Hawaiians having the shortest.

Introduction

Past research found significant differences in life expectancy and mortality rates among Hawaii's major ethnic groups.¹⁻⁷ To what extent do these differences exist today? To address this question, this paper presents updated life expectancy and mortality rate estimates by gender for the five major ethnic groups in Hawaii—Caucasians, Chinese, Filipinos, Japanese, and Native Hawaiians (full and part Hawaiian). Based on Department of Health statistics, of the state's 1990 population of 1,108,229, about 208,653 (19%) were Native Hawaiian, 285,524 (26%) were Caucasian, 259,465 (23%) were Japanese, 161,063 (15%) were Filipino, and 67,386 (6%) were Chinese.⁸

Ethnic differences in health status has been a long-standing concern of local researchers. Focusing on life expectancy, Park, Gardner, and Nordyke presented life tables by ethnicity over the century.⁴ While they found that life expectancy for the total population of Hawaii had improved from 45.69 years in 1920 to 74.20

years in 1970, they also found ethnic differences at each time point. In 1920, for example, Caucasians had the longest life expectancy (56.45 years), followed by Chinese (53.80 years), Japanese (50.54 years), Hawaiians (33.56 years), and Filipinos (29.12 years). By 1970, the pattern had changed, with the longest life expectancy seen among Japanese (77.44 years), followed by Chinese (76.11 years), Caucasians (73.24 years), Filipinos (72.61 years), and Hawaiians (67.62 years).⁴ In 1984, Gardner constructed life tables based on 1980 data, finding that life expectancy was still longest for Japanese and Chinese and shortest for Native Hawaiians.⁶

Among published reports of ethnic variation in mortality rates, a good overview of the 1980-1986 data was provided by Johnson.⁷ It showed a remarkable similarity in leading causes of death across ethnic groups, i.e., for all five major ethnic groups, heart disease was the leading cause of death, cancer was the second, and cerebrovascular disease (CVD) was the third. For all groups, accidents, influenza/pneumonia, and diabetes appeared as either fourth, fifth, or sixth leading cause of death. Cross-ethnic comparison of these mortality rates showed that individuals with Hawaiian ancestry had the highest overall death rates, as well as the highest death rates for the major causes of death.⁷ Focusing specifically on Native Hawaiian mortality across the century, a 1982 study by Look found significantly higher mortality rates among full Hawaiians compared to part Hawaiians and to the general population.⁹

This paper presents a summary of the life expectancy estimates and age-standardized mortality rates for the five major ethnic groups in Hawaii. These findings are from a program of research being undertaken by the authors and associated researchers to expand and update work in comparative mortality and longevity in Hawaii. Our earlier work updated the 1982 Look study, finding that 1990 mortality rates were still significantly higher among full and part Hawaiians compared to non-Hawaiians.¹⁰⁻¹²

Methods

This paper reports findings of two studies, one of comparative longevity and another of comparative mortality rates. In both studies, mortality rates were estimated by dividing the number of deaths by the population at risk for each age-gender-ethnic category. In estimating mortality rates, the death data were derived from vital records maintained by the Department of Health. Population estimates were based on Hawaii Health Survey estimates, as adjusted by the Cancer Research Center of Hawaii,¹³⁻¹⁴ rather than on U.S. Census estimates. These two data sources differ in their classification of ethnicity, resulting in the enumeration of 30% fewer Native Hawaiians by the U.S. Census compared to the Hawaii Health Survey in 1990. Because the ethnicity classification procedure of the Hawaii Health Survey more closely matches that of the death record, we consider the Hawaii Health Survey the better of the

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two sources of population data.

In the comparative life expectancy study, age-gender-ethnic-specific mortality rates were estimated and used to construct life tables. The life table procedure generates a measure of life expectancy, denoting the average number of years that would be lived by members of a newly born group given the current age-gender-ethnic-specific mortality rates. In order to compare findings of this research with previous studies, we followed the technique used in Gardner's 1984 publication⁶ with some modifications (e.g., longer life expectancy overall allowed us to use age 85+ as the terminal age category, rather than age 75+, in our calculations). Because of this, we recomputed the 1980 life tables using the modified method. While this provides a set of 1980 findings with which to compare our 1990 findings, it also means that our 1980 results differ slightly from the 1980 findings published by Gardner.⁶ A full description of the modified methodology is presented elsewhere.¹⁵

In the comparative mortality study, 1980 and 1990 mortality rates were estimated for specific age-gender-ethnic categories by major causes of death. Because of small numbers of deaths in some cells, rates were based on data from 5 years around each decade. (In contrast, rates estimated in the life expectancy study were based on data from 3.5 years around the decade, as done by Gardner).⁶ This "averaging" procedure is necessary to help smooth fluctuations of deaths that occur year-to-year. Rates were standardized to the 1940 U.S. population using the indirect method and 95% confidence intervals were estimated using a method developed by Mantel.¹⁶⁻¹⁷

While our study produced age-gender-ethnic-specific mortality rates, presented here are mortality rates and 95% confidence intervals by gender and ethnicity only.

Findings

Life Expectancy

Life Expectancy over the Century. Table 1 shows findings from our life expectancy study (1980 and 1990), combined with findings of Park, Gardner, and Nordyke (1920-1970).⁴ These data indicate that, overall, life expectancy in Hawaii has improved tremendously over the century, from 45.69 years in 1920 to 78.85 years in 1990.

Period	Total	Male	Female
1920*	45.69	45.64	45.75
1930*	53.95	52.70	55.86
1940*	62.00	59.92	64.86
1950*	69.53	67.77	71.67
1960*	72.42	70.39	74.75
1970*	74.20	72.12	76.44
1980*	77.87	74.54	81.51
1990*	78.85	75.90	82.06

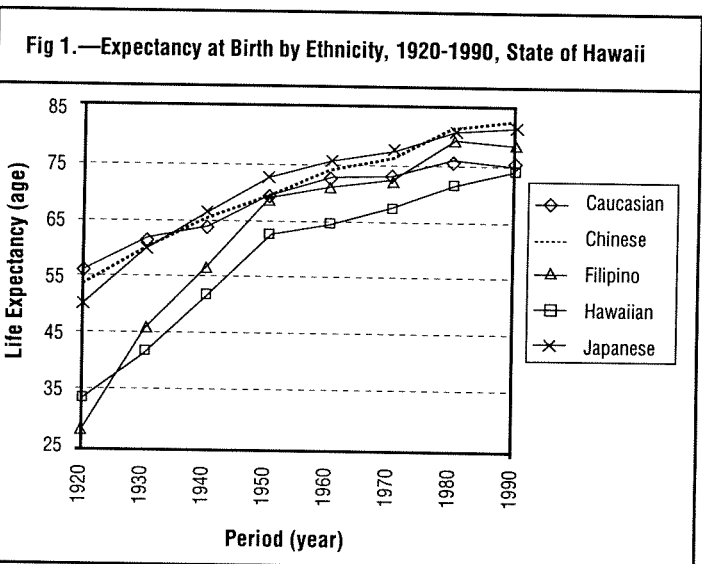
* Park, Gardner, & Nordyke (1979)
 ** Yang, Braun, Onaka, & Horiuchi (1996)

While dramatic improvements occurred earlier in the century, improvements between 1980 and 1990 were also noted. Specifically, Hawaii's life expectancy in 1990 (78.85 years) was almost a full year longer than in 1980 (77.87 years). The improvement in life expectancy at birth between 1980 and 1990 was greater for males (from 74.54 to 75.90 years, a gain of 1.36 years) than for females (from 81.51 to 82.06 years, a gain of .55 years). The difference in life expectancy between men and women, which became apparent in

1930, is still evident in the 1990 data, with females "outliving" males by 6.16 years.

Life Expectancy by Ethnicity. As shown in Table 2, ethnic variations in longevity continued to exist in 1980 and 1990. Specifically, the 1990 life expectancy was 82.93 years for Chinese, 82.06 years for Japanese, 78.94 years for Filipinos, 75.53 years for Caucasians, and 74.27 years for Native Hawaiians. Although ethnic difference still exist, looking across the century (see Figure 1) suggests that life expectancy among the ethnic groups is continuing to converge.³ In fact, while the 1920 discrepancy between the longest and shortest lived groups was 28 years,⁴ the 1950 discrepancy was only 10 years,⁴ and the 1990 discrepancy was only 8.7 years (Table 2).

Ethnicity	Total	Male	Female
Caucasian			
1980	75.79	72.80	79.28
1990	75.53	72.90	78.60
Chinese			
1980	81.65	78.91	84.51
1990	82.93	79.76	86.11
Filipino			
1980	79.32	76.61	83.36
1990	78.94	77.63	81.51
Japanese			
1980	80.91	77.75	84.09
1990	82.06	79.49	84.49
Native Hawaiian			
1980	71.83	68.18	75.63
1990	74.27	71.48	77.20



The gender differential is also apparent by ethnicity. Looking at the 1990 data, for example, the gender difference is most pronounced among Chinese (with women living 6.35 years longer than men) and least pronounced among Filipinos (with women living 3.88 years longer than men). The life expectancy for Hawaiian males (71.48 years) is the lowest among all groups.

The changes in life expectancy between 1980 and 1990 were not

consistent across gender-ethnic groups. Looking by gender, it appears that males made more gains than females between 1980 and 1990. For example, Native Hawaiian men gained 3.30 years compared to 1.57 years for Native Hawaiian women. Japanese men gained 1.74 years while Japanese women gained only 0.40 years. Filipino men gained 1.02 years while Filipino women lost 1.85 years. Caucasian men gained 0.10 years while Caucasian women lost 0.68 years. The exception is among Chinese, with women gaining 1.60 years compared to 0.85 years for men.

Comparative Mortality

Leading Causes of Death. Table 3 shows the top ten causes of death by gender and ethnicity. Heart disease, malignant neoplasms, and cerebrovascular disease (CVD) were the top three causes of death in 1990, regardless of ethnicity or gender, except for Caucasian males, for whom HIV was the third leading cause of death and CVD was the fourth. In contrast to the 1980 data, cancer (rather than heart disease) was the leading cause of death for females in all ethnic groups except Native Hawaiians in 1990.

Table 4.—Ranking Across Ethnic Groups of Leading Causes of Death by Gender and Ethnicity, State of Hawaii, 1990

Cause of Death	Cauc		Chin		Fil		Jap		Hawn	
	M	F	M	F	M	F	M	F	M	F
Heart Disease	2	2	4	4	3	3	5	5	1	1
Cancer	2	2	5	4	3	3	4	5	1	1
CVD	3	2	5	5	1	3	4	4	2	1
COPD	1	1	5	5	3	3	4	4	2	2
MVA	2	3	4	5	3	2	5	4	1	1
Influ/Pneumo	1	1	5	5	4	4	3	2	2	3
Diabetes	5	3	2	5	3	2	4	4	1	1
Suicide	1	1	5	2	3	4	4	3	2	5
Oth Accidents	2	2	4	5	3	4	5	3	1	1
HIV	1	1	4	5	3	2	5	4	2	3

for HIV, Suicide, COPD, and influenza/pneumonia. Filipinos tended to have intermediate rates compared to the other groups. Overall, Chinese and Japanese had the lowest mortality rates of the five ethnic groups with a few exceptions: Chinese females ranked second in age-adjusted rates of suicide for women; Chinese males ranked second highest in death from diabetes among males; Filipino men led in CVD deaths; and Japanese ranked relatively high in death from influenza/pneumonia. The actual age-standardized mortality rates for all causes of death and for death from heart disease and cancer are provided below.

Figures 2-11 display the mortality rates for the leading causes of death for each gender-ethnic group. Even-numbered figures show rates for males while odd-numbered figures show rates for females. The scale is constant across graphs so that the relative magnitude of mortality rates can be assessed at a glance. The exception is for Native Hawaiians (Figures 10 and 11) whose exceptionally high mortality rates for heart disease necessitate a different scale.

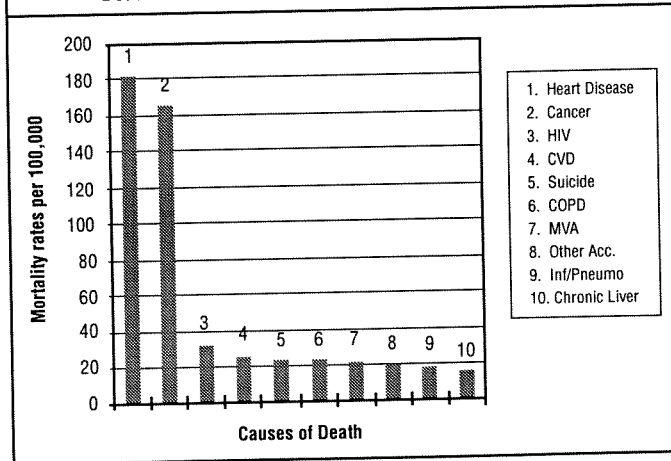
Table 3.—Ranking Within Each Ethnic Group of Leading Causes of Death by Gender and Ethnicity, State of Hawaii, 1990

Cause of Death	Cauc		Chin		Fil		Jap		Hawn	
	M	F	M	F	M	F	M	F	M	F
Heart Disease	1	2	1	2	1	2	2	2	1	1
Cancer	2	1	2	1	2	1	1	1	2	2
CVD	4	3	3	3	3	3	3	3	3	3
COPD	6	4	8	9	7	7	6	6	7	5
MVA	7	6	4	6	4	4	9	7	4	7
Influ/Pneumo	9	5	5	5	6		4	4	9	6
Diabetes	8		7	7	8	5	8	5	5	4
Suicide	5	7	9	4	6		5	8	8	
Oth Accidents	8	10	6		5		7	10	6	9
HIV	3		10		10					10
Perinatal			10		9	10	9			8
Chronic Liver	10	9					10			
Nephritis			8		8					
Homicide					9					
Septicemia										10

The next three leading causes of death differed by ethnic group. Ranked as either fourth, fifth, or sixth leading cause of death were: diabetes (for Native Hawaiians and for Filipino and Japanese females); motor vehicle accidents (for Chinese and Filipinos and for Caucasian females and Native Hawaiian males); suicide (for Caucasian, Filipino, and Japanese males and for Chinese females); COPD (for Caucasians, Japanese, and Native Hawaiian females); influenza/pneumonia (for females in all groups and for Chinese and Japanese males); and other accidents (for Chinese, Filipino, and Native Hawaiian males). This is in contrast to Johnson's 1980 finding that the second three leading causes of death were the same across ethnic groups—accidents, diabetes, and influenza/pneumonia.

Table 4 ranks 1990 age-adjusted mortality rates across the five ethnic groups. It shows that, of the five groups, Native Hawaiians had the highest mortality rates for heart disease, cancer, MVA, other accidents, and diabetes. Caucasians had the highest mortality rates

Fig 2.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Caucasian Males, State of Hawaii



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Fig 3.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Caucasian Females, State of Hawaii

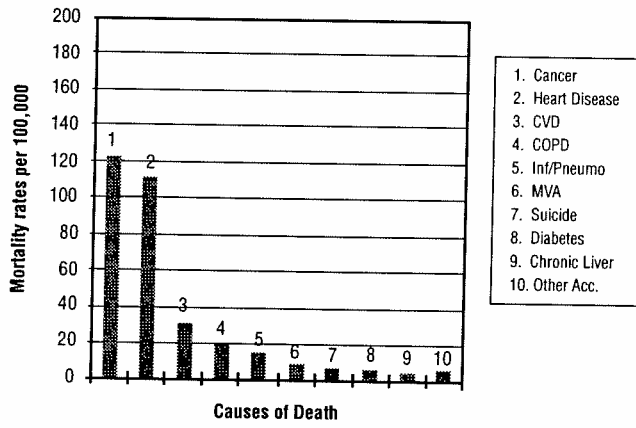


Fig 6.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Filipino Males, State of Hawaii

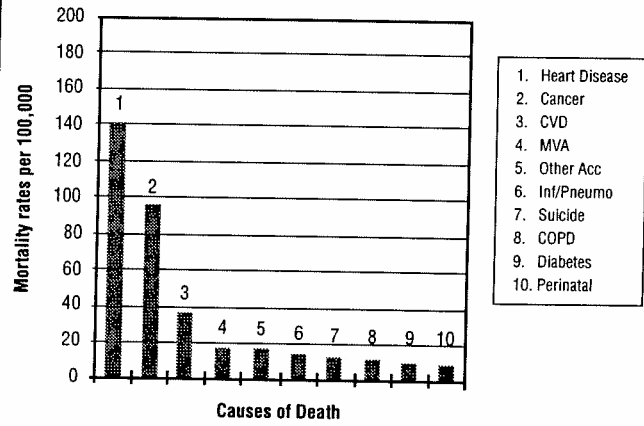


Fig 4.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Chinese Males, State of Hawaii

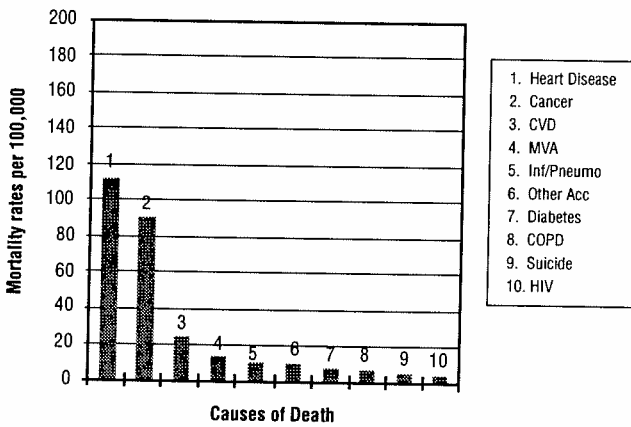


Fig 7.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Filipino Females, State of Hawaii

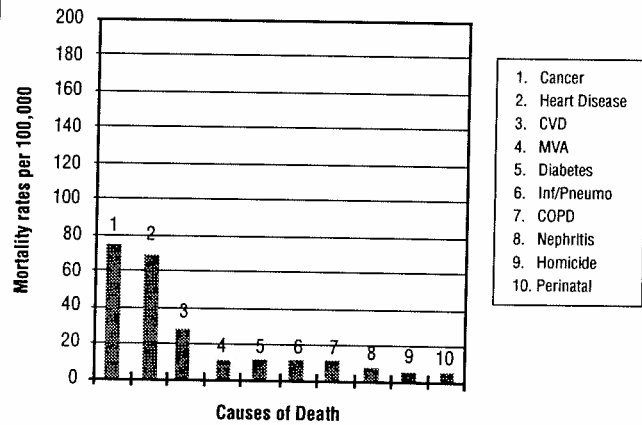


Fig 5.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Chinese Females, State of Hawaii

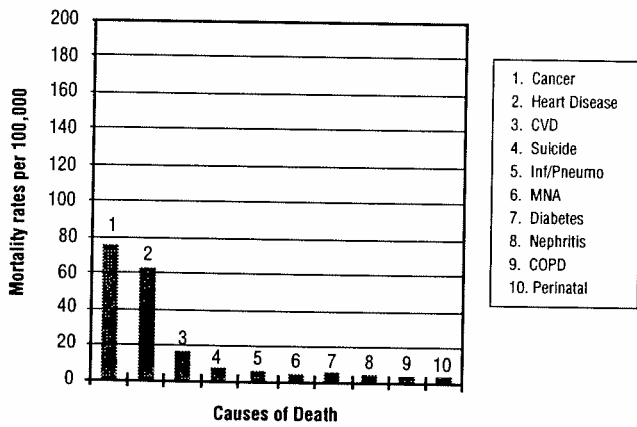


Fig 8.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Japanese Males, State of Hawaii

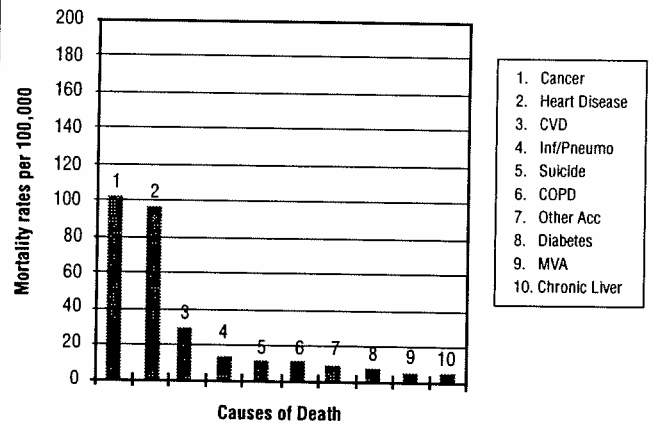
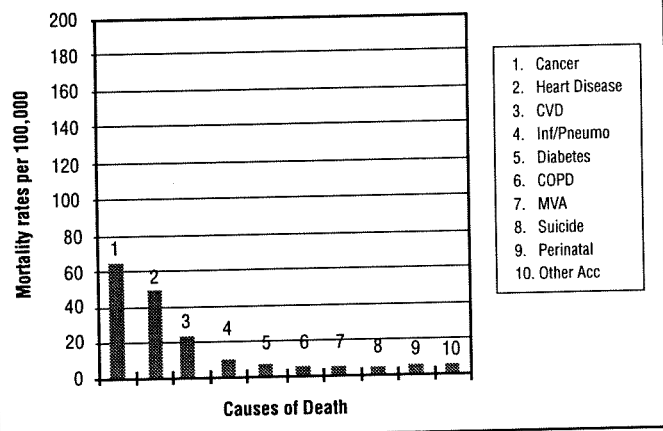


Fig 9.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Japanese Females, State of Hawaii



Mortality Rates for Heart Disease, Cancer, and all Causes of Death. Although not shown in the tables, we tested the inter-ethnic differences in mortality for statistical significance by estimating each mortality rate's 95 percent confidence intervals and checking for overlapping intervals. (Where intervals do not overlap, the differences in mortality rates are significant.) Using this method, we found that the all-cause mortality rates for males were significantly higher than for females within each ethnic groups in both decades. Within gender categories, mortality rates for Native Hawaiians were significantly higher than for all other ethnic groups. In addition, Caucasian mortality rates were significantly lower than Native Hawaiian mortality rates but significantly higher than Chinese, Filipino, and Japanese rates.

The same pattern appeared for heart disease, i.e., male mortality rates were significantly higher than female rates within each ethnic group and, within gender categories, Caucasian rates were significantly lower than Native Hawaiian rates but significantly higher than the Chinese, Filipino, and Japanese rates. A different pattern emerged for cancer mortality. Here, the gender differential appeared only among Japanese, with significantly higher cancer mortality rates for Japanese males than Japanese females. Within gender categories, the difference in rates between Caucasians and Native Hawaiians was not significant; however, rates for both of these groups were significantly higher than for Chinese, Filipinos, and Japanese.

Discussion

The life expectancy findings suggest that ethnic differences in longevity continued to exist in 1990, with Japanese and Chinese having the longest life expectancy and Native Hawaiians having the shortest. Of particular interest is the relative ranking of the Filipino group; while they had the shortest life expectancy in 1920 and the second shortest from 1930 to 1970, they ranked third longest in life expectancy in 1990, behind Chinese and Japanese. Gender differences in life expectancy also continued, with women outliving men in every ethnic group.

Although life expectancy among ethnic groups continued to show convergence,³ differences were still apparent. The obvious question is "why the differences?" To test the possible explanatory value of "cause of death," this paper includes findings from our mortality study, which also showed ethnic differences. As expected from the longevity study, the three Asian-American groups—Chinese, Filipino, and Japanese—had significantly lower overall mortality rates than did Caucasians and Native Hawaiians in 1980 and 1990.

Fig 10.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Hawaiian Males, State of Hawaii

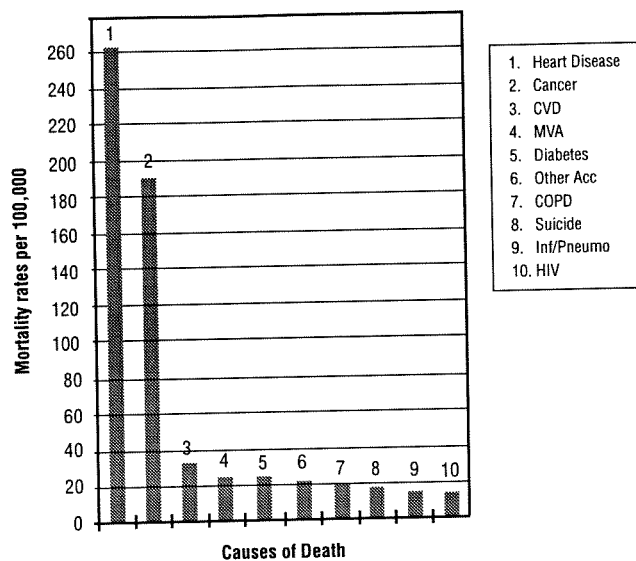
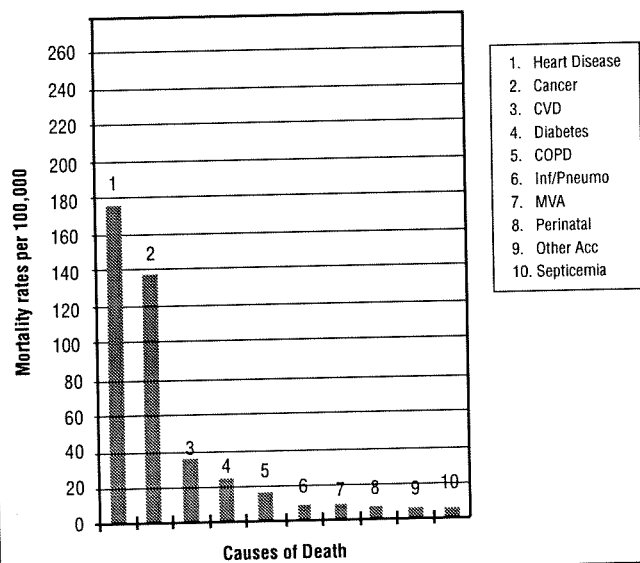


Fig 11.—Mortality rates per 100,000 Population for Top Ten Causes of Death for Hawaiian Females, State of Hawaii



Unexpectedly, differences were also seen among the groups in leading causes of death. For the first time, HIV was among the top three causes of death (for Caucasian males), COPD and suicide were among the top six causes of death (COPD for Caucasians and Japanese, and for Native Hawaiian females; suicide for Caucasian, Filipino, and Japanese males and for Chinese females). Certainly, lowering mortality from HIV would increase life expectancy for Caucasians, for example, as the HIV deaths were among individuals age 25 to 54 (not shown in tables). It is doubtful, however, that differences in causes of death explain much of the variance in life expectancy because, overall, heart disease, cancer, and cerebrovascular disease still account for between 60 and 70 percent of the deaths for all of the gender-ethnic groups (not shown in tables).

A laundry list of other factors have been shown to influence longevity and health status, including genetic predisposition to certain diseases, residency, individual diet and exercise patterns, individual socio-economic status, exposure to environmental hazards, and the general condition of society (e.g., its infrastructure for water, sanitation, and education).¹⁸ While there are some genetically-linked diseases among certain ethnic groups (e.g., sickle cell anemia among individuals of African ancestry¹⁹), not much is known about genetic susceptibility to disease among Asians and Pacific Islanders. Studies of heart disease, however, have found that residence plays a role in longevity and disease. For example, 1990 life tables from Japan suggest that Japanese Americans in Hawaii have longer life expectancy than Japanese nationals in Japan.^{15,20} On the other hand, investigators have found that Japanese residing in California have higher rates of heart disease than Japanese residing in Hawaii who, in turn, have higher rates of heart disease than Japanese in Japan.²¹ This finding supports the lifestyle origin of disease, as the diets of these immigrants have become more western as they moved from Japan to Hawaii to California. Ethnic differences in lifestyle have also been documented in Hawaii. For example, data from the state's Behavior Risk Factor Survey suggest that Native Hawaiians have the highest rates of obesity and smoking, that Native Hawaiians and Caucasians have the highest rates of binge and chronic drinking, and that Caucasians have the highest rates of drinking and driving of all ethnic groups.²² In terms of socio-economic status, federal and state publications include data that suggest that Native Hawaiians are socio-economically disadvantaged compared to other groups (e.g., they have lower income and less education and are more likely to receive government assistance).²²⁻²⁵ In addition, Native Hawaiians are more likely to live in rural areas with less access to health services.^{11,23} Lack of access may help explain the fact that while overall cancer incidence is similar for Caucasians and Native Hawaiians, cancer mortality is significantly higher for Native Hawaiians, suggesting delays in the detection and treatment among Native Hawaiians.²² Regardless of cause, ethnic differences in mortality rates continue to exist. In addition, variation appears to be increasing among groups in terms of their leading causes of death.

In the interpretation of our findings, several methodological caveats must be considered. First, these data cannot be used to predict individual life span, which is influenced by one's personal genetics, lifestyle, and environment. These data are based on current age-gender-ethnic-specific mortality rates to give an estimate of the average longevity of a specific gender-ethnic group who was born in 1990. Life expectancy estimates are useful, however, in that they provide information about the population at large which is critical for projecting population growth, determining service needs for a population, and allocating resources.²⁶⁻²⁷ For example, these data suggest that health programs that reduce the incidence of HIV, accidents, and suicide and programs that target Native Hawaiians may help lower mortality and improve life expectancy for the state as a whole.

A second caveat concerns data comparability. In the life expectancy study, we modified the method used by Gardner⁶ because we had better data available to us. Thus, the 1980 figures that appear here will not match the 1980 figures in earlier reports of life expectancy in Hawaii. In terms of source of population data, this study used data from the Hawaii Health Survey as modified by the Cancer Research Center of Hawaii. A few studies of life expectancy and mortality have used the U.S. Census data set instead. Because the method of classifying ethnicity in the Hawaii Health Survey more closely matches the method of classifying ethnicity in the

death record, we feel strongly that the Hawaii Health Survey is the preferred source of population data in studies of mortality and life expectancy. It should be noted, however, that its use results in higher estimate of life expectancy among Native Hawaiians (74.27 years vs. 67.95 years based on U.S. Census data) and a lower estimate of life expectancy for Caucasians (75.53 years vs. 78.86 years based on U.S. Census data).¹⁵

In addition to the differences in the way ethnicity is classified on state and federal surveys, there are other concerns about ethnicity as a measure. For example, all coding methods still depend on individual reports of ethnic heritage, and incentives to report one's ethnicity have changed over the century. While there were true disadvantages for reporting Hawaiian ancestry for much of the century, growing tolerance of diversity, local sovereignty movements, and programs that give Hawaiians increased access to education and land have changed that.^{12,28} With high inter-marriage rates in the state (about 40%²⁹), classification by ethnicity will become even less clear. Finally, the variable "ethnicity" is confounded by socio-economic status; because U.S. data sets rarely include a standard measure of socio-economic status, ethnicity is often used as a proxy.³⁰⁻³¹ Future research by the authors is proposed that will examine socio-economic status as a predictor of longevity in Hawaii.

Caveats aside, this paper presents the updated life expectancy estimations, by gender, for the five major ethnic groups in Hawaii. These data suggest that: 1) life expectancy in Hawaii increased by almost a year between 1980 and 1990; 2) women continue to have longer life expectancy than men (regardless of ethnicity); 3) the Chinese, Japanese, and Filipino populations have longer life expectancies than do the Caucasian and Native Hawaiian populations in Hawaii; 4) while the leading causes of death in 1990 were still heart disease and cancer, cancer became the leading cause of death for non-Hawaiian females; and 5) Native Hawaiians have the highest age-adjusted mortality rates overall and for heart disease, cancer, MVA, other accidents, and diabetes. While overall improvement in life expectancy continues, ethnic differences in health status remain.

Acknowledgements

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Dr William Haning, III, covered the outpatient evaluation and management of substance abusers. He described screening instruments used to assess abusers of alcohol and other drugs and criteria for deciding whether outpatient treatment is appropriate.

Dr Gerald McKenna discussed sources of physicians' stress and the impact on physicians' families. Stresses may come from the training experience, the demands of practice, failure to forgive oneself for mistakes, and the physician's personality. Stress may result in physical illness, depression, anxiety, and chemical dependence. Families may experience alienation from the physician, feel abandoned and they often suffer in silence. Chemical abuse/dependence is common; divorce and separation rates are high. Possible solutions are physician support groups, physicians health committees, psychotherapy (usually rejected), medication, or mentoring to improve practice management.

The Sunday morning session dealt with managed care. Robert C. Nickel (HMSA) gave an overview of managed care in Hawaii. Dr John Berthiaume discussed how physicians are selected, deselected, evaluated and compensated in managed care programs. Dr George Bussey described the effects of managed care on doctor-patient relationships and the ethical dilemmas which may arise. Dr Michael Nagoshi discussed practice guidelines and problems which may be associated with their use. Finally attorney Peter C. P. Char talked about medical-legal aspects of managed care and the potential liability of physicians. He emphasized the importance of careful documentation of the decision-making process and of discussions with the patient regarding informed consent.

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