PREMATURE MORTALITY
TEXAS, 1978

APRIL, 1980

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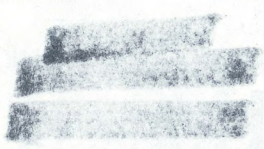

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INTRODUCTION

Overall statistics on causes of death are dominated by the fact that most deaths occur in the older population, typically over the age of 65. In 1978, for example, over 60 percent of all deaths in Texas occurred in this age group. As a result, the impact of the major causes of death is greatly influenced by mortality late in life.

Evaluating mortality in this manner assumes that in terms of societal costs, each instance of death is equal. From this perspective, the death of an individual at age 25 is viewed no differently from that of an individual at age 65. However, if the societal costs of these two events were to be compared, the age at death would have to be taken into consideration. The potential contribution to society of the younger individual is much greater simply because more time is available for productivity.

One method of measuring this differential in possible contribution is to calculate Potential Years of Life Lost. This technique is a means of examining premature death and relating its incidence to the various causes of mortality. In measuring the principal causes of early death, it is assumed that the average productive lifespan is, at minimum, those years prior to retirement. Using deaths occurring between the ages of one and 65 years, it is possible to calculate the years of potential life lost. First, the average age at death by cause is computed by multiplying grouped mortality data by the midpoint of their respective age intervals, summing these products, and dividing by total deaths ages one through 64. Second, the years of potential life lost are obtained by subtracting the average age at death from 65 and multiplying the result by total deaths ages one through 64. Each death, in effect is weighted according to its age of occurrence (see example, page 2).

The use of this technique produces findings substantially different from those resulting from ordinary mortality studies. This monograph presents a summary of these results based on mortality experienced in Texas during 1978.

EXAMPLE

CALCULATION OF POTENTIAL YEARS
OF LIFE LOST TO HOMICIDE

TEXAS, 1978

TOTAL POPULATION

(1) Age Group	(2) No. of Deaths	(3) Midpoint of Age Group	(4) Col. 2 x Col. 3
<1	9	0.5	4.5
1-4	22	3.0	66.0
5-9	13	7.5	97.5
10-14	23	12.5	287.5
15-19	176	17.5	3,080.0
20-24	380	22.5	8,550.0
25-34	576	30.0	17,280.0
35-44	323	40.0	12,920.0
45-54	211	50.0	10,550.0
55-64	125	60.0	7,500.0
65-74	66	70.0	4,620.0
75+	33	-	-
Unknown	6	-	-
TOTAL	1,962	-	64,955.5
TOTAL AGES 1-64	1,849	-	60,331.0

$$\text{AVERAGE AGE AT DEATH} = \text{Col. 4} \div \text{No. of Deaths 1-64 Years}$$
$$= 60{,}331 \div 1{,}849$$
$$= 32.6 \text{ Years}$$

$$\text{POTENTIAL YEARS OF LIFE LOST} = \left(65 - \text{Average Age at Death}\right) \times \left(\text{No. of Deat 1-64 Year}\right.$$
$$= (65 - 32.6) \times 1{,}849$$
$$= 32.4 \times 1{,}849$$
$$= 60{,}070 \text{ Years}$$

GENERAL AND PREMATURE MORTALITY

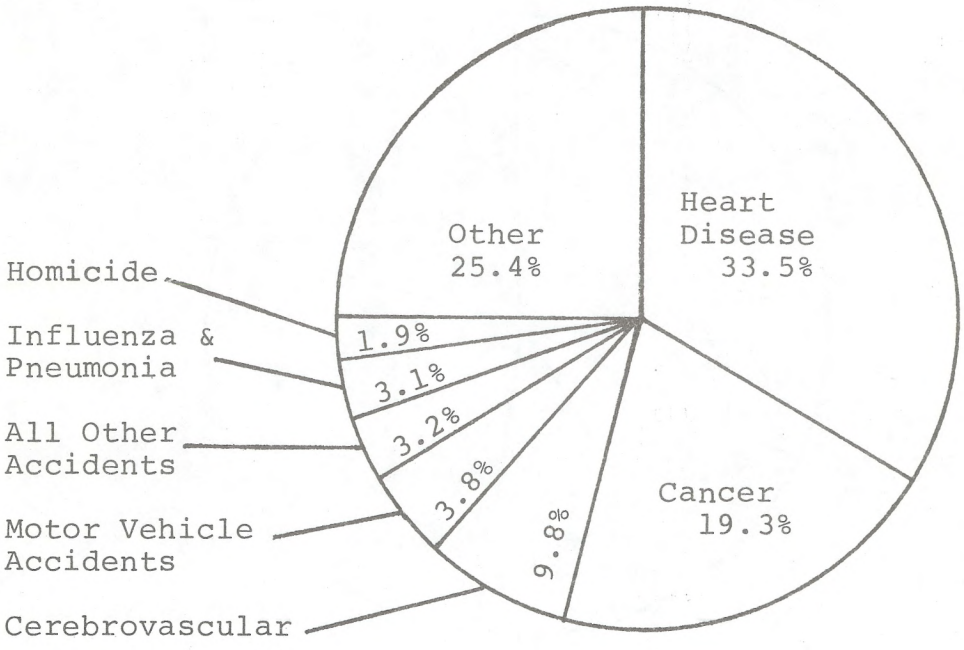
During 1978, three major causes accounted for over 60 percent of the State's 103,670 deaths. Approximately one-third was attributed to diseases of the heart, one-fifth to cancer, and one-tenth to cerebrovascular diseases. Motor vehicle accidents and all other accidents ranked fourth and fifth and were responsible for a total of seven percent of the mortality recorded in 1978. Influenza and pneumonia contributed an additional three percent with homicide following closely at nearly two percent (Figure 1).

Figure 1

LEADING CAUSES OF DEATH
PERCENT DISTRIBUTION BY CAUSE

TEXAS, 1978

TOTAL POPULATION



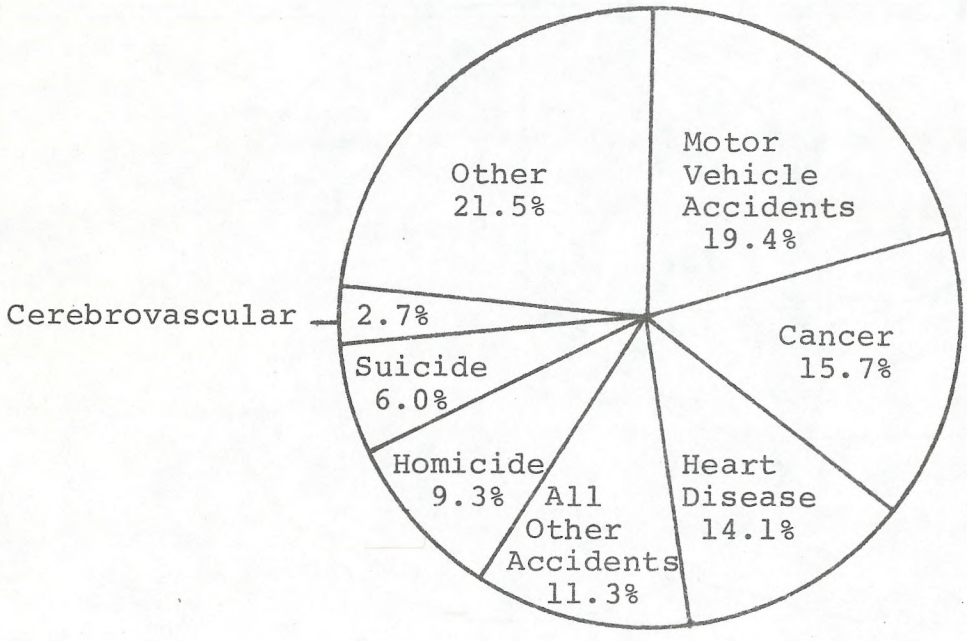
There were approximately 650,000 potential years of life lost in Texas in 1978. An analysis of the major causes of loss produced results which contrasted markedly from an analysis of gross numbers of deaths. Motor vehicle accidents became the leading cause, accounting for twenty percent of the potential years lost. Cancer maintained its rank at second with heart diseases falling to third place. All other accidents, homicide, and suicide ranked fourth, fifth, and sixth respectively. Cerebrovascular diseases dropped to seventh place contributing only about three percent of the total potential years lost (Figure 2).

Figure 2

POTENTIAL YEARS OF LIFE LOST
PERCENT DISTRIBUTION BY CAUSE

TEXAS, 1978

TOTAL POPULATION 1-64 YEARS OF AGE



Since the greatest number of deaths occur late in life, it would seem fairly obvious that the causes of these deaths would dominate overall mortality. Heart diseases, cerebrovascular diseases, and, to some extent, cancer are characteristic of these older populations. Violent deaths such as motor vehicle accidents, other accidents, homicide, and suicide account for only a small percentage of total deaths. However, when loss of productive years of life is considered the emphasis on chronic diseases decreases and the role of violent death becomes more significant. The consideration of age of death along with the number of events definitely shifts the relative importance of many causes of death. This is especially true with heart and cerebrovascular diseases. However, cancer causes approximately the same proportion of deaths as it does loss of potential years of life. It could then be concluded that cancer is not strictly a problem of old age, but that it plays a major factor in mortality throughout life.

SEX DIFFERENTIALS

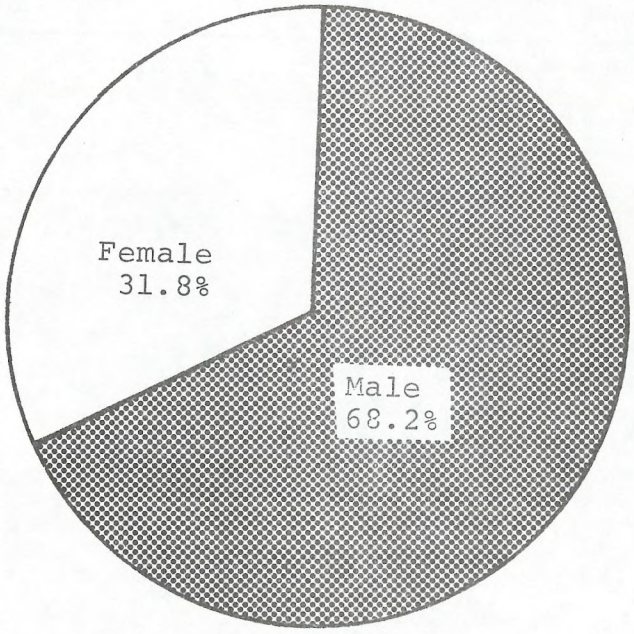
Of the approximately 650,000 potential years of life lost in Texas, over two-thirds were lost by males, indicating that premature death is more of a problem among men than among women (Figure 3).

Figure 3

POTENTIAL YEARS OF LIFE LOST
PERCENT DISTRIBUTION BY SEX

TEXAS, 1978

TOTAL POPULATION 1-64 YEARS OF AGE



Males

Motor vehicle accidents were the leading cause of loss in males contributing slightly over 20 percent of the total. Diseases of the heart ranked second at approximately 15 percent with all other accidents, cancer, and homicide following at 13, 12, and 11 percent respectively. The four violent causes of death included in this study accounted for over 50 percent of years of potential life lost in males (Table 1).

Table 1

POTENTIAL YEARS OF LIFE LOST
NUMBER OF YEARS LOST AND PERCENT OF TOTAL
BY SELECTED CAUSES

TEXAS, 1978

TOTAL MALES 1-64 YEARS OF AGE

Cause	No. of Years	Percent of Total
Motor Vehicle Accidents	93,600	21.2
Diseases of the Heart	67,100	15.2
All Other Accidents	57,600	13.0
Cancer	54,200	12.3
Homicide	49,400	11.2
Suicide	28,900	6.5
Cerebrovascular Diseases	9,800	2.2
Influenza and Pneumonia	6,700	1.5
Diabetes	3,300	0.7
Arteriosclerosis	300	0.1
All Other Causes	71,400	16.1
TOTAL	442,300	100.0

Females

Cancer was the major cause of premature mortality in females. Nearly one out of every four years of potential life lost was attributed to this disease. The proportion of years lost from cancer in women was twice that experienced by males. Motor vehicle accidents, diseases of the heart, all other accidents, and homicide followed in that order but at substantially lower proportions than for men. Fifteen percent of the total female years lost were due to motor vehicle accidents; 12 percent to heart diseases; eight percent to all other accidents; and, five percent to homicide. Only one-third of the total years lost was attributed to violent causes (Table 2).

Table 2

POTENTIAL YEARS OF LIFE LOST
NUMBER OF YEARS LOST AND PERCENT OF TOTAL
BY SELECTED CAUSES

TEXAS, 1978

TOTAL FEMALES 1-64 YEARS OF AGE

Cause	No. of Years	Percent of Total
Cancer	47,600	23.3
Motor Vehicle Accidents	32,000	15.7
Diseases of the Heart	24,000	11.7
All Other Accidents	15,600	7.6
Homicide	10,600	5.2
Suicide	10,200	5.0
Cerebrovascular Diseases	7,900	3.9
Influenza & Pneumonia	4,500	2.2
Diabetes	3,400	1.7
Arteriosclerosis	200	0.1
All Other Causes	48,300	23.6
TOTAL	204,300	100.0

RACE DIFFERENTIALS

Leading causes of loss of potential years of life varied significantly between racial subgroups. Motor vehicle accidents were the primary cause of loss in the white population accounting for slightly over twenty percent of the total. Second, at approximately sixteen percent, was cancer, followed by diseases of the heart, all other accidents, homicide, and suicide. Similar calculations for the black population indicated that homicide was the major cause of premature mortality, contributing nearly 18 percent of the total loss of potential years. Heart disease ranked second at 15 percent with cancer, motor vehicle accidents, and all other accidents ranging from 13 to 10 percent (Table 3).

Table 3

POTENTIAL YEARS OF LIFE LOST
NUMBER OF YEARS LOST AND PERCENT OF TOTAL
BY CAUSE AND BY RACE

TEXAS, 1978

TOTAL POPULATION 1-64 YEARS

Cause	WHITE No. of Years	%	Rank	BLACK No. of Years	%	Rank
Motor Vehicle Accidents	110,400	21.0	1	15,200	12.5	4
Cancer	86,200	16.4	2	15,600	12.9	3
Diseases of the Heart	72,600	13.8	3	18,400	15.2	2
All Other Accidents	60,700	11.5	4	12,500	10.3	5
Homicide	38,500	7.3	5	21,500	17.8	1
Suicide	36,600	7.0	6	2,500	2.0	8
Cerebrovascular Diseases	12,800	2.4	7	5,000	4.0	6
Influenza & Pneumonia	8,100	1.5	8	3,100	2.6	7
Diabetes	4,900	0.9	9	1,700	1.4	9
Arteriosclerosis	400	0.1	10	100	0.1	10
All Other Causes	94,500	18.0	-	25,700	21.2	-
TOTAL	525,700	100.0	-	121,300	100.0	-

In the black population, the proportion of years lost to homicide was more than twice that experienced by the white population. The opposite situation was true for motor vehicle accidents where whites lost nearly twice the percentage of years to motor vehicle accidents. Cancer seemed to be somewhat more of a problem in young whites while heart disease played a more important role in the early loss of life in blacks. The proportion of total years lost to all other types of accidents was approximately the same for both races. Suicide was responsible for seven percent of the total years lost in whites and only two percent in blacks (Figure 4).

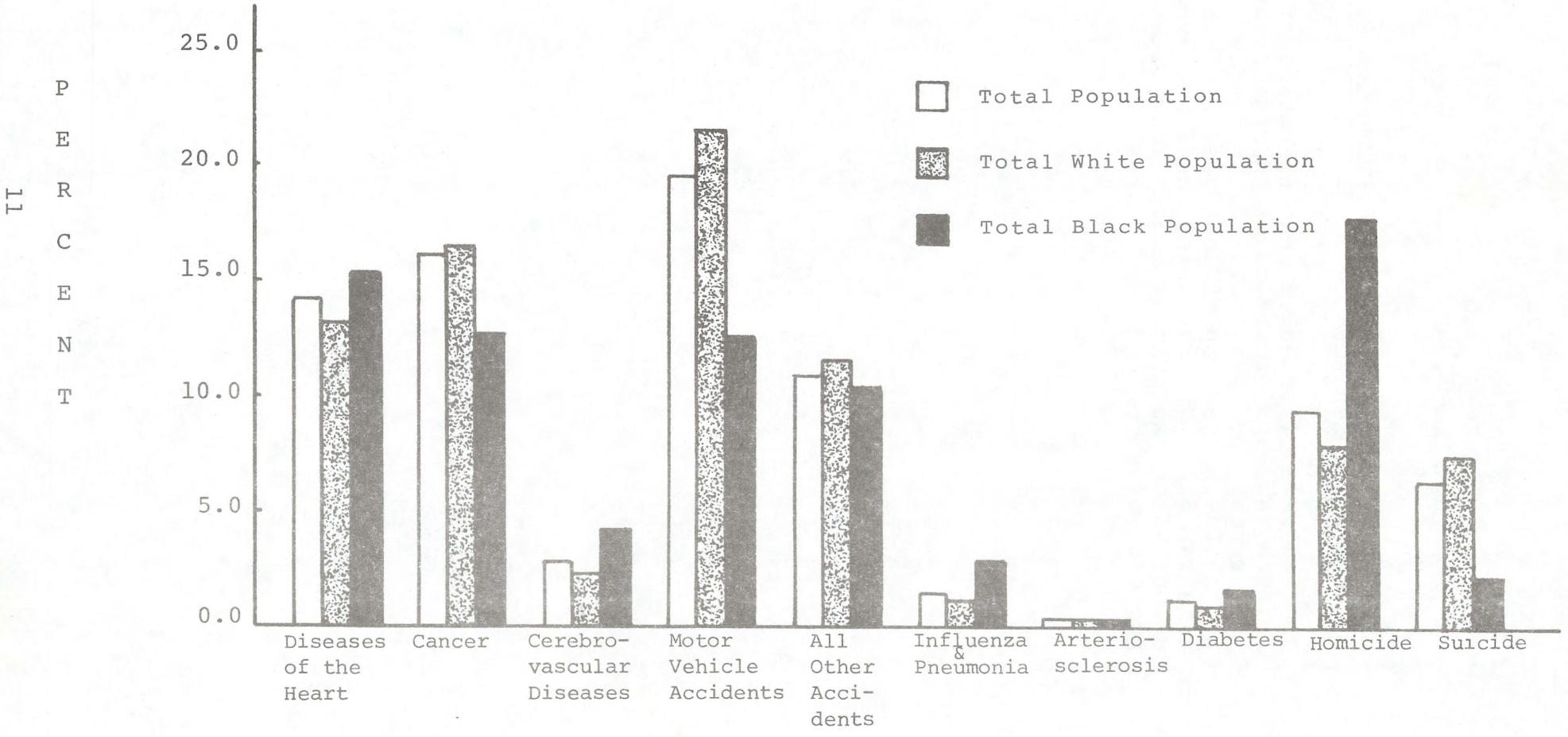
Figure 4

LEADING CAUSES OF DEATH

PERCENT POTENTIAL YEARS LOST BY CAUSE AND RACE

1-64 YEARS OF AGE

TEXAS, 1978



ANALYSIS OF LEADING CAUSES OF PREMATURE MORTALITY BY POPULATION SUBGROUPS

The analysis of selected leading causes of premature mortality in four race-sex groups revealed significant differences. These differences were primarily in the ranking of particular causes and in the proportion of lost years attributed to each cause (Figure 5). The following sections discuss the subgroup variations within individual causes and illustrate the relative importance of each.

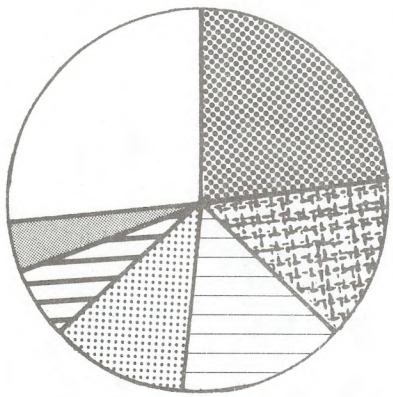
Figure 5

PREMATURE MORTALITY

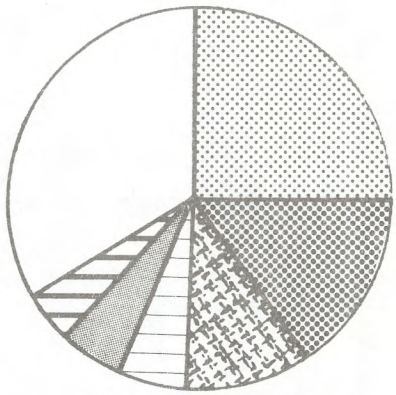
LEADING CAUSES OF LOSS OF POTENTIAL YEARS OF LIFE BY RACE AND SEX

TEXAS, 1978

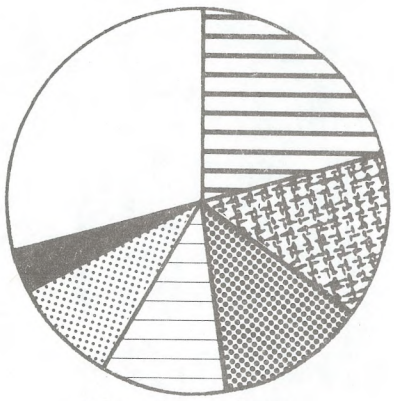
TOTAL POPULATION 1-64 YEARS OF AGE



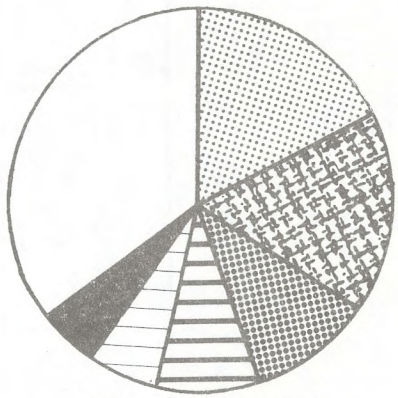
White Males



White Females



Black Males



Black Females

Motor Vehicle Accidents

Cancer

Heart Disease

All Other Accidents

Homicide

Suicide

Cerebrovas-cular Disease

Other

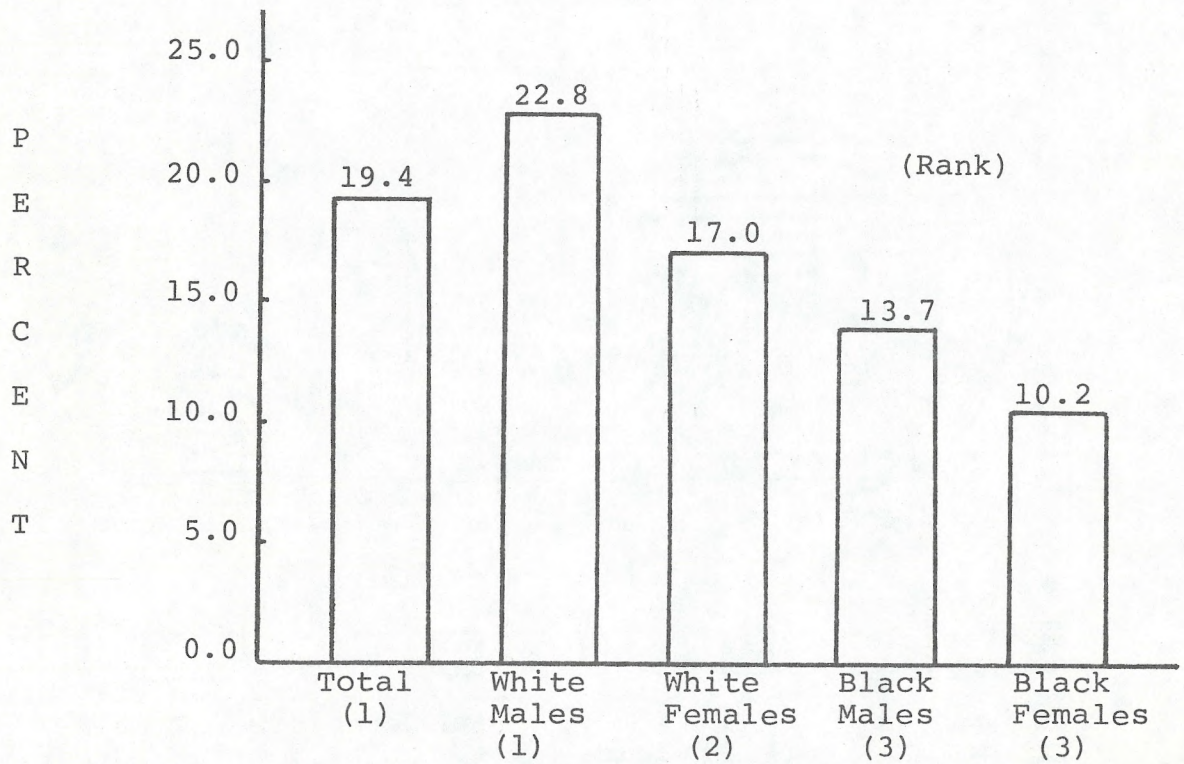
Motor Vehicle Accidents

Motor vehicle accidents, the leading cause of lost years in the total population, was the primary cause of loss in only one population subgroup. White males lost nearly one-fourth of all potential years to motor vehicle accidents. It was the second leading cause for white females at 17 percent and fell to third place for both black males and black females at 14 and 10 percent respectively (Figure 6).

Figure 6

POTENTIAL YEARS OF LIFE LOST

PERCENT OF TOTAL YEARS LOST AND RANK BY RACE AND SEX
1-64 YEARS OF AGE
TEXAS, 1978
MOTOR VEHICLE ACCIDENTS



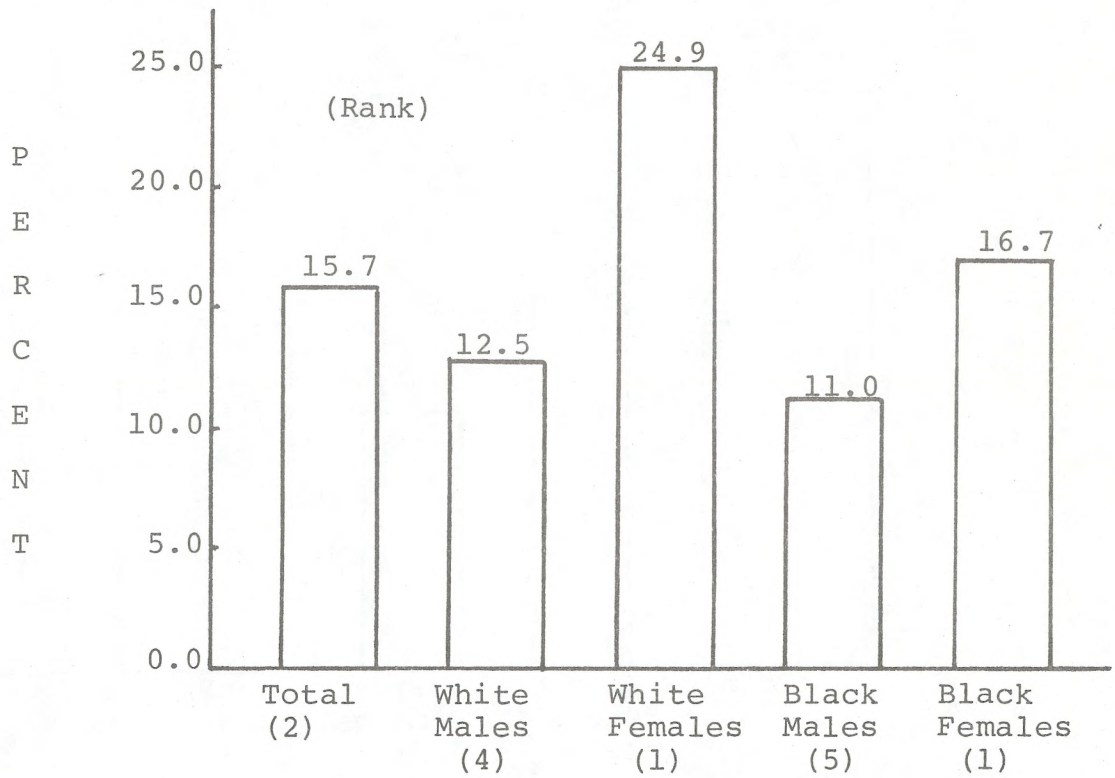
Cancer

Cancer, the second leading cause of premature death,was the primary cause of lost productivity in both white and black females. However, it seemed to be a somewhat more extensive problem in white females where it accounted for approximately one out of every four potential years of life lost. In black females cancer was responsible for only one out of every six years lost and closely approximated the second ranking cause in that race-sex group. Cancer played a less significant role in premature death in males, dropping to fourth place in white males and fifth in black males (Figure 7).

Figure 7

POTENTIAL YEARS OF LIFE LOST

PERCENT OF TOTAL YEARS LOST AND RANK BY RACE AND SEX
1-64 YEARS OF AGE
TEXAS, 1978
CANCER



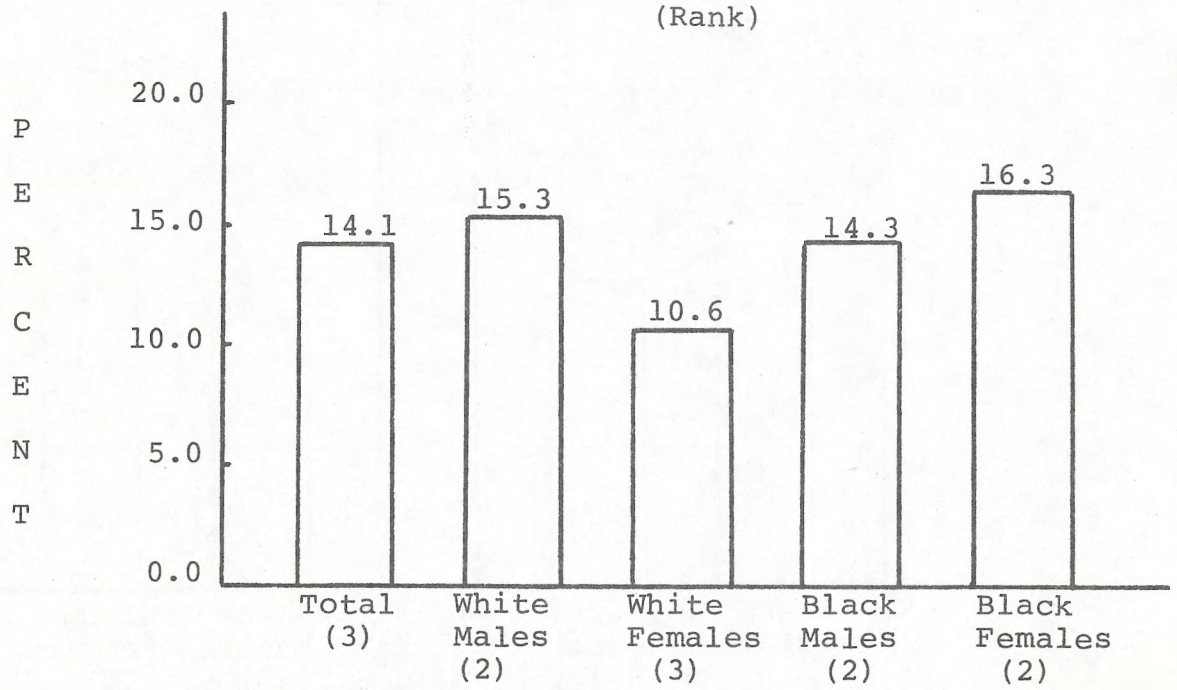
Heart Disease

Heart disease, historically the leading cause of death, falls to third place in causes of premature mortality for the total population. Percentages of years lost in three of the race-sex subgroups were approximately the same. Black males lost 14 percent of the total years lost to heart disease while males recorded 15 percent and black females 16 percent. Heart disease accounted for only about 11 percent of the potential years lost in white females (Figure 8).

Figure 8

POTENTIAL YEARS OF LIFE LOST

PERCENT OF TOTAL YEARS LOST AND RANK BY RACE AND SEX
1-64 YEARS OF AGE
TEXAS, 1978
HEART DISEASE



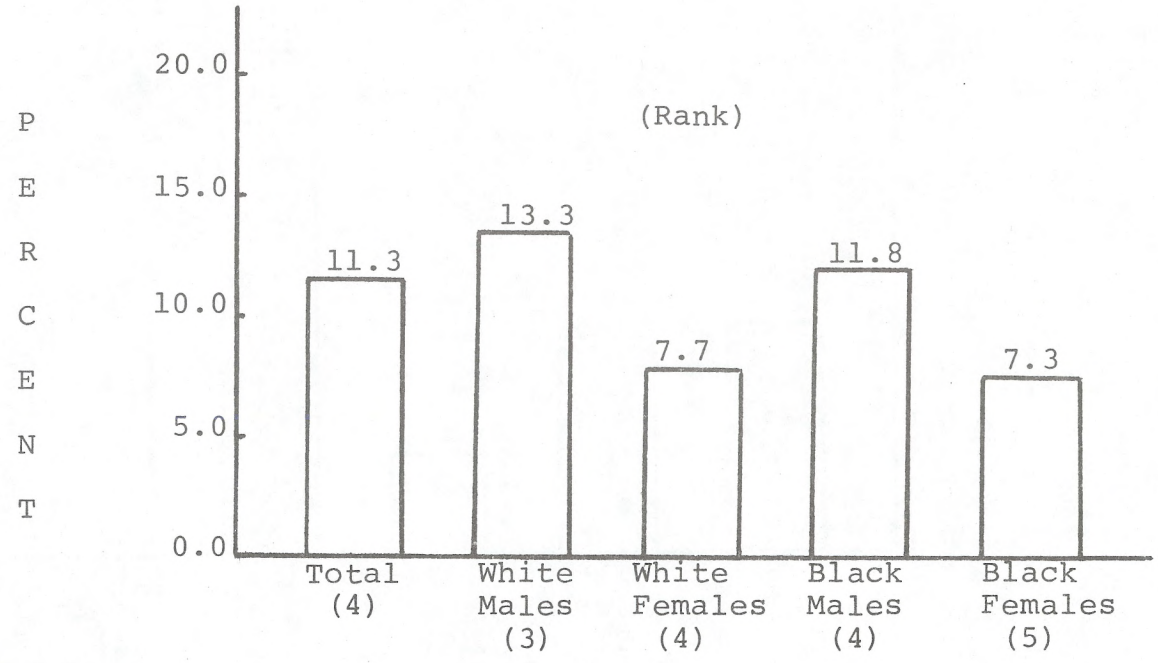
All Other Accidents

All other accidents ranked fourth in overall loss of potential years of life. Both male subgroups sustained greater losses from this particular cause. It was responsible for slightly over 13 percent of the total years lost in white males, nearly twice the proportion lost in black and white females and caused approximately 12 percent of the years lost in black males (Figure 9).

Figure 9

POTENTIAL YEARS OF LIFE LOST

PERCENT OF TOTAL YEARS LOST AND RANK BY RACE AND SEX
1-64 YEARS OF AGE
TEXAS, 1978
ALL OTHER ACCIDENTS



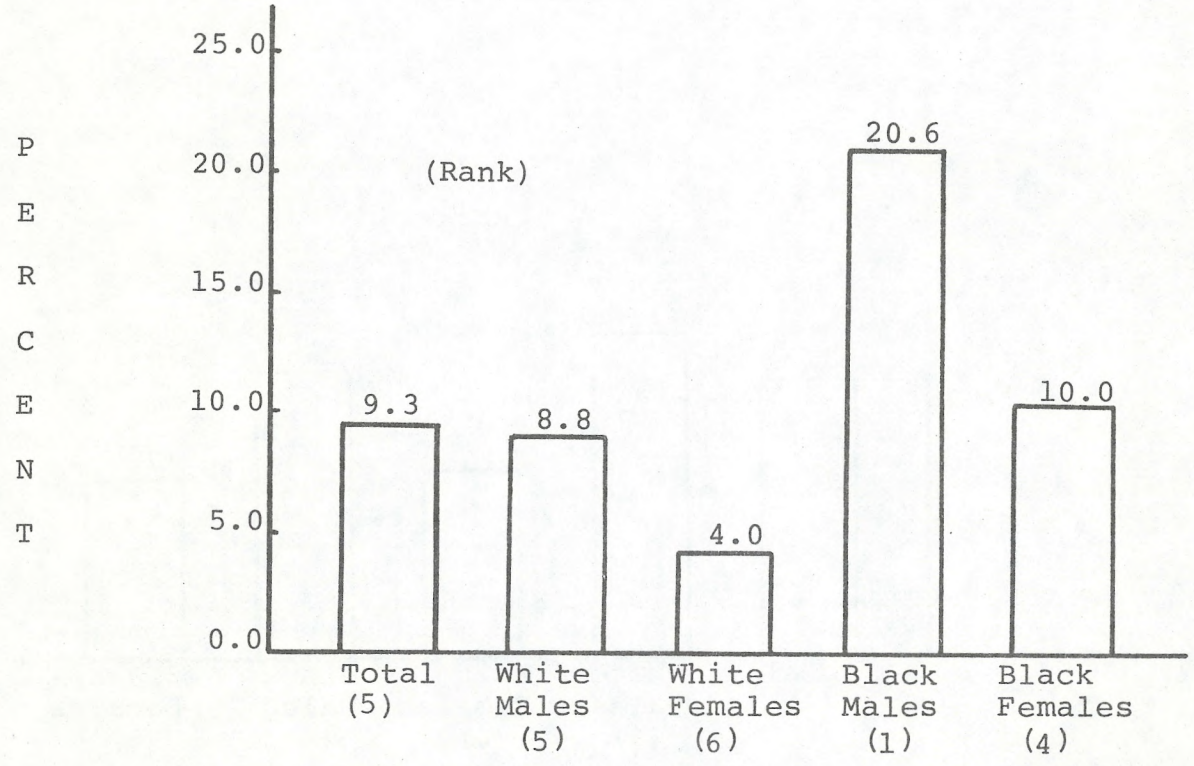
Homicide

Homicide was the fifth leading cause of premature mortality in the total population. However, an analysis of this cause produced the most startling results of those under consideration. Homicide was responsible for one out of every five years lost in black males and ranked as that subgroup's leading cause of premature death. This proportion was twice that recorded by black females, nearly two and one-half times that of white males, and five times greater than that of white females (Figure 10).

Figure 10

POTENTIAL YEARS OF LIFE LOST

PERCENT OF TOTAL YEARS LOST AND RANK BY RACE AND SEX
1-64 YEARS OF AGE
TEXAS, 1978
HOMICIDE



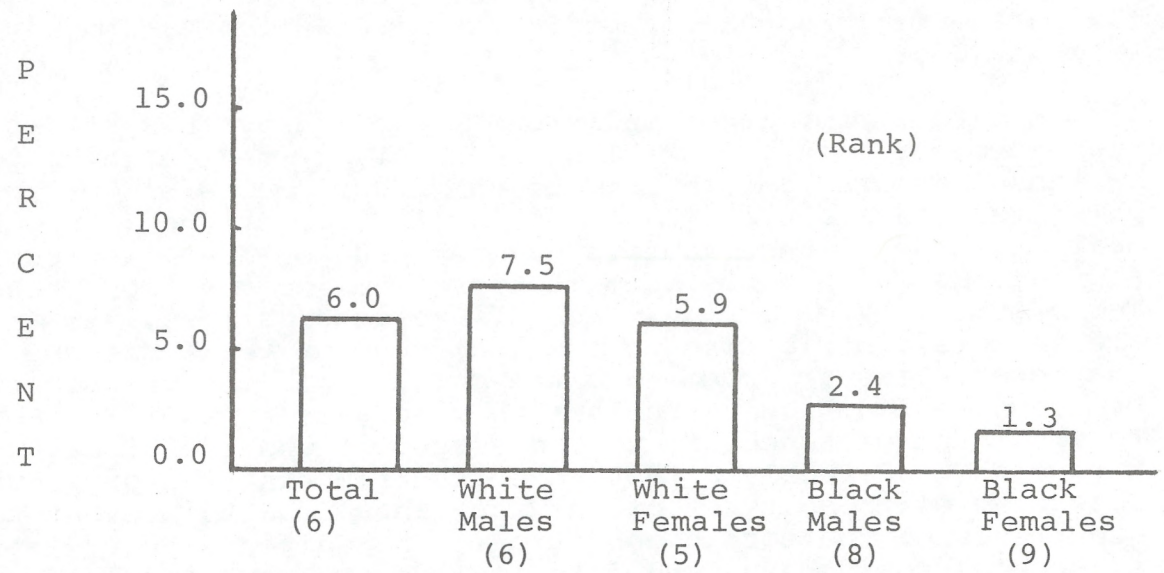
Suicide

Suicide, in contrast with homicide, seemed to be a greater problem in the white population. Both white males and white females suffered larger percentage losses of potential years than did their black counterparts. However, all of these proportions were significantly less than those attributed to homicide (Figure 11).

Figure 11

POTENTIAL YEARS OF LIFE LOST

PERCENT OF TOTAL YEARS LOST AND RANK BY RACE AND SEX
1-64 YEARS OF AGE
TEXAS, 1978
SUICIDE



SUMMARY AND CONCLUSIONS

If it is assumed that a death before age 65 is unnecessary, and is, therefore, premature, then it is possible to calculate the potential years of life lost for a given period of time. In Texas during 1978, the approximately 100,000 deaths of individuals one year of age or older translate to nearly 650,000 years of life lost.

Reappraising the causes of death in this manner results in a shift of emphasis from strictly chronic conditions. The causes of death which are most important in overall premature mortality are motor vehicle accidents, cancer, heart disease, and all other accidents, in that order. However, an analysis of premature death within race-sex groups shows that different causes are important for different groups. Among white males motor vehicle accidents are by far the most important contributor. Among both black and white females cancer is the predominant cause of premature death, although the magnitude is larger for the latter group. Among black males homicide constitutes the greatest hazard of premature death.

It should be noted that self-imposed risks and environment play major roles in the occurrence of premature deaths. Carelessness, failure to wear seat belts, alcohol consumption, and drug usage all affect the incidence of accidents and homicide. Chronic diseases such as cancer and heart disease are, to a great extent, influenced by self-imposed risks such as smoking, nutrition, and physical fitness. Environmental factors, both physical and social, also have implications on incidence of these deaths. Air and water pollution, working conditions, stressful lifestyles, and rapidly changing social environments all directly or indirectly influence personal lifestyle practices which ultimately affect untimely death.

In order to improve the conditions indicated by this analysis of premature mortality, it will be necessary to reduce the impact of those factors contributing to the major causes of loss of potential years of life, i.e. accidents, cancer, homicide and heart disease. These factors may be used to identify specific populations which would benefit most from intervention mechanisms. For example, hypertension, lack of exercise, stress, and smoking are factors contributing to the incidence of heart disease. These characteristics are common to the male population over forty years of age. In addition to the health care system providing services to treat the presence of heart disease, it should initiate activities which directly affect these contributing factors. The objective of these types of services should be to prevent the occurrence of the morbid condition. In addition, intervention strategies could be expanded to include programs involved with younger age groups, specifically those ages in which attitudes toward personal habits such as smoking are formed.

The results of this analysis suggest that programs designed to affect the factors contributing to early death would be highly beneficial. The expansion of activities dealing with these personal lifestyle decisions could ultimately affect the magnitude of loss of potential years of life. This approach does not suggest that current levels of support are not necessary for the treatment of conditions once they have occurred. On the contrary, the analysis of premature mortality indicates that even more interest should be invested in certain chronic diseases such as cancer since they present major problems in both overall and premature mortality. The focus of these additional activities is the important element. They should be directed toward alleviation of factors contributing to a particular condition rather than treating a condition once it exists.