

MICHIGAN DEPARTMENT
OF PUBLIC HEALTH

Michigan
**HEALTH
STATISTICS**



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MICHIGAN HEALTH STATISTICS

1988

Office of the State Registrar and Center for Health Statistics

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INTRODUCTION

The 1988 edition of Michigan Health Statistics is a statistical summary of vital events for calendar year 1988. Data relative to population, births, deaths, fetal deaths, marriages, divorces and communicable diseases are included. Although most of the data in this report pertain to events occurring in 1988, data for prior years have been included to illustrate trends. Most of the tabulations refer to Michigan residents. Some events, however, such as marriages and divorces are tabulated with respect to where the event occurred rather than the residence of the party or parties involved.

As a certain number of Michigan residents either deliver babies or die out of state each year, it is necessary to include data obtained from the certificates of other states in any tabulations pertaining to Michigan residents. This report includes all such out-of-state certificates received prior to April 30, 1989, and all in-state certificates and records received prior to March 15, 1989. Although a few additional records for the calendar year 1988 were received after these filing dates, their exclusion from this report is statistically insignificant.

This report is composed of the following sections and appendices:

1. Natality Section
2. Mortality Section
3. Marriage and Divorce Section
4. Reference Appendix

Comments or suggestions concerning the content and format of this report are always welcome. Any additional needs for data or analyses may be directed to the Office. A summary of prepared vital statistics tabulations, Index to Michigan Vital Statistics 1960 to Present, is also available. This index lists the types of tabulations and data available. The Office will make every attempt to comply with requests for data within the limitations of staff and resources.

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TECHNICAL NOTES, DEFINITIONS, RATES AND RATIOS

DEFINITIONS

BIRTH WEIGHT - Weight of fetus or infant at time of delivery.

FETAL DEATH - Death prior to the complete expulsion or extraction from its mother of a product of conception, having passed through at least the 20th week of gestation or weighing at least 400 grams; the fetus shows no signs of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. (Note: This includes both spontaneous and induced terminations.)

FIRST BIRTH - A live birth where the maternal medical history indicates there were no prior live births to the mother.

GESTATIONAL PERIOD - Number of completed weeks elapsed between the first day of the last menstrual period and the date of delivery.

HEBDOMADAL DEATH - Death occurring to an individual less than 7 days of age.

INFANT DEATH - Death occurring to an individual less than 1 year of age.

INTERPREGNANCY TIME PERIOD - Birth date minus date of last termination, whether a live birth or fetal death, in months. Time periods of zero length are dropped to exclude 2nd or higher births of multiple deliveries.

LEADING CAUSES OF DEATH - Deaths are grouped into 72 categories dependent upon

the underlying cause of death. Ranks are assigned by organizing these categories according to the number of deaths in each category from most frequent to least.

LIFE EXPECTANCY - A hypothetical calculation of the average age at death for a cohort of persons subject to the age-specific mortality rates observed over a given time period.

LIFE TABLE VALUES:

nq_x = The proportion of persons in the cohort alive at the beginning of an age interval (x) who will die before reaching the end of that age interval ($x+n$).

l_x = The number of persons living at the beginning of an age interval (x) out of an original cohort of 100,000.

ndx = The number of persons who would die during an age interval (x to $x+n$) out of an original cohort of 100,000.

nL_x = The number of person-years that would be lived within an indicated age interval (x to $x+n$) out of an original cohort of 100,000 alive for all or part of the interval.

T_x = The number of person-years that would be lived after the beginning of an age interval (x) by an original cohort of 100,000 until all are assumed to have died.

ex = The average remaining lifetime (in years) for an individual person who survives to the beginning of an indicated age interval (x).

LIVE BIRTH - A live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles. Effective on November 9, 1981, the definition of a live birth is established in administrative rule number 325.3201 as follows:

"Live birth" means the complete expulsion or extraction from a pregnant woman of a product of human conception which, after such expulsion or extraction, shows any evidence of life, whether or not the umbilical cord has been cut or the placenta is attached.

LIVE-BIRTH ORDER - Order number is equal to number of previous live births plus current birth.

LOW-WEIGHT BIRTH - Birth in 1984 or later wherein the birth weight is less than 2,500 grams (approximately 5 lbs., 8 oz.) or birth before 1984 wherein the birth weight is 2,500 grams or less.

MATERNAL DEATHS - Those deaths wherein the physician has designated a maternal condition as the underlying cause of death (9th Revision ICD codes 630-676).

MEAN - The average of a set of values, equal to the sum of the values divided by the number of values.

MEDIAN - The central value of a distribution of values wherein the same percentage of observations are above this point as are below.

MINOR CIVIL DIVISION - City, village, or township.

NEONATAL DEATH - Death occurring to individual less than 28 days of age.

OCCURRENCE - Place where the event actually occurred.

PERINATAL DEATH - Fetal death or death under 1 week of age.

PROBABILITY OF EVENTUALLY DYING FROM A GIVEN CAUSE OF DEATH - The chance of death due to a given cause rather than some competitive cause over the course of a lifetime based on current mortality data and life expectancy techniques.

RACE - Race for mother, father, or decedent is as stated on certificate. Race of child is determined from the race of the parents.

REMAINING YEARS OF LIFE - A hypothetical calculation of the average number of years a cohort of persons will live given that they have reached a specific age and assuming they are subject to the age-specific mortality rates observed over a given time period.

RESIDENCE - Usual place of residence for the person to whom the event occurred. For births and fetal deaths, residence is defined as the mother's usual place of residence.

TOTAL BIRTHS - Live births and fetal deaths.

UNDERLYING CAUSE OF DEATH - That condition giving rise to the chain of events leading to death.

YEARS OF POTENTIAL LIFE LOST - The number of years between the age at death and 65 years of age for individuals dying before age 65.

RATES AND RATIOS

AGE-ADJUSTED DEATH RATE - A summary rate of death that is developed using a standard population distribution to improve the comparability of rates for areas or population subgroups with differing age distributions. When calculated by the direct method, as in this report, age-specific death rates for a geographic area or population subgroup are multiplied by the standard population by specific age and the products summed and divided by the total standard population. Age-adjusted death rates represent the mortality experience that would have occurred in a standard population had the age-specific rates of the area or population subgroup been experienced by the standard population. These rates are presented as per 100,000 population.

AGE-SPECIFIC BIRTH RATE - Number of resident live births to women of a specific age divided by total resident female population of specific age x 1,000.

AGE-SPECIFIC DEATH RATE - Number of resident deaths in specific age group divided by total resident population in specific age group x 100,000.

AGE-SPECIFIC DEATH RATE BY CAUSE OF DEATH - Number of resident deaths in

specific age group and from a specific cause divided by total resident population in specific age group x 100,000.

AGE-SPECIFIC MARRIAGE RATE - Number of occurrent marriages in specific age group by sex divided by total resident population in specific age and sex group x 1,000.

CAUSE-SPECIFIC RATE - Number of resident deaths due to a specific cause divided by total resident population x 100,000.

CONGENITAL ANOMALY RATE - Number of resident live births with a congenital malformation reported divided by the total number of resident live births x 10,000.

COMMUNICABLE DISEASE CASE RATE - Number of reported cases (specific communicable diseases) divided by total resident population x 100,000.

CRUDE BIRTH RATE - Number of resident live births divided by total resident population x 1,000.

CRUDE DEATH RATE - Number of resident deaths divided by total resident population x 1,000.

DIVORCE RATE - Number of persons (with occurrent divorces and annulments) divided by total resident population x 1,000.

FERTILITY RATE - Number of resident live births divided by total resident female population ages 15-44 x 1,000.

FETAL DEATH RATE - Number of resident fetal deaths divided by total resident live births and resident fetal deaths x 1,000.

FETAL DEATH RATIO - Number of resident fetal deaths divided by total resident live births x 1,000.

FIRST MARRIAGE RATE - Number of current marriages to persons not previously married by sex divided by total resident population by sex x 1,000.

INFANT MORTALITY RATE - Number of resident infant deaths divided by total resident live births x 1,000.

LOW-WEIGHT BIRTH RATIO - Number of resident low-weight births divided by total resident live births x 1,000.

MARRIAGE RATE - Number of resident persons married in an area divided by total resident population x 1,000.

MATERNAL DEATH RATE - Number of resident maternal deaths divided by total resident live births x 10,000.

NEONATAL DEATH RATE - Number of resident neonatal deaths divided by total resident live births x 1,000.

NO PRENATAL CARE RATIO - Number of resident live births to mothers with no prenatal care divided by total resident live births x 1,000.

PERINATAL DEATH RATE - Number of perinatal deaths divided by total resident live births and resident fetal deaths x 1,000.

RATE OF NATURAL INCREASE - (Total resident live births minus total resident

deaths) divided by total resident population x 1,000.

TOTAL FERTILITY RATE - Sum of (age-specific birth rates) x (number of years in age group) for each age group from ages 10-14 through 45-49 years.

RELIABILITY OF RATES

Care should be taken in drawing specific inferences from comparisons of rates for different areas or different periods of time. Rates based on a small number of events or for a small area tend to exhibit considerable variation from time period to time period or place to place. Excessive variation in rates not only negates their utility as estimators of the probability of an event occurring but also their usefulness for comparative purposes.

Also, one should recognize the limitations of using unadjusted rates in attempting to attribute rate differences to particular factors. For example, one should not attempt to state that there was a significant difference in rates for two geographic areas for atherosclerosis without first adjusting the rates to negate the effects of differing age distributions in the two areas.

Many times there are simply not sufficient data available to adequately adjust rates for all possible confounding factors. For this reason the reader should exercise diligence and caution while attempting to draw substantive conclusions when comparing vital statistics rates.

QUALIFICATIONS AND LIMITATIONS OF DATA AND CALCULATIONS

UNDERREGISTRATION OF EVENTS

The underregistration of vital events in Michigan is considered to be a minimal problem, particularly for births and deaths. Tests of registration completeness conducted in conjunction with the 1950 Census indicate that the registration of births was 98.5 percent complete, and that death registration was even more complete. The number of certificates received too late for inclusion in annual statistical files is insignificant when examining statewide patterns.

GEOGRAPHIC ALLOCATION

The allocation of events on a residence or occurrence basis is for the most part accurate and complete. However, allocations to minor civil divisions are subject to question in some instances. In those cases where the respondent completes the residence item with a mailing address, geographic allocation is sometimes undeterminable and the record receives an unknown minor civil division code.

FETAL DEATHS

Fetal deaths in Michigan include only those conceptions that have passed through 20 weeks gestation or that weigh 400 grams or more. Prior to the introduction of a new reporting form for fetal deaths on September 30, 1978, Michigan law required only the reporting of deaths of fetuses which had

passed through 20 weeks gestation. Inadequacies in determining the gestational age of the fetus may have resulted in some underreporting of fetal deaths. The change in definition has had little impact on the number of fetal deaths reported.

COMPARABILITY IN CAUSE OF DEATH STATISTICS

The reader should bear in mind two major limitations in interpreting changes in cause-of-death statistics. Changes in nomenclature and the classification scheme (International Classification of Diseases) and changes in diagnostic practices may seriously affect the comparability of such statistics over time. The classification scheme (ICD) is modified approximately once every ten years to reflect changing medical opinion and practice. The reader is most accurate when comparing cause-of-death certificates which are coded via one revision of the International Classification of Diseases and utilizing the coding practices and procedures in effect at that time.

In order to compare cause-of-death statistics from one revision to the next it is necessary to apply a comparability ratio. Such ratios are developed by comparing the number of deaths assigned to a certain condition or group of conditions under one revision to the number assigned under another revision of the ICD.

In 1979 the 9th Revision of the International Classification of Diseases, WHO, was introduced for coding causes of death and was employed in categorizing the data for 1988.

LIFE EXPECTANCY

The procedure used to obtain the Michigan life table values is called the iterative method. This is a method which has been developed by Felix Moore formerly of the Department of Biostatistics, School of Public Health, University of Michigan.

For the age group 0-1 the method utilizes the algorithm developed by Greville with no iteration. For all subsequent age groups the method of Greville (Keyfitz) is used with three iterations to improve the estimate of nd_x and nq_x . An iteration procedure is also used for nL_x for age groups 75-80 and 80-85 where the accuracy of mortality information is a factor and for obtaining the separation factor for the age group 1-4.

AGE-ADJUSTMENT PROCEDURE AND POPULATION ESTIMATION

Population data for 1970 and 1980 were obtained from the April 1, 1970 and April 1, 1980 census counts. Data for 1980 include revised census data as released by the Census Bureau. The population totals used for 1971-1979 are intercensal estimates prepared by the Census Bureau utilizing the revised 1980 census figures. The breakdowns of these totals by age, race, and sex were prepared by the Office of the State Registrar and Center for Health Statistics. For 1970 and 1980 the proportion of the total population in each age, race, and sex group was computed. Estimates of the proportion of the total population in

each age, race, and sex group for the years 1971-1979 were then derived by interpolating between the proportions for 1970 and 1980. These subgroup proportions were then applied to the state totals to obtain population estimates by age, race, and sex for years 1971-1979.

Population estimates for 1985 through 1988 by age and sex were obtained by adding births, removing deaths and aging the remaining population, using Census Bureau-National Cancer Institute 1984 age, race and sex population estimates. Black and other race estimates for 1984 were prepared by projecting the mean annual change in the race proportions of each age-sex group of the non-white population observed between 1970 and 1980. Revised estimates of the proportion of the total population in each age, race and sex group for the years 1981-1983 were derived by interpolating between the populations for 1980 and 1984.

The age-adjusted rates for Michigan presented in this report for years 1970-1988 were calculated using Michigan resident mortality data and the series of population data described above. Death records with the race not stated were first randomly allocated to the white and other than white groups based on the proportion of Michigan resident deaths in each of the racial categories for that year. Records with sex not stated were randomly assigned to male and female (50 percent each). Records with age not stated were allocated to the age group 85 and over.

In the age-adjustment procedure ten age groups were employed including under 1 year, 1-14 years, ten year age groups from 15-24 years to age 75-84, and 85 years and over. Age-specific rates for the total popula-

tion and for each subgroup were applied to the same standard population distributed by age. The resulting expected deaths were then summed over the ten age groups and divided by the total of the standard population to obtain the age-adjusted rate. The standard population selected was the 1940 United States enumerated population. Comparisons can be made between subgroup rates, between rates in different years, and between rates for Michigan and similarly computed rates for the United States.

UNITED STATES DEATH RATES

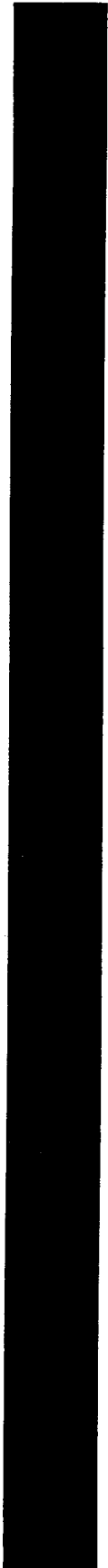
Death rates for the United States were taken from publications by the National Center for Health Statistics, U.S. Dept. of Health and

Human Services. Rates for the United States shown in the series of tables of age-adjusted death rates for Michigan and the United States are based on the 1980 census enumeration. The U.S. rates for 1971-1980 have been revised as a result of the large difference between the 1980 census enumeration and the previously estimated population for 1980. The 1980 census enumeration was about 5.5 million higher than the estimated population for April 1, 1980.

The unadjusted death rates for the United States for all causes and by cause for 1981 through 1988 quoted in the text and shown in Tables 2.1 and 2.7 were calculated using population estimates based on the 1980 census enumeration.

NATALITY

SECTION I



NATALITY

AN OVERVIEW, 1988

TOTAL RESIDENT BIRTHS	140,396
TOTAL RESIDENT LIVE BIRTHS	139,635
RESIDENT LIVE BIRTHS PER DAY	382
TOTAL RESIDENT FETAL DEATHS	761
RESIDENT FETAL DEATHS PER DAY	2
CRUDE BIRTH RATE	15.2
FERTILITY RATE	63.9
FETAL DEATH RATIO	5.4
FIRST ORDER BIRTHS (PERCENT OF TOTAL LIVE BIRTHS)	40.5
MEDIAN BIRTH WEIGHT IN GRAMS (LIVE BIRTHS)	3,388
MEDIAN BIRTH WEIGHT IN GRAMS (FETAL DEATHS)	1,047
LOW WEIGHT LIVE BIRTHS	10,237
LOW WEIGHT BIRTH RATIO	73.3
MEDIAN AGE OF MOTHER (LIVE BIRTHS)	26
MEDIAN AGE OF MOTHER (FETAL DEATHS)	26
LIVE BIRTHS WITH CONGENITAL ANOMALIES	746
CONGENITAL ANOMALIES PER 10,000 LIVE BIRTHS	53.4
LIVE BIRTHS WITH NO PRENATAL CARE	1,652
NO PRENATAL CARE RATIO	11.8
HOME BIRTHS	767
LIVE BORN SETS OF TWINS	1,579
LIVE BORN SETS OF TRIPLETS	30
LIVE BORN MULTIPLE BIRTHS OF FOUR OR MORE	2
MALE LIVE BIRTHS PER 100 FEMALE LIVE BIRTHS	104.7

Table 1.1
Total Births¹
Michigan Residents
Selected Years, 1900 - 1988

YEAR	TOTAL
1900	45,024
1901	44,722
1910	66,668
1920	96,015
1930	102,596
1933	83,258
1940	101,708
1950	163,150
1957	211,642
1960	198,064
1970	173,727
1971	164,167
1972	148,624
1973	143,232
1974	138,852
1975	135,287
1976	132,642
1977	139,700
1978	140,003
1979	145,627
1980	146,297
1981	141,619
1982	138,904
1983	133,959
1984	136,711
1985	139,005
1986	138,491
1987	141,290
1988	140,396

¹ Live births plus fetal deaths.

Between 1900 and 1988, the number of total births (live births and fetal deaths) has varied considerably (Table 1.1). The general trend has been increasing numbers of total births from 1900 through 1957, declining numbers through 1976 and fairly stable numbers since that time.

According to the annual enumeration of births by local officials in 1900 there were 45,024 births in Michigan. This figure

dropped slightly to 44,722 in 1901 (the lowest total in the century). The number of reported births increased significantly with the initiation in 1906 of mandatory filing of individual certificates for each Michigan birth. Total births increased during the next two decades, dropped temporarily in 1919, and then leveled off at just over 100,000 between 1924 and 1930.

During the first years of the Great Depression, total births declined from 102,596 in 1930

to 83,258 in 1933. Then from 1933 to 1957, excluding the war years of 1944 and 1945, total births increased to a century high peak of 211,642 in 1957. Births in the next two decades dropped to a post-World War II low of 132,642 in 1976. Since 1976, the number of total births increased, reaching 146,297 in 1980, declined to 133,959 in 1983 and generally increased to 140,396 in 1988.

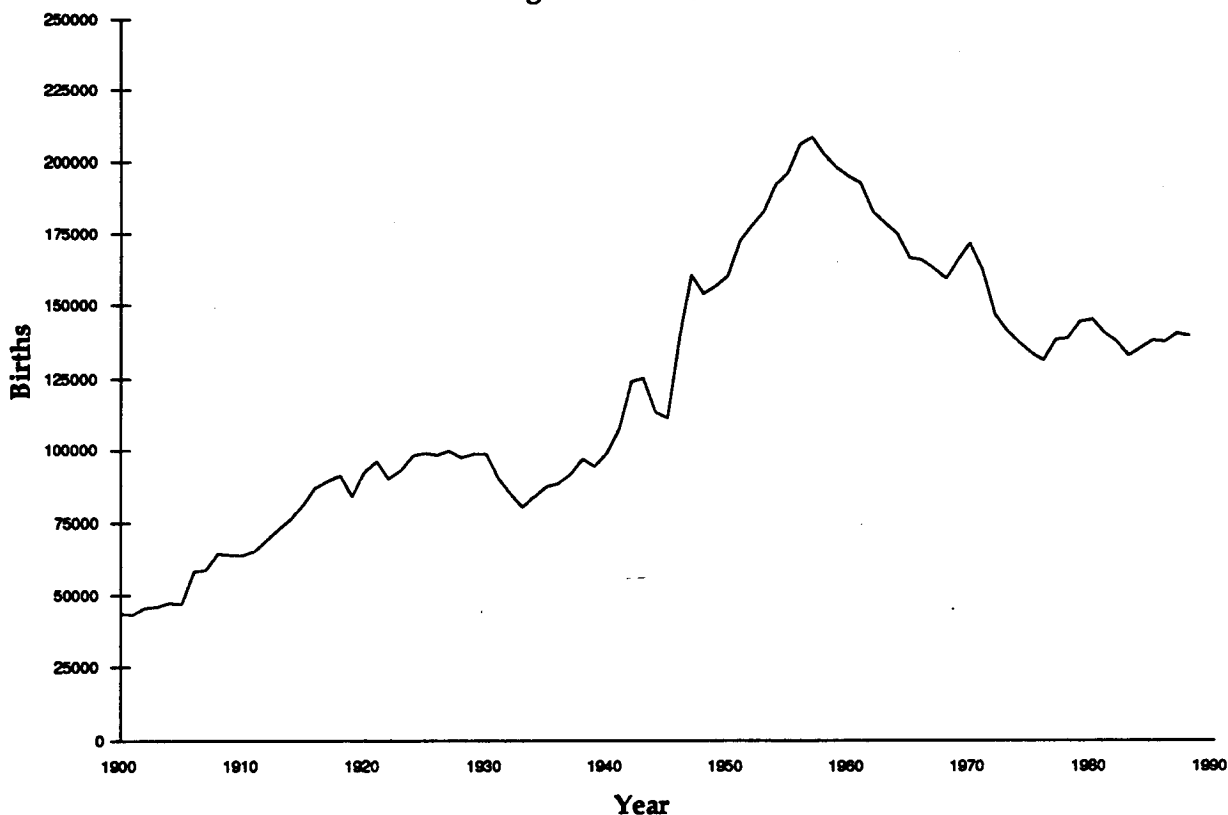
LIVE BIRTHS

The smallest number of live births officially recorded in this century was 43,221 in 1901. The actual number of live births was undoubtedly higher. Because of the method of recording, many live births were probably not

recorded. Figure 1.1 portrays the number of live births for Michigan from 1900 through 1988.

Live births, which constitute a large percentage of total births, naturally followed the same pattern of increases and decreases, rising appreciably from 43,699 in 1900 to 208,488 in 1957, the peak year for this century (Figure 1.1 and Table 1.2). Between 1957 and 1976, live births decreased by 37.0 percent to 131,378, the lowest total in 31 years. In 1977, however, live births increased by 5.4 percent, the largest such increase since 1951. In each of the following three years the number of live births also increased. In 1980 there were 145,162 live births, the highest annual total since 1972. Between 1980 and 1983 the number of live

Figure 1.1
Live Births
Michigan Residents, 1900-1988



births declined by 8.4 percent, reaching 133,026 in 1983. By 1988 the number of live births increased 5.0 percent to 139,635.

The national pattern was similar to that observed in Michigan. Live births increased from an estimated 2,718,000 in 1909 to an estimated 4,300,000 in 1957. Since 1957, there has been a general decline in live births. The low point occurred in 1973 when live births in the United States totaled 3,136,965. Unlike Michigan, the number of live births for the nation increased in nine out of twelve years from 1977 through 1988. For 1988 the provisional figure was 3,913,000 an increase (2.7 percent) from the number born in 1987.

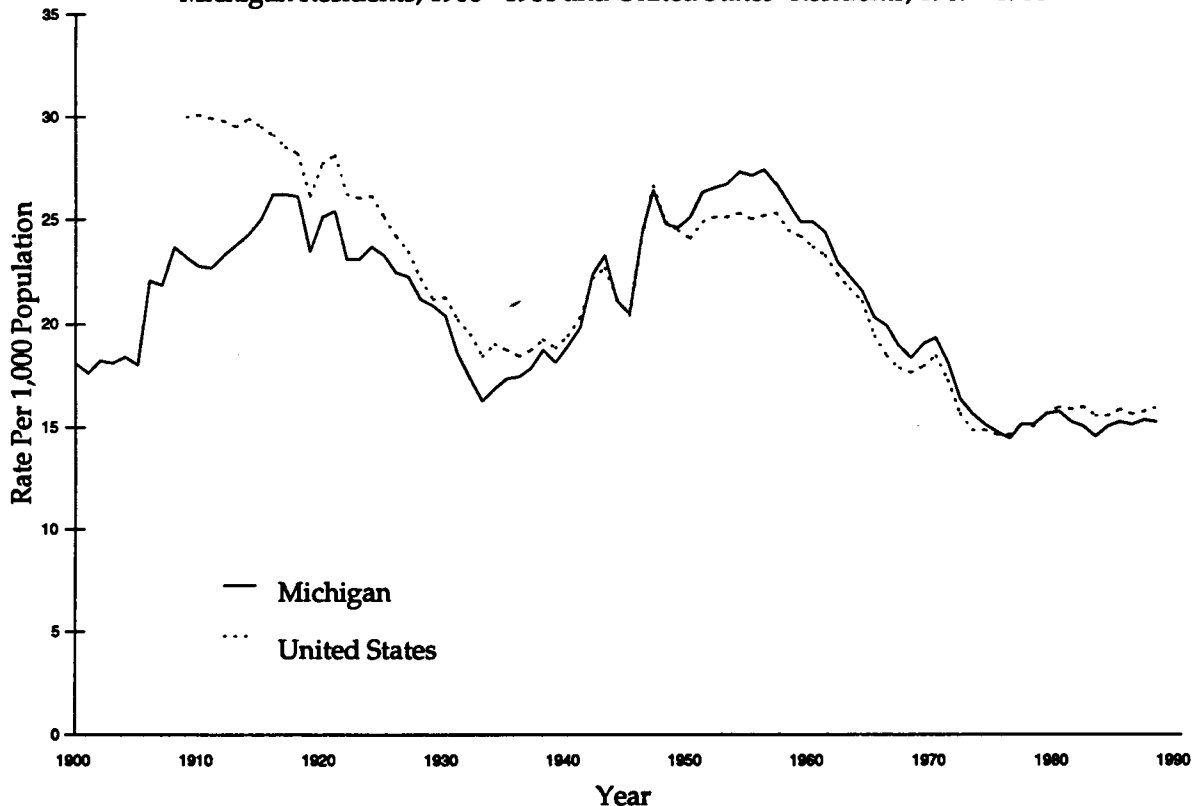
Another view of the historic pattern in live births may be obtained through examination of changes in the crude birth rate. By considering population size the historic pattern of live births is stabilized (Figure 1.2). The crude birth rate in Michigan ranges from a low of 14.4 per 1,000 residents in 1976 to a high of 27.4 in 1906. The crude birth rate increased from 22.1 in 1906, the first year for filing birth certificates, to 26.2 in 1916. During the period 1917 to 1933 Michigan's crude birth rate declined steadily, reaching 16.2. The birth rate rose over the next 23 years to a peak in 1956 (27.4). Between 1956 and 1976 Michigan's crude birth rate declined by 47.4 percent, falling to 14.4. Since 1976, the crude birth rate has fluctuated between a high of 15.7 in 1980 and a low of 14.5 in 1983. In 1988 the rate was 15.2.

National statistics since 1900 follow the same general pattern of rising and falling as observed in Michigan. The highest rate observed nationally over the period 1909 through 1986 was 30.1 in 1910, while the lowest was 14.6, occurring in both 1975 and 1976. United States live birth rates were above those observed in Michigan without exception from 1909 to 1941. Between 1942 and 1947, national rates were slightly above

Table 1.2
Live Births and Crude Birth Rates
Michigan and United States Residents
Selected Years, 1900 - 1988

UNITED STATES		YEAR	MICHIGAN	
NUMBER	RATE		NUMBER	RATE
—	—	1900	43,699	18.1
2,777,000	30.1	1910	64,109	22.8
2,950,000	27.7	1920	92,245	25.1
2,618,000	21.3	1930	98,882	20.4
2,559,000	19.4	1940	99,106	18.9
3,632,000	24.1	1950	160,055	25.1
4,257,850	23.7	1960	195,056	24.9
4,268,326	23.3	1961	192,825	24.4
4,167,362	22.4	1962	182,790	23.0
4,098,020	21.7	1963	178,871	22.3
4,027,490	21.1	1964	175,103	21.6
3,760,358	19.4	1965	166,464	20.3
3,606,274	18.4	1966	165,794	19.9
3,520,959	17.8	1967	162,756	18.9
3,501,564	17.6	1968	159,058	18.3
3,600,206	17.9	1969	165,760	19.0
3,731,386	18.4	1970	171,667	19.3
3,555,970	17.2	1971	162,244	18.1
3,258,411	15.6	1972	146,854	16.3
3,136,965	14.8	1973	141,550	15.6
3,159,958	14.8	1974	137,414	15.1
3,144,198	14.6	1975	133,931	14.7
3,167,788	14.6	1976	131,378	14.4
3,326,632	15.1	1977	138,416	15.1
3,333,279	15.0	1978	138,802	15.1
3,494,398	15.6	1979	144,452	15.6
3,612,258	15.9	1980	145,162	15.7
3,629,238	15.8	1981	140,579	15.2
3,680,537	15.9	1982	137,950	15.0
3,638,933	15.5	1983	133,026	14.5
3,669,141	15.5	1984	135,782	15.0
3,760,561	15.8	1985	138,052	15.2
3,756,547	15.6	1986	137,626	15.1
3,809,394	15.7	1987	140,466	15.3
3,913,000Pr.	15.9Pr.	1988	139,635	15.2

Figure 1.2
Live Birth Rates
 Michigan Residents, 1900 - 1988 and United States¹ Residents, 1909 - 1988²



¹ United States rates prior to 1909 are not available.

² United States rate for 1988 is provisional.

those for the state twice. National birth rates were below Michigan rates from 1949 through 1975. For eleven of the past twelve years, the rates for the nation were equal to or above those observed in Michigan. The 1988 provisional rate for the United States was 15.9 per 1,000 people.

FERTILITY

The crude birth rates examined above are useful statistics for gauging overall trends in live births for specific geographic areas. Where attempts are made to interpret such trends, however, crude birth rates can be misleading. These rates do not specifically incorporate the size of the population capable

of bearing children. This population subset, generally considered to be women between the ages of 15 through 44, does not always maintain a stable relationship with the total population. A more exact measure for analyzing changing birth patterns is the fertility rate. Since the fertility rate relates the number of live births to the female population of childbearing age, more valid comparisons for various periods of time and locations are possible.

A comparison of fertility rates for Michigan with those for the United States is presented in Table 1.3. The crude birth rate changes observed understate the recent decline in fecundity for both regions. Since 1960 the crude birth rate in Michigan has dropped 39.0

Table 1.3
Fertility Rates
Michigan and United States Residents
Selected Years, 1900 - 1988

UNITED STATES	YEAR	MICHIGAN
—	1900	78.5
126.8	1910	99.0
117.9	1920	111.6
89.2	1930	87.6
79.9	1940	78.9
106.2	1950	110.5
118.0	1960	123.1
117.1	1961	119.0
112.0	1962	110.8
108.3	1963	106.6
104.7	1964	102.6
96.3	1965	95.9
90.8	1966	94.0
87.2	1967	90.8
85.2	1968	87.3
86.1	1969	89.6
87.9	1970	91.7
81.6	1971	84.5
73.1	1972	75.1
68.8	1973	71.2
67.8	1974	68.0
66.0	1975	65.5
65.0	1976	63.5
66.8	1977	65.9
65.5	1978	65.0
67.2	1979	66.6
68.4	1980	66.3
67.4	1981	65.6
67.3	1982	64.7
65.8	1983	62.7
65.4	1984	63.1
66.2	1985	63.8
65.4	1986	63.2
65.7	1987	64.3
67.3Pr.	1988	63.9

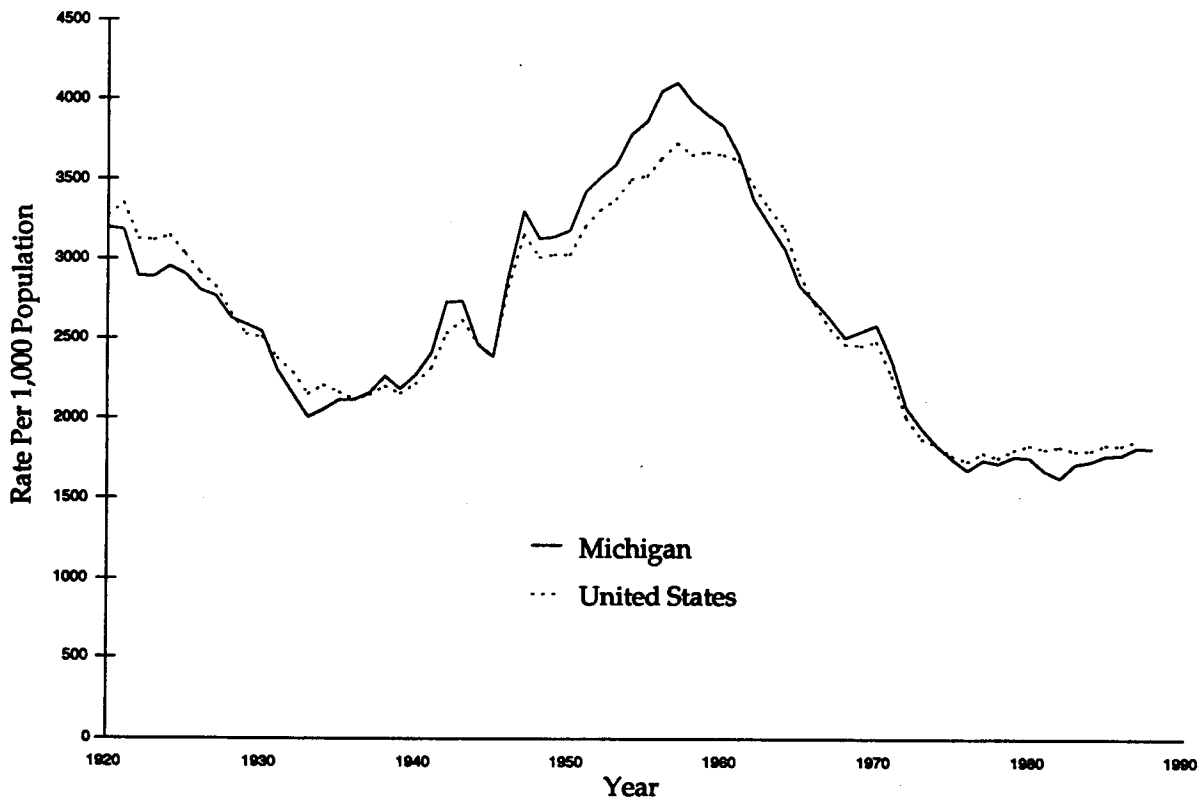
percent, while the fertility rate in 1988 was 48.1 percent below the 1960 rate. For the United States over this same period the crude birth rate declined 32.9 percent and the fertility rate fell by 43.0 percent. The difference in these two measures occurred because the proportion of the population in the childbearing ages has increased over this 28 year period. In Michigan, though the total population has increased 18.1 percent in this time period, the number of women 15 to 44 years of age has increased 37.7 percent. The proportion of women of childbearing age in Michigan increased from 20.3 percent to 23.7 percent of the population.

Figure 1.3 displays the changes in the total fertility rate between 1920 and 1988 for Michigan and the United States. (See also Table 4.4) The total fertility rate is a hypothetical measure of the number of live births that would occur to each 1,000 women during their reproductive life, if these women experienced the age-specific birth rates observed in a given year.

Michigan's total fertility rate has generally paralleled that of the nation. The Michigan rate dropped from 3,195.5 in 1920 to 2,006.5 in 1933 and then increased between 1933 and 1957, reaching 4,100.0 in the latter year. Between 1957 and 1976 the total fertility rate in Michigan declined to a low of 1,682.0 in 1976. The rates for the following twelve years were higher, fluctuating between a high level of 1,826.0 in 1987 and 1,823.0 in 1988 and a low of 1,632.5 in 1982. The rate was 1,871.0 in 1987 for the United States. The national rates were higher than the Michigan rates each year between 1975 and 1987.

Since 1973 both Michigan and national total fertility rates have been below 2,000. A total fertility rate of over 2,000 is necessary for replacement of the parents, since not all women survive the reproductive years nor would all children survive to adulthood. If

Figure 1.3
Total Fertility Rates¹
 Michigan Residents, 1920 - 1988 and United States Residents, 1920 - 1987



¹ Total fertility rate is total children to 1,000 women in their lifetime assuming constant live birth rates.

the total fertility rate falls below 2,000 for a long period, a natural decrease in population would eventually result. It should be noted that although the total fertility rate has been below 2,000 since 1973, the rate of natural increase for Michigan remains positive. Over the period 1973 through 1988, there were 988,769 persons added to the population of Michigan through the excess of live births over deaths.

RACIAL COMPOSITION

The racial composition of live births in Michigan changed over the period 1970 through 1988 (Table 1.4). Live births of white persons declined from 83.8 percent of all live

births in 1970 to 81.2 percent in 1973. Between 1974 and 1982, this percentage held between 81.9 and 82.5. In 1988, the percentage dropped to a new low of 79.5 percent.

Live births of black persons increased from 15.7 percent of the total in 1970 to 18.2 percent in 1973 and then fluctuated to 18.6 percent of all live births in 1988. Live births of all other races increased from 0.4 percent in 1970 to 1.3 percent in 1981, held at that level through 1983 and increased to 1.8 in 1988.

It should be noted that Indians from India were classified as white before 1978 and among Asian or Pacific Islanders since 1978. Also, changes in the method of determining the race of the infant born in 1984 to parents

of different races resulted in a 0.7 percent decrease in the number of infants coded white and a 0.1 percent decrease in the number of infants coded black when compared to the numbers which would have been coded white and black in 1984 if the method used in 1983 had been retained. There was a corresponding increase in the number of births coded to a race or national origin other than white or black in 1984.

In absolute terms, the numbers of births of black and white infants declined between 1970 and 1976, with an especially sharp decline observed in births of white infants between 1970 and 1972. Between 1976 and 1980 the numbers of live births of white and black infants increased by 10.4 and 8.0 percent respectively. From 1980 through 1983 the numbers of white and black infants decreased to the second lowest and lowest numbers

Table 1.4
Live Births by Infant's Race or National Origin
Michigan Residents, 1970 - 1988¹

YEAR	TOTAL ALL RACES	WHITE ²	BLACK	AMERICAN INDIAN	ASIAN OR PACIFIC ISLANDER ^{2,3}	OTHER ⁴	UNKNOWN
1970	171,667	143,871	26,957	299	356	74	110
1971	162,244	134,165	27,245	313	373	40	108
1972	146,854	119,787	26,215	316	366	64	106
1973	141,550	114,878	25,741	302	288	144	197
1974	137,414	112,474	23,328	270	310	194	838
1975	133,931	109,718	23,224	294	331	184	180
1976	131,378	107,907	22,349	368	390	188	176
1977	138,416	114,042	23,195	431	365	221	162
1978	138,802	114,217	23,025	377	998	7	178
1979	144,452	118,671	24,010	435	1,117	13	206
1980	145,162	119,103	24,127	481	1,230	32	189
1981	140,579	115,972	22,705	526	1,256	16	104
1982	137,950	113,868	22,270	488	1,224	17	83
1983	133,026	109,335	21,932	490	1,154	25	90
1984	135,782	110,418	23,005	780	1,462	46	71
1985	138,052	112,994	22,659	748	1,486	52	113
1986	137,626	111,115	24,078	753	1,571	58	51
1987	140,466	112,167	25,729	777	1,654	51	88
1988	139,635	110,982	26,034	766	1,732	58	63

¹ Coding changes initiated in 1984 resulted in a net decrease of 0.7 and 0.1 percent of the infants coded to the races White and Black respectively. This change resulted in an increase in the number of infants coded to races other than White or Black in 1984.

² Persons of Spanish or of Mexican-American descent are included with White. Indians from India were counted as "White" from 1970-1977 and with "Other Asian or Pacific Islander" since 1978.

³ Includes Chinese, Japanese, Hawaiian, Filipino, and other Asian or Pacific Islander.

⁴ Includes Koreans for 1973-1977. Koreans are included in "Other Asian or Pacific Islander" for other years.

respectively since 1970. The numbers of white infants fluctuated between 1984 and 1988, while the numbers for black infants has increased 13.2 percent since 1984.

The numbers of Asian or Pacific Islander births remained fairly stable between 1970 and 1977. A sharp increase in the number of births occurred in 1978 when births to Indians from India were added to this category. The numbers of American Indian births increased by about 64 percent between 1970 and 1983. Most of the increases observed in 1984 for American Indians and Asian or Pacific Islanders were the result of coding changes. There has been an 18.5 percent increase in the number of Asian or Pacific Islander infants between 1984 and 1988.

Table 1.5 provides a comparison between crude birth rates and fertility rates for white and black persons in Michigan for the period since 1970. In 1970 the crude birth rate for black persons was 54.3 percent above that for white persons. By 1973, this percentage had increased to 71.7 percent. In 1974, the percent dropped sharply returning to 57.4, and by 1982 it had fallen to 20.7 percent. By 1988 the crude birth rate for black persons was 50.4 percent higher than the rate for white persons as the rate increased for black persons and decreased for white persons.

Paralleling the trends in numbers of live births, the crude birth rates for both groups declined between 1970 and 1976. Between 1976 and 1980 the crude birth rate for white persons increased by 10.3 percent, while that for black persons remained essentially unchanged. By 1988 the crude birth rate for white persons declined by 6.0 percent, while the crude birth rate for black persons increased by 5.5 percent. The crude birth rate for white persons in 1988 was 23.4 percent below that observed in 1970 while the rate for the black group was 25.4 percent below the rate for 1970.

Table 1.5
Crude Live Birth Rates and
Fertility Rates by Race
Michigan Residents, 1970 - 1988

CRUDE BIRTH RATE		YEAR	FERTILITY RATE	
WHITE RACE	BLACK RACE		WHITE RACE	BLACK RACE
18.4	28.4	1970	88.0	125.6
17.0	27.6	1971	80.2	121.7
15.1	25.9	1972	70.6	112.9
14.5	24.9	1973	66.7	107.9
14.1	22.2	1974	64.5	94.8
13.8	21.6	1975	62.4	91.6
13.6	20.5	1976	60.7	85.5
14.4	20.8	1977	63.3	85.9
14.4	20.2	1978	62.6	82.5
14.9	20.6	1979	64.2	83.4
15.0	20.1	1980	63.9	80.7
15.2	18.5	1981	64.6	72.0
15.0	18.1	1982	63.9	69.9
14.6	17.7	1983	61.9	68.2
14.3	18.8	1984	61.0	73.7
14.6	18.5	1985	62.2	71.9
14.2	19.6	1986	60.8	75.8
14.3	20.9	1987	61.2	80.5
14.1	21.2	1988	60.5	81.8
-23.4	-25.4	Percent Change 1970 - 1988	-31.3	-34.9

The fertility rates contained in Table 1.5 reveal that there are important differences in population structure for white persons compared to that of black persons. By comparing live births to the respective numbers of women aged 15-44 for these two groups, the relative differences in rates for 1988 decrease. The fertility rate for black persons was 42.7 percent above the rate for white persons in 1970, fell to 9.4 percent higher in 1982 and

increased to 35.2 percent higher in 1988. Since 1970 the fertility rate for black persons has declined 34.9 percent compared with a 31.3 percent drop for white persons.

AGE OF MOTHER

In 1988, 39.4 percent of all live births were to women less than 25 years of age. Only 0.8 percent occurred to women 40 or more years of age. The median age of mothers was 26 years. Mothers of black infants were younger (median 23 years) than mothers of white children (median 26 years). Mothers of all other infants were older with a median age of 28 years.

Approximately 56.5 percent of the black infants were born to women aged 24 or less

compared to 35.4 percent of the white infants and 30.7 percent of all other infants. This differential was the result of the relatively large percentage of black infants born to women at ages below 20 (25.2 percent) (Table 1.6).

The total number of live births increased by 0.6 percent between 1978 and 1988 (Table 1.7) while the number of women of child bearing age (15 to 44 years of age) increased by 2.1 percent.

The largest relative decrease in the number of live births occurred to women 20 to 24 years of age. There was a 24.2 percent decrease in the number of births to these women while there was a 14.8 percent decrease in the number of women 20 to 24 years of age. For the age group under age 20

Table 1.6
Live Births and Percent Distribution by Age of Mother and Race of Child
Michigan Residents, 1988

Age Of Mother in Years	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 15	371	0.3	103	0.1	264	1.0	3	0.1	1	1.6
15 - 19	17,003	12.2	10,470	9.4	6,304	24.2	216	8.5	13	20.6
20 - 24	37,529	26.9	28,793	25.9	8,154	31.3	566	22.1	16	25.4
25 - 29	45,924	32.9	38,887	35.0	6,183	23.7	836	32.7	18	28.6
30 - 34	28,469	20.4	24,181	21.8	3,638	14.0	642	25.1	8	12.7
35 - 39	8,553	6.1	7,049	6.4	1,262	4.8	236	9.2	6	9.5
40 or More	1,148	0.8	903	0.8	192	0.7	53	2.1	-	-
Not Stated	638	0.5	596	0.5	37	0.1	4	0.2	1	1.6
Total	139,635	100.0	110,982	100.0	26,034	100.0	2,556	100.0	63	100.0
Median Age at Last Birthday	26		26		23		28		25	

the percent decrease in the number of births (20.4 percent) was less than the percent decrease (23.0 percent) in the number of women.

The number of live births to women 25-29 was 5.0 percent higher in 1988 than in 1978, while there was a 85.0 and 87.5 percent increase in the number of live births to women 30-34 years and 35-39 years of age respectively over the decade. There was a 47.4 percent increase in the number of live births to women 40 years of age or older. Although there were increases in the number of women in these

age groups, the percent increase in the numbers of women were lower for the age groups over age 25 than the percent increase in the numbers of births.

Table 1.7 also provides the age distribution of the childbearing population in 1978 and 1988. The largest relative increase in population occurred in the age group 35-39, the age group with the greatest increase in live births between 1978 and 1988. The only groups to experience a population decline were those under 25 years of age.

Table 1.7
Live Births and Population of Women by Age
Michigan Residents, 1978 and 1988

AGE GROUP	LIVE BIRTHS			POPULATION ESTIMATES		
	1978	1988	PERCENT CHANGE	1978	1988	PERCENT CHANGE
Under 20 Years ¹	21,832	17,374	-20.4	461,703	355,696	-23.0
20 - 24 Years	49,498	37,529	-24.2	443,967	378,240	-14.8
25 - 29 Years	43,744	45,924	+5.0	392,146	396,673	+1.2
30 - 34 Years	18,367	28,469	+85.0	336,899	389,907	+15.7
35 - 39 Years	4,562	8,553	+87.5	270,980	357,639	+32.0
40 and Over ²	779	1,148	+47.4	234,330	307,182	+31.1
All Ages ³	138,802	139,635	+0.6	2,140,025	2,185,337	+2.1

¹ Population shown is for females 15 - 19.

² Population shown is for females 40 - 44.

³ Population shown is for females 15 - 44. Live births with age not stated are included only in the total.

AGE-SPECIFIC LIVE BIRTH RATES

As displayed in Table 1.8, a reduction in the total live birth fertility rate for Michigan females of 1.5 percent has occurred since 1978. The greatest relative decrease in age-specific live birth rates between 1978 and 1988 was 11.0 percent for women 20 to 24 years of age. The live birth rates for women 30-34 and 35-39 years old in 1988 were 33.9 and 42.3 percent above the rates for these age groups in 1978.

Figure 1.4 displays age-specific live birth rates for the period 1970-1988. Live birth rates in all age groups dropped between 1970 and 1976. For women under 20 years the rate continued to decline throughout the years

1976-1983. The rate fluctuated between 1980 and 1988 reaching a new low of 38.6 in 1983. The rate was 48.8 in 1988.

After declining between 1970 and 1976, the live birth rates for women between 20 and 29 years of age remained stable into the 1980's. The rates for women in the age groups 20-24 increased in 1984 then declined 4.4 percent to a low of 99.2 live births per 1,000 women in 1988.

The rates for women 25-29 declined between 1970 and 1976 then generally increased through 1980. The rates fluctuated between

Table 1.8
Age-Specific Live Birth Rates by Race
Michigan Residents, 1978 and 1988

Age Group in Years	Race ¹											
	Total			White			Black			All Other ¹		
	1978	1988	Percent Change In Rate	1978	1988	Percent Change In Rate	1978	1988	Percent Change In Rate	1978	1988	Percent Change In Rate
Under 20 ²	47.3	48.8	+3.2	38.8	36.2	-6.7	102.6	112.2	+9.4	30.5	43.7	+43.3
20 - 24	111.5	99.2	-11.0	108.1	91.4	-15.4	135.4	139.6	+3.1	66.4	121.1	+82.4
25 - 29	111.6	115.8	+3.8	114.1	116.8	+2.4	96.6	105.7	+9.4	94.2	163.3	+73.4
30 - 34	54.5	73.0	+33.9	54.0	73.7	+36.5	55.7	65.4	+17.4	70.4	105.8	+50.3
35 - 39	16.8	23.9	+42.3	15.9	23.2	+45.9	22.8	26.1	+14.5	23.8	39.1	+64.3
40 or More ³	3.3	3.7	+12.1	3.0	3.4	+13.3	5.5	5.0	-9.1	4.4	11.1	+152.3
Total ⁴ Fertility	64.9	63.9	-1.5	62.2	60.5	-2.7	82.5	81.8	-0.8	53.6	80.7	+50.6

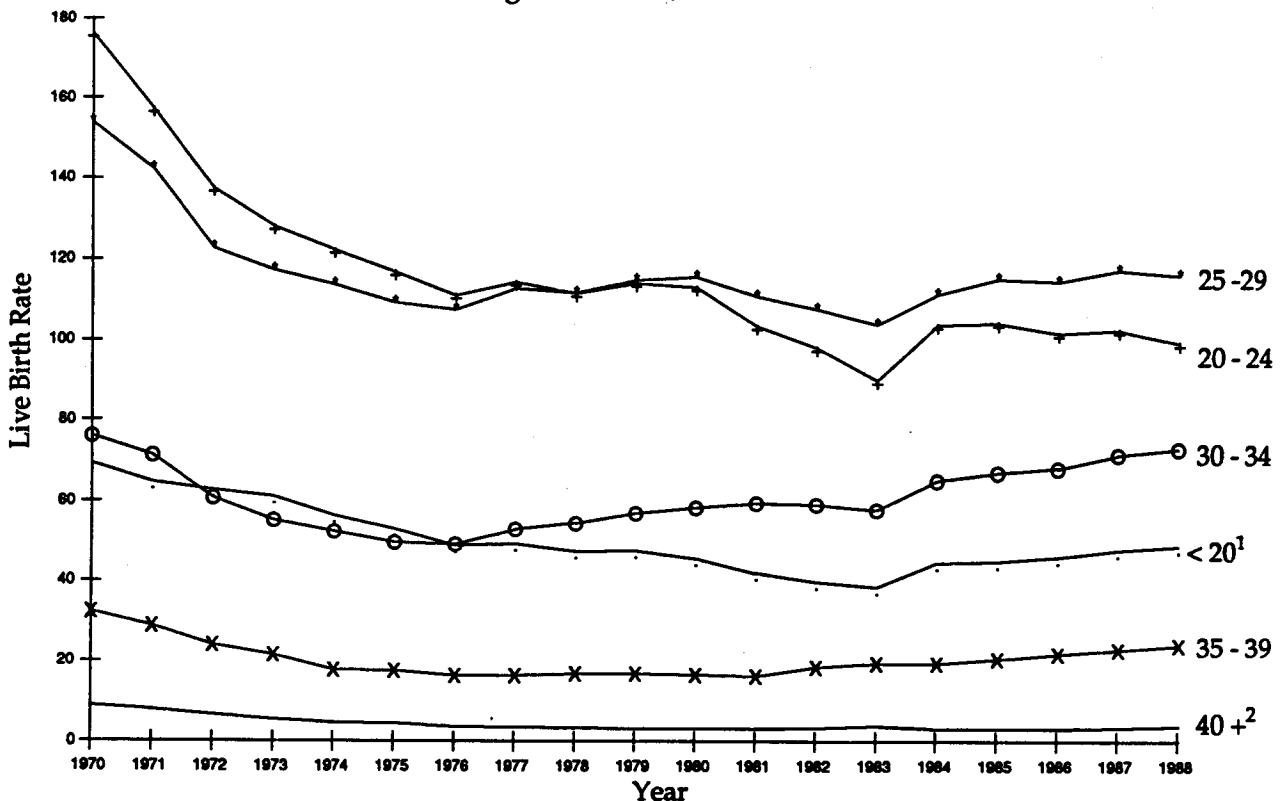
¹ Data on race not stated are included only in the total columns.

² Age-specific birth rates for under 20 are based on female population 15-19.

³ Age-specific birth rates for 40 and over are based on female population 40-44.

⁴ Total birth rates (fertility rates) are based on female population 15-44.

Figure 1.4
Age-Specific Live Birth Rates
Michigan Residents, 1970 - 1988



¹ Based on live births to women under 20 and population of females 15-19.

² Based on live births to women 40 and over and population of females 40-44.

1980 and 1988. The 1988 rate of 115.8 was 16.7 percent higher than the 1988 rate for women 20-24 years of age.

For women in the age groups 30-34 and 35-39 live birth rates decreased between 1970 and 1976 then increased by 48.7 and 46.6 percent, respectively by 1988.

In 1970, women aged 20-24 had the highest live birth rate of any age group, 14.3 percent higher than that of women aged 25-29. In 1978 through 1988 the live birth rate of women in the 25-29 year age group was above that of women aged 20-24 (Table 4.4).

Table 1.8 displays age-specific live birth rates for white and black women and women

of all other races for the years 1978 and 1988. Generally, rates for black women under age 25 and over age 34 were above those for white women in both years. However, the live birth rate for white women between 25 and 29 years exceeded that for black women by 18.1 and 10.5 percent, respectively, in 1978 and 1988. In 1988 the rate for white women between 30 and 34 years also exceeded that for their black counterparts by 12.7 percent.

In 1978 the live birth rates for all other women under 30 years of age were lower than the rates for black and white women of the same ages. For women 30 to 39 years of age, however, live birth rates for all other women were higher than those for black and white women.

In 1978 the live birth rate for black women age 15 to 44 (82.5) was 32.6 percent higher than the rate for white women (62.2) in 1978. By 1988 the difference between the rates was slightly more. The rate for black women was 35.2 percent higher than the rate for white women. During the ten years the rate for black females declined by 0.8 percent while the rate for white females declined by 2.7 percent.

The rates for females below age 25 increased for black females, while rates for white females decreased. For ages 25 to 29 years the rates increased more for black females than white females. Conversely the rates increased less for black females between 30 and 39 years of age than their white counterparts. For ages 40 or over the rates decreased for black females, while rates increased for white females. The rates for all

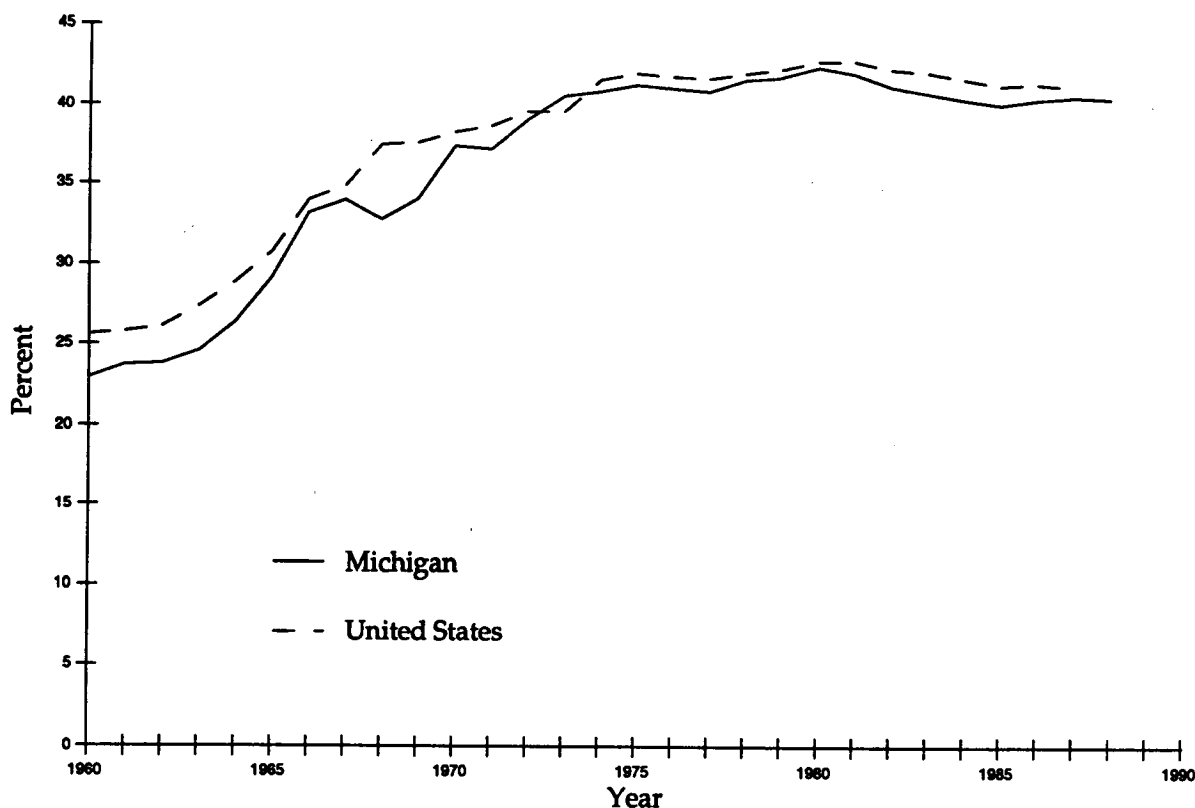
other women rose overall and for each age group during the ten years.

BIRTH ORDER

The percent of live births which were first-order births is displayed in Figure 1.5 and Table 1.9 for Michigan and the United States for the period since 1960. Between 1960 and 1970, the percent of first-order births increased from 22.9 to 37.4 in Michigan and by 1980 the percent had increased to 42.4. Then the percentage steadily decreased to 40.1 in 1985, the lowest level since 1972. The percentage increased to 40.5 percent in 1988.

The actual number of first births declined by 15.9 percent between 1970 and 1976, increased between 1976 and 1980 by 13.9 percent and decreased by 11.8 percent between

Figure 1.5
First Births as a Percentage of All Live Births
 Michigan Residents, 1960 - 1988 and United States Residents, 1960 - 1987



1980 and 1983. By 1988 the number of first births increased by 4.2 percent. The trend in first births is similar for the United States.

The distribution of Michigan resident live births by live birth order is displayed in Tables 1.10 and 1.11 for the years 1978 and 1988. The distributions of births by birth order were similar in 1978 and 1988. Of the births where birth order was known, first- and second-order live births comprised 74.5 percent of all live births in 1978 and 73.6 percent in 1988. On the other hand, 9.8 percent of all live births in 1978 were fourth or higher order live births. In 1988 the figure was 9.6 percent. The greatest relative decline occurred in fifth or higher order live births. These constituted 3.9 percent of all live births in 1978 compared to 3.5 percent in 1988.

The distribution of births for women under 25 years of age were about the same in 1978 and 1988. For women under age 20 about 79 to 80 percent of the births were first-order births, about 17 to 18 percent were second-order births and about 3 percent were third- or higher-order births. For births to women 20 to 24 years of age about 48 percent were first-order births in 1978 and 1988. The percentages of second-order births were 36.5 and 34.3 percent while about 15.5 and 17.3 percent were third- or higher-order births in 1978 and 1988.

The percent of first order births increased for women 25 years or over between 1978 and 1988. In 1978 31.0 percent of the births to women 25-29 years of age were first order births. By 1988 the percent of first order births had risen to 35.2 percent. For women 30 to 39 years of age the percent of first-order births rose from 15.8 percent in 1978 to 22.2 percent in 1988. For births to women 40 or over the percentages of first-order births were 8.2 and 15.0 percent respectively in 1978 and 1988.

Table 1.9
First Births
Michigan and United States Residents
Selected Years, 1960 - 1988

UNITED STATES		YEAR	MICHIGAN	
FIRST BIRTHS	PERCENT OF ALL BIRTHS		FIRST BIRTHS	PERCENT OF ALL BIRTHS
1,090,152	25.6	1960	44,711	22.9
1,157,386	30.8	1965	48,660	29.2
1,430,680	38.3	1970	64,222	37.4
1,375,668	38.7	1971	60,413	37.2
1,289,257	39.6	1972	57,477	39.1
1,243,358	39.6	1973	57,411	40.6
1,314,194	41.6	1974	56,233	40.9
1,319,126	42.0	1975	55,348	41.3
1,324,811	41.8	1976	54,003	41.1
1,387,143	41.7	1977	56,622	40.9
1,401,491	42.0	1978	57,767	41.6
1,479,260	42.3	1979	60,424	41.8
1,545,604	42.8	1980	61,516	42.4
1,553,665	42.8	1981	59,105	42.0
1,555,627	42.3	1982	56,879	41.2
1,530,639	42.1	1983	54,271	40.8
1,529,905	41.7	1984	54,907	40.4
1,554,788	41.3	1985	55,373	40.1
1,553,751	41.4	1986	55,615	40.4
1,567,678	41.2	1987	56,971	40.6
—	—	1988	56,561	40.5

The percent of second order births born to women 25-29 years of age were about the same in 1978 and 1988 at 37.6 and 36.8 percent. The percent of these births born to

Table 1.10
Live Births by Live Birth Order and Age of Mother
 Michigan Residents, 1978

LIVE BIRTH ORDER	AGE OF MOTHER							MEDIAN AGE AT LAST BIRTHDAY
	UNDER 20	20 - 24 YEARS	25 - 29 YEARS	30 - 39 YEARS	40 OR MORE YEARS	NOT STATED	ALL AGES	
First Birth	17,290	23,501	13,361	3,543	62	10	57,767	22
Second Birth	3,840	17,831	16,192	6,421	67	5	44,356	25
Third Birth	516	5,789	9,101	5,980	100	-	21,486	27
Fourth Birth	57	1,370	3,118	3,353	84	2	7,984	29
Fifth Birth or Greater	10	405	1,346	3,188	445	1	5,395	32
Not Stated	119	602	626	444	21	2	1,814	26
All Birth Orders	21,832	49,498	43,744	22,929	779	20	138,802	24

Table 1.11
Live Births by Live Birth Order and Age of Mother
 Michigan Residents, 1988

LIVE BIRTH ORDER	AGE OF MOTHER							MEDIAN AGE AT LAST BIRTHDAY
	UNDER 20	20 - 24 YEARS	25 - 29 YEARS	30 - 39 YEARS	40 OR MORE YEARS	NOT STATED	ALL AGES	
First Birth	13,777	18,078	16,100	8,172	171	263	56,561	23
Second Birth	2,987	12,817	16,833	12,621	209	239	45,706	26
Third Birth	515	4,841	8,676	9,053	233	90	23,408	28
Fourth Birth	58	1,258	2,884	4,102	196	29	8,527	30
Fifth Birth or Greater	9	371	1,226	2,879	329	9	4,823	32
Not Stated	28	164	205	195	10	8	610	27
All Birth Orders	17,374	37,529	45,924	37,022	1,148	638	139,635	26

women over 29 years of age increased from 28.6 percent to 34.3 percent for women age 30-39 and from 8.8 to 18.4 percent for women over 40 years of age.

Between 1978 and 1988 the percent of third- or higher-order births decreased for women 25-29 years of age from 31.5 percent to 28.0 percent. The largest changes occurred for women ages 30 and over. The proportions for woman 30 to 39 years of age decreased from 55.7 to 43.5 percent. The decrease for women ages 40 and above was from 83.0 to 66.6 percent.

The median age of mothers having their first child increased from 22 to 23 between 1978 and 1988. For mothers having their second child, the median age also increased from 25 to 26. The median ages for mothers increased by one year for all birth orders between 1978 and 1988, except fifth order births, which remained the same.

INTERPREGNANCY TIME PERIOD

The distributions of live births by interpregnancy time period were similar in 1978 and 1988. In both years fewer than 4 percent of the births occurred less than a year after the termination of the most recent prior pregnancy (Table 1.12). Another 30.5 and 31.6 percent of the births were to women with prior deliveries occurring one to two years after the most recent pregnancy termination. About 24 percent of the births had spacings of two to three years. A lower percentage of births had a spacing of 3 to 5 years in 1988 (22.4 percent) than in 1978 (24.0 percent). In both years 18.2 percent of the births were to women five or more years after the termination of their most recent prior pregnancy.

In 1988 women having live births whose most recent prior termination was a fetal death had a median time span of 1 year and 11 months between their previous termination

Table 1.12
Live Births to Women Reporting Prior Pregnancy Terminations¹
by Time Span Between Last and Current Termination
Michigan Residents, 1978 and 1988²

TIME SPAN IN YEARS	1978		1988	
	NUMBER	PERCENT	NUMBER	PERCENT
Total	86,852	100.0	93,207	100.0
Less Than One	2,849	3.3	3,675	3.9
1 < 2	26,512	30.5	29,440	31.6
2 < 3	20,860	24.0	22,273	23.9
3 < 5	20,864	24.0	20,843	22.4
5 or More	15,767	18.2	16,976	18.2
Median Time Span	2 Years 7 Months		2 Years 6 Months	

¹ Terminations with time spans of zero years (i.e., second or later births in plural deliveries) and terminations with unknown time spans are excluded.

² The methodology for calculating interpregnancy time span was altered slightly in 1984. Hence, median time spans and percentages are not comparable to statistics published in prior years.

and a live birth (Table 1.13). This compares to a median of 2 years 8 months for prior live births. Although 1 to 2 years was the modal time span for both groups, the percent of women with prior fetal deaths in this interval (40.4) was much larger than that for women with prior live births (28.4). The greatest relative difference was associated with time spans of less than one year. A spacing of less than one year was observed for 10.1 percent of all women reporting their most recent prior pregnancy as a fetal death. This compares to 1.7 percent of all women reporting their most recent prior pregnancy as a live birth.

PRENATAL CARE

The most common month of pregnancy in which women first obtain prenatal care was the second month. In 1988 41.0 percent of all women having live births initiated care during the second month. The median number of prenatal visits was 12, and 61.2 percent

of all live births were to women receiving 10-14 prenatal visits. Table 1.14 indicates the relationship between the month of pregnancy prenatal care began and the number of prenatal visits. For births in which the mother began receiving care in the first month, the median number of visits was 13. The median number of visits was lower for women where prenatal care began later in the pregnancy.

The proportion of live births to women who initially obtained prenatal care in the first trimester of pregnancy was 79.2 percent in 1988. This percent increased steadily between 1970, when the figure was 69.0, and 1985 when it peaked at 81.0 (Figure 1.6). It fluctuated between 79.2 and 80.0 after 1985.

There were also small but steady increases in the percentage of births to women receiving care prior to the sixth month of pregnancy over the period 1970-1975. In 1970, 86.0 percent of all live births were to women who received care prior to the sixth month of

Table 1.13
Live Births to Women Reporting Prior Pregnancy Terminations¹
by Time Span Between Last and Current Termination and
by Whether Prior Termination Resulted in a Live Birth or a Fetal Death²
 Michigan Residents, 1988³

TIME SPAN IN YEARS	TOTAL		PRIOR FETAL DEATH		PRIOR LIVE BIRTH	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total	93,207	100.0	24,614	100.0	68,593	100.0
Less Than One	3,675	3.9	2,492	10.1	1,183	1.7
1 < 2	29,440	31.6	9,952	40.4	19,488	28.4
2 < 3	22,273	23.9	4,287	17.4	17,986	26.2
3 < 5	20,843	22.4	3,707	15.1	17,136	25.0
5 or More	16,976	18.2	4,176	17.0	12,800	18.7
Median Time Span	2 Years 6 Months		1 Year 11 Months		2 Years 8 Months	

¹ Terminations with time spans of zero years (i.e., second or later births in plural deliveries) and terminations with unknown time spans are excluded.

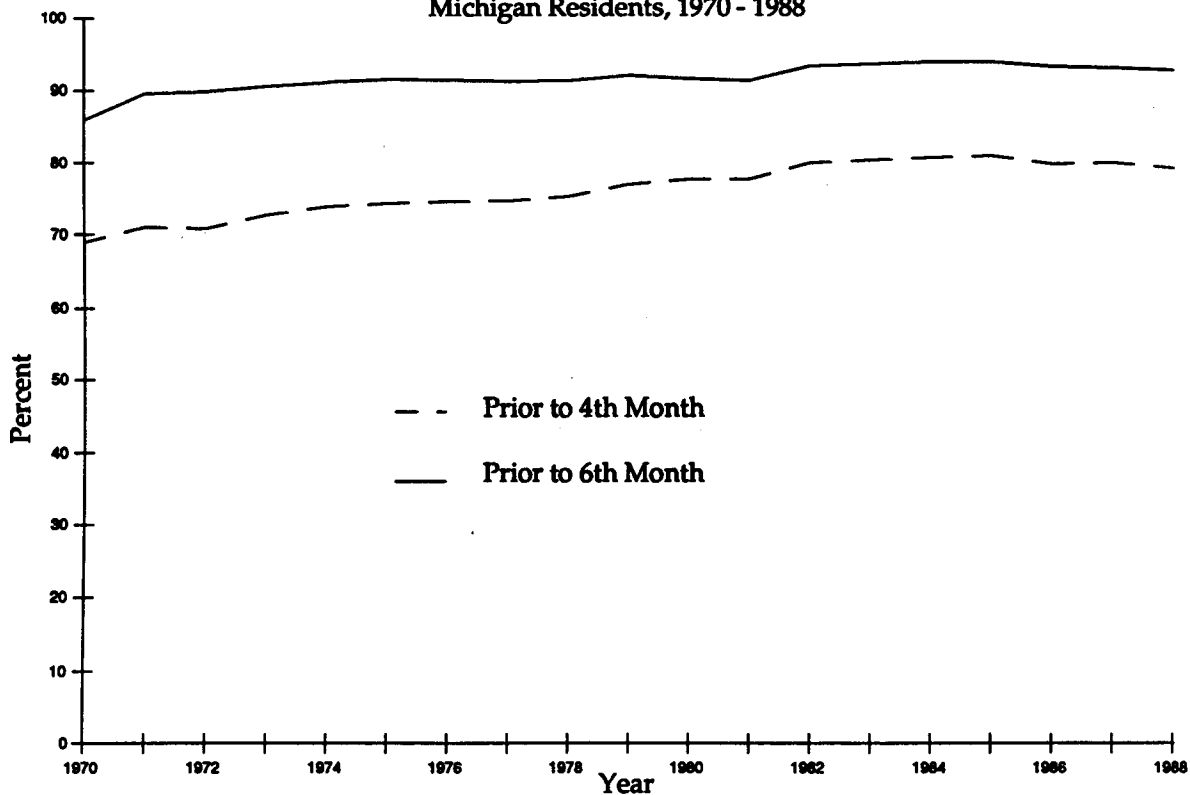
² Fetal death as defined for the pregnancy history on the birth record is a fetal death of any gestational age.

³ The methodology for calculating interpregnancy time span was altered slightly in 1984. Hence, median time spans and percentages are not comparable to statistics published in prior years.

Table 1.14
Live Births by Month Prenatal Care Began and Number of Prenatal Visits
 Michigan Residents, 1988

MONTH CARE BEGAN	NUMBER OF VISITS								MEDIAN NUMBER OF VISITS
	TOTAL	NONE	1 - 4	5 - 9	10 - 14	15 - 19	20 OR MORE	UNK-KNOWN	
Total	139,635	1,652	3,311	23,600	85,413	18,409	4,446	2,804	12
First	22,412	-	134	1,360	12,465	6,864	1,308	281	13
Second	57,204	-	296	5,023	41,014	8,153	2,019	699	12
Third	30,964	-	327	5,564	21,377	2,439	757	500	12
Fourth	12,488	-	353	4,375	6,734	622	221	183	10
Fifth	6,497	-	398	3,245	2,478	208	80	88	9
Sixth	3,657	-	437	2,146	925	73	30	46	8
Seventh	2,141	-	533	1,315	228	21	15	29	6
Eighth	1,043	-	540	420	58	8	2	15	4
Ninth	274	-	188	45	19	2	5	15	3
No Care	1,652	1,652	-	-	-	-	-	-	-
Unknown	1,303	-	105	107	115	19	9	948	8

Figure 1.6
Percent of Women Having Live Births Who Received Care
Prior to the 4th Month and 6th Month of Pregnancy
 Michigan Residents, 1970 - 1988



pregnancy. By 1975, this had risen to 91.6 percent. The figure remained at that level through 1981. By 1985 the percent of all women who received care before the sixth month was 93.9 percent. The percentage decreased for the next three years to 92.8 in 1988.

The proportion of births to women receiving early prenatal care varied considerably by race of infant and age of mother (Table 1.15). In 1988, 82.1 percent of white infants compared to 67.1 percent of the black infants were born to mothers who began their prenatal care in the first trimester. Over 85.0 percent of live births to women 25 to 39 years of age were to women who sought care promptly. The proportion of births to women receiving early prenatal care declined with maternal age increasing and decreasing from 30-34 years of age. The proportion fell to 79.6 percent for women 40 years or over and 32.6 percent for women under 15 years. About six in ten (57.5

percent) live births to mothers 15-19 years of age were to mothers who received care early. Similar patterns in this proportion by age of mother are evident for white, black and all other infants. However, the highest levels of proportions for mothers of black infants were between 76.2 and 76.6 for mothers over twenty-nine while the rates were between 81.1 and 89.4 for mothers of white infants who were over twenty-four years of age.

The month prenatal care began varied with live birth order (Table 1.16). The proportion of live births to women who began care during the first trimester was highest for second order live births (82.1 percent) and lowest for fifth or higher order births (63.7 percent). Conversely, the proportion of births to women who began care during the third trimester, or received no care, was lowest (3.1 percent) for second order live births. This figure increased with the number of previous live births. Among fifth order live births 10.2

Table 1.15
**Numbers and Percents of Live Births with Prenatal Care
 Beginning in the First Trimester by Age of Mother and Race of Child
 Michigan Residents, 1988**

Age of Mother in Years	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
Under 15	121	32.6	32	31.1	88	33.3	1	*	-	-
15 - 19	9,775	57.5	6,260	59.8	3,396	53.9	112	51.9	7	53.8
20 - 24	27,729	73.9	21,888	76.0	5,440	66.7	392	69.3	9	56.3
25 - 29	39,265	85.5	33,978	87.4	4,623	74.8	656	78.5	8	44.4
30 - 34	24,930	87.6	21,609	89.4	2,786	76.6	529	82.4	6	75.0
35 - 39	7,335	85.8	6,175	87.6	962	76.2	194	82.2	4	*
40 or More	914	79.6	732	81.1	147	76.6	35	66.0	-	-
Not Stated	511	80.1	490	82.2	19	51.4	2	*	-	-
Total	110,580	79.2	91,164	82.1	17,461	67.1	1,921	75.2	34	54.0

¹ Percent denominators obtained from Table 1.6.

Table 1.16
Live Births by Month of Pregnancy Prenatal Care Began and Live Birth Order
 Michigan Residents, 1988

MONTH OF PREGNANCY CARE BEGAN	LIVE BIRTH ORDER						
	TOTAL	FIRST	SECOND	THIRD	FOURTH	FIFTH OR GREATER	NOT STATED
1st Month	22,412	9,216	7,945	3,418	1,214	545	74
2nd Month	57,204	23,310	19,624	9,556	3,088	1,423	203
3rd Month	30,964	12,321	9,945	5,446	2,025	1,105	122
4th Month	12,488	4,963	3,676	2,250	919	628	52
5th Month	6,497	2,835	1,773	1,084	463	312	30
6th Month	3,657	1,580	992	564	275	231	15
7th Month	2,141	851	608	372	164	140	6
8th Month	1,043	408	300	158	93	81	3
9th Month	274	96	78	51	22	24	3
No Care	1,652	486	422	302	172	246	24
Not Stated	1,303	495	343	207	92	88	78
Total	139,635	56,561	45,706	23,408	8,527	4,823	610
Percentage Beginning Care in First Trimester	79.2	79.3	82.1	78.7	74.2	63.7	65.4
Percentage Without Care During First Six Months	3.7	3.3	3.1	3.8	5.3	10.2	5.9

percent were to women who had received no care by the beginning of the 7th month of the pregnancy.

The proportion of live births to mothers having ten or more prenatal visits was 77.6 percent in 1988 compared to 70.3 percent in 1980 (Table 1.17). This statistic varied considerably by race. While mothers of 79.1 percent of white infants had at least ten prenatal visits, the percentages were only 71.2 and 72.1 for black and all other infants, respectively. The median number of prenatal visits was 12 for mothers of children of all races. The mean

number of prenatal visits was 13.6 for mothers of white infants, 8.8 percent higher than the mean of 12.5 visits for mothers of black infants. The mean number of visits for mothers of infants of all other races was 13.2, 5.6 percent higher than the mean for mothers of black infants.

In 1988, 1,652 resident live births, or 11.8 of every 1,000, occurred with the mother having had no prenatal care (Table 1.18). This figure includes only those where it was specified that the mother received no prenatal care. The comparative statistics were 6.3 in 1985 and

Table 1.17
Live Births and Percent Distribution by Number of the Mother's Prenatal Visits and
Race of Child
Michigan Residents, 1988

Number of Prenatal Visits	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Ratio ¹	Number	Ratio ¹	Number	Ratio ¹	Number	Ratio ¹	Number	Ratio ¹
None	1,652	1.2	701	0.6	933	3.6	15	0.6	3	4.8
1 - 4	3,311	2.4	1,955	1.8	1,259	4.8	93	3.6	4	6.3
5 - 9	23,600	16.9	18,156	16.4	4,886	18.8	550	21.5	8	12.7
10 - 14	85,413	61.2	69,938	63.0	13,976	53.7	1,469	57.5	30	47.6
15 - 19	18,409	13.2	14,341	12.9	3,769	14.5	294	11.5	5	7.9
20 or Over	4,446	3.2	3,588	3.2	779	3.0	78	3.1	1	1.6
Not Stated	2,804	2.0	2,303	2.1	432	1.7	57	2.2	12	19.0
Total	139,635	100.0	110,982	100.0	26,034	100.0	2,556	100.0	63	100.0
Median Number of Visits	12		12		12		12		12	
Mean Number of Visits	13.4		13.6		12.5		13.2		27.1	

Table 1.18
Live Births with No Prenatal Care by Age of Mother and Race of Child
Michigan Residents, 1988

Age of Mother in Years	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Ratio ¹	Number	Ratio ¹	Number	Ratio ¹	Number	Ratio ¹	Number	Ratio ¹
Under 15	24	64.7	10	97.1	13	49.2	-	-	1	*
15 - 19	436	25.6	171	16.3	265	42.0	-	-	-	-
20 - 24	540	14.4	256	8.9	275	33.7	9	15.9	-	-
25 - 29	344	7.5	145	3.7	195	31.5	2	*	2	*
30 - 39	282	7.6	106	3.4	173	35.3	3	*	-	-
40 or More	13	11.3	5	*	7	36.5	1	*	-	-
Not Stated	13	20.4	8	13.4	5	*	-	-	-	-
Total	1,652	11.8	701	6.3	933	35.8	15	5.9	3	*
Median Age at Last Birthday	23		22		23		23		27	

¹ Percent denominators obtained from Table 1.6.

11.8 in 1971. In 1986 and 1987, 1,195 and 1,303 resident live births, respectively, were born to mothers having no prenatal care.

Those who received no prenatal care were for the most part younger mothers (median age of 23). Also, the lack of prenatal care was disproportionately high among mothers of black infants. The ratio of live births in which the mother received no prenatal care to the total number of live births was 5.7 times as large for black infants than for white infants in 1988. The ratio was 6.1 times larger for black infants than for all other infants.

A measure of the quality of care has been developed by Dr. D. W. Kessner which combines information on the month prenatal care began, the gestational age at birth and the number of prenatal visits. Adequate prenatal care is defined as care which began within the first trimester and which included an average of at least one or two additional prenatal visits per month of gestation depending on the length of gestation.

Intermediate care is defined as care which began during the second trimester of the

pregnancy with correspondingly fewer visits, or which began during the first trimester but a few less visits occurred than would be appropriate for the length of gestation. Finally, care is defined as inadequate when no care was received or if care began during the third trimester. It is also defined as inadequate if care began during the first or second trimester but less than five visits occurred, when the length of gestation was 34 weeks or more. When the length of gestation was less than 34 weeks, care was defined as inadequate when care began during the first or second trimester but even fewer than five visits occurred.

Adequate prenatal care was obtained by mothers of 72.3 percent of the live births (Table 1.19). The proportion of live births to mothers of white infants who received adequate care (75.3 percent) was higher than the corresponding proportion for mothers of black (60.2) and all other infants (67.3 percent). Inadequate care was received by the mothers of 6.2 percent of all live births. The proportions of live births to mothers who received inadequate care were 5.1 percent for white infants, 10.9 percent for black infants and 7.6 percent for all other infants.

Table 1.19
Number and Percent of Live Births by Level of Prenatal Care and Race of Child
Michigan Residents, 1988

Level of Prenatal Care (Kessner Index ¹)	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
Adequate	100,969	72.3	83,548	75.3	15,670	60.2	1,720	67.3	31	49.2
Intermediate	26,697	19.1	19,290	17.4	6,824	26.2	574	22.5	9	14.3
Inadequate	8,702	6.2	5,655	5.1	2,844	10.9	194	7.6	9	14.3
Unknown	3,267	2.3	2,489	2.2	696	2.7	68	2.7	14	22.2
Total	139,635	100.0	110,982	100.0	26,034	100.0	2,556	100.0	63	100.0

¹ The Kessner Index is a classification of prenatal care based on the month of pregnancy in which prenatal care began, the number of prenatal visits and the length of pregnancy (i.e., for shorter pregnancies, fewer prenatal visits constitute adequate care.)

Although the mothers of 79.2 percent of all live births received prenatal care during the first trimester, only 72.3 received adequate care as defined by the Kessner Index. Overall, this means that for 8.7 percent of the live births whose mothers initiated prenatal care most promptly, their mothers did not receive the minimum number of visits they should have received during the time they were pregnant.

For white infants 8.3 percent of the mothers began prenatal care during the first trimester and failed to receive an adequate number of prenatal visits during the pregnancy. The percentages for black and all other infants were 10.3 and 10.5, respectively (Tables 1.15 and 1.19).

Considered as a proportion of the live births to mothers who did not receive adequate care,

24.9 percent of the live births to mothers not receiving adequate care were to mothers who initiated care within the recommended first trimester, but did not continue to receive the appropriate minimum number of prenatal care visits. The percentages were 27.5, 17.3 and 24.2 percent respectively for mothers of white, black and all other infants.

BIRTH WEIGHT

The mean weight for all live births was 3,348 grams or approximately 7 pounds 6 ounces (Table 1.20). The median weight was 3,388 grams or about 7 pounds 8 ounces. For black infants the mean (3,077 grams) and median (3,147 grams) birth weights were much lower than the mean and median birth weights for white infants (3,412 and 3,430 grams, respectively). For all other infants, the

Table 1.20
Live Births by Birth Weight and Race
Michigan Residents, 1988

WEIGHT AT BIRTH	RACE				
	TOTAL	WHITE	BLACK	ALL OTHER	NOT STATED
500 Grams or Less	332	140	186	3	3
501 - 1,000 Grams	754	389	359	5	1
1,001 - 1,500 Grams	946	540	391	15	-
1,501 - 2,000 Grams	2,006	1,222	752	30	2
2,001 - 2,499 ¹ Grams	6,199	4,073	2,030	94	2
2,500 - 3,000 Grams	21,854	15,138	6,236	465	15
3,001 - 3,500 Grams	50,038	39,326	9,684	1,004	24
3,501 - 4,000 Grams	41,393	35,654	5,038	692	9
4,001 - 4,500 Grams	13,278	11,929	1,155	191	3
4,501 Grams or More	2,804	2,553	196	55	-
Not Stated	31	18	7	2	4
Total	139,635	110,982	26,034	2,556	63
Mean Weight in Grams	3,347.9	3,412.1	3,076.6	3,328.4	2,959.9
Median Weight in Grams	3,388.4	3,430.4	3,147.3	3,344.7	3,115.0

¹ In order to conform to national standards, the definition of low birthweight was changed in 1984 to less than 2500 grams.

mean and median birth weights were 84 and 86 grams less than the mean and median for white infant but were 252 and 197 grams higher than the birth weights of black infants.

A subgroup of major importance when analyzing birth weight trends is the category of infants weighing less than 2,500 grams (approximately 5 pounds 8 ounces or less) at birth. Such infants have historically experienced higher mortality in their first year of life than heavier infants. In 1988, 73.3 of every 1,000 live births weighed less than 2,500 grams (Table 1.21).

The proportion of low birth weight infants varies with the race of the child, the age of the mother, and the amount and adequacy of prenatal care the mother has received. Mothers that are very young, black or of races

other than black or white have fewer prenatal visits. Black women also have higher birth rates in the younger age groups. Tables 1.21, 1.22 and 1.23 present data on these variables with respect to birth weight.

The age group with the highest low birth weight ratio (132.1) was the group of mothers under 15 years of age. This ratio was lower for each succeeding age group through age group 25-29 (64.3) then increased for the older age groups to 85.4 per 1,000 live births for mothers 40 years or over (Table 1.21).

The low birth weight ratio for black infants was 142.8 compared with 57.3 for white infants and 57.5 for all other infants (Table 1.21). The low birth weight ratios for black infants vary less by age of mother than those for white infants. For white infants the ratio

Table 1.21
Low Weight¹ Live Births and Low Birth Weight Ratios by Age of Mother
and Race of Child
Michigan Residents, 1988

Age of Mother	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²
Under 15	49	132.1	14	135.9	35	132.6	-	-	-	-
15 - 19	1,616	95.0	778	74.3	822	130.4	13	60.2	3	*
20 - 24	2,820	75.1	1,752	60.8	1,041	127.7	27	47.7	-	-
25 - 29	2,952	64.3	1,956	50.3	942	152.4	50	59.8	4	*
30 - 39	2,654	71.7	1,763	56.5	836	170.6	54	61.5	1	*
40 or More	98	85.4	64	70.9	32	166.7	2	*	-	-
Not Stated	48	75.2	37	62.1	10	270.3	1	*	-	-
Total	10,237	73.3	6,364	57.3	3,718	142.8	147	57.5	8	127.0
Median Age at Last Birthday	26		26		24		27		26	

¹ Less than 2,500 grams.

² Ratio denominators obtained from Table 1.6.

associated with mothers under 15 years of age (135.9) was 2.7 times that of mothers in the 25-29 year age group (50.3). For black infants the differential between the age groups with the highest and lowest ratios was about 1.3 times.

The ages of mothers associated with the lowest low birth weight ratio were 25-29 for white infants (50.3) and 20-24 years of age (127.7) for black infants. Where ratios could be calculated, the low birth weight ratios for all other births were higher than the ratios for white infants for mothers over 24 years of age, but lower than the ratios for black infants. The ratios increased for infants born to mothers of increasing and decreasing age around 25-29 years for white infants and around 20-24 years for black infants. Historically for black infants, the ratios generally

increase with increasing and decreasing maternal age around 15-24 years.

When low birth weight ratios are examined by the number of the mother's prenatal visits even more striking variations are evident. The low birth weight ratio for the highest risk group was 6.6 times that of the group with the lowest ratio. The low birth weight ratio was highest when the mother had no prenatal care at 316.0. The ratio declined as the number of prenatal visits increased through 10-14 visits, where the ratio was 47.8. The low birth weight ratio was 86.6 for mothers with 20 or more prenatal visits. It is likely that a very high number of prenatal visits is associated with problems in the pregnancy (Table 1.22).

Black and white infants show similar patterns of rising and falling ratios varying with

Table 1.22
Low Weight¹ Live Births and Low Birth Weight Ratios by Number of Prenatal Visits and Race of Child
 Michigan Residents, 1988

Number of Prenatal Visits	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²
None	522	316.0	164	234.0	355	380.5	3	*	-	-
1 - 4	912	275.4	437	223.5	458	363.8	16	172.0	1	*
5 - 9	3,071	130.1	2,135	117.6	885	181.1	51	92.7	-	-
10 - 14	4,080	47.8	2,538	36.3	1,493	106.8	47	32.0	2	*
15 - 19	944	51.3	573	40.0	357	94.7	14	47.6	-	-
20 or More	385	86.6	291	81.1	81	104.0	13	166.7	-	-
Not Stated	323	115.2	226	98.1	89	206.0	3	*	5	*
Total	10,237	73.3	6,364	57.3	3,718	142.8	147	57.5	8	127.0
Median Number of Visits	10		10		10		10		10	
Mean Number of Visits	12.5		13.3		11.1		12.1		64.7	

¹ Less than 2500 grams.

² Ratio denominators obtained from Table 1.17.

the frequency of prenatal visits (Table 1.22). The low birth weight ratio for black infants varied from a high of 380.5 where the mother had no care to a low of 94.7 where the mother had 15 to 19 visits. The ratio for white infants varied from a high of 234.0 where the mother had no care to a low of 36.3 where the mother had 10 to 14 prenatal visits.

The greatest relative difference between the low birth weight ratios was observed for births to mothers with 10-14 visits. The ratio for black infants was 2.9 times the ratio for white infants. Overall, the low birth weight ratio for black infants was 2.5 times the ratio for white infants. This high overall difference in the low birth weight ratios is also associated with a differential in the proportion of mothers having had fewer than 10 prenatal visits, where low birth weight ratios are high. While 18.8 percent of the white infants were to mothers who had less than 10 prenatal visits, the corresponding figure for black infants was 27.2 percent (Table 1.17).

For low birth weight infants the median number of the mother's prenatal visits was 10, compared to 12 for all infants. The mean number of visits for mothers of low birth weight infants was 12.5, 6.7 percent less than the mean of 13.4 for mothers of all infants. As low birth weight infants are more likely to have been born prematurely, the shorter prenatal period results in a reduction of the potential length of time for prenatal care.

The low birth weight ratio varied by adequacy of prenatal care as indicated by the Kessner Index (Table 1.23). The ratio was 2.1 times higher for both black and white infants born to mothers with inadequate care than to mothers with adequate prenatal care. The ratio was 1.5 times higher for white infants born to women with intermediate care than for white infants born to women with adequate care. For black infants the ratio was 1.2 times higher when the mother received an intermediate level of care. For all other infants the ratios of low birth weight for

Table 1.23
Low Weight¹ Live Births and Low Birth Weight Ratios
by Level of Prenatal Care and Race of Child
Michigan Residents, 1988

Level of Prenatal Care (kessner Index ²)	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Ratio ³	Number	Ratio ³	Number	Ratio ³	Number	Ratio ³	Number	Ratio ³
Adequate	6,046	59.9	4,085	48.9	1,868	119.2	91	52.9	2	*
Intermediate	2,447	91.7	1,412	73.2	1,003	147.0	31	54.0	1	*
Inadequate	1,299	149.3	582	102.9	700	246.1	17	87.6	-	-
Unknown	445	136.2	285	114.5	147	211.2	8	117.6	5	*
Total	10,237	73.3	6,364	57.3	3,718	142.8	147	57.5	8	127.0

¹ Less than 2500 grams.

² The Kessner Index is a classification of prenatal care based on the month of pregnancy in which prenatal care began, the number of prenatal visits and the length of pregnancy (i.e., for shorter pregnancies, fewer prenatal visits constitute adequate care).

³ Ratio denominators obtained from Table 1.19.

women who receive inadequate and intermediate care were 65.6 and 2.1 percent higher than the ratio for women who received adequate care.

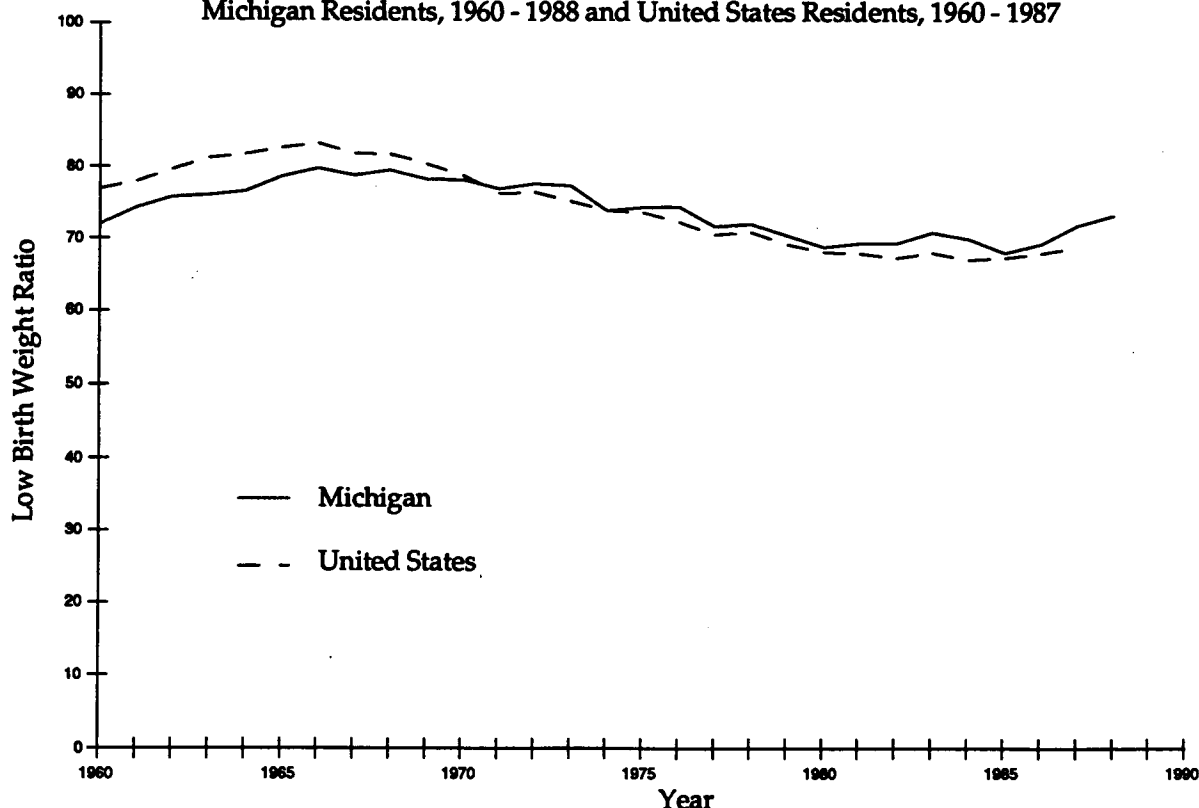
At birth 14.3 percent of the black infants weighed less than 2,500 grams. Of black infants born to women with adequate care, a lower percentage (11.9) weighed less than 2,500 grams. The low weight ratio for black infants born to women with adequate care was still higher than the ratio for white and all other infants at any level of prenatal care. The low birth weight ratio was 2.4 and 2.3 times higher for black infants born to women with adequate care than for the corresponding white and all other infants.

The low birth weight ratios were lower for white infants than all other infants born to women receiving adequate care, but higher

for women receiving intermediate or inadequate care. For all other infants born to women with inadequate care, the low birth weight ratio was 14.9 percent lower than the corresponding ratio for white infants.

Figure 1.7 displays the low birth weight ratio for Michigan and the United States over the last twenty-eight years. In 1960 this ratio was 72.0 for Michigan. Between 1960 and 1966 the ratio increased, reaching a high for the 28 year period in 1966 (79.8). Since that time the ratio has generally declined. The ratio for 1985 was 68.1, the lowest rate since 1960. It rose to 73.3 in 1988. The pattern for the United States has been similar. The ratio increased from 76.9 in 1960 to 83.3 in 1966, and declined to 67.1 in 1984. In 1987 the low birth weight ratio for the nation had increased to 68.9. The ratio for the United States was above that for Michigan each year from 1960

Figure 1.7
Low Birth Weight¹ Ratios
 Michigan Residents, 1960 - 1988 and United States Residents, 1960 - 1987



¹ Prior to 1984, low birth weight was defined as 2,500 grams or less. Starting with year 1984, low birth weight is defined as less than 2,500 grams in order to conform to national standards.

through 1970. Since then the ratio for the nation has been the same or lower than that of Michigan.

SEX OF INFANT

In 1988 51.1 percent of the infants born to Michigan residents were male. The proportion of males to females varies by race. The numbers of males per 1,000 females were 1,050 for white infants, 1,023 for black infants, 1,087 for American Indians, and 1,170 for infants of all other races (Table 1.24). For all races, except for American Indians, the low birth weight ratio for females was higher than for males. The ratio of 80.9 for females, was 22.6 percent above the corresponding ratio of 66.0 for males.

MOTHER'S EDUCATION

Educational attainment of women having live births in 1988 varied with their age (Table

1.25). Of all Michigan resident live births in 1988, 18.9 percent were to women who had not completed high school. For mothers less than 20 years of age, the majority of live births (64.3) were to mothers who had not completed high school. The percentage of live births to mothers with fewer than 4 years of high school dropped to 21.4 for those aged 20-24 and to 6.6 for mothers aged 30-34. This percentage increased to 7.4 for mothers aged 35-39 and to 13.9 for mothers 40 years or older. Conversely, age of mothers of live born infants varied with the level of education. The median age of the mother was 20 years for those with 1 to 3 years of high school and 30 years for women with 4 or more years of college.

Birth order varies with the mother's education as well as her age (Table 1.26). The first birth ratio (number of first live births per 100 live births) decreased with increasing maternal age. Within maternal age categories the ratio generally increased with educational attainment. The first birth ratio for mothers

Table 1.24

Live Births, Low Weight Live Births and Low Birth Weight Ratios by Sex and Race Michigan Residents, 1988

Race	Live Births				Low Weight Live Births			Low Birth Weight Ratios		
	Total ¹	Male	Female	Males per 1,000 Females	Total ¹	Male	Female	Total ¹	Male	Female
Total	139,635	71,405	68,226	1,047	10,237	4,714	5,519	73.3	66.0	80.9
White	110,982	56,848	54,131	1,050	6,364	2,939	3,422	57.3	51.7	63.2
Black	26,034	13,164	12,869	1,023	3,718	1,695	2,022	142.8	128.8	157.1
American Indian	766	399	367	1,087	47	26	21	61.4	65.2	57.2
Other	1,790	965	825	1,170	100	49	51	55.9	50.8	61.8
Unknown	63	29	34	853	8	5	3	127.0	*	*

¹ Records with sex not stated are included only in total columns.

Table 1.25
Live Births by Age and Education of Mother
 Michigan Residents, 1988

Age of Mother in Years	Mother's Education							Percent With At Least High School Education
	Total	8th Grade or Less	1 - 3 Years High School	4 Years High School	1 -3 years College	4 or More Years College	Not Stated	
Under 20	17,374	1,280	9,896	5,534	588	2	74	35.2
20 - 24	37,529	661	7,356	19,839	8,298	1,216	159	78.2
25 - 29	45,924	454	3,981	20,394	13,025	7,937	133	90.1
30 - 34	28,469	298	1,571	10,210	8,289	8,019	82	93.1
35 - 39	8,553	175	459	2,603	2,233	3,048	35	92.2
40 or More	1,148	67	93	345	260	375	8	85.4
Not Stated	638	7	89	274	169	91	8	83.7
Total	139,635	2,942	23,445	59,199	32,862	20,688	499	80.7
Median Age at Last Birthday	26	21	20	25	27	30	25	000

Table 1.26
First Birth Ratios¹ by Age and Education of Mother
 Michigan Residents, 1988

AGE OF MOTHER	MOTHER'S EDUCATION					
	TOTAL	8TH GRADE OR LESS	1 - 3 YEARS HIGH SCHOOL	4 YEARS HIGH SCHOOL	1 - 3 YEARS COLLEGE	4 OR MORE YEARS COLLEGE
Under 20 Years	79.3	76.4	76.4	84.2	88.8	-
20 - 24 Years	48.2	22.7	23.8	49.9	63.0	81.1
25 - 29 Years	35.1	11.9	11.8	29.3	37.8	58.5
30 - 34 Years	23.3	6.4	7.6	18.7	23.1	33.1
35 or More Years	17.7	4.5	4.9	13.6	18.1	23.8
Total	40.5	41.3	42.5	38.7	39.9	44.2

¹ First live births per 100 live births. Births where the Mother's age and/or education are not stated are included in the total but are not reallocated to specific age and education categories.

with 4 or more years of college was 44.2 compared to 41.3 for mothers with 8th grade education.

For live births to women 20-24 years of age who had completed 4 or more years of college, 81.1 percent were to women with no previous live births, while only 22.7 percent of the live births to women of the same age who had completed the eighth grade or less were first births. Mothers with 1 to 3 years of high school had the lowest or second lowest first birth ratio within each age interval taken separately but the second highest total first birth ratio (42.5). This high overall ratio reflects the fact that a relatively large proportion (42.2 percent) of births to mothers with 1 to 3 years of high school occurred before the age of 20.

CONGENITAL ANOMALIES

One or more congenital anomalies were reported for 746 of the 139,635 resident live births in 1988 (Table 1.27). This translates to a rate of 53.4 per 10,000 live births.

In 1979 the 9th Revision of the International Classification of Diseases was introduced for the coding of reported congenital anomalies. Care should be exercised in making comparisons between the reported incidences of specific types of anomalies for years during which different revisions of the ICD were used to classify anomalies. In addition, the frequency of reporting of specific anomalies is affected by the reporting schedule. Many conditions may not be apparent at the time the birth certificate is completed and filed.

(On the other hand, multiple anomalies may be reported in the same or different ICD classes for the same live birth.)

The most frequently reported category was ICD 755, other congenital anomalies of limbs (excluding those classified to 754), with 156 anomalies. When this category was combined with the category 754, certain congenital musculoskeletal deformities (including clubfoot), and category 756, other congenital musculoskeletal anomalies, the total number of musculoskeletal system anomalies reported added to 267, or 31.7 percent of the 841 distinct anomalies reported.

Congenital anomaly rates by age of mother and race of child are presented in Table 1.28. The rates for all races combined varied with the age of the mother. The lowest rates were experienced by mothers 25-29 years of age. The rates increase with age above 29 years. Congenital anomaly rates for black infants were below those for white infants for women at each age group with a rate except 30-34 years of age. The overall rate for white infants was 55.0 compared to 46.1 for black infants.

Figure 1.8 displays the rate of reported congenital anomalies for Michigan resident live births over the period 1960-1988. The rate has exhibited a cyclical pattern over this time period rising from 88.4 per 10,000 live births in 1960 to 120.6 in 1963. By 1970 the rate had returned to the level of 1960 (88.3). The rate then rose to 100.8 in 1973. Since 1973 the rate has declined by 47.0 percent. The rate of 53.4 for 1988 was the lowest reported congenital anomalies rate during the 29 year period.

Table 1.27
Congenital Anomalies¹ Reported by Type of Anomaly
 Michigan Residents, 1988

TYPE OF ANOMALY	ICD ³ NUMBER	NUMBER OF CONDI- TIONS ⁴	RATE PER 10,000 LIVE BIRTHS
Other congenital anomalies of limbs	755	156	11.2
Congenital anomalies of genital organs	752	91	6.5
Certain congenital musculoskeletal deformities	754	76	5.4
Cleft palate and cleft lip	749	72	5.2
Other congenital anomalies of the heart	746	46	3.3
Chromosomal anomalies	758	45	3.2
Congenital anomalies of the integument	757	42	3.0
Other and unspecified congenital anomalies	759	40	2.9
Congenital anomalies of urinary system	753	37	2.6
Other congenital musculoskeletal anomalies	756	35	2.5
Other congenital anomalies of nervous system	742	35	2.5
Other congenital anomalies of circulatory system	747	28	2.0
Congenital anomalies of ear, face, and neck	744	27	1.9
Other congenital anomalies of digestive system	751	22	1.6
Spina bifida	741	19	1.4
Other congenital anomalies of upper alimentary tract	750	19	1.4
Congenital anomalies of respiratory system	748	14	1.0
Congenital anomalies of eye	743	14	1.0
Anencephalus and similar anomalies	740	14	1.0
Bulbus cordis anomalies and anomalies of cardiac septal closure	745	9	0.6
At Least One Anomaly²		746	53.4

¹ Indicates anomalies apparent soon after a live birth.

² Does not equal the sum of anomalies specified because of multiple anomaly occurrences.

³ Ninth Revision International Classification of Diseases, WHO.

⁴ Includes three digit duplicates if fourth digit is different, permitting total counting of distinct conditions.

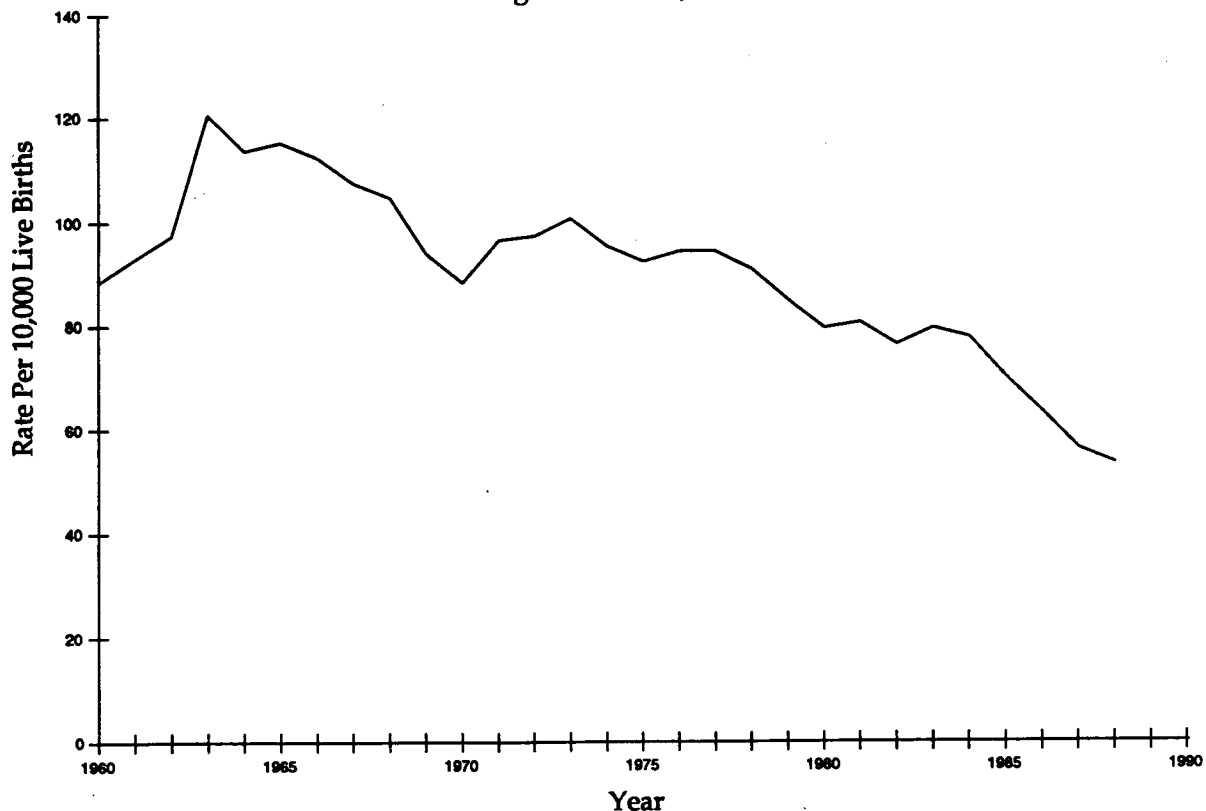
Table 1.28
Live Births with Congenital Anomalies Reported and Congenital Anomaly Rates¹
by Age of Mother and Race of Child
 Michigan Residents, 1988

Age of Mother in Years	Race of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²	Number	Ratio ²
Under 15	1	*	-	-	1	*	-	-	-	-
15 - 19	90	52.9	59	56.4	30	47.6	1	*	-	-
20 - 24	225	60.0	182	63.2	39	47.8	4	*	-	-
25 - 29	229	49.9	200	51.4	23	37.2	5	*	1	*
30 - 34	145	50.9	120	49.6	22	60.5	2	*	1	*
35 - 39	44	51.4	38	53.9	4	*	2	*	-	-
40 or More	8	69.7	8	88.6	-	-	-	-	-	-
Total	746	53.4	610	55.0	120	46.1	14	54.8	2	*
Median Age at Last Birthday	26		26		23		28		26	

¹ Number of live births with congenital anomalies reported per 10,000 live births.

² Rate denominator obtained from Table 1.6.

Figure 1.8
Incidence of Congenital Anomalies Reported Per 10,000 Live Births
 Michigan Residents, 1960 - 1988



COMPLICATIONS

The numbers of deliveries with specific types of complications reported in 1988 are shown in Table 1.29. These data represent entries in three boxes on the live birth certificate: complications of pregnancy, concurrent illnesses or conditions affecting this pregnancy, and complications of labor and/or delivery. It is important to note that these items are under-reported on the birth certificate. Some conditions or procedures, such as obstetrical operations, may be routinely performed by some physicians, and hence not be considered complications.

In addition to valid complications there are also inappropriate terms entered, such as "prematurity", "spontaneous delivery" or "home delivery". These inappropriate terms were omitted in the tabulations of complications shown in Tables 1.29 and 1.30. The total number of deliveries with one or more valid complications was 42,965. This was a rate of 30.8 per 100 live births.

It should be noted that in some cases the code used to describe the complication is dependent on the box in which the entry is found, while in other cases the same code is given regardless of the box used. An example of the latter situation is chronic hypertension, which is shown in Table 1.29 under the heading "Concurrent illnesses or conditions affecting this pregnancy" regardless of the box in which it was entered on the birth certificate.

Thus, there were 11,219 deliveries (803.5 per 10,000 live births) with one or more entries which were coded to the various categories under the heading "Concurrent illnesses or conditions affecting this pregnancy", while the number of births with one or more entries in the box bearing this title on the birth certificate was only 7,971 (570.8 per 10,000 live births). This latter figure was more com-

parable to the rate of 427.8 reported for 1978, as prior to 1979 specific types of complications were not coded and tabulated. Rates presented for "Concurrent illnesses or conditions affecting this pregnancy", "Complications of pregnancy", and "Complications of labor and/or delivery" were derived from the numbers of records with entries in these boxes prior to 1979.

Among the most commonly reported maternal conditions affecting the pregnancy were chronic hypertensive disease, diabetes mellitus, and previous Cesarean sections, which were reported 2,144; 1,782, and 2,926 times, respectively, in 1988. Toxemia of pregnancy was reported for 1,800 deliveries (128.9 per 10,000). The most common form of toxemia was pre-eclampsia of pregnancy, which was reported 90.9 times per 10,000 deliveries.

Various forms of difficult labor were reported in 6.8 percent of all live births. There were 1,233 deliveries complicated by conditions of the placenta and fetal membranes, and 3,659 by conditions of the umbilical cord. Premature rupture of membranes was reported for 3,075 deliveries. There were 21,692 deliveries reported as cesarean sections. It should be noted that the type of delivery is not a question on the birth certificate, so that the rate of 1,553.5 cesarean sections per 10,000 deliveries undoubtedly understated the true rate.

The distribution of deliveries with complications reported by age of mother and race of infant is shown in Table 1.30. The rates generally increased with mother's age, overall and for each race of child. Mothers under 15 years of age had the lowest rate overall (25.1 percent), and mothers 40 years or more had the highest overall rate (39.5 percent). The

Table 1.29
Live Births with Specific Types of Complications Reported
 Michigan Residents, 1988

TYPE OF COMPLICATION	NUMBER OF DELIVERIES ¹	RATE PER 10,000 LIVE BIRTHS
Concurrent Illnesses or Conditions Affecting this Pregnancy . . .	11,219	803.5
Chronic Circulatory and Genitourinary Diseases in Mother . . .	3,242	232.2
Chronic rheumatic heart disease	79	5.7
Chronic hypertensive disease	2,144	153.5
Other chronic diseases and congenital anomalies of heart and circulatory system	193	13.8
Chronic diseases of genitourinary system	893	64.0
Other Maternal Conditions	8,526	610.6
Syphilis	31	2.2
Gonorrhea and other VD, excluding syphilis	600	43.0
Diabetes mellitus	1,782	127.6
Influenza	13	0.9
Rubella	13	0.9
Injury	66	4.7
Prior operations (excluding previous cesarean section)	99	7.1
Previous cesarean section	2,926	209.5
Narcotic or drug user	856	61.3
Obesity	216	15.5
Hepatitis	51	3.7
Anemia	243	17.4
Pneumonia	44	3.2
Bronchitis	36	2.6
Emphysema	1	0.1
Epilepsy	72	5.2
Asthma	333	23.8
Alcohol Abuse	134	9.6
Overdose of Aspirin	-	-
All other maternal conditions	1,650	118.2
Unknown type of maternal condition	41	2.9
Toxemia of Pregnancy	1,800	128.9
Hypertensive disease arising during pregnancy	27	1.9
Pre-eclampsia of pregnancy	1,269	90.9
Eclampsia of pregnancy	37	2.6
Hyperemesis gravidarum	145	10.4
Toxemia superimposed on pre-existing hypertensive cardiovascular disease	81	5.8
Other and unspecified toxemia of pregnancy	379	27.1

Table 1.29 (continued)
Live Births with Specific Types of Complications Reported
 Michigan Residents, 1988

TYPE OF COMPLICATION	NUMBER OF DELIVERIES ¹	RATE PER 10,000 LIVE BIRTHS
Maternal Ante- and Intrapartum Infection	663	47.5
Infections of genital tract	81	5.8
Pyelitis and pyelonephritis	30	2.1
Other infections of urinary tract	199	14.3
Infections of amniotic fluid	186	13.3
Other infections	180	12.9
Difficult Labor With Disproportion or Abnormality of Organs and Tissues of the Pelvis	3,635	260.3
Difficult Labor With Malposition of Fetus	4,010	287.2
Breech presentation	2,897	207.5
Transverse presentation	208	14.9
Brow presentation	24	1.7
Face presentation	64	4.6
Compound or shoulder presentation	51	3.7
Other specified presentation	275	19.7
Unspecified presentation	519	37.2
Difficult Labor With Abnormality of Forces of Labor	902	64.6
Primary uterine inertia	187	13.4
Secondary uterine inertia	192	13.8
Prolonged second stage	143	10.2
Precipitate birth	331	23.7
Other and unspecified abnormality of forces of labor	61	4.4
Other and Unspecified Difficult Labor	991	71.0
Laceration of Pelvic Organs	412	29.5
Conditions of Placenta and Fetal Membranes	1,233	88.3
Placenta previa - partial	341	24.4
Placenta previa - complete	29	2.1
Premature separation of placenta - partial	585	41.9
Premature separation of placenta - complete	3	0.2
Placental insufficiency	34	2.4

Table 1.29 (continued)
Live Births with Specific Types of Complications Reported
 Michigan Residents, 1988

TYPE OF COMPLICATION	NUMBER OF DELIVERIES ¹	RATE PER 10,000 LIVE BIRTHS
Delivery complicated by retained placenta	204	14.6
Other and unspecified abnormalities of placenta and fetal membranes	76	5.4
Conditions of Umbilical Cord	3,659	262.0
Other Complications of Pregnancy and Childbirth	11,689	837.1
Incompetent cervix	166	11.9
Premature rupture of membranes	3,075	220.2
Hydramnios	128	9.2
Ectopic pregnancy	4	0.3
Abortion - any type	17	1.2
Destructive operation on live fetus to facilitate birth	13	0.9
Multiple pregnancy	1,429	102.3
Hemorrhage or threatened abortion	770	55.1
RH incompatibility	243	17.4
Anemia of pregnancy	179	12.8
All other complications of pregnancy and childbirth	6,407	458.8
Unknown type of complication of pregnancy and childbirth	48	3.4
Obstetrical Operations	23,899	1,711.5
Antepartum obstetrical procedures	132	9.5
Operations inducing labor or assisting delivery	1,971	141.2
Cesarean section	21,692	1,553.5
Operations after delivery or abortion	1,508	108.0
At Least One Complication	42,965	3,077.0

¹ Sum of subcategories may not equal total for category due to the occurrences of multiple complications.

Table 1.30
Number and Percent of Live Births with Complications Reported by Age of Mother
and Race of Child
Michigan Residents, 1988

Age Of Mother	Race Of Child									
	Total		White		Black		All Other		Not Stated	
	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹	Number	Percent ¹
Under 15	93	25.1	25	24.3	66	25.0	1	*	1	*
15 - 19	4,934	29.0	2,984	28.5	1,900	30.1	48	22.2	2	*
20 - 24	11,463	30.5	8,589	29.8	2,706	33.2	165	29.2	3	*
25 - 29	13,864	30.2	11,377	29.3	2,240	36.2	243	29.1	4	*
30 - 34	8,864	31.1	7,299	30.2	1,373	37.7	189	29.4	3	*
35 - 39	2,975	34.8	2,318	32.9	577	45.7	78	33.1	2	*
40 or More	453	39.5	346	38.3	87	45.3	20	37.7	-	-
Not Stated	319	50.0	295	49.5	20	54.1	4	*	-	-
Total	42,965	30.8	33,233	29.9	8,969	34.5	748	29.3	15	23.8
Median Age at Last Birthday	26		27		24		28		26	

¹ Denominators obtained from Table 1.6.

median age of mothers for births with complications reported was 26 years, the same as the median age for all live births.

The rate of deliveries with complications for mothers of black infants was higher than for mothers of white infants in all age groups. Overall the rate for black infants was 15.4 percent higher than the rate for white infants (34.5 compared to 29.9).

PLACE OF OCCURRENCE

Of some confusion to persons not familiar with vital records data is the difference between occurrence and residence figures. Information on events to residents of Michigan that occur throughout the country and, in some instances, outside United States boundaries is collected in order to obtain the full scope of activity for the state population.

In 1988 2,122 Michigan resident live births occurred outside the state. Information on these events was forwarded to the state of Michigan for statistical purposes only. While only 1.5 percent of the total for the state was involved, statistics for the counties on Michigan's southern and northwestern borders would be strongly affected were this information not available.

Table 1.31 shows that births in the four border states comprise 91.2 percent of all resident live births that occurred out of state. Live births to Michigan residents occurred in 41 of the 50 states in 1988.

The number of nonresident live births that occurred in Michigan in 1988 was 461. Information about those events was shared with the appropriate states by the State of Michigan under specific confidentiality guidelines so they might have a complete statistical file on their residents. Births in the four border areas comprised 73.7 percent of these events, as shown in Table 1.31. There were live births in Michigan to residents of 33 states, the Virgin Islands and at least 3 foreign countries.

Table 1.31
Michigan Resident Live Births
Occurring Outside of Michigan by Place of Occurrence, and
Occurring in Michigan to Non-Michigan Residents
by Place of Residence
 1988

GEOGRAPHIC AREA	LIVE BIRTHS TO RESIDENTS OCCURRING OUTSIDE MICHIGAN		LIVE BIRTHS TO NONRESIDENTS OCCURRING IN MICHIGAN	
	NUMBER	PERCENT	NUMBER	PERCENT
Total	2,122	100.0	461	100.0
Florida	20	0.9	13	2.8
Illinois	9	0.4	18	3.9
Indiana	624	29.4	96	20.8
Ohio	987	46.5	34	7.4
Texas	10	0.5	17	3.7
Wisconsin	317	14.9	192	41.6
Other States	155	7.3	75	16.3
U.S. Territories	-	-	3	0.7
Canada	-	-	8	1.7
Other Countries	-	-	5	1.1

PLACE OF BIRTH

In 1988, 99.3 percent of the 137,974 infants born in Michigan were delivered in hospitals. There were 767 infants born at home, and 187 other non-hospital deliveries (Table 1.32). While the percentage of infants not born in hospitals was still very small, the number of home deliveries and other out-of-hospital births has increased in recent years. Between 1975 and 1982 the number of infants born at

home increased by 126 percent. The proportion of all live-born infants who were delivered at home increased from 0.24 percent in 1975 to 0.52 percent in 1982 (117 percent increase). The number of home births decreased for the three years between 1982 and 1985, then increased again from 1986 to 1988 to a high of 767 home deliveries (0.56 percent).

Table 1.32
Live Births by Place of Delivery
Michigan Occurrences, 1975 - 1988

YEAR	PLACE OF DELIVERY						
	TOTAL	HOSPITAL ¹		HOME		OTHER AND UNKNOWN	
		NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
1975	132,777	132,354	99.68	313	0.24	110	0.08
1976	130,253	129,714	99.59	375	0.29	164	0.13
1977	137,140	136,503	99.54	489	0.36	148	0.11
1978	137,896	137,119	99.44	573	0.42	204	0.15
1979	143,240	142,437	99.44	619	0.43	184	0.13
1980	144,077	143,257	99.43	645	0.45	175	0.12
1981	139,415	138,604	99.42	646	0.46	165	0.12
1982	137,127	136,236	99.35	707	0.52	184	0.13
1983	131,838	131,010	99.37	670	0.51	158	0.12
1984	134,847	134,042	99.40	646	0.48	159	0.12
1985	136,764	135,942	99.40	620	0.45	202	0.15
1986	136,214	135,308	99.33	733	0.54	173	0.13
1987	138,935	137,984	99.32	742	0.53	209	0.15
1988	137,974	137,020	99.31	767	0.56	187	0.14

¹ Does not include births in hospitals without a maternity ward.

ATTENDANT AT BIRTH

Data in Table 1.33 reveal that 98.0 percent of the live births which occurred in Michigan during 1988 were attended by a physician, either an M.D. or D.O. There were 138 live births attended by the mother's husband, while nurses delivered 156 infants. Midwives and nurse-midwives delivered 2,162 infants.

During 1988 there were 86 infants born to unattended women.

Of the 767 infants born in the mother's home, only 10.3 percent were attended by a physician while 16.3 percent were attended by the husband and 49.3 by midwives and nurse-midwives.

Table 1.33
Live Births by Place of Delivery and Type of Attendant
Michigan Occurrences, 1988

ATTENDANT	PLACE OF DELIVERY							
	TOTAL		HOSPITAL ¹		HOME		OTHER AND UNKNOWN	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total	137,974	100.0	136,412	100.0	767	100.0	795	100.0
Physician, M.D.	116,491	84.4	115,749	84.9	65	8.5	677	85.2
Physician, D.O.	18,720	13.6	18,690	13.7	14	1.8	16	2.0
Husband	138	0.1	3	0.0	125	16.3	10	1.3
Nurse	156	0.1	150	0.1	3	0.4	3	0.4
Midwife	415	0.3	33	0.0	361	47.1	21	2.6
Physician's Asst.	1	0.0	-	-	-	-	1	0.1
Nurse-Midwife ²	1,747	1.3	1,729	1.3	17	2.2	1	0.1
Other	201	0.1	37	0.0	112	14.6	52	6.5
Unattended	86	0.1	3	0.0	70	9.1	13	1.6
Unknown	19	0.0	18	0.0	-	-	1	0.1

¹ Does not include births in hospitals without a maternity ward.

² May or may not be certified by the American College of Nurse Midwives.

FETAL DEATHS

There were 1,325 fetal deaths reported in 1900. The number of reported fetal deaths increased from 1900 through 1916 and by 1916 3,689 were reported (Figure 1.9 and Table 4.1). The numbers of deaths were relatively stable from 1916 through 1930, with the peak year for the period being 1927. This year marked the highest frequency of occurrence in this century with 3,834 fetal deaths.

Over the period 1930 through 1939, fetal deaths declined to 2,572 fetal deaths then increased through 1943, decreased in 1944 and 1945, and increased again to 3,422 in 1947. Fetal deaths numbered between about 3,000 and 3,250 in the period 1948 to 1958. In the 1960's through the 1980's the number of

reported fetal deaths declined sharply. By 1988 the number had decreased to 761 resident fetal deaths.

The fetal death ratio for Michigan has declined through most of the twentieth century (Figure 1.10 and Table 4.2). The ratio rose from 30.3 in 1900 to 43.5 fetal deaths per 1,000 live births in 1905. Through the teens and early twenties, this ratio fluctuated between 38.0 and 42.4, never reaching the peak ratio observed in 1905. In 1922, Michigan's fetal death ratio was 42.0, marking a turning point, as fetal death ratios have generally declined since that year. The low ratio of 1900 was first succeeded by a new low ratio in 1936 (29.7). Over the next 50 years, new lows were

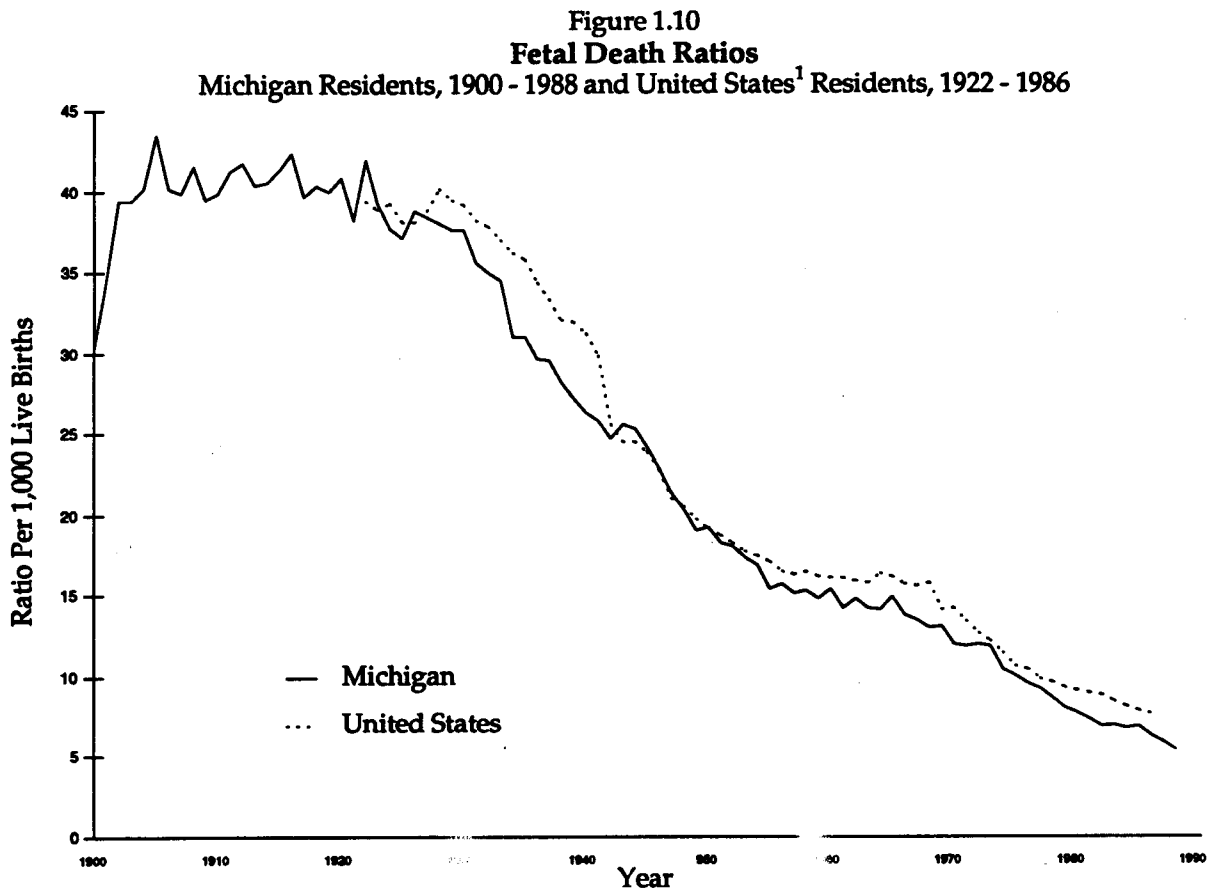
Figure 1.9
Fetal Deaths
Michigan Residents, 1900 - 1988



established repeatedly, as the fetal death ratio continued to decline. The ratio in 1988 was 5.4, the lowest observed in this century.

National fetal death data are presented in Figure 1.10 and Table 1.34. Michigan's fetal death ratios have generally been below national ratios. In fact, the United States ratio has been below that for Michigan in only nine of the 65 years for which national data are

available. The last time the United States ratio was below the Michigan ratio was in 1950. In 1986, the Michigan ratio of 6.3 was 18.2 percent below the national ratio of 7.7. It should be noted that fetal deaths in Michigan are comprised of infants born dead who had passed through 20 weeks gestation or weighed 400 grams or more. This definition is different from that of most states.



¹ United States ratios prior to 1933 are for registration areas only. United States ratios are based on three different definitions of fetal death:

- 1) Prior to 1942 - all reported fetal deaths regardless of period of gestation
- 2) 1942 to 1968 - fetal deaths with gestation age 20 weeks or more or not stated
- 3) 1969 to current - fetal deaths of stated or presumed period of gestation of 20 or more weeks

Table 1.34
Fetal Deaths and Fetal Death Ratios
 Michigan and United States Residents, 1900 - 1988

UNITED STATES		YEAR	MICHIGAN	
FETAL DEATHS	FETAL DEATH RATIOS		FETAL DEATHS	FETAL DEATH RATIOS
—	—	1900	1,325	30.3
—	—	1910	2,559	39.9
70,010 ¹	39.4	1920	3,770	40.9
86,466	39.2	1930	3,714	37.6
73,802	31.3	1940	2,602	26.3
68,262	19.2	1950	3,095	19.3
68,480	16.1	1960	3,008	15.4
52,961	14.2	1970	2,060	12.0
47,818	13.4	1971	1,923	11.9
41,380	12.7	1972	1,765	12.0
38,309	12.2	1973	1,682	11.9
36,281	11.5	1974	1,438	10.5
33,796	10.7	1975	1,356	10.1
33,111	10.5	1976	1,264	9.6
33,053	9.9	1977	1,284	9.3
32,301	9.7	1978	1,201	8.7
32,969	9.4	1979	1,175	8.1
33,353	9.2	1980	1,135	7.8
32,596	9.0	1981	1,040	7.4
32,694	8.9	1982	954	6.9
30,752	8.5	1983	933	7.0
30,099	8.2	1984	929	6.8
29,661	7.9	1985	953	6.9
28,972	7.7	1986	865	6.3
N.A.	N.A.	1987	824	5.9
N.A.	N.A.	1988	761	5.4

¹ Data for 1922.

CAUSES OF FETAL DEATH

A classification of fetal deaths by underlying cause of death is contained in Table 1.35. This classification is based on the 9th Revision of the International Classification of Diseases which was introduced in 1979. Since major changes were made between the 8th and 9th revisions of the ICD in the section used for classifying causes of fetal death, comparisons

between cause-specific ratios for 1979 and later years and those for years prior to 1979 require detailed study. Also, since a relatively large number of deaths are allocated to unspecified causes, caution should be exercised in attempting to draw specific inferences regarding causes of death.

Table 1.35
Fetal Deaths and Fetal Death Ratios by Underlying Cause of Death
 Michigan Residents, 1988

ICD. No. ¹	CAUSE OF DEATH	FREQUENCY	RATIO ²
740	Anencephalus and similar anomalies	7	5.0
741	Spina bifida	2	1.5
742	Other congenital anomalies of nervous system	6	4.3
745	Bulbus cordis anomalies and anomalies of cardiac septal closures	2	1.5
746	Other congenital anomalies of heart	5	3.6
747	Other congenital anomalies of circulatory system	4	2.9
748	Congenital anomalies of respiratory system	1	0.7
753	Congenital anomalies of urinary system	3	2.1
755	Other congenital anomalies of limbs	2	1.5
756	Other congenital musculoskeletal anomalies	3	2.1
757	Congenital anomalies of the integument	1	0.7
758	Chromosomal anomalies	11	7.9
759	Other and unspecified congenital anomalies	24	17.2
740 - 759	All Congenital Anomalies Combined	71	50.8
760	Fetus or newborn affected by maternal conditions which may be unrelated to present pregnancy	28	20.1
761	Fetus or newborn affected by maternal complications of pregnancy	84	60.2
762	Fetus or newborn affected by complications of placenta, cord, and membranes	213	152.5
763	Fetus or newborn affected by other complications of labor and delivery	3	2.1
765	Disorders relating to short gestation and unspecified low birthweight	32	22.9
768	Intrauterine hypoxia and birth asphyxia	17	12.2
770	Other respiratory conditions of fetus and newborn	1	0.7
772	Fetal and neonatal hemorrhage	4	2.9
773	Hemolytic disease of fetus or newborn, due to isoimmunization	1	0.7
775	Endocrine and metabolic disturbances specific to the fetus and newborn	5	3.6
778	Conditions involving the integument and temperature regulation of fetus and newborn	8	5.7
779	Other and ill-defined conditions originating in the perinatal period	294	210.5
740 - 779	All Causes	761	545.0

¹ Ninth Revision of the International Classification of Diseases, WHO.

² Ratios per 100,000 resident live births.

In 1988, 294 of the total 761 deaths were assigned to the category of "other and ill-defined conditions originating in the perinatal period". Nearly half (45.6 percent) of the remaining fetal deaths for which a cause was stated were attributed to complications of placenta, cord, and membranes (ICD 762). This is a group of maternal conditions which includes placenta previa, premature separation of the placenta, placental hemorrhage, and compression of the umbilical cord.

Second in frequency was the category maternal complications of pregnancy (ICD 761), which was listed as the cause of 84 fetal deaths. This includes such complications as premature rupture of membranes, multiple pregnancy, and incompetent cervix. An additional 32 and 28 fetal deaths were caused by disorders relating to short gestation and unspecified low birth weight and by maternal conditions which may be unrelated to the pregnancy, respectively. There were 71 fetal deaths caused by congenital anomalies in 1988.

AGE OF MOTHER AND RACE OF FETUS

The overall fetal death rate per 1,000 total births (live births plus fetal deaths) was 5.4 in

1988. It appears that the younger and older mothers and mothers of black fetuses have a greater risk of delivering a stillborn fetus (Table 1.36). The 25-29 age group displayed the lowest rates. Progressively older and younger age groups displayed increasingly higher rates. The rate for women 15-19 (6.2) was 37.8 percent higher than the rate for women 25-29 years of age (4.5). The highest rate was experienced by women 40 and over, for whom the rate (8.6) was 1.9 times the rate for women in the lowest risk age group. The median age of women whose pregnancy resulted in a fetal death was 26 years, the same as the median age for women having live births.

In 1988 the fetal death rate for white fetuses was 4.4. The rate for mothers of fetuses of races other than white and black was less than the rate for mothers of white fetuses, while the fetal death rate for mothers of black fetuses was 120.5 percent higher at 9.7. Rates for black fetuses were higher than for white fetuses in all age intervals with sufficient events to calculate rates. The differentials ranged from 52.0 percent higher for women aged 15 through 19 to 161.7 percent higher for women aged 30 through 39.

Table 1.36
Fetal Deaths, Live Births, Total Births and Fetal Death Rates
by Age of Mother and Race of Fetus
 Michigan Residents, 1988

AGE OF MOTHER AND RACE OF FETUS	FETAL DEATHS	LIVE BIRTHS	TOTAL BIRTHS	RATE PER 1,000 TOTAL BIRTHS
Under 15 Years	4	371	375	*
White	-	103	103	-
Black	3	264	267	*
All Other Races	-	3	3	-
Not Stated	1	1	2	*
15 - 19 Years	106	17,003	17,109	6.2
White	53	10,470	10,523	5.0
Black	48	6,304	6,352	7.6
All Other Races	1	216	217	*
Not Stated	4	13	17	*
20 - 24 Years	211	37,529	37,740	5.6
White	133	28,793	28,926	4.6
Black	75	8,154	8,229	9.1
All Other Races	1	566	567	*
Not Stated	2	16	18	*
25 - 29 Years	207	45,924	46,131	4.5
White	147	38,887	39,034	3.8
Black	56	6,183	6,239	9.0
All Other Races	4	836	840	*
Not Stated	-	18	18	-
30 - 39 Years	212	37,022	37,234	5.7
White	148	31,230	31,378	4.7
Black	61	4,900	4,961	12.3
All Other Races	3	878	881	*
Not Stated	-	14	14	-
40 or Over	10	1,148	1,158	8.6
White	4	903	907	*
Black	6	192	198	30.3
All Other Races	-	53	53	-
Not Stated	-	-	-	-
Not Stated	11	638	649	16.9
White	2	596	598	*
Black	7	37	44	159.1
All Other Races	-	4	4	-
Not Stated	2	1	3	*
Total	761	139,635	140,396	5.4
White	487	110,982	111,469	4.4
Black	256	26,034	26,290	9.7
All Other Races	9	2,556	2,565	3.5
Not Stated	9	63	72	125.0

INTERPREGNANCY TIME PERIOD FOR FETAL DEATHS

For those women whose pregnancy terminated with a fetal death in 1988, a total of 348 reported the date of the termination of a previous pregnancy. Table 1.37 presents a comparison of fetal death rates by interpregnancy time span for births in 1988 to women who reported the date of a prior termination. Minimum risk was associated with spacings of between 2 and 3 years (3.0 fetal deaths per 1,000 total births). Risk increased progressively as the length of spacings decreased or increased. The fetal death rate for births with spacings of five or more years was 50.0 percent above the rate of the risk with spacing between 2 and 3 years. The greatest risk of fetal death was associated with spacings of less than one year. For births in this category the fetal death rate (10.2) was three times the rate with spacing between 1 and 2 years and 3.4 times the rate with spacing between 2 and 3 years.

When comparing interpregnancy time spans for live births and fetal deaths one should be aware that the shorter gestational period associated with fetal deaths results in a correspondingly shorter interpregnancy time span because span is measured from the date of last termination to date of current birth. The median interpregnancy time period for fetal deaths was 2 years and 5 months (Table 1.38) which was one month shorter than the median time period of 2 years and 6 months for women having live births in 1988 (Table 1.13).

As with live births, the outcome of the immediate prior termination has a strong influence on the interval between pregnancies. For 116 women whose prior termination was a fetal death, the median interpregnancy time span was 1 year and 10 months. For 232 women whose prior termination was a live

Table 1.37
Fetal Deaths, Live Births, Total Births and Fetal Death Rates
by Time Span Between Last and Current Termination
Michigan Residents Reporting Prior Pregnancy Terminations¹, 1988²

TIME SPAN IN YEARS	FETAL DEATHS	LIVE BIRTHS	TOTAL BIRTHS	RATE PER 1,000 TOTAL BIRTHS
Total	348	93,207	93,555	3.7
Less Than One	38	3,675	3,713	10.2
1 < 2	101	29,440	29,541	3.4
2 < 3	67	22,273	22,340	3.0
3 < 5	65	20,843	20,908	3.1
5 or More	77	16,976	17,053	4.5

¹ Terminations with time spans of zero years (i.e., second or later births in plural deliveries) and terminations with unknown time spans are excluded.

² The methodology for calculating interpregnancy time span was altered slightly in 1984. Hence, rates are not comparable to data from prior years.

Table 1.38
Fetal Deaths¹ to Women Reporting Prior Pregnancy Terminations²
by Time Span Between Last and Current Termination and
by Whether Prior Termination Resulted in a Live Birth or a Fetal Death
Michigan Residents, 1988³

TIME SPAN IN YEARS	TOTAL		PRIOR FETAL DEATH ⁴		PRIOR LIVE BIRTH	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total	348	100.0	116	100.0	232	100.0
Less than One	38	10.9	26	22.4	12	5.2
1 < 2	101	29.0	35	30.2	66	28.4
2 < 3	67	19.3	21	18.1	46	19.8
3 < 5	65	18.7	16	13.8	49	21.1
5 or More	77	22.1	18	15.5	59	25.4
Median Time Span	2 Years 5 Months		1 Year 10 Months		2 Years 8 Months	

¹ Deaths of fetuses of twenty or more weeks gestation or weighing 400 grams or more.

² Terminations with time spans of zero years (i.e., second or later births in plural deliveries) and terminations with unknown time spans are excluded.

³ The methodology for calculating interpregnancy time span was altered slightly in 1984. Hence, median time spans and percentages are not comparable to data from prior years.

⁴ Fetal death as defined for the pregnancy history on the fetal death record is a fetal death of any gestational age.

birth, the median interpregnancy time span was 2 years and 8 months.

PRENATAL CARE - FETAL DEATHS

Of the 761 fetal deaths reported for 1988, 103 or 13.5 percent of the reports indicated that the mother had no prenatal visits. The comparable percent for live births was 1.2. The percent of mothers with fewer than ten prenatal visits was 61.8 for fetal deaths and 20.5 for live births (Table 1.17 and Table 1.39).

The number of prenatal visits varied by race. Mothers of white fetuses had a mean of 7.1 visits whereas those of black fetuses and fetuses of all other races reported means of 3.7

and 5.1 visits respectively. Note, however, that the number of prenatal visits was not stated on 8.2 percent of the reports for white fetuses, compared to 30.5 and 22.2 percent of the reports for black fetuses and fetuses of all other races.

The fetal death rate varied with the number of prenatal visits (Table 1.40). The rate was 58.7 for mothers with no care, 41.7 for mothers with 1-4 visits, and 9.4 for those with 5-9 visits. The fetal death rate was low for mothers with 10-14 visits (1.7) and 15-19 visits (1.1).

For those cases with one or more prenatal visits, where rates could be calculated, black fetuses had similar or lower fetal death rates.

Table 1.39
Fetal Deaths and Percent Distribution by Number of the Mother's Prenatal Visits
and Race of Fetus
Michigan Residents, 1988

Number of Prenatal Visits	Race of Fetus									
	Total		White		Black		All Other		Not Stated	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	103	13.5	33	6.8	67	26.2	2	22.2	1	11.1
1 - 4	144	18.9	90	18.5	52	20.3	1	11.1	1	11.1
5 - 9	223	29.3	182	37.4	36	14.1	4	44.4	1	11.1
10 - 14	142	18.7	119	24.4	22	8.6	-	-	1	11.1
15 - 19	21	2.8	20	4.1	1	0.4	-	-	-	-
20 or Over	3	0.4	3	0.6	-	-	-	-	-	-
Not Stated	125	16.4	40	8.2	78	30.5	2	22.2	5	55.6
Total	761	100.0	487	100.0	256	100.0	9	100.0	9	100.0
Median Number of Visits	6		7		3		6		4	
Mean Number of Visits	6.1		7.1		3.7		5.1		5.8	

Table 1.40
Fetal Deaths, Total Births and Fetal Death Rates by Number of Prenatal Visits and Race¹
Michigan Residents, 1988

Number Of Visits	All Births			White Births			Black Births			Other Births		
	Fetal Deaths	Total Births	Fetal Death Rates	Fetal Deaths	Total Births	Fetal Death Rates	Fetal Deaths	Total Births	Fetal Death Rates	Fetal Deaths	Total Births	Fetal Death Rates
Total	761	140,396	5.4	487	111,469	4.4	256	26,290	9.7	9	2,565	3.5
None	103	1,755	58.7	33	734	45.0	67	1,000	67.0	2	17	*
1 - 4	144	3,455	41.7	90	2,045	44.0	52	1,311	39.7	1	94	*
5 - 9	223	23,823	9.4	182	18,338	9.9	36	4,922	7.3	4	554	*
10 - 14	142	85,555	1.7	119	70,057	1.7	22	13,998	1.6	-	1,469	-
15 - 19	21	18,430	1.1	20	14,361	1.4	1	3,770	*	-	294	-
20 +	3	4,449	*	3	3,591	*	-	779	-	-	78	-
Not Stated	125	2,929	42.7	40	2,343	17.1	78	510	152.9	2	59	*

¹ Race not stated included in total columns only.

The proportion of fetal deaths where the mother's number of prenatal visits was not stated was, as noted previously, considerably greater for black fetuses than for white fetuses (30.5 versus 8.2). In this category, the death rate for black fetuses was 8.9 times higher than for white fetuses.

Caution should be exercised in interpreting the above fetal death rates and proportions. Incomplete reporting of the number of visits occurred on 16.4 percent of the fetal death reports compared with 2.0 percent of the live birth records. It should also be kept in mind that fetal deaths are much more likely to occur preterm and this affects the possible number of prenatal visits (Table 1.41). In 1988, 30.4 percent of the reported fetal deaths occurred before 28 weeks of gestational age, and 50.7 percent occurred before 36 weeks. Incomplete reporting of gestational age occurred on 25.4 percent of the fetal death reports.

The month of pregnancy that prenatal care began was most frequently the second month (Table 1.42). The proportion of all fetal deaths

Table 1.41
Fetal Deaths by Gestational Age
and Number of Prenatal Visits
Michigan Residents, 1988

GESTATIONAL AGE IN WEEKS	NUMBER	PERCENT	MEDIAN NUMBER OF VISITS
Under 20	20	2.6	4
20 - 23	125	16.4	4
24 - 27	87	11.4	5
28 - 31	68	8.9	6
32 - 35	87	11.4	7
36 - 39	113	14.8	10
40 - 43	60	7.9	11
44 or More	8	1.1	9
Unknown	193	25.4	0
Total	761	100.0	6

Table 1.42
Fetal Deaths by Month Prenatal Care Began and Number of Prenatal Visits
Michigan Residents, 1988

MONTH CARE BEGAN	NUMBER OF VISITS							
	TOTAL	NONE	1 - 4	5 - 9	10 - 14	15 - 19	20 OR OVER	UN-KNOWN
Total	761	103	144	223	142	21	3	125
First	61	-	11	25	17	5	-	3
Second	236	-	50	92	76	11	-	7
Third	127	-	29	58	32	3	1	4
Fourth	53	-	17	21	9	2	1	3
Fifth	33	-	20	10	3	-	-	-
Sixth	21	-	7	11	3	-	-	-
Seventh	7	-	3	3	-	-	-	1
Eighth	3	-	2	1	-	-	-	-
Ninth	1	-	1	-	-	-	-	-
No Care	103	103	-	-	-	-	-	-
Unknown	116	-	4	2	2	-	1	107

in 1988 that were to women who reported receiving care prior to the fourth month of pregnancy was 55.7 with 67.0 percent receiving care prior to the sixth month.

The percentage of fetal deaths in which the mother received care prior to the fourth and sixth month generally increased from 1970 through 1973, declined between 1973 and 1976, and generally increased again between 1976 and 1983 (Figure 1.11). Both percentages declined between 1983 and 1986 and increased in 1987 and declined again in 1988. However the percentage of live births in which the mother received care prior to the fourth month increased between 1970 and 1985 to 81.0 percent, declined to 79.8 percent in 1986, increased to 80.0 in 1987 and again declined to 79.2 in 1988. The percentage of live births in which the mother received care prior to the sixth month increased to 93.9 percent in 1985 then declined to 92.8 in 1988 (Figure 1.6).

The relationship between the fetal death rates and numbers and the Kessner Index are displayed in Tables 1.43 and 1.44. The fetal death rate increased as the quality of prenatal care measured by the Kessner Index decreased (Table 1.43). The rate was 3.1 per 1,000 total births (fetal deaths and live births) born to women receiving adequate prenatal care. The rate increased to 5.8 and 18.6 for births to women receiving intermediate and inadequate levels of care respectively.

The fetal death rate was 9.7 percent higher for black births than for white births for women receiving an adequate level of care. This difference was reversed for women receiving intermediate care where the death rate for black fetuses was 8.5 percent less than for white fetuses. The fetal death rate was over 3.2 times higher for black births than for white births to women receiving inadequate levels of care.

Figure 1.11
Percent of Women Having Fetal Deaths who Received Care Prior to the 4th Month
and the 6th Month of Pregnancy
Michigan Residents, 1970 - 1988

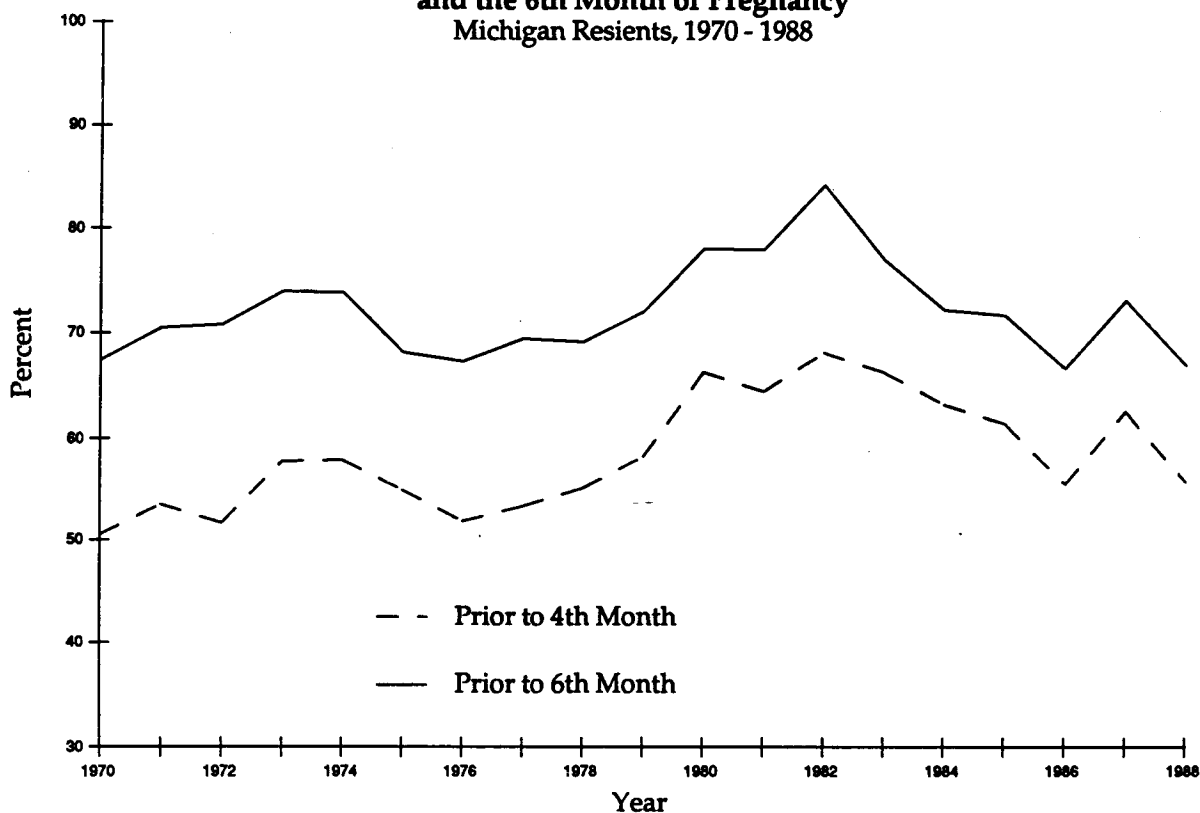


Table 1.43
Fetal Deaths, Total Births and Fetal Death Rates by Level of Prenatal Care and Race¹
 Michigan Residents, 1988

LEVEL OF CARE (Kessner Index ²)	ALL BIRTHS			WHITE BIRTHS			BLACK BIRTHS			ALL OTHER BIRTHS		
	FETAL DEATHS	TOTAL BIRTHS	FETAL DEATH RATES	FETAL DEATHS	TOTAL BIRTHS	FETAL DEATH RATES	FETAL DEATHS	TOTAL BIRTHS	FETAL DEATH RATES	FETAL DEATHS	TOTAL BIRTHS	FETAL DEATH RATES
Adequate	317	101,286	3.1	261	83,809	3.1	54	15,724	3.4	1	1,721	*
Intermediate	156	26,853	5.8	114	19,404	5.9	37	6,861	5.4	4	578	*
Inadequate	165	8,867	18.6	61	5,716	10.7	100	2,944	34.0	3	197	*
Unknown	123	3,390	36.3	51	2,540	20.1	65	761	85.4	1	69	*
Total	761	140,396	5.4	487	111,469	4.4	256	26,290	9.7	9	2,565	3.5

¹ Race not stated included in total columns only.

² The Kessner Index is a classification of prenatal care based on the month of pregnancy prenatal care began, the number of prenatal visits, and the length of pregnancy (i.e., for shorter pregnancies, fewer prenatal visits constitute adequate care).

Table 1.44
Number and Percent of Fetal Deaths by Level of the Mother's Prenatal Care and Race of Fetus
 Michigan Residents, 1988

LEVEL OF CARE (Kessner Index ¹)	RACE OF FETUS									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Adequate	317	41.7	261	53.6	54	21.1	1	11.1	1	11.1
Intermediate	156	20.5	114	23.4	37	14.5	4	44.4	1	11.1
Inadequate	165	21.7	61	12.5	100	39.1	3	33.3	1	11.1
Unknown	123	16.2	51	10.5	65	25.4	1	11.1	6	66.7
Total	761	100.0	487	100.0	256	100.0	9	100.0	9	100.0

¹ The Kessner Index is a classification of prenatal care based on the month of pregnancy in which prenatal care began, the number of prenatal visits and the length of pregnancy (i.e., for shorter pregnancies, fewer prenatal visits constitute adequate care).

The numbers of fetal deaths increased as the quality of prenatal care increased even though the fetal death rates decreased because most women receive adequate care (Table 1.44). The proportion of live births born to women receiving adequate care in 1988 was 72.3 percent while 41.7 percent of the fetal deaths were born to women with adequate prenatal care. Since the Kessner Index reduces the minimum number of prenatal visits required to meet the definition of adequate care when gestational age at birth is less than 36 weeks, the percent of the fetal deaths which were born to women with adequate prenatal care should not be affected by the shorter gestational age experienced by many fetal deaths.

FETAL WEIGHT

Among live births, the percentage of infants weighing less than 2,500 grams at birth was 7.3. The comparable percent among fetal deaths was 75.0. The distribution of fetal weight by plurality for fetal deaths is presented in Table 1.45. Note that twin deliveries are not sets, but are total occurrences and that any given set may have included a live birth. The percent of single delivery fetal deaths under 2,500 grams was 74.5. The comparable percent for twin deliveries was 81.1.

Table 1.45
Fetal Deaths by Fetal Weight and Plurality¹
Michigan Residents, 1988

WEIGHT	FETAL DEATHS	CUM. PERCENT	SINGLE DELIVERY	TWIN DELIVERY	TRIPLET DELIVERY	QUAD-RUPLET DELIVERY
500 Grams or Less	225	29.6	205	18	1	-
501-1,000 Grams	146	48.8	131	15	-	-
1,001-1,500 Grams	78	59.0	74	4	-	-
1,501-2,000 Grams	60	66.9	55	5	-	-
2,001-2,499 Grams	62	75.0	61	1	-	-
2,500-3,000 Grams	64	83.4	60	4	-	-
3,001-3,500 Grams	65	92.0	61	4	-	-
3,501-4,000 Grams	31	96.1	30	1	-	-
4,001-4,500 Grams	9	97.2	9	-	-	-
4,501 Grams or More	8	98.3	8	-	-	-
Not Stated	13	100.0	12	1	-	-
Total	761	100.0	706	53	1	-

¹ Plurality unknown included in fetal deaths column only.

The fetal weight distribution is strongly associated with gestational age (Table 1.46). The median fetal weight for all fetal deaths was 1,047 grams compared to a median birthweight of 3,388 grams for live births. For

deaths of fetuses of 32-35 weeks of age, the median was 1,672 grams, while for the normal gestational age ranges of 36-39 and 40-43 weeks the median weight was 2,806 and 3,288 grams respectively.

Table 1.46
Fetal Deaths by Fetal Weight and Gestational Age
Michigan Residents, 1988

FETAL WEIGHT IN GRAMS	GESTATIONAL AGE IN COMPLETED WEEKS									
	TOTAL	UNDER 20	20 - 23	24 - 27	28 - 31	32 - 35	36 - 39	40 - 43	44 OR MORE	UN-KNOWN
Less Than 1501	449	19	120	80	51	35	7	-	2	135
1501 - 2499	122	-	1	3	14	39	27	6	2	30
2500 or Over	177	-	1	1	1	13	78	54	4	25
Unknown	13	1	3	3	2	-	1	-	-	3
Total	761	20	125	87	68	87	113	60	8	193
Median ¹	1,047	340	394	567	963	1,672	2,806	3,288	2,466	700

¹ Excluding unknown fetal weight.

MORTALITY

SECTION II



MORTALITY

AN OVERVIEW, 1988

RESIDENT DEATHS	80,075
CRUDE DEATH RATE	8.7
INFANT DEATHS	1,542
INFANT DEATH RATE	11.0
NEONATAL DEATHS	1,068
NEONATAL DEATH RATE	7.6
PERINATAL DEATHS	1,659
PERINATAL DEATH RATE	11.9
MATERNAL DEATHS	11
MATERNAL DEATH RATE	0.8
DEATHS FROM HEART DISEASE PER DAY	83
DEATHS FROM CANCER PER DAY	49
DEATHS FROM STROKE PER DAY	14
DEATHS FROM ACCIDENTS PER DAY	9
MEDIAN AGE AT DEATH	74 Years
MEDIAN AGE AT DEATH FOR MALES	70 Years
MEDIAN AGE AT DEATH FOR FEMALES	77 Years

In 1988 there were 80,075 deaths recorded for Michigan residents, 280 more than in the previous year. The crude death rate per 1,000 population was 8.7 in 1988 the same rate as 8.7 observed in 1987 (Table 2.1). The age-adjusted death rate decreased in 1988 being 2.0 percent less than the age-adjusted rate for 1987. This latter rate, the age-adjusted rate, serves as a better measure of mortality than a crude death rate as age-adjusted death rates control for most of the differences or variations in the age composition of the populations.

Between 1900 and 1988 the number of deaths occurring to Michigan residents increased from 32,453 to 80,075. The 31,472 deaths recorded in 1902 was the lowest number of resident deaths in this century, while the number of resident deaths recorded in 1986 was the greatest number of resident deaths for the century.

Although the total number of deaths increased between 1900 and 1988, the increase is due to an increasing population. The crude death rate decreased from 13.4 (per 1,000 population) in 1900 to 8.7 in 1988. The 1979 death rate of 7.9 was the lowest crude death rate ever recorded for Michigan. The highest death rate (15.6) was observed in 1918 (Figure 2.1).

A comparison of deaths and crude death rates for Michigan and the United States for the period 1970-1988 is presented in Table 2.1. Between 1970 and 1984, the Michigan rates had been consistently below the United States rates. In 1985 and 1987, however, the Michigan rate of 8.7 was the same as the United States rate. In 1986, the Michigan rate of 8.8 was above the United States rate of 8.7, while in 1988 the Michigan rate of 8.7 was again below the United States provisional rate of 8.8. The Michigan rates were relatively stable between 1970 and 1973, declined 9.2 percent between 1973 and 1979 and then increased to equal the 1973 rate. The national rates followed a similar pattern.

Between 1970 and 1988 the number of Michigan resident deaths increased by 4.9 percent and the crude death rate increased by 1.2 percent. The age-adjusted death rates displayed the opposite pattern by dropping 24.0 percent (Table 2.6). Over the period 1970-1988 the age-adjusted death rates for the nation declined by a greater amount, 24.9

Table 2.1
Number of Deaths and Crude Death Rates
 Michigan and United States Residents, 1970 - 1988

UNITED STATES		YEAR	MICHIGAN	
NUMBER	RATE		NUMBER	RATE
1,921,031	9.5	1970	76,321	8.6
1,927,542	9.3	1971	77,395	8.6
1,963,944	9.4	1972	79,210	8.8
1,973,003	9.3	1973	78,522	8.7
1,934,388	9.1	1974	76,143	8.4
1,892,879	8.8	1975	74,522	8.2
1,909,440	8.8	1976	75,801	8.3
1,899,597	8.6	1977	74,144	8.1
1,927,788	8.7	1978	74,773	8.1
1,913,841	8.5	1979	73,480	7.9
1,989,841	8.8	1980	74,991	8.1
1,977,981	8.6	1981	75,818	8.2
1,974,797	8.5	1982	75,536	8.2
2,019,201	8.6	1983	76,639	8.4
2,039,369	8.6	1984	76,401	8.4
2,086,440	8.7	1985	78,635	8.7
2,105,361	8.7	1986	80,177	8.8
2,123,323	8.7	1987	79,795	8.7
2,171,000Pr.	8.8Pr.	1988	80,075	8.7

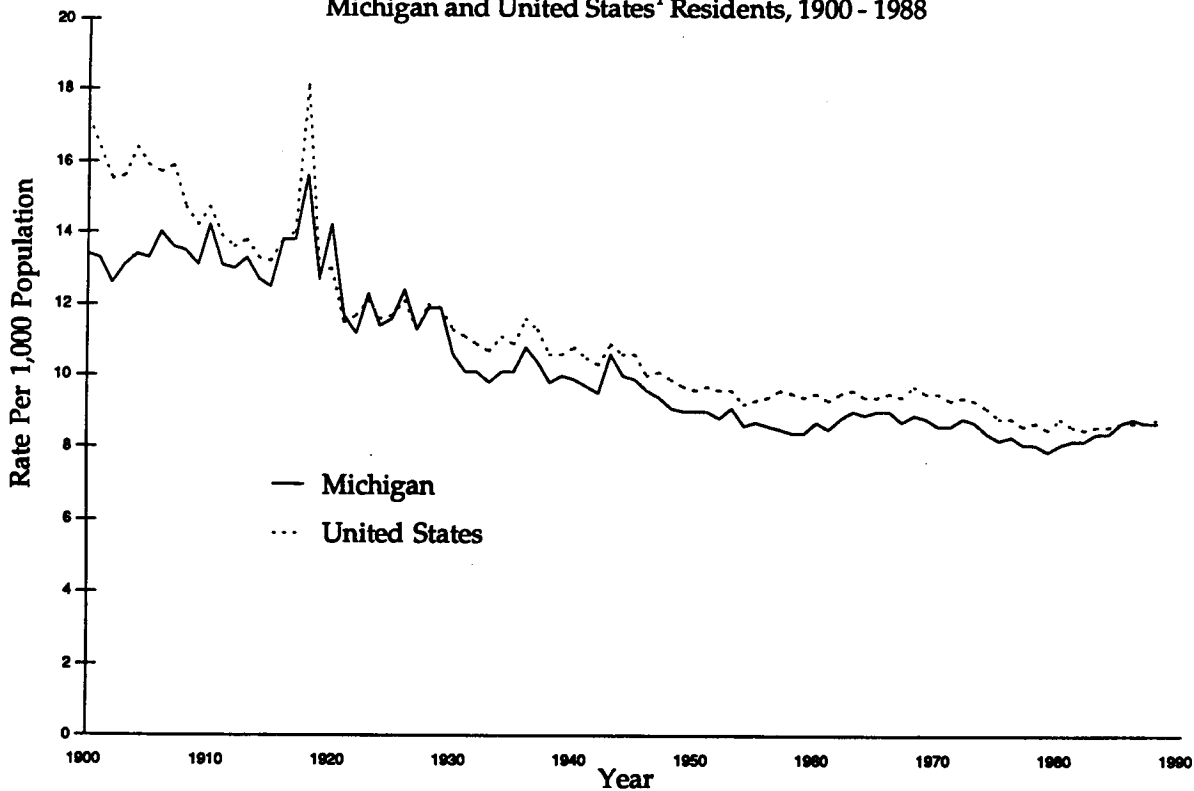
percent. For this same period, the age-adjusted rates for Michigan were higher than national rates eighteen out of nineteen years. Between 1970 and 1983 the rates were similar, based upon the revised data in Table 2.6. By 1988 the age-adjusted rate for Michigan was 1.6 percent above the provisional national rate.

The numbers of deaths by marital status and age for men and women are displayed in Table 2.2. The majority of men were married at the time of death while the majority of women were widows. Men were more than twice as likely as women to be married at the time of death (57.9 percent compared to 26.4 percent). Conversely, women were over three

times as likely to be widows at the time of death as men were to be widowers (56.5 percent compared to 18.0 percent). Among males, 14.5 percent had never been married, while the corresponding figure for females was 9.5 percent. Men were also more likely to be divorced (9.3 percent compared to 7.5 percent).

Table 2.3 presents data on the number of deaths by race for the period 1970-1988. The number of deaths of white persons increased by 1.4 percent over these years while deaths of black persons increased by 32.5 percent. Reported deaths of American Indians remained fairly constant. In 1988 deaths of white persons numbered 68,191 and ac-

Figure 2.1
Crude Death Rates
Michigan and United States¹ Residents, 1900 - 1988



¹ United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

Table 2.2
Deaths by Age, Sex and Marital Status
Michigan Residents, 1988

Age in Years	Males						Females					
	Total	Never Married	Divorced	Widower	Married ¹	Unknown	Total	Never Married	Divorced	Widow	Married ¹	Unknown
Under 15	1,198	1,198	-	-	-	-	956	955	-	1	-	-
15 - 24	1,073	1,014	10	-	47	2	380	322	10	2	46	-
25 - 34	1,449	797	207	6	433	6	605	264	105	8	228	-
35 - 44	1,924	513	490	21	891	9	1,007	199	238	47	519	4
45 - 54	2,762	319	627	84	1,717	15	1,629	136	346	154	993	-
55 - 64	6,272	545	932	417	4,362	16	4,080	240	570	972	2,294	4
65 - 74	10,757	716	898	1,467	7,640	36	7,840	380	661	3,572	3,214	13
75 - 84	10,527	620	522	2,684	6,672	29	11,124	564	589	7,646	2,307	18
85 +	5,494	283	183	2,771	2,240	17	10,982	600	357	9,401	611	13
Unknown	2	-	-	-	-	2	7	2	1	-	-	4
All Ages	41,458	6,005	3,869	7,450	24,002	132	38,610	3,662	2,877	21,803	10,212	56

¹ Includes legally separated.

Table 2.3
Number of Deaths by Race¹
 Michigan Residents, 1970 - 1988

YEAR	ALL RACES	WHITE	BLACK	AMERICAN INDIAN	OTHER ²
1970	76,321	67,270	8,731	127	54
1971	77,395	67,847	9,259	128	45
1972	79,210	69,598	9,409	126	40
1973	78,522	68,502	9,641	121	54
1974	76,143	66,600	9,233	128	58
1975	74,522	65,191	9,024	118	60
1976	75,801	66,334	9,146	125	70
1977	74,144	64,816	9,038	140	53
1978	74,773	65,149	9,254	152	72
1979	73,480	63,955	9,188	129	75
1980	74,991	64,897	9,704	137	93
1981	75,818	65,559	9,950	127	78
1982	75,536	65,259	9,941	148	101
1983	76,639	66,103	10,178	163	121
1984	76,401	65,732	10,359	129	115
1985	78,635	67,426	10,903	130	116
1986	80,177	68,602	11,283	139	134
1987	79,795	67,831	11,614	137	146
1988	80,075	68,191	11,569	132	152

¹ Deaths with race not stated included in total column only. Persons of Spanish or of Mexican-American descent are included with white.

² Includes Chinese, Japanese, Filipino, Hawaiian, other Asian or Pacific Islander. Indians from India were counted as "White" from 1970 - 1977 and with "Other" since 1978.

counted for 85.2 percent of all deaths, while deaths of black persons constituted 14.4 percent of the state total.

It should be noted that data on race are derived from the death certificates filed by funeral directors. Data from sources where race is self-enumerated, when matched with death data, indicate that there are larger numbers of American Indians and persons of other races dying than are reported as members of those groups on the death certificate.¹

Michigan resident deaths in 1988 are tabulated by age, race, and sex in Table 2.4. Of the 80,075 Michigan resident deaths that occurred in 1988, 41,458 (51.8 percent) occurred to males and 38,610 occurred to females (7 records had sex not stated). The median age at death for males was 70 years, compared to a significantly higher figure of 77 years for females. The median age at death was 75 years for white persons, 65 years for black persons and 64 years for persons of other races.

¹ National Center for Health Statistics, Comparability of Marital Status, Race, Nationality and Country of Origin in the Death Certificate and Matching Census Record: United States, May - August, 1986 (Washington, D.C., 1969).

Table 2.4
Number of Deaths by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	1,542	832	703	952	524	426	570	297	268	19	10	9
1 - 4	237	137	100	181	105	76	52	30	22	4	2	2
5 - 9	178	103	75	130	68	62	48	35	13	-	-	-
10 - 14	204	126	78	148	87	61	53	38	15	3	1	2
15 - 19	675	499	176	465	334	131	199	158	41	11	7	4
20 - 24	778	574	204	535	398	137	236	171	65	6	4	2
25 - 29	909	671	238	627	465	162	273	200	73	9	6	3
30 - 34	1,145	778	367	774	521	253	362	251	111	7	5	2
35 - 39	1,395	930	465	881	591	290	505	335	170	7	3	4
40 - 44	1,536	994	542	1,056	702	354	475	290	185	5	2	3
45 - 49	1,893	1,223	670	1,409	907	502	475	313	162	8	3	5
50 - 54	2,498	1,539	959	1,937	1,207	730	538	317	221	23	15	8
55 - 59	3,994	2,396	1,598	3,223	1,957	1,266	751	426	325	17	10	7
60 - 64	6,358	3,876	2,482	5,271	3,255	2,016	1,059	609	450	26	11	15
65 - 69	8,470	4,971	3,499	7,137	4,227	2,910	1,299	727	572	31	16	15
70 - 74	10,127	5,786	4,341	8,877	5,090	3,787	1,217	680	537	31	14	17
75 - 79	10,798	5,616	5,182	9,581	5,008	4,573	1,176	584	592	36	21	15
80 - 84	10,853	4,911	5,942	9,842	4,457	5,385	988	438	550	21	14	7
85 - 89	8,665	3,270	5,395	7,926	2,986	4,940	723	274	449	13	9	4
90 +	7,811	2,224	5,587	7,235	2,048	5,187	567	174	393	7	2	5
Not Stated	9	2	7	4	1	3	3	1	2	-	-	-
All Ages	80,075	41,458	38,610	68,191	34,938	33,251	11,569	6,348	5,216	284	155	129
Median Age At Last Birthday	74	70	77	75	72	78	65	62	69	64	64	64

¹ Deaths with race and/or sex not stated are included only in the total column.

In 1988, 23,342 or 29.2 percent of all deaths occurred to persons under the age of 65. The proportion dying under age 65 was greater for males than females and greater for black persons and persons of races other than black or white than for white persons. For deaths of white persons 31.8 percent of the males and 19.4 percent of the females died before age 65. For deaths of black persons, 54.7 percent of the males and 40.7 percent of the females died before age 65. For persons of races other than black or white, the percentage of the males (51.0) who died before the age of 65 was lower than the percentage for black males and

higher than the percentage for white males. The percentage of females of races other than black or white (51.2) was greater than the percentages of both black and white females.

Since about eighty-eight percent of the population is below age 65, a better reflection of the probability of living to age 65 is obtained from appendix Tables 4.19 - 4.27. Based on current age-specific death rates, 76.4 percent of white males born in 1988 would survive to age 65. The percentages are 86.0, 54.6 and 72.2, respectively, for white females, black males and black females.

Crude age-specific, and age-adjusted death rates by race and sex are presented in Table 2.5. The crude rate for males of 921.5 was 13.1 percent above that for females, while the age-adjusted rate for males was 66.5 percent higher than the age-adjusted rate for females. The population with the lowest crude death rate was black females (803.6) and the highest

crude rate was experienced by black males (1,102.2).

Age-adjusting the data produced a different relationship, with the age-adjusted rate being lowest for white females rather than for black females. The age-adjusted rate was still highest for black males.

Table 2.5
Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	866.6	921.5	814.5	864.4	904.9	825.6	944.0	1,102.2	803.6
Under 1	1,104.7	1,179.6	1,027.5	851.1	923.3	776.3	2,331.7	2,448.0	2,214.7
1 - 14	32.3	37.3	27.1	29.2	32.3	26.1	49.1	65.6	32.4
15 - 24	97.9	142.9	51.8	81.0	116.6	44.1	189.3	291.2	90.6
25 - 34	132.0	188.3	76.9	105.9	148.8	62.9	302.0	468.9	161.2
35 - 44	224.7	300.7	151.5	172.1	231.2	113.8	623.2	891.3	407.5
45 - 54	467.4	605.0	337.3	405.8	522.2	293.6	979.9	1,369.1	667.7
55 - 64	1,263.2	1,607.9	950.2	1,170.2	1,499.2	867.7	2,077.5	2,635.4	1,620.0
65 - 74	2,940.4	3,844.0	2,223.3	2,827.1	3,710.1	2,123.9	4,043.1	5,204.6	3,150.9
75 - 84	6,514.2	8,308.7	5,408.7	6,455.3	8,281.8	5,336.2	7,316.2	8,799.0	6,358.1
85 and Over	14,105.9	15,627.4	13,450.9	14,236.8	15,859.4	13,548.1	13,298.4	13,714.1	13,087.3
Age-Adjusted Rate ²	545.0	698.0	419.1	504.9	647.2	388.6	858.2	1,120.2	647.9

¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

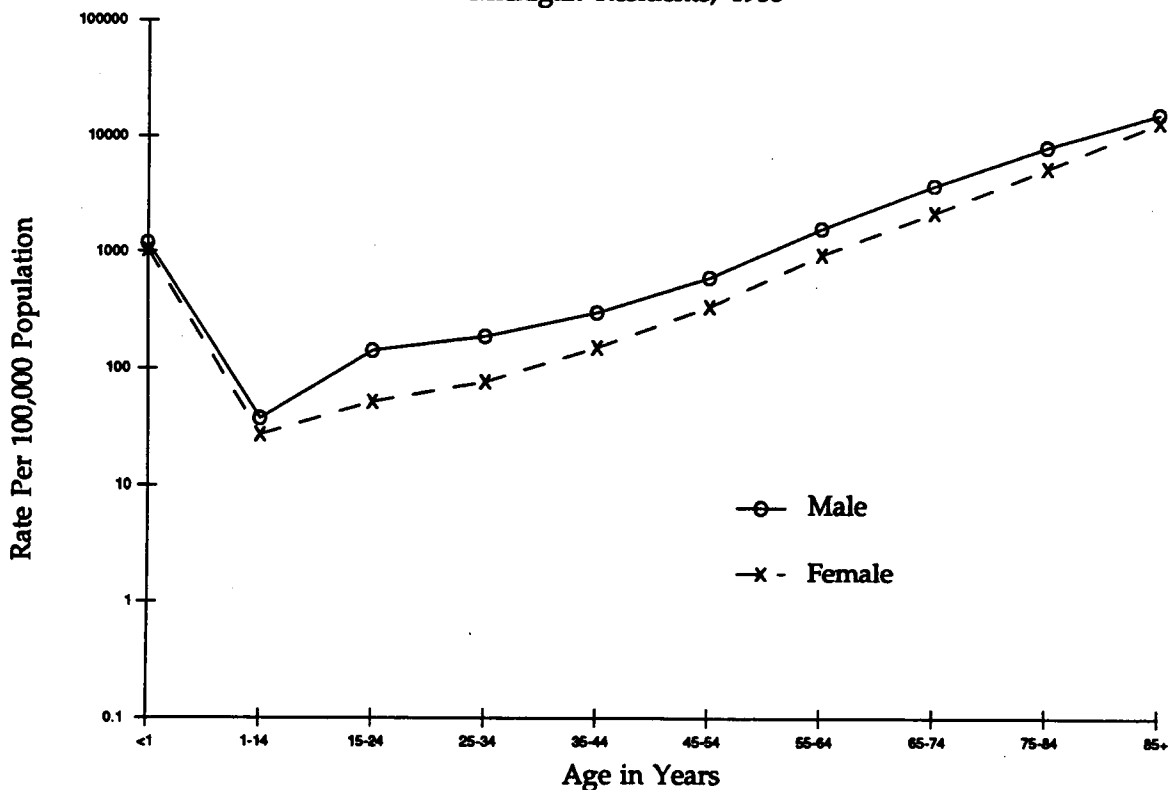
* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

The age-specific death rates for all males and all females displayed in Figure 2.2 indicate a similar pattern. Rates for both sexes declined from birth to a low for ages 1-14 years. The rate for males aged 15-24 was 3.8 times higher than the rate for males 1-14 years of age, while the rate for females in the 15-24 years age group was 1.9 times higher than the

rate for their 1-14 years of age counterparts. Rates for both sexes rose through the terminal age group (85 years and over). Rates for males were consistently above those for females with the greatest relative differential occurring in the age group 15-24 years, where the rate for males was 2.8 times that for females.

Figure 2.2
Age - Specific Death Rates¹ by Sex
Michigan Residents, 1988

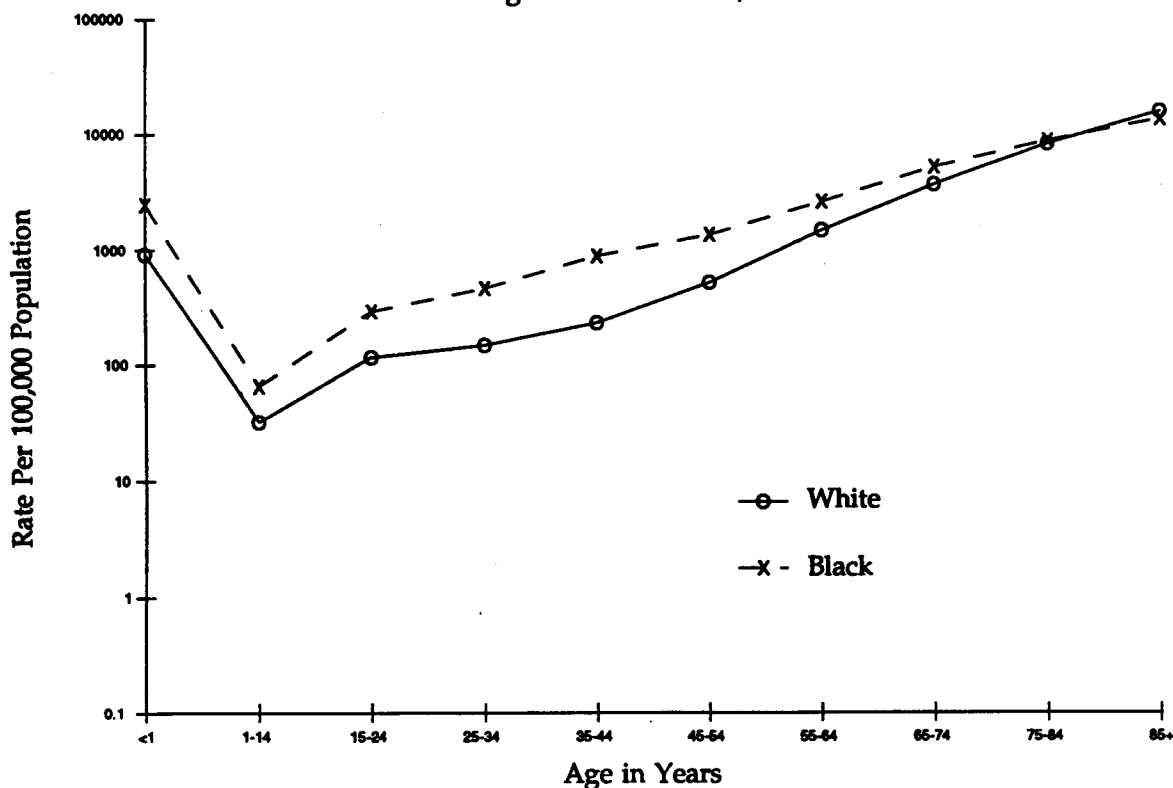


¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

A comparison by race of 1988 age-specific death rates for males is graphically presented in Figure 2.3. Rates for white and black males were 3.6 and 4.4 times higher, respectively, for the 15-24 age groups than for the 1-14 age groups. Between ages 15-24 and 25-34 the rate for white males increased by 27.6 percent, while the corresponding increase for black males was 61.0 percent. Rates for black males were above those for white males at all ages below 85 years. The largest relative differential was for persons from 35 through 44 years of age, where the rate for black males was 3.9 times that of white males. Beyond age 84, the rates for white males were higher.

The overall death rate of 1,102.2 per 100,000 for black males was 21.8 percent higher than the rate for white males (904.9). This is a reflection of the younger age distribution of the black male population and the higher death rates for black males under age 85 years, especially in the 15-54 year age groups where rates were 2.5 to 3.9 times higher than rates for their white male counterparts. The age-adjusted death rate for black males, which is a better indicator of relative mortality, was 73.1 percent higher than that for white males.

Figure 2.3
Age - Specific Death Rates¹ by Race
Michigan Resident Males, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

Rates for black females were higher than those for white females at all ages prior to 85 years (Figure 2.4). For women from 35 through 44 years, the rates for black females were 3.6 times the rates for white females. The death rate for all ages was 825.6 for white females and 803.6 for black females reflecting the greater concentration of the white female population in the older age intervals with relatively high death rates. After adjusting for differences in the age distributions of the populations, the rate for black females was 66.7 percent greater than that for their white counterparts.

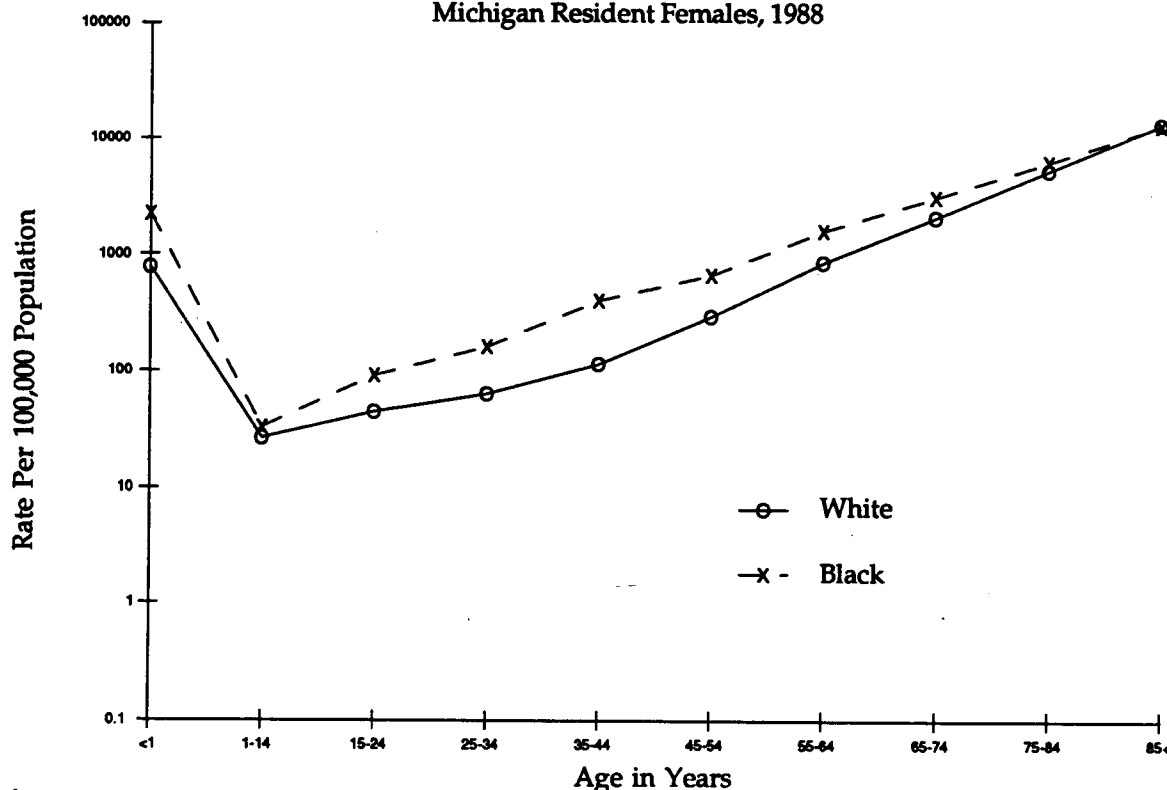
In Table 2.6, population and death counts for black and additional other than white persons have been combined for the purpose of calculating "other than white" age-adjusted mortality rates. This grouping was made

because the National Center for Health Statistics provides national age-adjusted data only for white and other than white categories.

Michigan age-adjusted death rates for other than white persons were considerably higher than comparable rates for white persons throughout the period 1970-1988 (Table 2.6). Age-adjusted rates for other than white males ranged between 34.0 percent (in 1978) and 66.2 percent (in 1987) higher than comparable rates for white males in Michigan. For females this differential was less extreme with the rate for other than white women exceeding that for white women by 34.5 percent (in 1975) to 59.0 percent (in 1988).

Declines have occurred since 1970 both in Michigan and the United States in age-adjusted death rates in each race-sex group. The

Figure 2.4
Age - Specific Death Rates¹ by Race
Michigan Resident Females, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

rates for Michigan and the United States white males and females and the United States male and female persons of other races generally decreased during the nineteen years achieving the lowest rates in 1988. However, other than white males and females in Michigan were lowest in 1982. Michigan's age-adjusted rate for the population as a whole declined by 24.0 percent between 1970 and 1988 while the estimated decline for the United States was 24.9 percent.

For the other than white population, the relative decline in Michigan was less than it was for the United States through the year 1987, the last year for which national data were available. For Michigan other than white persons, male age-adjusted rates declined 8.9 percent and female rates declined 19.0 percent between 1970 and 1987. The United States rates for these groups declined by 27.1 and 32.5 percent, respectively, during this period. The Michigan rates for white males and females declined 25.9 and 21.5 percent, respectively. The United States rates for these groups dropped 25.2 and 23.4 percent, respectively, during the same period.

During the period 1970 through 1987, the age-adjusted mortality rates for Michigan white females have been consistently greater than the rates for their national counterparts. For ten of the eighteen years of this period, Michigan white male rates have exceeded the national white male rates. Michigan rates for other than white females were less than the rates for their national counterparts from 1970 through 1977 and greater since then. For Michigan other than white males the age-adjusted mortality rates have been greater than the rates for national other than white males for sixteen of the eighteen years of the period.

Between 1970 and 1988, the minimum age-adjusted death rates were achieved in 1988 for Michigan white males and females and in 1987, the latest available year, for the United States white males and females and other than white males and females; while in Michigan other than white males and females achieved their lowest rates in 1982. The rate for other than white females showed a slight increase between 1987 and 1988 while the rate for other than white males dropped to its lowest level since 1984.

Table 2.6
Age - Adjusted Death Rates¹ by Race and Sex
Michigan² and United States Residents, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	717.5	925.9	537.3	685.5	889.4	510.8	961.5	1,201.7	744.8
	1971	707.9	922.9	524.0	672.5	881.2	495.7	969.6	1,226.9	739.3
	1972	711.1	928.2	526.4	677.2	888.0	499.4	954.7	1,220.4	719.6
	1973	694.3	906.3	513.7	658.4	862.6	486.0	949.5	1,223.6	709.2
	1974	660.7	865.1	488.0	628.4	824.6	464.2	885.2	1,153.2	651.4
	1975	640.2	840.3	472.4	610.1	800.5	452.0	846.1	1,122.0	607.8
	1976	636.1	838.5	469.1	607.2	801.4	448.5	835.0	1,100.7	608.1
	1977	614.4	814.8	449.4	587.3	781.6	428.8	802.2	1,049.4	592.9
	1978	606.3	797.8	449.8	578.7	765.7	426.8	798.9	1,025.7	608.9
	1979	585.4	775.6	431.4	557.9	742.5	409.7	773.0	1,007.6	577.6
	1980	588.0	773.9	438.7	557.1	735.5	414.9	797.3	1,045.8	594.3
	1981	567.4	752.1	424.5	542.2	718.5	403.0	742.4	977.6	554.1
	1982	556.9	739.5	416.8	531.9	705.4	395.6	730.9	961.8	546.1
	1983	557.1	735.0	421.2	531.1	698.7	399.3	738.9	973.3	551.7
	1984	564.5	736.5	431.3	533.7	694.8	407.2	779.4	1,024.5	582.0
	1985	570.0	747.3	427.6	534.9	701.2	402.8	801.0	1,063.7	587.9
	1986	566.9	734.8	431.0	529.2	685.4	404.0	815.2	1,076.8	603.9
	1987	556.4	713.6	428.4	516.1	658.8	400.9	822.4	1,094.8	603.5
	1988	545.0	698.0	419.1	504.9	647.2	388.6	813.1	1,054.9	618.0
U.S.	1970	714.3	931.6	532.5	679.6	893.4	501.7	983.4	1,231.4	770.8
	1971	697.6	913.3	519.1	663.7	876.0	489.1	959.5	1,206.7	749.8
	1972	698.0	918.0	516.6	664.0	879.3	487.6	958.6	1,223.1	737.1
	1973	687.3	905.9	508.1	654.0	868.5	479.3	942.2	1,199.5	728.1
	1974	659.5	870.9	487.0	629.0	836.1	461.0	889.6	1,142.4	680.5
	1975	630.4	837.2	462.5	602.2	804.3	439.0	840.6	1,090.1	634.5
	1976	618.5	820.9	455.0	591.3	789.3	432.5	818.5	1,063.4	618.3
	1977	602.1	801.3	441.8	575.7	770.6	419.6	796.7	1,036.1	601.8
	1978	595.0	791.4	437.4	569.5	761.1	416.4	780.0	1,021.0	585.8
	1979	577.0	768.6	423.1	551.9	738.4	402.5	757.1	994.8	566.9
	1980	585.8	777.2	432.6	559.4	745.3	411.1	774.2	1,015.1	582.6
	1981	568.2	753.3	420.4	544.6	724.4	401.4	732.6	964.3	549.4
	1982	553.8	733.1	411.2	531.8	706.0	393.3	704.6	928.4	529.3
	1983	550.5	725.3	411.5	528.0	698.4	392.7	703.1	916.3	535.2
	1984	545.9	716.7	409.6	523.6	689.9	391.3	694.5	904.4	529.0
	1985	546.1	716.8	409.4	523.1	688.7	390.6	697.8	910.4	530.0
	1986	541.7	709.1	406.6	518.0	679.8	387.7	693.1	905.7	524.0
	1987	535.5	698.6	403.3	511.1	668.2	384.1	688.0	898.1	520.1
	1988 ³	536.3	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ Provisional data.

LEADING CAUSES OF DEATH

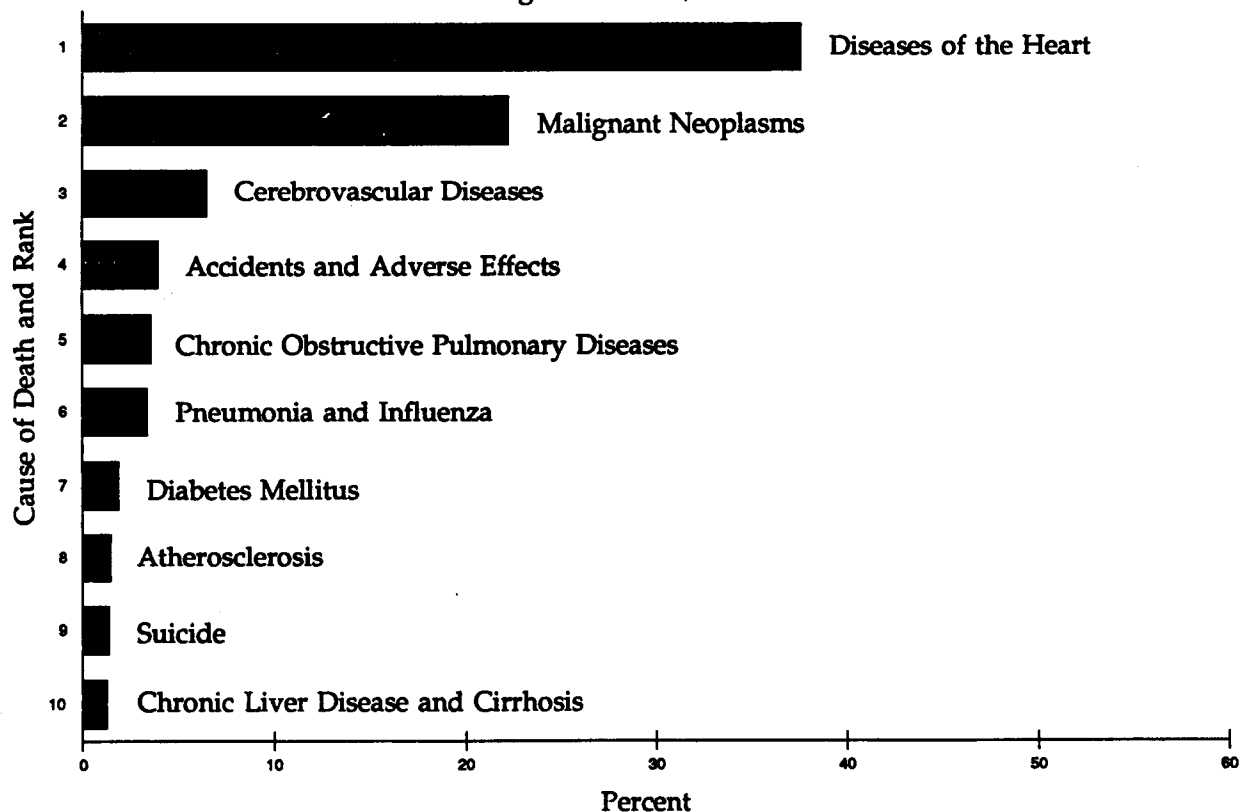
Deaths due to the 10 leading causes accounted for 83.7 percent of all deaths in 1988. Diseases of the heart were the leading cause of death with 37.7 percent of all deaths due to heart diseases. Another 22.3 percent of the deaths were due to cancer. Together these two causes of death were responsible for 60.0 percent of all Michigan resident deaths. The percentage of total deaths resulting from each of the 10 leading causes of death in 1988 is illustrated in Figure 2.5.

Causes of death since 1979 are classified according to the Ninth Revision International Classification of Diseases (ICD-9) published by the World Health Organization. The

causes-of-death from 1900 through 1978 were coded based on earlier revisions of the International Classification of Disease.

During the twentieth century there have been nine revisions published in 1900, 1909, 1920, 1929, 1939, 1948, 1955, 1968 and 1979. The first revision was used in Michigan in 1900 to code cause of death starting with 1898 deaths. Between 1929 and 1939 data were coded using the fourth revision. It is unclear if and/or when the second and third revisions were used in Michigan. The fifth through eight revisions were used from 1940 through 1949, 1950 through 1957, 1958 through 1967, and 1968 through 1978, respectively.

Figure 2.5
Leading Causes of Death
Michigan Residents, 1988



The cause-of-death ranking procedure used in Michigan is identical to that used by the National Center for Health Statistics (NCHS). It is based on a "List of 72 Selected Causes of Death," which NCHS constructed by combining titles in the "List of 282 Selected Causes of Death." This latter list, which is also used in this publication, was constructed by aggregating the detailed titles of ICD-9.

The numbers of deaths and the death rates for the 10 leading causes for 1988 are shown

in Table 2.7. The ranking of the 10 leading causes for 1988 was similar to the rankings for the last eight out of nine years. Suicide was again listed among the 10 leading causes of death in 1988; before 1987 it was generally the 10th leading cause of death. In 1988, suicide ranked as the 9th leading cause of death. Chronic liver disease and cirrhosis, which in recent years had been ranked as the 8th or 9th leading cause of death, was ranked 10th in 1988. Homicide did not rank among the 10 leading causes of death in 1988 with 1,060

Table 2.7
Leading Causes of Death and Cause - Specific Rates
Michigan and United States Residents, 1988

RANK	CAUSE OF DEATH	NUMBER OF DEATHS		RATE	
		MICHIGAN	U.S. ¹	MICHIGAN	U.S. ¹
1	Diseases of the Heart	30,218	767,400	327.0	312.2
2	Malignant Neoplasms	17,890	488,240	193.6	198.6
3	Cerebrovascular Diseases	5,237	150,300	56.7	61.1
4	Accidents and Adverse Effects	3,237	97,500	35.0	39.7
5	Chronic Obstructive Pulmonary Diseases and Allied Conditions	2,899	81,960	31.4	33.3
6	Pneumonia and Influenza	2,684	77,330	29.0	31.5
7	Diabetes Mellitus	1,522	39,610	16.5	16.1
8	Atherosclerosis	1,187	23,700	12.8	9.6
9	Suicide	1,087	30,260	11.8	12.3
10	Chronic Liver Disease and Cirrhosis	1,080	26,080	11.7	10.6
Sub Total		67,041	1,782,380	725.5	725.0
All Other Causes		13,034	388,620	141.1	158.0
Total		80,075	2,171,000	866.6	883.0

¹ United States data are estimates based on a 10 percent sample of deaths.

deaths. In 1987 homicide ranked as the 9th leading cause of death. It did not rank among the top 10 leading causes in 1979 through 1986.

Crude death rates in Michigan were lower in 1988 than in 1987 for three of the ten leading causes. The rates were lower in 1988 for diseases of the heart, cerebrovascular disease and chronic liver disease and cirrhosis. The rates were higher for malignant neoplasms, accidents and adverse effects, chronic obstructive pulmonary diseases and allied conditions, pneumonia and influenza, diabetes mellitus, atherosclerosis, and suicide.

Through the 7th leading cause of death, the order of the leading causes of death for Michigan and the United States were similar for 1988 (Table 2.7). For the United States, suicide was the 8th leading cause of death with 30,260 attributed deaths and a rate of 12.3. Nationally, chronic liver disease and cirrhosis ranked 9th and atherosclerosis was the 10th leading cause of death. The overall Michigan death rate was lower than the national rate. Nevertheless, Michigan's mortality rates for diseases of the heart, diabetes mellitus, atherosclerosis and chronic liver disease and cirrhosis were higher than the comparable national rates.

During the years 1968-1978 the Eighth Revision International Classification of Diseases. Adapted for Use in the United States (ICDA-8) was used to classify causes of death. The introduction of the Ninth Revision in 1979 resulted in a change in the ranking of the 10 leading causes between 1978 and 1979. The ranking of the four leading causes of death, heart disease, cancer, stroke, and accidents, was not changed. However, the fifth leading cause of death since 1979, chronic obstructive pulmonary diseases and allied conditions, was a new category, comparable to the Eighth Revision categories of bronchitis, emphysema, asthma, and chronic obstructive lung disease

without mention of asthma, bronchitis, or emphysema. This latter category was used increasingly by physicians during the 1970's in preference to more specific categories.

During the years in which the Eighth Revision was used, bronchitis, emphysema, and asthma were grouped together for purposes of ranking, and chronic obstructive lung disease without mention of asthma, bronchitis, or emphysema was not used in ranking. The causes ranked 6th to 10th between 1979 and 1986 are the same as the causes ranked 5th to 9th in 1978, although the order was slightly different in 1981 through 1983 and 1986. In 1987, suicide had dropped out of the 10 leading causes of death for the first time since 1963. In 1988 suicide was the ninth leading cause of death.

Table 4.8 shows the numbers of deaths and death rates for each year during this century for several major causes including seven causes currently ranked among the 10 leading causes of death. There has been no change in the ranking of the four leading causes since 1950. From 1950 through 1978 the ranks of 5th and 6th were held by diabetes mellitus and pneumonia, with pneumonia ranking 5th in 14 of the 29 years. For the past twelve years pneumonia has ranked above diabetes.

Atherosclerosis, previously termed arteriosclerosis, has consistently been among the ten leading causes of death, ranking 7th in 1950 and 8th in 1988. Suicide, the 9th leading cause of death in 1988, was first ranked among the ten leading causes in 1963 when it ranked 10th. The 10th leading cause of death in 1988, chronic liver disease and cirrhosis (formerly titled cirrhosis of the liver) was not among the ten leading causes of death in 1950. This cause ranked 10th in 1955 and has been among the ten most frequent causes consistently since 1960. It was the 7th leading cause each year from 1969 through 1978 and between 8th and 9th from 1979 through 1986.

In 1987 it was the 10th leading cause. In 1988, seven of the ten leading causes of death were chronic conditions, one was an acute disease category, and two were external non-disease groupings.

While the most frequent causes of death among all Michigan residents have changed only slightly in recent years, this does not imply similarity in the leading causes of death among residents of different ages, sexes or races. Table 2.8 presents the five most frequent causes of death by age, sex and race. Races other than white and black are not presented in this table because of the small number of deaths in any age-sex-cause of death category.

There are differences in the leading causes of death associated with age, race and sex. Diseases of the heart are among the most frequent causes in all but three categories. Malignant neoplasms and accidents have the next most widespread significance, being present in 26 of the 32 age-sex-race groups. Homicides are next in 17 groupings and cerebrovascular diseases and suicide in 12 groupings.

The variation in leading causes of death by age is most evident among deaths to infants under one year. Deaths among infants are primarily due to conditions originating in the perinatal period and congenital anomalies. External causes of death, including accidents, suicide and homicide, are predominant killers among persons 1 through 34 years of age. Among persons 35 years and over, chronic conditions are responsible for the majority of deaths.

Although homicide did not rank in the top ten causes of death in 1988, it was one of the top five leading causes of death for all age groups from 1 to 50 years of age among both black males and females, the leading cause for black males and females 15 to 34 years of age

and among black males it was the third leading cause of death over all, representing 9.8 percent of the deaths among this group.

Homicide was the fourth or fifth leading cause of death for white males 1-34 years of age. Among white females homicide was the fourth or fifth leading cause of death for ages 15-34 years. It was not among the top five causes of death for white males and females in other age categories.

Among white males, accidents were one of the top five leading causes for all ages under 65 years and the leading cause for the ages 1 to 34 years. Suicides were the second leading cause of death for ages 15-34 and fourth for age group 5-14 and 35-49 among white males. Accidents were one of the top leading causes of death among black males under 50 years of age and the leading cause for ages 1 to 14 years. Suicide was the third leading cause among black males ages 15 to 24 years and the fourth leading cause for ages 25-34 years.

Among white females accidents were the leading cause of death for ages 1-34 and the third leading cause for ages 35 to 49 years. Accidents were the fourth leading cause of death for white female infants under 1 year of age. Suicide was among the top five leading causes for ages 5 to 49 years. For black females accidents were one of the top five causes for all age groups under 50 years of age and the leading cause for ages 1-14 years. Suicide was the fifth leading cause of death among black females 15-24 years of age.

Among black males 25-34 years of age HTLV-III/LAV infection (AIDS) was the fifth leading cause of death with 20 deaths. Among white males 5-14 years of age homicide and AIDS are tied for the fifth leading cause with three deaths. Congenital anomalies are among the leading causes for persons under 15 years of age for most race-sex-groups. Pneumonia and Influenza

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988

TOTAL POPULATION ¹			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
All Ages	1. Diseases of the Heart	30,218	327.0
	2. Malignant Neoplasms	17,890	193.6
	3. Cerebrovascular Diseases	5,237	56.7
	4. Accidents	3,237	35.0
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	2,899	31.4
	All Causes	80,075	866.6
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	844	604.6
	2. Congenital Anomalies	292	209.2
	3. Accidents	37	26.5
	4. Diseases of the Heart	25	17.9
	5. Pneumonia and Influenza	16	11.5
	All Causes	1,542	1,104.7
1 - 4 Years	1. Accidents	92	16.8
	2. Congenital Anomalies	32	5.8
	3. Malignant Neoplasms	22	4.0
	4. Homicide	11	2.0
	5. Diseases of the Heart	10	1.8
	All Causes	237	43.2
5 - 14 Years	1. Accidents	168	12.3
	2. Malignant Neoplasms	52	3.8
	3. Homicide	33	2.4
	4. Congenital Anomalies	20	1.5
	5-6. Diseases of the Heart - Suicide	12	0.9
	All Causes	382	28.0
15 - 24 Years	1. Accidents	632	42.6
	2. Homicide	297	20.0
	3. Suicide	197	13.3
	4. Malignant Neoplasms	86	5.8
	5. Diseases of the Heart	42	2.8
	All Causes	1,453	97.9
25 - 34 Years	1. Accidents	567	36.4
	2. Homicide	320	20.6
	3. Suicide	239	15.4
	4. Malignant Neoplasms	183	11.8
	5. Diseases of the Heart	143	9.2
	All Causes	2,054	132.0

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

TOTAL POPULATION ¹			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
35 - 49 Years	1. Malignant Neoplasms	1,216	67.4
	2. Diseases of the Heart	1,001	55.5
	3. Accidents	530	29.4
	4. Chronic Liver Disease and Cirrhosis	270	15.0
	5. Homicide	259	14.4
	All Causes	4,824	267.3
50 - 64 Years	1. Malignant Neoplasms	4,694	372.9
	2. Diseases of the Heart	4,298	341.4
	3. Chronic Obstructive Pulmonary Diseases and Allied Conditions	466	37.0
	4. Cerebrovascular Diseases	462	36.7
	5. Chronic Liver Disease and Cirrhosis	407	32.3
	All Causes	12,850	1,020.8
65 and Over	1. Diseases of the Heart	24,684	2,282.0
	2. Malignant Neoplasms	11,634	1,075.5
	3. Cerebrovascular Diseases	4,516	417.5
	4. Pneumonia and Influenza	2,359	218.1
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	2,349	217.2
	All Causes	56,724	5,244.0

¹ Subtotals by sex and race do not add to the grand total as the race was not stated on records for 17 males and 14 females. In addition, the sex was not stated on 2 records for white and 5 black persons. Age groups do not add to respective totals because records with age not stated are included only in the total.

² Rates may not agree with those shown elsewhere in this section since records of unknown sex and race were randomly allocated prior to rate calculation for the other tables, and were not included in calculations for this table.

³ Rate per 100,000 population.

are in the top five causes of death for infants and persons 65 and over for each race-sex-group. They were the fourth leading cause of death for white females.

Chronic obstructive pulmonary diseases and allied conditions (COPD) are the fifth leading cause of death in Michigan. They are

among the top five causes for people aged 50 or over but not among the top five for people under age 50 years. Chronic liver disease and cirrhosis is among the top five causes of death for Michigan residents between 35 and 64, years of age. Diabetes is the fifth leading cause of death for black females.

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

WHITE MALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
All Ages	1. Diseases of the Heart	13,256	343.2
	2. Malignant Neoplasms	8,145	210.9
	3. Accidents	1,853	48.0
	4. Cerebrovascular Diseases	1,801	46.6
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	1,591	41.2
	All Causes	34,938	904.5
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	238	417.8
	2. Congenital Anomalies	122	214.2
	3. Accidents	16	28.1
	4. Diseases of the Heart	9	15.8
	5-6. Pneumonia and Influenza - Cerebrovascular Diseases	4	7.0
	All Causes	524	919.8
1 - 4 Years	1. Accidents	45	19.5
	2. Congenital Anomalies	15	6.5
	3. Malignant Neoplasms	11	4.8
	4. Diseases of the Heart	6	2.6
	5. Homicide	4	1.7
	All Causes	105	45.5
5 - 14 Years	1. Accidents	85	14.8
	2. Malignant Neoplasms	18	3.1
	3. Congenital Anomalies	9	1.6
	4. Suicide	6	1.0
	5-6. Homicide - HTLV-III/LAV Infection (AIDS)	3	0.5
	All Causes	155	26.9
15 - 24 Years	1. Accidents	425	67.7
	2. Suicide	139	22.2
	3. Malignant Neoplasms	38	6.1
	4. Homicide	35	5.6
	5. Diseases of the Heart	12	1.9
	All Causes	732	116.6
25 - 34 Years	1. Accidents	376	56.7
	2. Suicide	167	25.2
	3. Malignant Neoplasms	76	11.5
	4. Diseases of the Heart	64	9.7
	5. Homicide	59	8.9
	All Causes	986	148.8

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

WHITE MALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
35 - 49 Years	1. Diseases of the Heart	571	73.6
	2. Malignant Neoplasms	443	57.1
	3. Accidents	318	41.0
	4. Suicide	172	22.2
	5. Chronic Liver Disease and Cirrhosis	114	14.7
	All Causes	2,200	283.7
50 - 64 Years	1. Diseases of the Heart	2,450	456.2
	2. Malignant Neoplasms	2,146	399.6
	3. Chronic Obstructive Pulmonary Diseases and Allied Conditions	240	44.7
	4. Chronic Liver Disease and Cirrhosis	208	38.7
	5. Accidents	191	35.6
	All Causes	6,419	1,195.3
65 and Over	1. Diseases of the Heart	10,141	2,552.4
	2. Malignant Neoplasms	5,412	1,362.2
	3. Cerebrovascular Diseases	1,512	380.6
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	1,320	332.2
	5. Pneumonia and Influenza	1,024	257.7
	All Causes	23,816	5,994.3

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

BLACK MALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
All Ages	1. Diseases of the Heart	1,874	325.1
	2. Malignant Neoplasms	1,292	224.2
	3. Homicide	619	107.4
	4. Cerebrovascular Diseases	305	52.9
	5. Accidents	284	49.3
	All Causes	6,348	1,101.3
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	197	1,607.5
	2. Congenital Anomalies	37	301.9
	3. Accidents	8	65.3
	4. Diseases of the Heart	5	40.8
	5. Pneumonia and Influenza	4	32.6
	All Causes	297	2,423.5
1 - 4 Years	1. Accidents	11	24.8
	2. Malignant Neoplasms	4	9.0
	3-4. Certain Conditions Originating in the Perinatal Period - Homicide	3	6.8
	5-6. Congenital Anomalies - Meningitis	2	4.5
	All Causes	30	67.6
5 - 14 Years	1. Accidents	23	20.4
	2. Homicide	21	18.6
	3. Malignant Neoplasms	11	9.8
	4-5. Diseases of the Heart - Chronic Obstructive Pulmonary Diseases and Allied Conditions	2	1.8
	All Causes	73	64.8
15 - 24 Years	1. Homicide	209	184.5
	2. Accidents	40	35.3
	3. Suicide	24	21.2
	4. Malignant Neoplasms	11	9.7
	5. Diseases of the Heart	8	7.1
	All Causes	329	290.4
25 - 34 Years	1. Homicide	192	199.2
	2. Accidents	52	53.9
	3. Diseases of the Heart	36	37.3
	4. Suicide	25	25.9
	5. HTLV-III/LAV Infection (AIDS)	20	20.7
	All Causes	451	467.9

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

BLACK MALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
35 - 49 Years	1. Diseases of the Heart	177	186.6
	2. Homicide	142	149.7
	3. Malignant Neoplasms	105	110.7
	4. Chronic Liver Disease and Cirrhosis	89	93.9
	5. Accidents	65	68.5
	All Causes	938	989.1
50 - 64 Years	1. Diseases of the Heart	482	795.6
	2. Malignant Neoplasms	404	666.9
	3. Chronic Liver Disease and Cirrhosis	62	102.3
	4. Cerebrovascular Diseases	57	94.1
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	34	56.1
	All Causes	1,352	2,231.7
65 and Over	1. Diseases of the Heart	1,164	2,776.5
	2. Malignant Neoplasms	747	1,781.8
	3. Cerebrovascular Diseases	193	460.4
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	108	257.6
	5. Pneumonia and Influenza	100	238.5
	All Causes	2,877	6,862.6

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

WHITE FEMALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
All Ages	1. Diseases of the Heart	13,085	324.8
	2. Malignant Neoplasms	7,292	181.0
	3. Cerebrovascular Diseases	2,763	68.6
	4. Pneumonia and Influenza	1,234	30.6
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	1,077	26.7
	All Causes	33,251	825.3
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	210	381.8
	2. Congenital Anomalies	105	190.9
	3. Diseases of the Heart	10	18.2
	4. Accidents	9	16.4
	5. Pneumonia and Influenza	6	10.9
	All Causes	426	774.5
1 - 4 Years	1. Accidents	27	12.3
	2. Congenital Anomalies	12	5.5
	3-4. Pneumonia and Influenza - Certain Conditions Originating in the Perinatal Period	4	1.8
	5. Diseases of the Heart	3	1.4
	All Causes	76	34.7
	5 - 14 Years	1. Accidents	54
2. Malignant Neoplasms		19	3.5
3. Congenital Anomalies		10	1.8
4. Diseases of the Heart		7	1.3
5. Suicide - Diabetes Mellitus		3	0.6
All Causes		123	22.6
15 - 24 Years	1. Accidents	133	21.9
	2. Suicide	30	4.9
	3. Malignant Neoplasms	28	4.6
	4. Diseases of the Heart	16	2.6
	5. Homicide	13	2.1
	All Causes	268	44.1
25 - 34 Years	1. Accidents	109	16.5
	2. Malignant Neoplasms	75	11.3
	3. Suicide	43	6.5
	4. Homicide	29	4.4
	5. Diseases of the Heart	22	3.3
	All Causes	415	62.8

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

WHITE FEMALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
35 - 49 Years	1. Malignant Neoplasms	528	66.9
	2. Diseases of the Heart	139	17.6
	3. Accidents	109	13.8
	4. Cerebrovascular Diseases	47	6.0
	5. Suicide	45	5.7
	All Causes	1,146	145.2
50 - 64 Years	1. Malignant Neoplasms	1,799	312.5
	2. Diseases of the Heart	996	173.0
	3. Chronic Obstructive Pulmonary Diseases and Allied Conditions	173	30.1
	4. Cerebrovascular Diseases	167	29.0
	5. Accidents	113	19.6
	All Causes	4,012	696.9
65 and Over	1. Diseases of the Heart	11,891	2,061.3
	2. Malignant Neoplasms	4,840	839.0
	3. Cerebrovascular Diseases	2,534	439.3
	4. Pneumonia and Influenza	1,134	196.6
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	876	151.9
	All Causes	26,782	4,642.7

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

BLACK FEMALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
All Ages	1. Diseases of the Heart	1,919	295.4
	2. Malignant Neoplasms	1,090	167.8
	3. Cerebrovascular Diseases	356	54.8
	4. Certain Conditions Originating in the Perinatal Period	184	28.3
	5. Diabetes Mellitus	156	24.0
	All Causes	5,216	803.0
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	184	1,509.3
	2. Congenital Anomalies	22	180.5
	3. Cerebrovascular Diseases	5	41.0
	4. Accidents	4	32.8
	5. Homicide - Nephritis, Nephrotic Syndrome and Nephrosis - Pneumonia and Influenza	2	16.4
	All Causes	268	2,198.3
1 - 4 Years	1. Accidents	7	16.1
	2. Malignant Neoplasms	5	11.5
	3-4. Congenital Anomalies - Homicide	3	6.9
	5-7. Anemia - Diseases of the Heart - Nephritis, Nephrotic Syndrome and Nephrosis	1	2.3
	All Causes	22	50.6
5 - 14 Years	1-2. Accidents - Homicide	6	5.4
	3. Malignant Neoplasms	3	2.7
	4. Suicide	2	1.8
	5-12. Congenital Anomalies - Benign Neoplasms - Diabetes Mellitus - Meningitis - Diseases of the Heart - Cerebrovascular Diseases - Chronic Obstructive Pulmonary Diseases and Allied Conditions - Septecemia	1	0.9
	All Causes	28	25.3
15 - 24 Years	1. Homicide	38	32.5
	2. Accidents	21	18.0
	3. Malignant Neoplasms	9	7.7
	4. Diseases of the Heart	5	4.3
	5. Suicide - Complications of Pregnancy, Childbirth and the Puerperium	3	2.6
	All Causes	106	90.6
25 - 34 Years	1. Homicide	39	34.2
	2. Accidents	23	20.1
	3-4. Diseases of the Heart - Malignant Neoplasms	20	17.5
	5. Chronic Liver Disease and Cirrhosis	9	7.9
	All Causes	184	161.2

Table 2.8
Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race
 Michigan Residents, 1988 (continued)

BLACK FEMALES ²			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE ³
35 - 49 Years	1. Malignant Neoplasms	134	113.8
	2. Diseases of the Heart	110	93.4
	3. Chronic Liver Disease and Cirrhosis	35	29.7
	4. Accidents	33	28.0
	5-6. Cerebrovascular Diseases - Homicide	29	24.6
	All Causes	517	439.24
50 - 64 Years	1. Diseases of the Heart	353	472.8
	2. Malignant Neoplasms	321	429.9
	3. Cerebrovascular Diseases	48	64.3
	4. Diabetes Mellitus	38	50.9
	5. Chronic Liver Disease and Cirrhosis	35	46.9
	All Causes	996	1,333.9
65 and Over	1. Diseases of the Heart	1,427	2,393.4
	2. Malignant Neoplasms	597	1,001.3
	3. Cerebrovascular Diseases	268	449.5
	4. Diabetes Mellitus	100	167.7
	5. Pneumonia and Influenza	91	152.6
	All Causes	3,093	5,187.7

DISEASES OF THE HEART

The leading cause of death, heart disease, caused the death of 30,218 Michigan residents in 1988. That was more than the number of deaths from the next four largest categories combined. There were 303 less deaths from heart disease in 1988 than in 1987. The crude rate of 327.0 deaths per 100,000 population from this cause in 1988 is 1.4 percent lower than the rate of 331.8 in 1987.

The median age of persons who died from heart disease was 77 years, compared to a

median of 74 years for deaths from all causes. Of the 30,218 deaths due to diseases of the heart, 50.2 percent were to males. The median age at death for males was 73 years compared to 81 years for females. The median age of 74 years for white males exceeded that for black males by 5 years and the median for males of other races by three years. The median age at death for white females was 82 years, 7 years above that for black females and 8 years above that for females of other races (Table 2.9).

Table 2.9
Deaths Due to Diseases of the Heart by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	25	14	11	19	9	10	6	5	1	-	-	-
1 - 4	10	6	4	9	6	3	1	-	1	-	-	-
5 - 9	4	2	2	3	1	2	1	1	-	-	-	-
10 - 14	8	2	6	6	1	5	2	1	1	-	-	-
15 - 19	19	13	6	11	7	4	7	5	2	1	1	-
20 - 24	23	8	15	17	5	12	6	3	3	-	-	-
25 - 29	48	30	18	27	19	8	21	11	10	-	-	-
30 - 34	95	71	24	59	45	14	35	25	10	1	1	-
35 - 39	173	118	55	112	85	27	61	33	28	-	-	-
40 - 44	314	231	83	215	174	41	98	57	41	1	-	1
45 - 49	514	400	114	383	312	71	128	87	41	3	1	2
50 - 54	743	525	218	589	443	146	149	79	70	5	3	2
55 - 59	1,319	909	410	1,046	747	299	267	156	111	5	5	-
60 - 64	2,236	1,510	726	1,811	1,260	551	419	247	172	5	2	3
65 - 69	3,210	1,984	1,226	2,702	1,706	996	498	270	228	10	8	2
70 - 74	4,058	2,405	1,653	3,554	2,137	1,417	491	261	230	12	6	6
75 - 79	4,506	2,314	2,192	3,979	2,066	1,913	509	238	271	15	8	7
80 - 84	4,810	2,112	2,698	4,360	1,920	2,440	443	188	255	6	3	3
85 - 89	4,114	1,469	2,645	3,750	1,343	2,407	355	120	235	6	5	1
90 +	3,986	1,057	2,929	3,687	969	2,718	295	87	208	4	1	3
Not Stated	8,102 3	1	2	2	1	1	1	-	1	-	-	-
All Ages	30,218	15,181	15,037	26,341	13,256	13,085	3,793	1,874	1,919	74	44	30
Median Age At Last Birthday	77	73	81	78	74	82	71	69	75	71	71	74

¹ Deaths with race and/or sex not stated are included only in the total column.

Table 2.10 presents death rates for diseases of the heart by age, race and sex. Note that the death rate associated with this cause rose markedly with advancing age. Heart disease was the underlying cause of death for 35 persons below 5 years of age or about 2.0 percent of all deaths in this age group. In contrast, 49.2 percent of all deaths in the age group 85 and over were attributed to this cause in 1988. The heart disease death rate

was 6,933.6 per 100,000 persons over 84 years of age in 1988.

Examination of Table 2.10 reveals that the heart disease death rate for males was greater than that for females (337.4 compared to 317.2 per 100,000 population). The relationship between rates for males and females is graphically displayed in Figure 2.6. The age-specific heart disease death rates for males were

Table 2.10
Heart Disease Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	327.0	337.4	317.2	333.9	343.2	324.9	309.4	325.1	295.4
Under 1	17.9	19.8	16.0	17.0	15.8	18.2	24.5	40.8	*
1 - 14	1.1	1.0	1.3	1.1	1.0	1.3	*	*	*
15 - 24	2.8	2.8	2.9	2.3	1.9	2.6	5.6	7.1	4.3
25 - 34	9.2	13.1	5.3	6.5	9.7	3.3	26.6	37.3	17.5
35 - 44	37.3	54.6	20.8	29.0	46.3	12.0	101.1	128.3	79.2
45 - 54	133.8	202.6	68.7	117.9	186.5	51.7	267.9	360.7	193.5
55 - 64	433.8	620.1	264.6	393.7	577.4	224.7	786.9	1,026.2	590.8
65 - 74	1,149.1	1,568.4	816.4	1,104.3	1,530.2	765.0	1,589.3	1,964.2	1,301.3
75 - 84	2,802.9	3,493.3	2,377.6	2,772.0	3,488.5	2,332.9	3,217.1	3,667.7	2,926.0
85 and Over	6,933.6	7,185.3	6,825.2	6,983.3	7,287.3	6,854.2	6,695.5	6,322.5	6,884.8
Age-Adjusted Rate ²	181.4	240.4	133.5	172.0	231.4	123.6	265.7	326.8	217.8

¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

higher than female rates for all age groups except persons 1 to 24 years of age. For persons 1 to 14 years of age the rate for females was 30.0 percent higher than the male rate. For persons 15 to 24 years of age the rate for females was 3.6 percent higher. The greatest relative differentials occurred from ages 25 through 64 with rates for males ranging from 2.3 to 2.9 times the corresponding rates for females. The gap between rates for males and females became progressively smaller after age 64. Among persons 85 years of age or over the rate of 7185.3 for males was 5.3 percent above that for females (6825.2). The age-adjusted death rate for males was 1.8 times that for females.

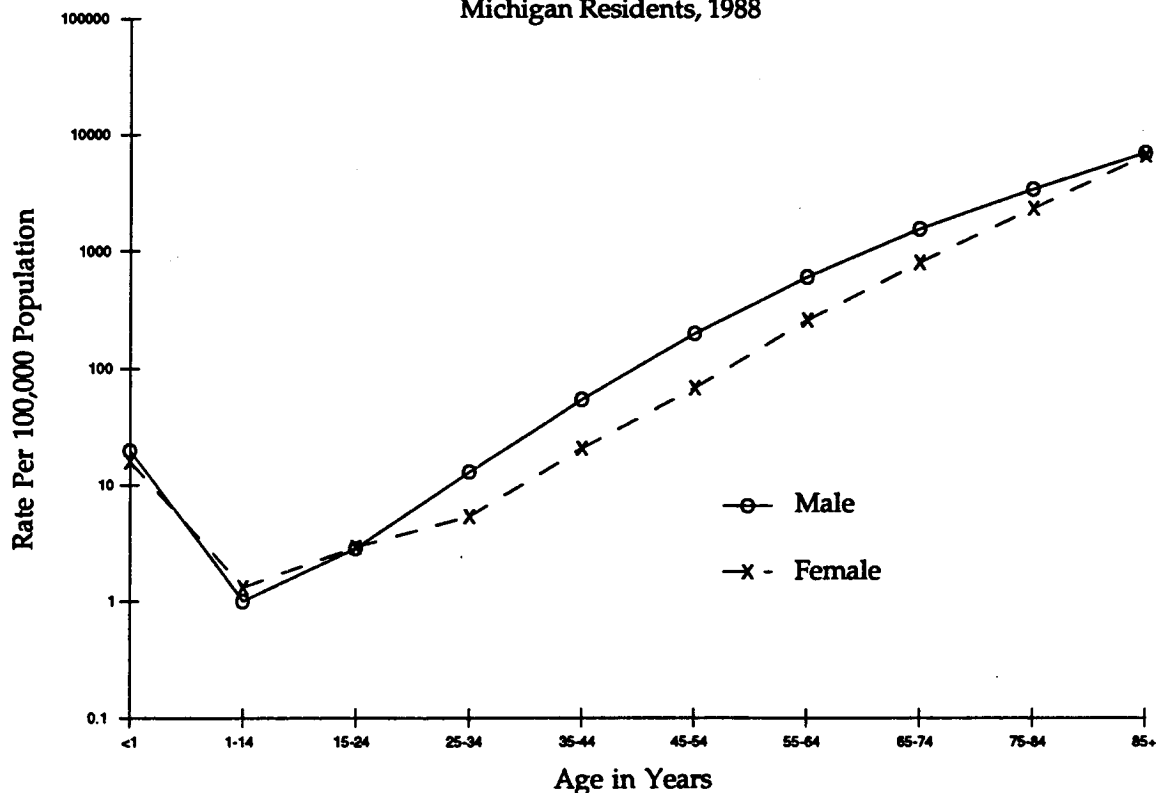
A comparison of 1988 heart disease death rates for males by race is graphically presented in Figure 2.7. Rates for black males were higher than those for white males for all

age intervals below 85 for which rates can be calculated. The rate for white males across all ages was 343.2 compared to 325.1 for black males. This differential stems mostly from the fact that a greater proportion of the white male population was in the older age groups where heart disease death rates were particularly high. The age-adjusted heart disease death rate for white males in 1988 was 29.2 percent below the rate for black males.

Heart disease death rates for white and black females are displayed in Figure 2.8. Rates for black females were greater than those for white females for all ages with the relative differentials steadily decreasing with advancing age.

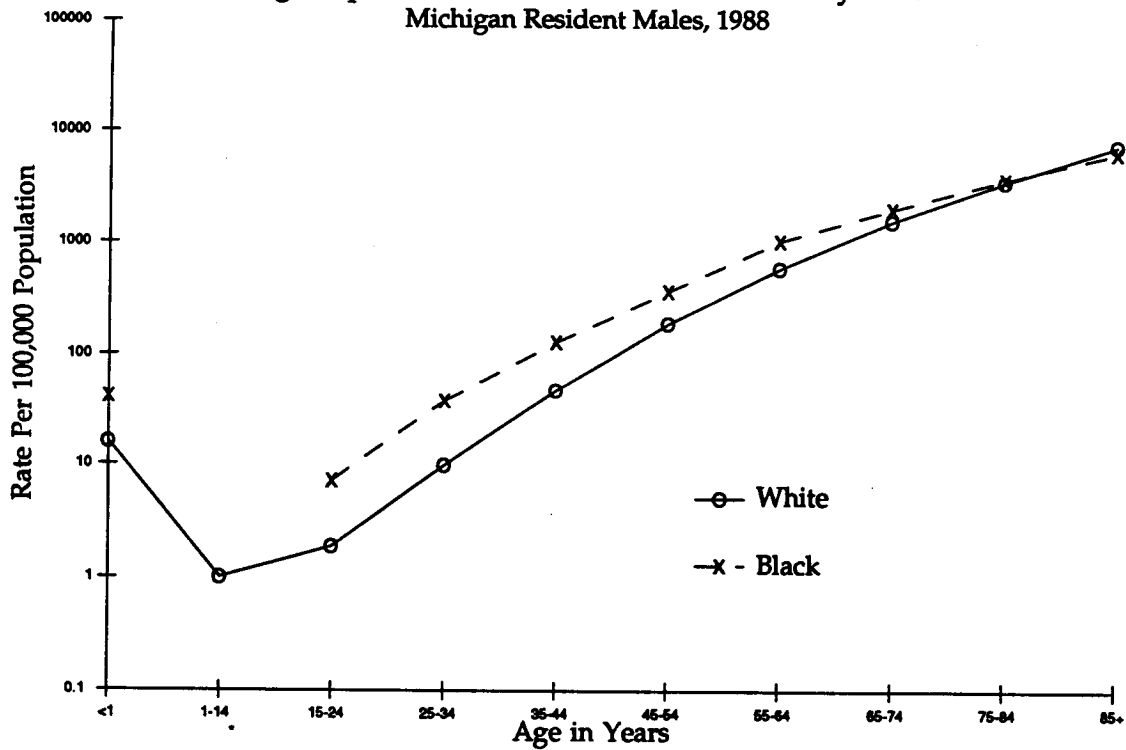
Although the rate for white females of all ages (324.9) was greater than the comparable rate for black females (295.4), this relationship

Figure 2.6
Age - Specific Heart Disease Death Rates¹ by Sex
Michigan Residents, 1988



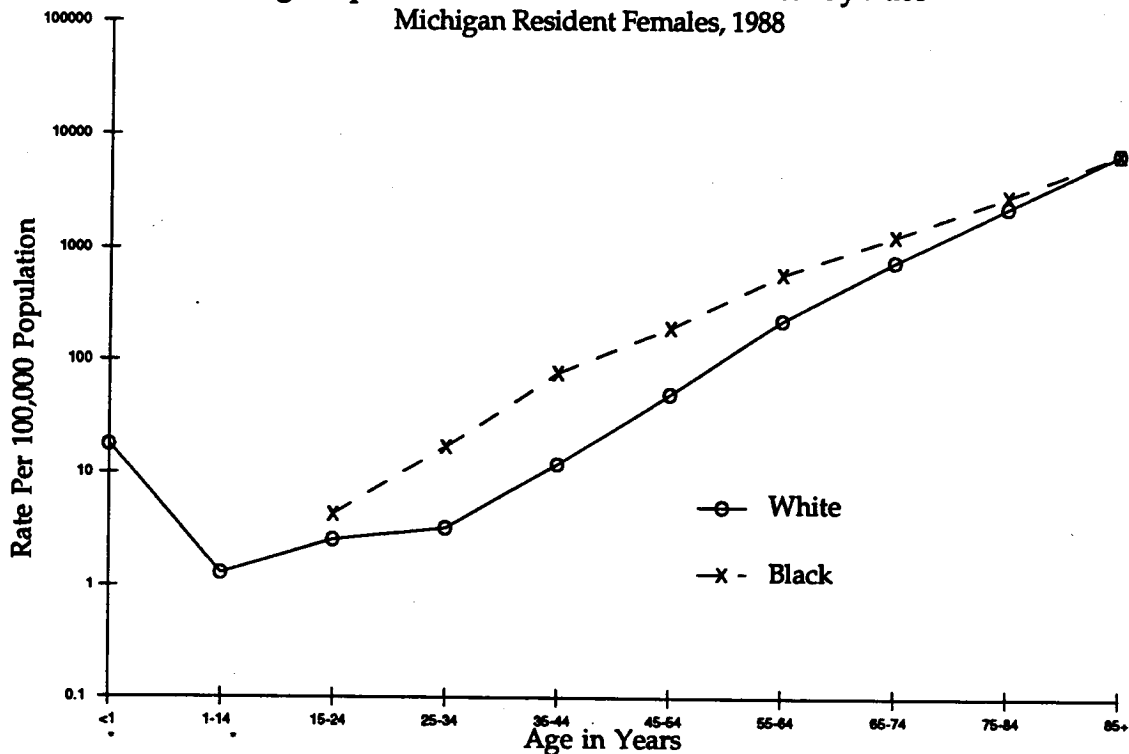
¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

Figure 2.7
 Age - Specific Heart Disease Death Rates¹ by Race
 Michigan Resident Males, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.8
 Age - Specific Heart Disease Death Rates¹ by Race
 Michigan Resident Females, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

is reversed when the differing age distributions of the two populations are considered. The age-adjusted rate for black females was 76.2 percent higher than that for white females.

In 1900 the crude heart disease death rate in Michigan was 117.1, the lowest rate of this century (Figure 2.9). Heart disease death rates rose through the time period 1900-1950, remained relatively stable between 1950 and 1961, peaked between 1962 and 1972, decreased between 1973 and 1979 and increased after 1979. The highest rate observed during the century was 343.1 in 1965. The next highest rate of 342.1 for 1968 was 0.3 percent below the peak rate observed in 1965. The rate then declined 4.4 percent to 327.0 in 1988.

The heart disease death rate for Michigan was consistently close to the national rate until 1947. From 1947 through 1981 the crude rate for Michigan was below that of the nation but by a progressively lesser degree in later years. From 1982 through 1988 rates for Michigan were above the national rates with the 1988 Michigan rate of 327.0, 4.7 percent above the national provisional rate of 312.2.

Age-adjusted death rates for diseases of the heart since 1970 are presented in Table 2.11. These data indicate a downward trend in heart disease death rates for the Michigan population as a whole and for white males and females. Between 1970 and 1975 the rates decreased for other than white males and females. However, since 1975 the rates have been generally increasing for the two groups. Between 1970 and 1972 the overall rate for Michigan remained constant. Since 1972 the rate has declined each year, with the exception of 1976 and 1984. The age-adjusted death rate for the nation declined each year between 1970 and 1988 except 1980. The age-adjusted rate for Michigan declined by 30.3 percent between 1970 and 1988 whereas the age-ad-

justed rate for the nation declined by 34.3 percent (see Technical Notes). Since 1970, the age-adjusted rate for Michigan has been consistently above that for the nation with the 1988 Michigan rate 8.8 percent above the national provisional rate.

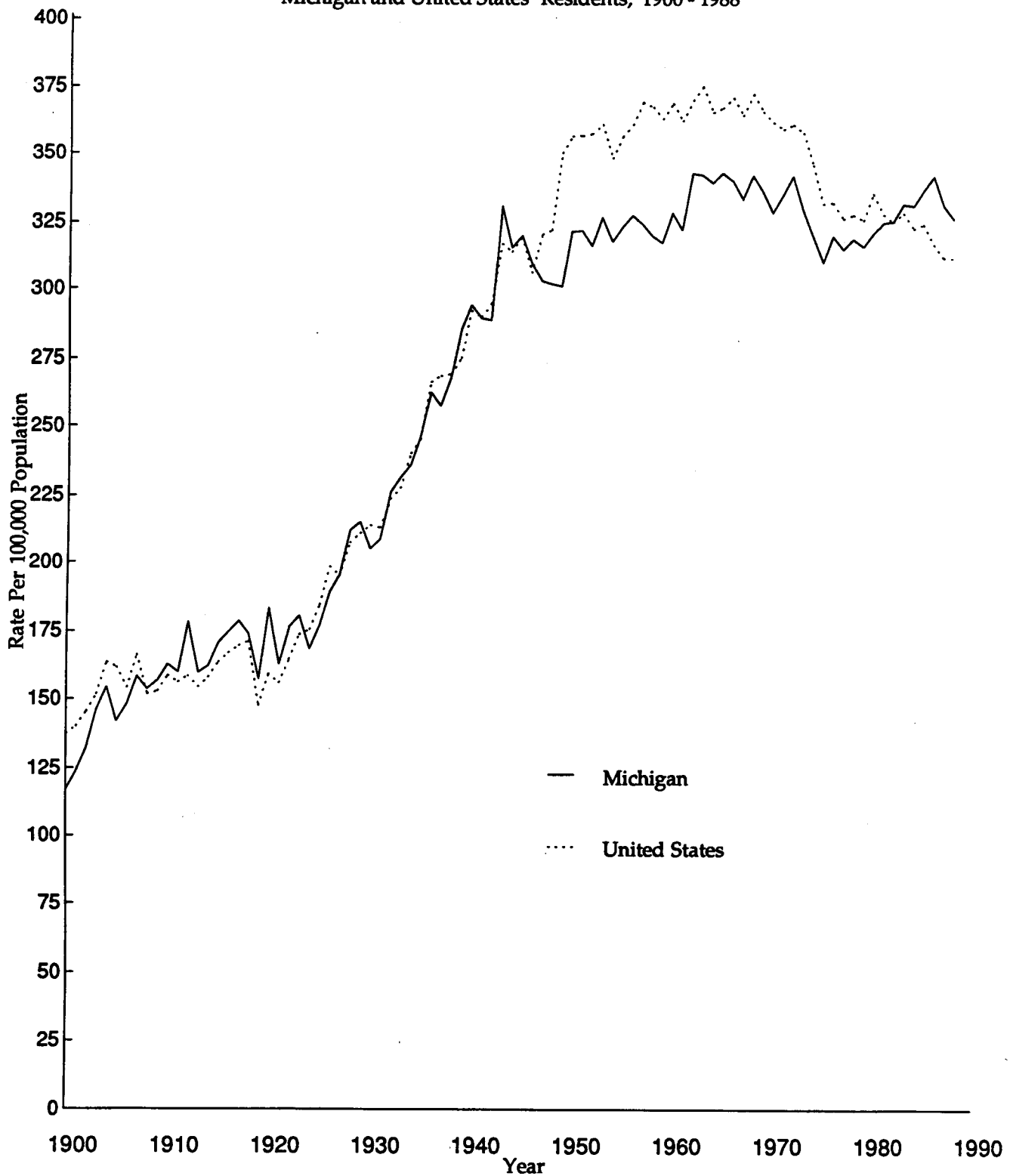
Age-adjusted rates for other than white females have been well above those for white females in both Michigan and the United States. In 1988 the Michigan age-adjusted heart disease death rate for other than white females exceeded the rate for white females by 67.6 percent.

In Michigan age-adjusted rates for other than white males were less than those for white males for most years between 1970 and 1977. After 1977 the Michigan rates for other than white males have been greater than rates for white males. In 1988 the rate for other than white males was 34.2 percent higher than the rate for white males. Nationally the rates were highest generally for other than white males, next highest for white males, then for other than white females and lowest for white females each year from 1970 to 1987.

The most prevalent type of heart disease death was old myocardial infarction and other forms of chronic ischemic heart disease (10,993 deaths in 1988) (Table 2.12). The second most frequent was acute myocardial infarction, commonly referred to as a "coronary". In 1988 there were 9,758 deaths attributed to this cause. Together, these causes accounted for 68.7 percent of all Michigan resident deaths from heart disease. Of the remaining 9,467 heart disease deaths, 79.7 percent were attributed to all other and ill-defined forms of heart disease (5,932 deaths) and heart failure (1,615 deaths).

The probabilities of eventually dying from heart disease, based on Michigan resident death data from 1986, 1987 and 1988 were 0.397 for males and 0.425 for females at year

Figure 2.9
Heart Disease Death Rates
Michigan and United States¹ Residents, 1900 - 1988²



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

² Heart disease death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration. See Technical Notes.

Table 2.11
Age-Adjusted Heart Disease Death Rates¹ by Race and Sex
Michigan² and United States Residents, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	260.4	352.2	181.2	257.0	352.5	175.1	280.6	336.6	230.2
	1971	259.7	358.7	175.5	255.9	359.0	168.8	281.8	339.7	229.4
	1972	260.5	355.2	180.3	256.7	353.9	174.7	284.1	356.1	220.6
	1973	247.7	339.2	170.8	243.8	337.8	165.0	273.0	340.4	213.9
	1974	235.6	321.7	163.7	232.6	321.8	158.2	253.8	311.5	203.8
	1975	226.2	312.2	154.5	224.7	313.6	150.8	231.3	290.6	180.2
	1976	228.0	316.6	155.4	225.7	316.9	151.2	241.8	306.6	186.8
	1977	221.5	308.4	150.7	218.2	308.1	145.1	242.6	302.1	192.1
	1978	219.0	302.4	151.2	214.9	301.0	145.2	247.8	307.9	197.8
	1979	215.4	298.5	148.5	211.2	296.2	143.0	243.2	310.7	187.7
	1980	214.9	295.5	150.6	210.0	292.2	144.4	249.5	317.5	195.2
	1981	204.4	288.9	138.9	201.2	287.3	132.7	230.7	294.5	179.8
	1982	199.7	279.8	138.6	196.4	278.0	132.2	227.5	287.9	180.2
	1983	198.6	273.3	141.4	195.1	271.0	134.8	229.7	286.0	185.6
	1984	200.5	271.7	145.5	194.5	265.7	138.4	249.0	313.3	197.1
	1985	199.8	272.2	141.9	193.1	265.5	135.3	247.8	321.1	189.4
	1986	196.7	262.3	143.9	188.8	254.4	136.1	254.9	322.0	201.5
	1987	188.7	252.1	137.6	180.5	242.9	130.1	249.7	323.1	191.7
	1988	181.4	240.4	133.5	172.0	231.4	123.6	252.7	310.6	207.1
U.S.	1970	253.6	348.5	175.2	249.1	347.6	167.8	288.9	350.8	236.6
	1971	249.3	344.1	171.7	245.1	343.5	164.8	280.3	343.2	227.8
	1972	247.9	343.1	170.3	243.5	341.8	163.4	281.1	348.7	225.8
	1973	242.4	337.3	165.6	237.9	336.0	158.7	276.9	343.6	222.5
	1974	230.3	321.3	157.1	226.4	320.3	150.8	259.7	325.1	206.8
	1975	217.8	305.7	147.4	214.5	305.1	141.9	241.8	305.9	190.1
	1976	213.6	300.2	144.4	210.4	299.6	139.2	237.0	301.6	185.1
	1977	206.9	291.3	139.9	203.3	290.2	134.4	233.0	296.3	182.4
	1978	203.8	286.2	138.5	200.2	284.7	133.3	229.4	294.6	178.1
	1979	199.5	278.9	136.8	195.6	276.8	131.3	227.4	291.8	177.3
	1980	202.0	280.4	140.3	197.6	277.5	134.6	234.2	299.6	183.5
	1981	195.0	271.2	135.1	191.1	268.8	129.8	222.6	286.1	173.5
	1982	190.5	264.4	132.5	186.8	262.1	127.4	215.8	278.7	167.9
	1983	188.8	260.4	132.3	184.6	257.8	126.7	217.8	277.4	171.8
	1984	183.6	252.2	129.3	179.5	249.5	124.0	211.2	268.8	166.8
	1985	180.5	247.7	127.3	176.1	244.5	121.7	210.4	268.4	165.8
	1986	175.0	238.2	124.6	170.4	234.8	119.0	205.3	260.1	162.8
	1987	169.6	229.6	121.7	165.0	225.9	116.3	199.9	253.6	158.0
	1988 ³	166.7	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981 - 1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ Provisional data.

Table 2.12
Deaths Due to Diseases of the Heart by Specific Cause
Michigan Residents, 1988

282 LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
139	Old Myocardial Infarction and Other Forms of Chronic Ischemic Heart Disease	10,993	36.4
136	Acute Myocardial Infarction	9,758	32.3
148	All Other and Ill - Defined Forms of Heart Disease	5,932	19.6
146	Heart Failure	1,615	5.3
133	Hypertensive Heart Disease	649	2.1
140	Diseases of Pulmonary Circulation	403	1.3
144	Aortic Valve Disorders	247	0.8
135	Hypertensive Heart and Renal Disease	118	0.4
128	Diseases of Mitral Valve	86	0.3
145	All Other Diseases of Endocardium	75	0.2
143	Mitral Valve Disorders	65	0.2
131	All Other Chronic Rheumatic Heart Disease	64	0.2
138	Angina Pectoris	43	0.1
137	Other Acute and Subacute Forms of Ischemic Heart Disease	39	0.1
141	Acute and Subacute Endocarditis	34	0.1
130	Diseases of Mitral and Aortic Valves	32	0.1
142	Acute Pericarditis, Acute Myocarditis, and Other Diseases of Pericardium	32	0.1
147	Myocarditis, Unspecified and Myocardial Degeneration	24	0.1
129	Diseases of Aortic Valve	7	0.0
127	Acute Rheumatic Fever	2	0.0
TOTAL		30,218	100.0

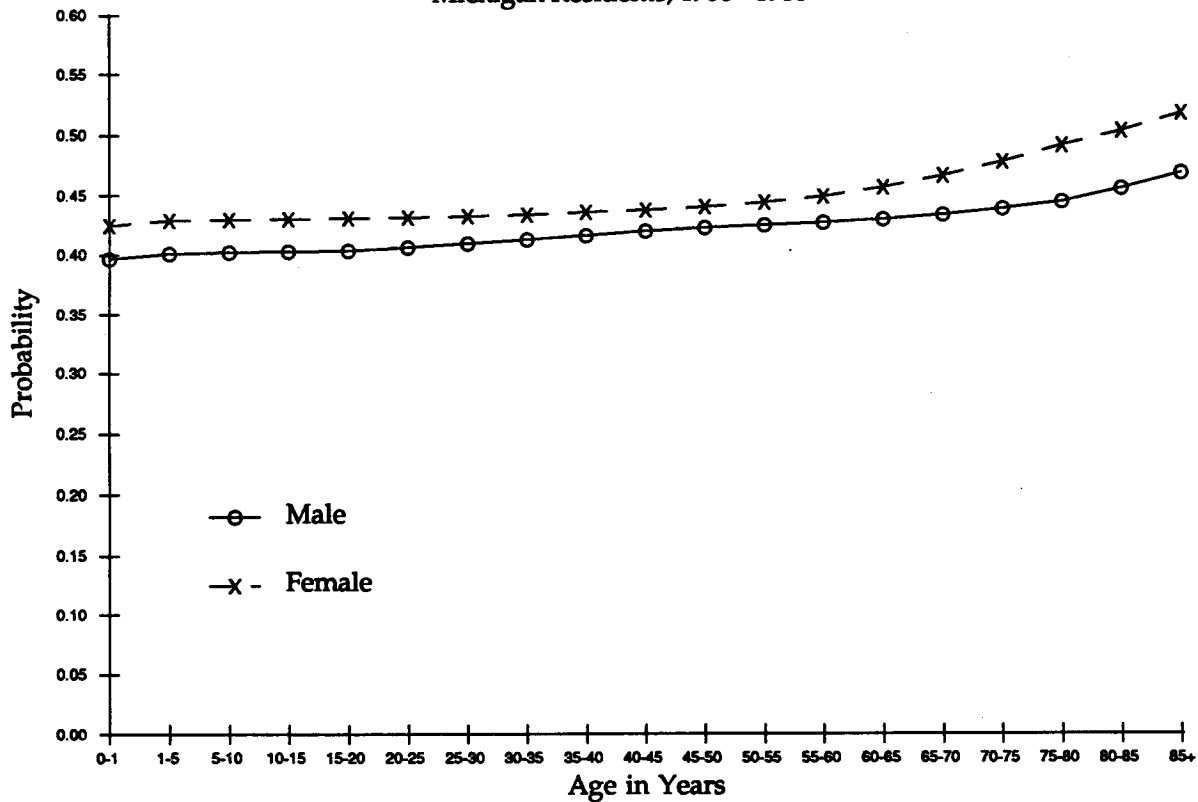
¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

of birth. The chance associated with dying from heart disease increases steadily for both sexes with advancing age as certain competing causes of death become less likely. By age 85 and above, the observed probability was 0.467 for males and 0.516 for females. At all ages the probability of death eventually being caused by heart disease was greater for females. The differences in the probability of

eventual death due to heart disease for males and females were smallest from ages 35 to 44. The higher probability for females reflects smaller chances of death due to some cause other than heart disease (Figure 2.10).

An apparent inconsistency can be noted by review of Figure 2.6 and Figure 2.10. The heart disease mortality rate for males was

Figure 2.10
 Probability of Eventually Dying from Heart Disease by Age and Sex
 Michigan Residents, 1986 - 1988¹



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

higher than that for females over nearly all ages, yet the chance of eventual death due to heart disease was slightly greater for females at all ages. This paradox is explained by a comparison of these two measures. The cause-specific mortality rate measures the proportion of a population that died from the particular cause over a certain period of time. The probability estimate takes into account the present age and cause-specific mortality

rates and the life expectancy of the population. A greater proportion of all females now alive are expected to live into the older age intervals where they will be subject to the high heart disease mortality rates characteristic of those age groups. The effect of the longer female life span outweighs the effect of the higher mortality rate for males from heart disease.

CANCER

Of 80,075 Michigan resident deaths in 1988, 17,890 were attributed to cancer. Although not the leading cause of death in Michigan or the United States, cancer affects all the human body's major systems and persons of all ages. The frequency of death due to cancer was 59.2 percent of the number of deaths due to heart disease across all ages, but the number of cancer deaths below age 65 was greater than the number of deaths due to heart disease below age 65. The median age at death for cancer was 69 years, well below the median

age of 77 years for heart disease deaths (Table 2.13).

Of the 17,890 cancer deaths in 1988 occurring to Michigan residents, 52.9 percent were to males. The median age at death was 70 years for white males and females. The median ages at death for black persons who died of cancer were 67 years for males and 66 years for females. The median age at death for persons of all other races were 67 years for males and 65 years for females.

Table 2.13
Deaths Due to Cancer by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	3	1	2	2	1	1	1	-	1	-	-	-
1 - 4	22	15	7	13	11	2	9	4	5	-	-	-
5 - 9	24	14	10	15	6	9	9	8	1	-	-	-
10 - 14	28	16	12	22	12	10	5	3	2	1	1	-
15 - 19	36	20	16	29	17	12	7	3	4	-	-	-
20 - 24	50	29	21	37	21	16	13	8	5	-	-	-
25 - 29	56	35	21	50	32	18	6	3	3	-	-	-
30 - 34	127	51	76	101	44	57	24	7	17	1	-	1
35 - 39	238	99	139	185	79	106	51	20	31	1	-	1
40 - 44	403	167	236	313	135	178	88	32	56	2	-	2
45 - 49	575	283	292	473	229	244	100	53	47	1	1	-
50 - 54	938	502	436	745	398	347	185	100	85	8	4	4
55 - 59	1,496	802	694	1,255	668	587	235	132	103	5	1	4
60 - 64	2,260	1,258	1,002	1,945	1,080	865	305	172	133	10	6	4
65 - 69	2,770	1,555	1,215	2,354	1,317	1,037	402	234	168	11	3	8
70 - 74	2,805	1,560	1,245	2,460	1,360	1,100	337	197	140	8	3	5
75 - 79	2,549	1,427	1,122	2,267	1,260	1,007	274	161	113	7	5	2
80 - 84	1,900	968	932	1,723	872	851	171	91	80	6	5	1
85 - 89	1,039	453	586	945	412	533	93	40	53	1	1	-
90 +	571	215	356	503	191	312	67	24	43	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	17,890	9,470	8,420	15,437	8,145	7,292	2,382	1,292	1,090	62	30	32
Median Age At Last Birthday	69	69	70	70	70	70	67	67	66	66	67	65

¹ Deaths with race and/or sex not stated are included only in the total column.

Cancer death rates by age, race and sex are presented in Table 2.14. The cancer death rate across all ages in 1988 was higher for males (210.5) than for females (177.6). The cancer death rates displayed in Figure 2.11 show a strong increase in mortality with advancing age. Mortality rates for males were lower than those for females between 25 through 44 years of age. For those ages with sufficient

data to calculate rates, rates for males were higher than those of females below age 25 and above age 44. After 44 years of age the relative differential between male and female rates increased with age, from 14.1 percent in the 45-54 year age group to a high of 89.3 percent in the age group 75-84 years. The age-adjusted cancer death rate for males was 42.5 percent above that for females.

Table 2.14
Cancer Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	193.6	210.5	177.6	195.7	210.9	181.1	194.3	224.2	167.8
Under 1	*	*	*	*	*	*	*	*	*
1 - 14	3.9	4.6	3.1	3.2	3.6	2.8	7.4	9.5	5.2
15 - 24	5.8	6.5	5.0	5.3	6.1	4.6	8.7	9.7	7.7
25 - 34	11.8	11.2	12.3	11.5	11.5	11.5	14.2	10.4	17.5
35 - 44	49.1	41.6	56.4	44.3	38.2	50.3	88.4	74.2	99.9
45 - 54	161.0	171.9	150.7	147.8	154.9	141.0	275.7	332.5	230.1
55 - 64	458.3	528.1	395.0	440.8	502.7	383.9	619.5	774.1	492.7
65 - 74	881.5	1,113.2	697.6	850.1	1,066.1	678.2	1,187.5	1,594.3	875.1
75 - 84	1,338.6	1,890.3	998.7	1,326.0	1,865.4	995.5	1,503.8	2,169.6	1,073.6
85 and Over	1,377.6	1,899.4	1,153.0	1,359.7	1,899.0	1,130.8	1,645.6	1,954.8	1,488.6
Age-Adjusted Rate ²	136.0	164.2	115.2	130.3	156.7	110.9	188.1	237.2	151.1

¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

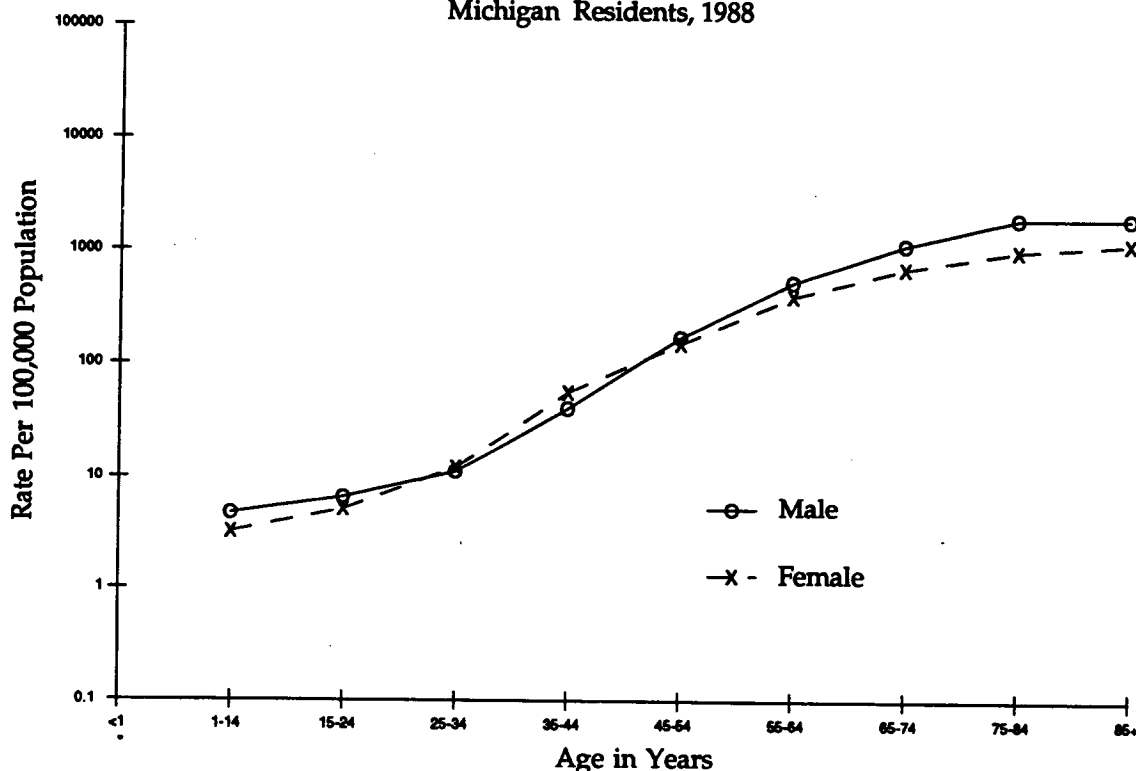
Cancer death rates for white and black males recorded in Table 2.14 are graphically displayed in Figure 2.12. Black males had rates lower than white males for the 25-34 age group. Rates for black males exceeded those for white males at all other ages, with sufficient data to calculate rates. The largest relative differentials occurred in the age groups for 1-14 and 45-54 years, where the rate for black males were 2.6 and 2.1 times higher than the rate for white males. The crude death rate for black males (224.2) was above the corresponding rates for white (210.9) males. The age-adjusted cancer death rate for black males was 51.4 percent above the rate for white males.

The age specific cancer death rates for black females were above those for white females at all ages with sufficient data to calculate rates (Figure 2.13). The rate for black females was

52.2 percent higher than the rate for white females at ages 25-34 years. This is different from the experience of black males ages 25-34 who died less frequently than their white counterparts. The largest differential in rates occurred for females between 35 and 44 years of age, where the rate for black females exceeded the rate for white females by 98.6 percent. The crude rate for white females was 7.9 percent higher than the crude rate for black females. The age-adjusted rate for black females, however, was 36.2 percent greater than that for white females.

Among the major cause of death categories, cancer death rates have increased most persistently during the 20th century (Figure 2.14). The 1988 rate of 193.6 was 0.8 percent higher than the 1987 rate. It was the highest rate observed in this century. The lowest observed rate for Michigan was 59.3 in 1902.

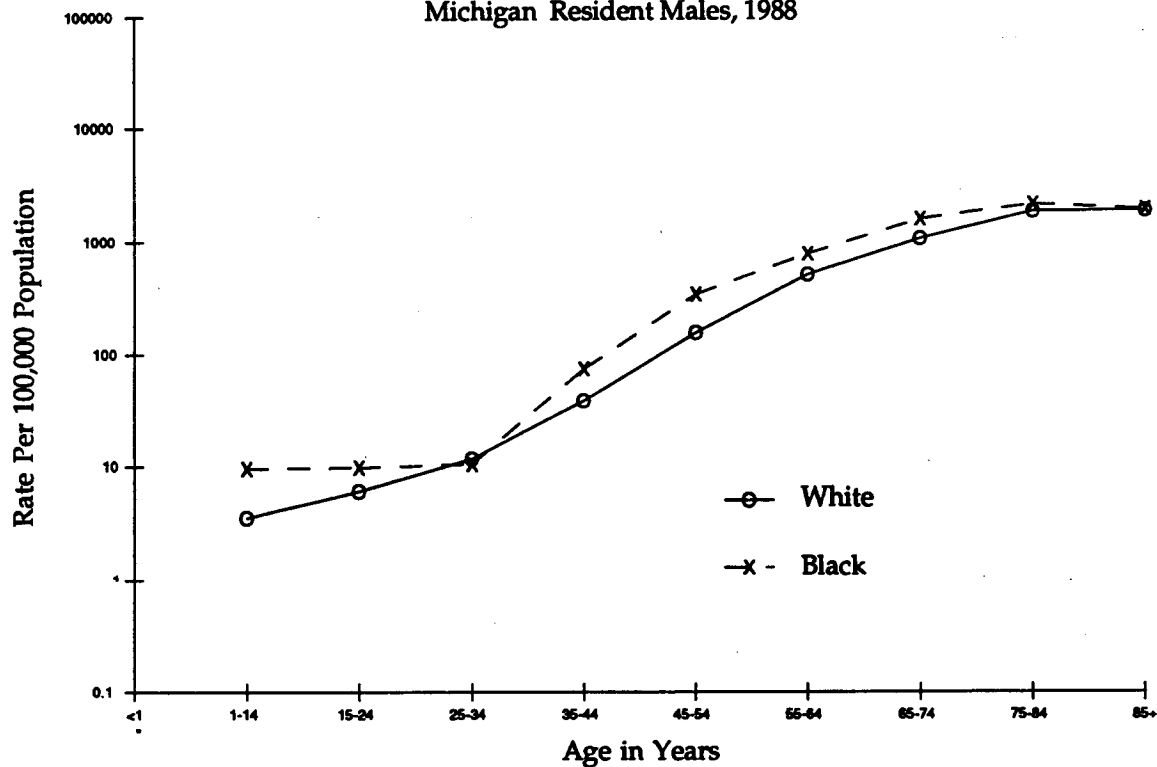
Figure 2.11
Age - Specific Cancer Death Rates¹ by Sex
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

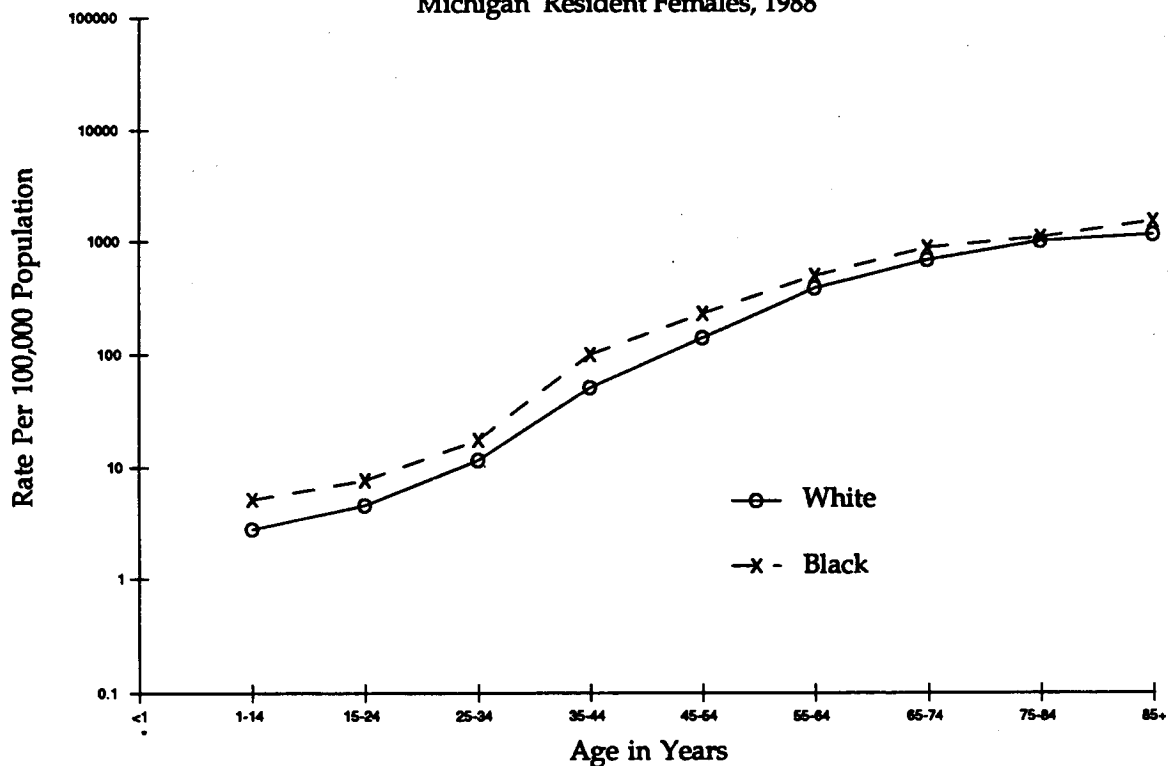
• Rate is considered statistically unreliable.

Figure 2.12
 Age-Specific Cancer Death Rates¹ by Race
 Michigan Resident Males, 1988



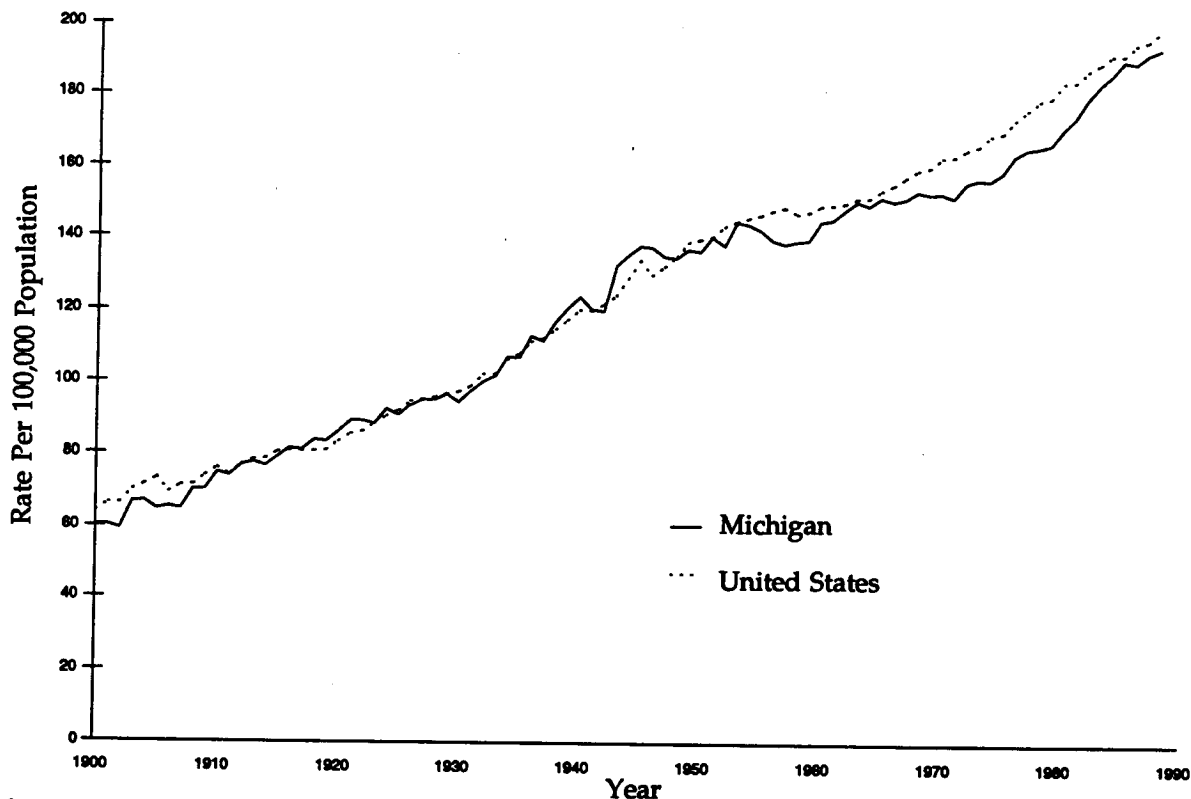
¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.13
 Age-Specific Cancer Death Rates¹ by Race
 Michigan Resident Females, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.14
Cancer Death Rates
 Michigan and United States¹ Residents, 1900 - 1988²



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

² Cancer death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration. See Technical Notes.

Michigan's cancer death rate was less than the national rate from 1900 through 1915. During the period 1916 through 1947 Michigan's rate was generally close to the national rate. Since 1948, the state rate has been consistently less than the national cancer death rate. The national provisional cancer death rate in 1988 was 198.6, 2.6 percent above the state rate.

Age-adjusted cancer death rates for the years since 1970, presented in Table 2.15, show a much closer relationship between Michigan and United States mortality patterns than that indicated by crude mortality rates. While Michigan crude cancer death rates were consistently below the United States crude death rates from 1970 through 1988, Michigan age-

adjusted rates were consistently higher than the United States age-adjusted rates during this time period. Michigan's 1970 age-adjusted rate for the total population was 3.7 percent higher than the comparable United States rate. From 1970 through 1983 Michigan's age-adjusted cancer death rate remained relatively stable. The rate rose 1.3 percent between 1983 and 1988. The United States rates remained stable from 1970 through 1979 and rose 2.1 percent between 1979 and 1985. In the last three years the United States rate has fluctuated near the 1985 level (see Technical Notes).

Table 2.15 contains a comparison of age-adjusted cancer death rates for white males and females and other than white males and

Table 2.15
Age - Adjusted Cancer Death Rates¹ by Race and Sex
Michigan² and United States Residents, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	134.7	164.7	110.1	131.9	160.2	109.1	159.4	206.6	117.1
	1971	131.6	159.0	109.7	128.6	154.8	107.9	158.3	197.3	123.7
	1972	133.8	163.2	111.0	130.6	159.3	108.6	161.2	196.6	130.9
	1973	133.8	163.1	110.7	130.7	158.7	108.9	159.9	202.3	123.9
	1974	131.9	160.6	109.6	129.0	156.1	108.2	155.9	198.7	119.8
	1975	131.7	161.6	108.9	128.1	155.4	107.7	162.1	215.2	117.7
	1976	134.1	165.5	110.2	130.7	159.6	109.0	163.0	215.8	119.1
	1977	134.5	168.8	108.5	130.5	162.5	106.5	168.6	222.1	125.1
	1978	133.7	166.7	109.2	130.2	160.7	107.8	162.1	217.1	118.1
	1979	131.8	165.2	107.0	128.2	160.0	105.0	160.6	208.6	122.2
	1980	134.4	167.8	109.7	130.7	161.8	107.9	163.9	216.6	122.2
	1981	132.4	160.7	113.0	129.0	154.2	111.5	161.6	212.0	123.1
	1982	134.5	165.9	113.1	132.2	160.7	112.3	157.2	206.5	119.6
	1983	134.3	166.8	112.4	131.5	160.8	111.2	160.4	212.7	120.3
	1984	137.2	169.2	115.0	133.0	161.5	113.1	172.0	230.2	127.7
	1985	137.5	167.9	115.9	133.2	161.2	113.5	171.7	222.7	133.1
	1986	136.4	168.3	113.1	131.1	160.7	109.8	176.6	230.2	135.9
	1987	136.9	165.4	116.2	132.3	158.7	113.4	172.4	221.0	136.4
	1988	136.0	164.2	115.2	130.3	156.7	110.9	179.5	225.2	145.0
	U.S.	1970	129.9	157.4	108.8	127.8	154.3	107.6	148.3	185.3
1971		129.3	157.6	108.0	126.9	154.5	106.2	150.7	186.0	121.7
1972		130.1	159.2	108.2	127.6	155.7	106.8	151.1	190.7	119.1
1973		129.7	159.2	107.8	126.9	155.3	105.9	154.7	195.1	122.6
1974		130.7	161.2	108.1	127.9	157.1	106.5	154.7	198.2	120.2
1975		129.4	160.1	106.8	126.7	155.8	105.6	152.7	198.8	116.2
1976		130.6	161.7	107.8	127.9	157.3	106.7	153.5	201.0	116.2
1977		131.0	162.6	108.0	128.0	158.0	106.5	156.0	204.0	118.7
1978		131.6	163.7	108.3	128.7	159.0	107.0	155.5	204.6	117.7
1979		130.8	163.4	107.1	127.8	158.7	105.7	155.1	204.2	117.8
1980		132.8	165.5	109.2	129.6	160.5	107.7	158.2	209.0	120.2
1981		131.6	163.7	108.6	128.5	158.3	107.2	156.7	209.4	117.5
1982		132.5	164.8	109.5	129.4	159.4	108.2	157.0	210.1	117.9
1983		132.6	164.3	109.9	129.4	158.9	108.5	156.8	208.4	118.6
1984		133.5	164.6	111.1	130.2	159.0	109.9	157.8	209.7	119.4
1985		133.6	164.5	111.4	130.7	159.2	110.3	155.7	206.5	118.3
1986		133.2	163.6	111.4	130.4	158.8	110.1	154.1	202.2	118.8
1987		132.9	163.2	111.0	130.1	158.4	109.7	153.0	200.2	118.4
1988 ³		133.3	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981 - 1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ Provisional data.

females. Nationally during 1970 through 1987 and in Michigan during 1970 through 1988, the rates for the other than white groups were consistently higher than those for their white counterparts. Rates increased for other than white males nationally and in Michigan and for Michigan other than white females. Age-adjusted rates for other than white females

were essentially stable in the nation. The rates for United States white males and females and Michigan white females increased more gradually while the rates for Michigan white males remained generally stable.

The numbers of deaths from cancer for 50 different sites are presented in Table 2.16.

Table 2.16
Deaths Due to Malignant Neoplasms by Site Affected
Michigan Residents, 1988

282 LIST ¹ NUMBER	CAUSES OF DEATH	NUMBER OF DEATHS	PERCENT
57	Malignant Neoplasms of Trachea, Bronchus, and Lung	4,914	27.5
48	Malignant Neoplasms of Other and Unspecified Colon	1,591	8.9
63	Malignant Neoplasms of Female Breast	1,588	8.9
78	Malignant Neoplasms of All Other and Unspecified Sites	1,329	7.4
69	Malignant Neoplasms of Prostate	1,056	5.9
54	Malignant Neoplasms of Pancreas	850	4.8
81	Other Malignant Neoplasms of Lymphoid and Histiocytic Tissue	562	3.1
42	Malignant Neoplasms of Stomach	500	2.8
67	Malignant Neoplasms of Ovary and Other Uterine Adnexa	487	2.7
75	Malignant Neoplasms of Brain	442	2.5
72	Malignant Neoplasms of Bladder	365	2.0
41	Malignant Neoplasms of Esophagus	362	2.0
73	Malignant Neoplasms of Kidney and Other and Unspecified Urinary Organs	339	1.9
82	Multiple Myeloma and Immunoproliferative Neoplasms	312	1.7
49	Malignant Neoplasms of Rectum, Rectosigmoid Junction, and Anus	290	1.6
84	Myeloid Leukemia	250	1.4
66	Malignant Neoplasms of Other Parts of Uterus	237	1.3
86	Other and Unspecified Leukemia	228	1.3
83	Lymphoid Leukemia	175	1.0
61	Melanoma of Skin	175	1.0
53	Malignant Neoplasms of Gallbladder and Extrahepatic Bile Ducts	156	0.9
65	Malignant Neoplasms of Cervix Uteri	154	0.9
39	Malignant Neoplasms of Pharynx	143	0.8
56	Malignant Neoplasms of Larynx	141	0.8

Table 2.16
Deaths Due to Malignant Neoplasms by Site Affected
Michigan Residents, 1988 (continued)

282 LIST ¹ NUMBER	CAUSES OF DEATH	NUMBER OF DEATHS	PERCENT
52	Malignant Neoplasms of Liver not Specified as Primary or Secondary	120	0.7
60	Malignant Neoplasms of Connective and Other Soft Tissue	99	0.6
50	Malignant Neoplasms of Liver, Primary	99	0.6
55	Malignant Neoplasms of Retroperitoneum, Peritoneum, and Other and Ill-Defined Sites Within the Digestive Organs and Peritoneum	95	0.5
79	Lymphosarcoma and Reticulosarcoma	87	0.5
40	Malignant Neoplasms of Other and Ill-Defined Sites Within Lip, Oral Cavity, and Pharynx	79	0.4
80	Hodgkin's Disease	79	0.4
38	Malignant Neoplasms of Tongue	74	0.4
58	Malignant Neoplasms of All Other and Ill-Defined Sites Within the Respiratory System and Intrathoracic Organs	66	0.4
62	Other Malignant Neoplasms of Skin	61	0.3
77	Malignant Neoplasms of Thyroid Gland and Other Endocrine Glands and Related Structures	55	0.3
47	Malignant Neoplasms of Cecum, Appendix, and Ascending Colon	53	0.3
51	Malignant Neoplasms of Intrahepatic Bile Ducts	48	0.3
68	Malignant Neoplasms of Other and Unspecified Female Genital Organs	44	0.2
46	Malignant Neoplasms of Sigmoid Colon	38	0.2
43	Malignant Neoplasms of Small Intestine, Including Duodenum	32	0.2
59	Malignant Neoplasms of Bone and Articular Cartilage	31	0.2
70	Malignant Neoplasms of Testis	17	0.1
76	Malignant Neoplasms of Other and Unspecified Parts of Nervous System	15	0.1
64	Malignant Neoplasms of Male Breast	11	0.1
71	Malignant Neoplasms of Penis and Other Male Genital Organs	10	0.1
85	Monocytic Leukemia	9	0.1
74	Malignant Neoplasms of Eye	9	0.1
45	Malignant Neoplasms of Descending Colon	6	0.0
44	Malignant Neoplasms of Hepatic and Splenic Flexures and Transverse Colon	4	0.0
37	Malignant Neoplasms of Lip	3	0.0
	TOTAL	17,890	100.0

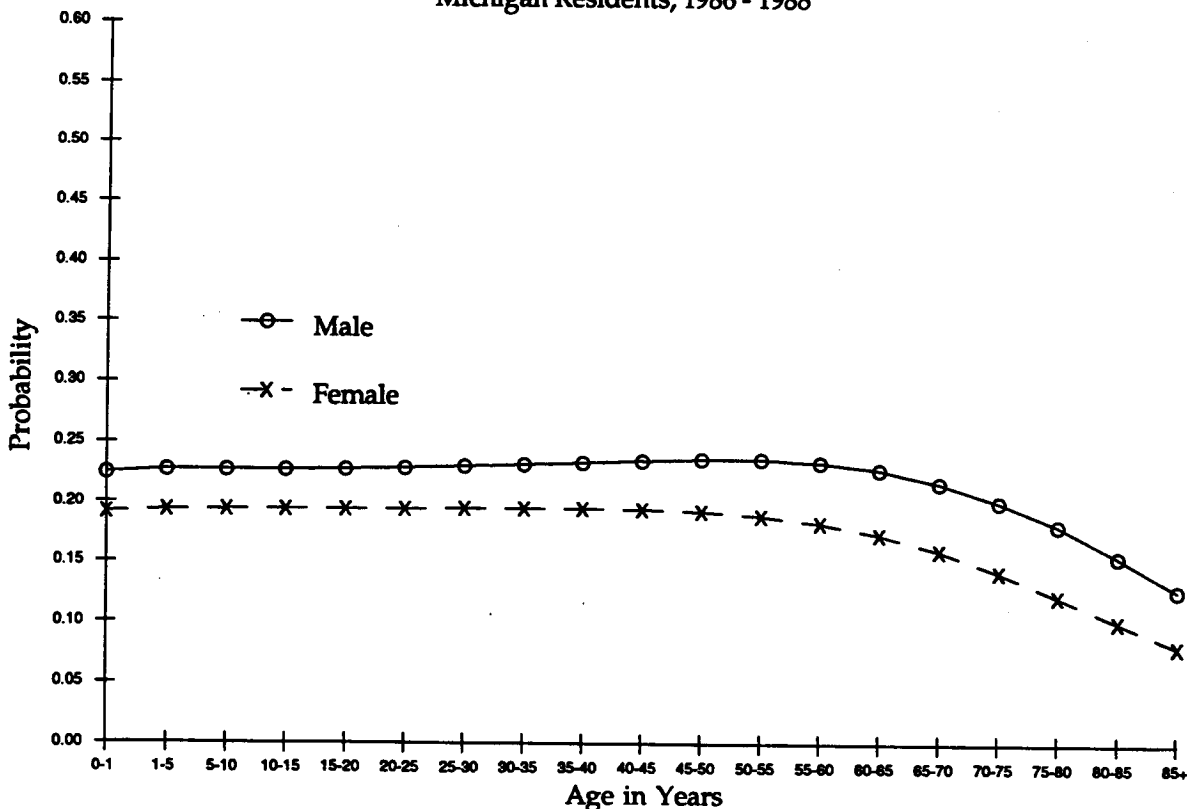
¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

Malignant neoplasms of the trachea, bronchus, and lung were the underlying cause of 4,914 deaths, 27.5 percent of all cancer deaths. The second most frequent category of cancer mortality was cancer of other and unspecified parts of the colon (1,591). The total number of deaths attributed to colon cancer was 1,692. Cancer of female breast was the third leading cause of cancer mortality (1,588 deaths). Malignant neoplasms of the prostate and the pancreas caused 1,056 and 850 deaths, respectively. There were 19 other categories which had at least 100 deaths in 1988.

Based upon 1986 through 1988 death data, the probability of death due to cancer is 0.225

for males and 0.192 for females at birth (Figure 2.15). The probability of eventually dying from cancer is greater for males than for females at all ages. The probability for males rises slowly to a peak of 0.237 by age 54 then declines to 0.128 at age 85 and above. Probabilities for females display little change from birth to age 49, then diminish to 0.081 by age 85. This decreasing probability beyond age 49, noting the high cancer mortality rates of older ages (Figure 2.11), indicates that age-specific death rates due to competing causes of death, such as heart disease, cerebrovascular disease and pneumonia and influenza, increase relatively faster with advancing age.

Figure 2.15
Probability of Eventually Dying from Cancer by Age and Sex
Michigan Residents, 1986 - 1988¹



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

CEREBROVASCULAR DISEASE

Deaths due to cerebrovascular disease (stroke) numbered 5,237 in 1988 or 6.5 percent of the 80,075 total Michigan resident deaths. This is 244 less stroke deaths than were observed in 1987. Of the total in 1988, 59.7 percent were to females.

The median age at death from stroke was 80 years (Table 2.17). The median age for

females was 82 years, 6 years higher than that for males. Deaths among white persons due to cerebrovascular disease displayed median ages several years higher than those among black persons. The median age was 70 and 75 years for black males and females, 71 and 77 years for males and females of other races and 77 and 83 years for white males and females.

Table 2.17
Deaths Due to Cerebrovascular Disease by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	11	6	5	4	4	-	7	2	5	-	-	-
1 - 4	1	1	-	1	1	-	-	-	-	-	-	-
5 - 9	3	1	2	2	-	2	1	1	-	-	-	-
10 - 14	3	2	1	2	2	-	1	-	1	-	-	-
15 - 19	4	3	1	4	3	1	-	-	-	-	-	-
20 - 24	8	6	2	6	4	2	2	2	-	-	-	-
25 - 29	11	5	6	8	4	4	3	1	2	-	-	-
30 - 34	26	17	9	12	6	6	13	10	3	1	1	-
35 - 39	41	29	12	25	18	7	16	11	5	-	-	-
40 - 44	69	40	29	48	29	19	21	11	10	-	-	-
45 - 49	82	47	35	50	29	21	31	17	14	1	1	-
50 - 54	82	48	34	59	32	27	23	16	7	-	-	-
55 - 59	138	64	74	103	49	54	35	15	20	-	-	-
60 - 64	242	134	108	194	108	86	47	26	21	1	-	1
65 - 69	411	215	196	322	175	147	87	40	47	2	-	2
70 - 74	626	329	297	536	275	261	89	53	36	1	1	-
75 - 79	779	338	441	692	304	388	84	33	51	3	1	2
80 - 84	986	368	618	902	337	565	83	30	53	1	1	-
85 - 89	925	281	644	849	255	594	75	26	49	1	-	1
90 +	789	177	612	745	166	579	43	11	32	1	-	1
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	5,237	2,111	3,126	4,564	1,801	2,763	661	305	356	12	5	7
Median Age At Last Birthday	80	76	82	81	77	83	72	70	75	77	71	77

¹ Deaths with race and/or sex not stated are included only in the total column.

The cerebrovascular disease death rate was 56.7 in 1988. The rate for females (65.9) was greater than the rate for males (46.9). The age-specific death rates recorded in Table 2.18 and displayed in Figure 2.16 indicate that rates for both sexes increased markedly in the older age groups. Rates for males were above those of females below age 85 for all age groups where rates could be calculated, but

among persons 85 years of age or over, the rate for females was above that for males. The crude death rate for females exceeded that for males because of the larger proportion of women in the high risk older age groups. The age-adjusted rate for males was 19.3 percent higher than the age-adjusted rate for females.

Table 2.18
Cerebrovascular Disease Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	56.7	46.9	65.9	57.8	46.6	68.6	53.9	52.9	54.8
Under 1	7.9	8.5	7.3	*	*	*	28.6	*	41.0
1 - 14	0.4	*	*	0.3	*	*	*	*	*
15 - 24	0.8	1.2	*	0.8	1.1	*	*	*	*
25 - 34	2.4	2.9	1.9	1.5	1.5	1.5	7.6	11.4	4.4
35 - 44	8.4	10.8	6.2	6.5	8.4	4.6	23.5	31.4	17.2
45 - 54	17.5	20.8	14.3	13.2	15.1	11.4	52.2	71.7	36.6
55 - 64	46.4	50.8	42.4	40.9	45.1	37.0	94.1	104.4	85.6
65 - 74	164.0	194.4	139.8	151.4	179.1	129.4	282.8	344.0	235.8
75 - 84	531.0	557.2	514.9	529.6	560.6	510.6	564.3	542.4	578.5
85 and Over	1,466.6	1,302.3	1,537.4	1,495.7	1,325.8	1,567.9	1,213.6	1,130.1	1,256.0
Age-Adjusted Rate ²	28.8	31.5	26.4	26.9	29.2	24.8	45.7	52.9	39.9

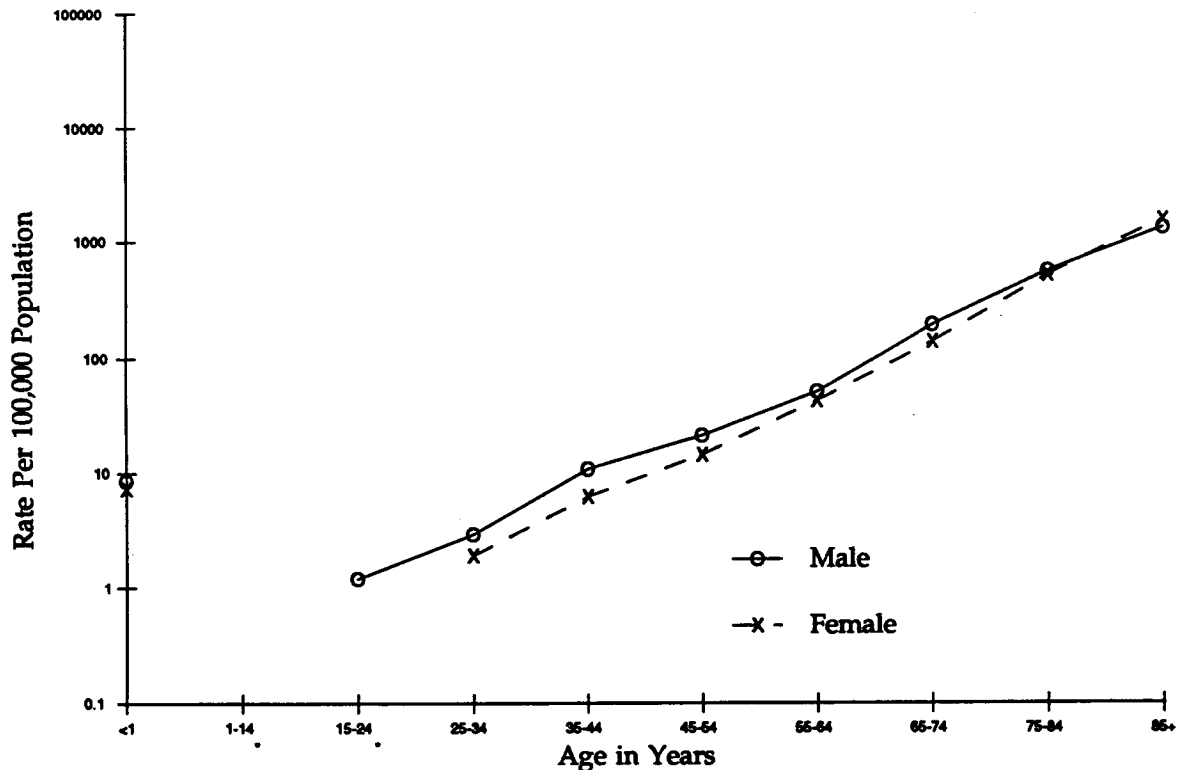
¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.16
Age - Specific Cerebrovascular Disease Death Rates¹ by Sex
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

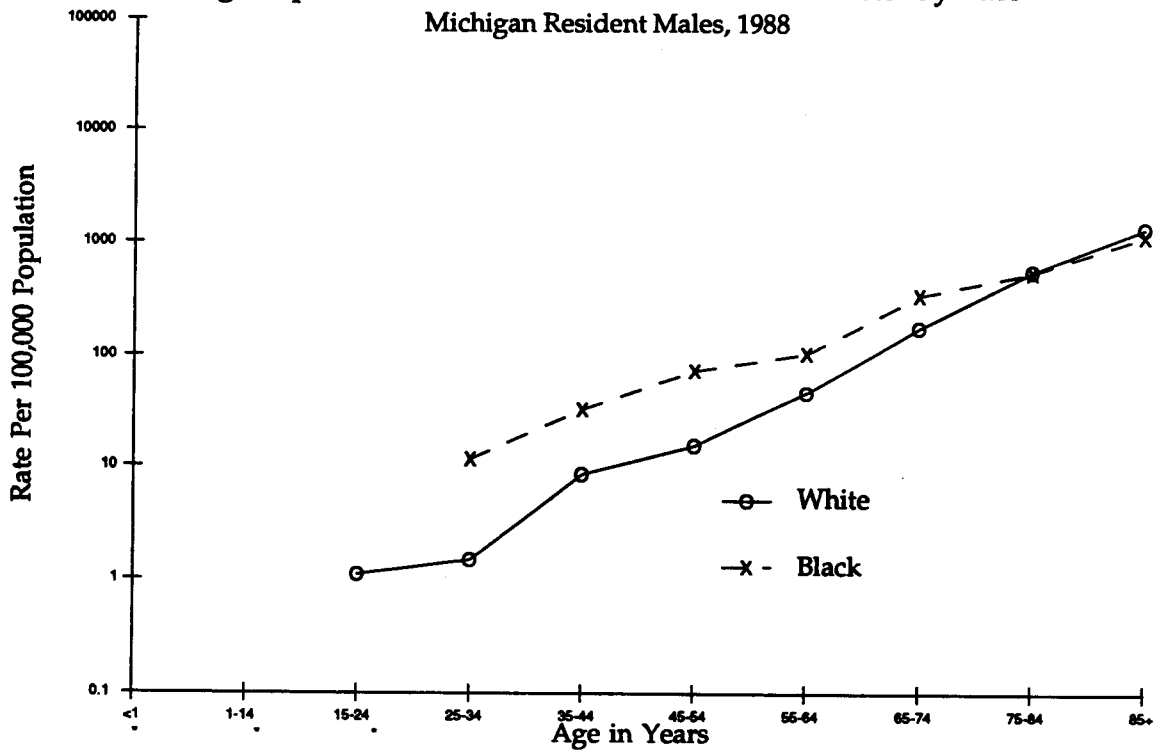
Cerebrovascular disease death rates by age and race from Table 2.18 are graphically displayed in Figures 2.17 and 2.18 for those age and racial groups with sufficient data to calculate rates. Rates for black males and females were higher than comparable rates for white persons in all age groups below ages 75 and 85, respectively. After 34 years of age for females and 44 years of age for males, the relative differentials progressively decreased with increasing age. Rates for white persons were considerably higher than those for black persons beyond age 84.

Although the crude rate for white females was 25.2 percent higher than the rate for black females, the age-adjusted rate indicates an opposite relationship. The cerebrovascular

disease age-adjusted death rate for black females was 60.9 percent higher than that for white females, while for black males the age-adjusted rate was 81.2 percent higher than that for white males.

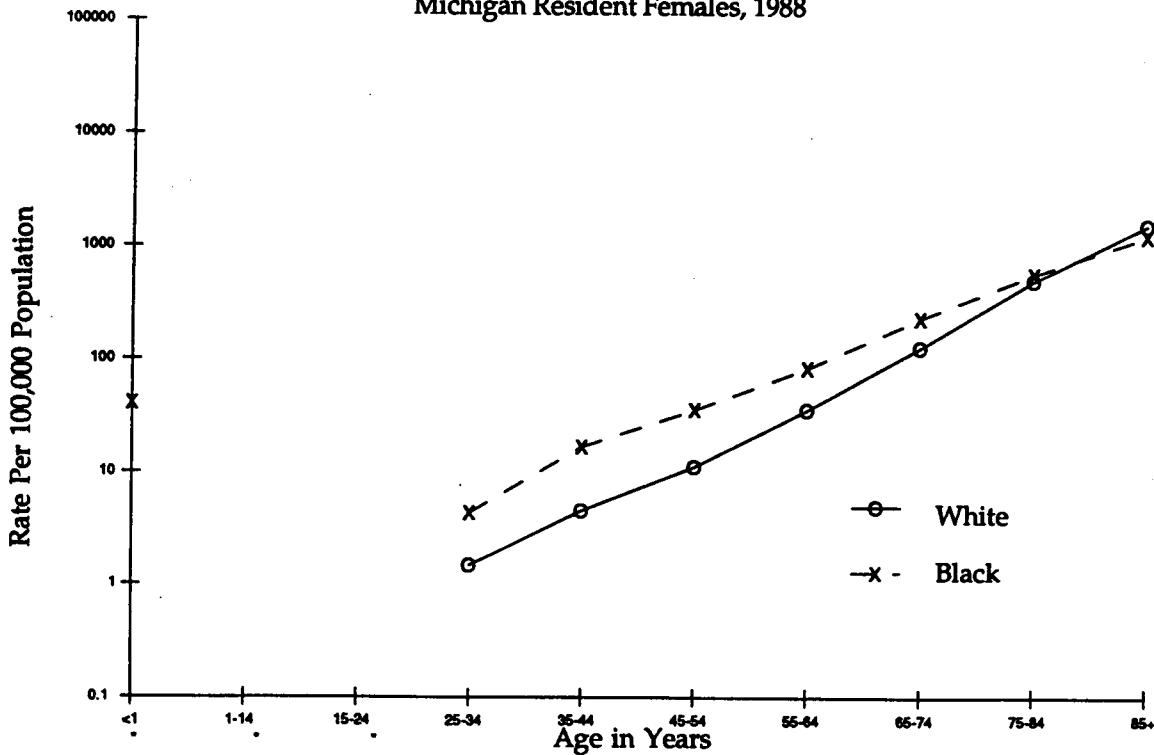
The historic pattern of cerebrovascular disease death rates has been one of strong variation (Figure 2.19). During the time period 1900-1949, the rates in Michigan ranged from a low of 83.9 in 1902 to a high of 110.0 eight years later. The national high and low rates for the years 1900-1948 were, respectively, 108.6 in 1904 and 84.1 in 1933. Rates for Michigan were below national rates from 1900 through 1907 but were generally, and sometimes markedly, higher from 1908 through 1938. Michigan and national rates

Figure 2.17
 Age - Specific Cerebrovascular Disease Death Rates¹ by Race
 Michigan Resident Males, 1988



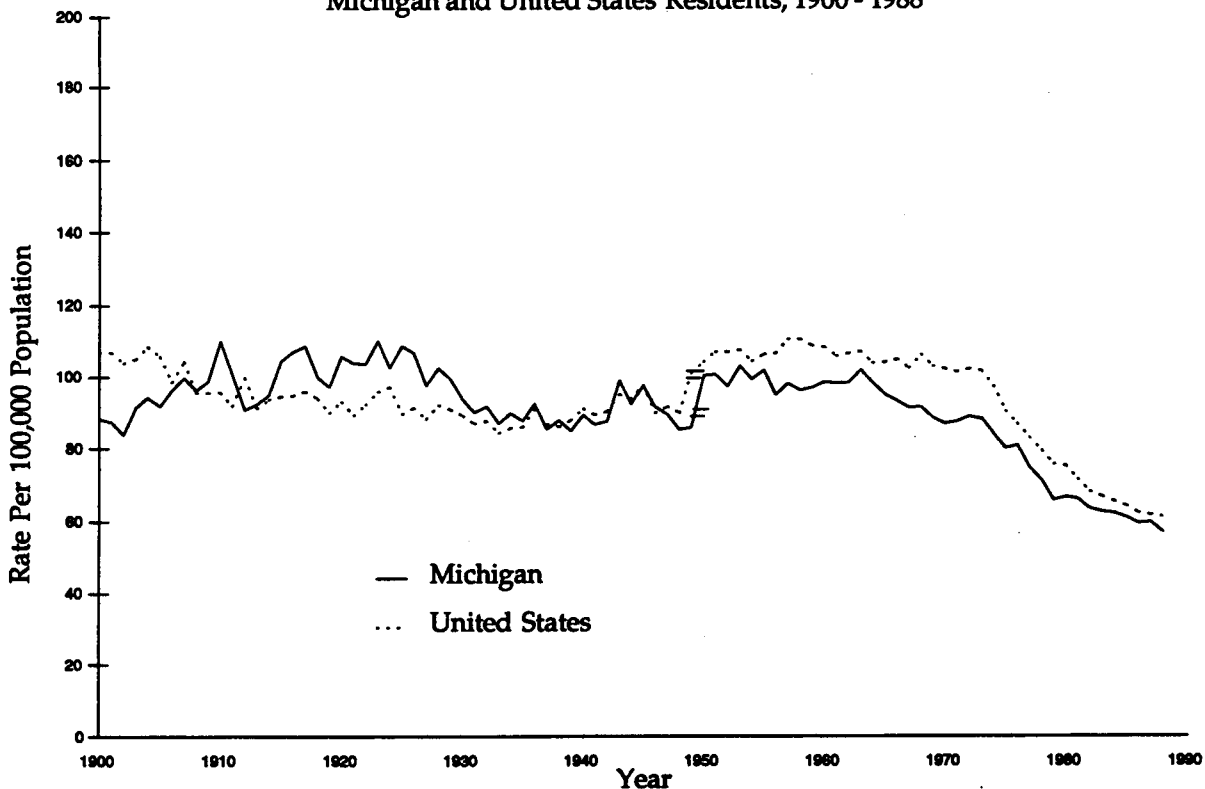
¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.18
 Age - Specific Cerebrovascular Disease Death Rates¹ by Race
 Michigan Resident Females, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.19
Cerebrovascular Disease Death Rates
 Michigan and United States¹Residents, 1900 - 1988²



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

² The comparability of cerebrovascular disease death rates from the 5th revision of ICDA coding procedures with those of the 6th revision is considered weak. The comparability ratio is estimated to be 1.16. The 6th revision was adopted in 1949 for national cause-of-death statistics and in 1950 for Michigan statistics. The comparability of cerebrovascular disease death rates through the 6th, 7th, 8th and 9th revisions (1949 to date nationally and 1950 to date in Michigan) is high. General comparison before and after these dates can be made but detailed study requires special consideration. See Technical Notes.

were very similar over the next eight years, whereupon the Michigan rate slipped below the national rate and has remained so since.

The 6th revision to ICD cause of death coding was adopted in the year 1949 nationally and in 1950 in Michigan. This revision resulted in a lack of direct comparability between cerebrovascular disease death rates prior to these dates and those after adoption. Since the significant change in coding procedures, the cerebrovascular disease death rate in Michigan has ranged from a high of 102.8 in 1953 to a low of 56.7 in 1988.

Cerebrovascular disease death rates over the last twenty five years have shown a clear downward tendency both nationally and in Michigan. The 1988 rates for Michigan and the United States are over forty percent lower than rates in 1963. In 1988 the Michigan rate was 7.2 percent below the United States provisional rate of 61.1.

Age-adjusted rates for cerebrovascular disease deaths by race and sex are presented in Table 2.19. Michigan rates have declined by 56.1 and 58.8 percent since 1970 for white and other than white females, respectively, by 57.0

Table 2.19
Age - Adjusted Cerebrovascular Disease Death Rates¹ by Race and Sex
Michigan² and United States Residents, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	64.7	70.8	59.9	61.5	67.9	56.5	93.9	95.4	92.2
	1971	63.7	72.5	56.7	61.0	70.4	53.5	86.9	89.1	84.9
	1972	63.3	69.5	58.2	60.6	66.6	55.6	84.8	91.8	78.2
	1973	61.4	67.4	56.4	58.9	65.0	53.9	80.8	86.2	76.4
	1974	57.8	64.7	52.2	55.5	62.4	50.0	74.6	81.6	68.2
	1975	53.9	60.1	49.0	52.1	57.9	47.6	67.3	77.2	59.0
	1976	53.1	58.0	49.3	51.2	56.2	47.3	67.2	71.9	63.3
	1977	48.4	54.0	44.0	46.4	51.9	42.2	64.2	71.9	58.2
	1978	45.2	49.3	42.0	42.9	47.3	39.6	62.7	63.8	61.1
	1979	40.9	46.3	36.8	38.6	44.0	34.6	58.6	64.3	53.8
	1980	40.6	44.9	37.4	38.1	42.4	35.0	59.4	64.1	55.6
	1981	37.8	41.3	35.6	35.6	39.1	33.3	53.6	57.3	50.5
	1982	34.9	39.9	31.6	33.2	37.9	29.8	48.3	54.8	43.3
	1983	34.1	37.6	31.9	32.0	35.3	29.6	50.0	53.4	47.1
	1984	34.5	37.9	32.1	33.0	36.2	30.6	45.3	50.7	41.3
	1985	33.2	36.5	30.6	31.0	34.4	28.3	49.3	51.8	46.8
	1986	31.6	34.2	29.4	29.5	32.0	27.3	47.3	50.3	44.6
	1987	31.4	33.5	29.7	28.7	30.3	27.4	51.4	58.7	45.6
	1988	28.8	31.5	26.4	26.9	29.2	24.8	43.3	49.8	38.0
U.S.	1970	66.3	73.2	60.8	61.8	68.8	56.2	107.0	113.5	101.4
	1971	65.0	72.7	59.1	60.9	68.7	54.9	102.0	109.4	95.8
	1972	64.6	72.3	58.6	60.6	68.4	54.5	100.6	107.6	94.8
	1973	63.1	69.9	57.9	59.0	65.8	53.9	98.6	106.4	92.3
	1974	59.2	65.9	54.1	55.7	62.4	50.8	89.7	98.0	83.0
	1975	53.7	60.0	49.0	50.6	56.7	46.1	80.8	88.9	74.2
	1976	50.6	56.1	46.5	47.6	53.0	43.6	76.2	84.1	69.9
	1977	47.3	52.7	43.3	44.4	49.7	40.6	71.7	79.3	65.6
	1978	44.4	49.1	40.8	41.6	46.0	38.4	67.6	76.1	60.9
	1979	41.6	45.9	38.3	38.9	42.9	35.9	63.6	71.8	57.1
	1980	40.8	44.9	37.6	38.0	41.9	35.2	62.9	70.5	57.0
	1981	38.1	41.7	35.4	35.6	38.9	33.1	58.6	65.6	53.2
	1982	35.8	39.2	33.2	33.4	36.6	31.0	54.8	61.8	49.6
	1983	34.4	37.7	31.8	32.0	35.2	29.6	52.6	57.8	48.6
	1984	33.4	36.4	31.1	31.1	33.9	28.9	51.1	56.3	46.9
	1985	32.3	35.2	30.0	30.1	32.8	27.9	49.4	54.2	45.5
	1986	31.0	33.5	29.0	28.8	31.1	27.1	47.0	52.4	42.7
	1987	30.3	32.7	28.3	28.1	30.3	26.3	45.8	51.1	41.7
	1988 ³	29.8	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1971-1982 have been revised based upon revisions to population estimates; see Technical Notes.

³ Provisional data.

percent for white males and by 47.8 percent for other than white males. However, rates for other than white persons, especially males, remained substantially above rates for white persons throughout the period. The gap between other than white males and white males widened from 40.5 percent in 1970 to 70.5 percent in 1988.

Age-adjusted rates for the United States showed a similar pattern of decline. However, while Michigan and national rates were quite similar for white males and females, the state age-adjusted rates for other than white males and females were lower than comparable national rates almost each year until 1985 when national rates for other than white females were less than the rates for their Michigan counterparts (see Technical Notes).

By 1987 the national rate for other than white males was lower than the rate for their Michigan counterparts. In 1988, the Michigan age-adjusted rate for cerebrovascular disease deaths was 3.4 percent below the national provisional rate.

Acute but ill-defined cerebrovascular disease was most frequently given as the type of cerebrovascular disease causing death (2,521 deaths). Second in frequency was cerebral thrombosis and unspecified occlusion of cerebral arteries which caused 952 deaths in 1988 (Table 2.20). These two cause of death categories comprised 66.3 percent of all stroke deaths. Intracerebral and other intracranial hemorrhage caused 785 deaths while other and late effects of cerebrovascular diseases caused 650 stroke deaths.

Table 2.20
Deaths Due to Cerebrovascular Disease by Specific Cause
Michigan Residents, 1988

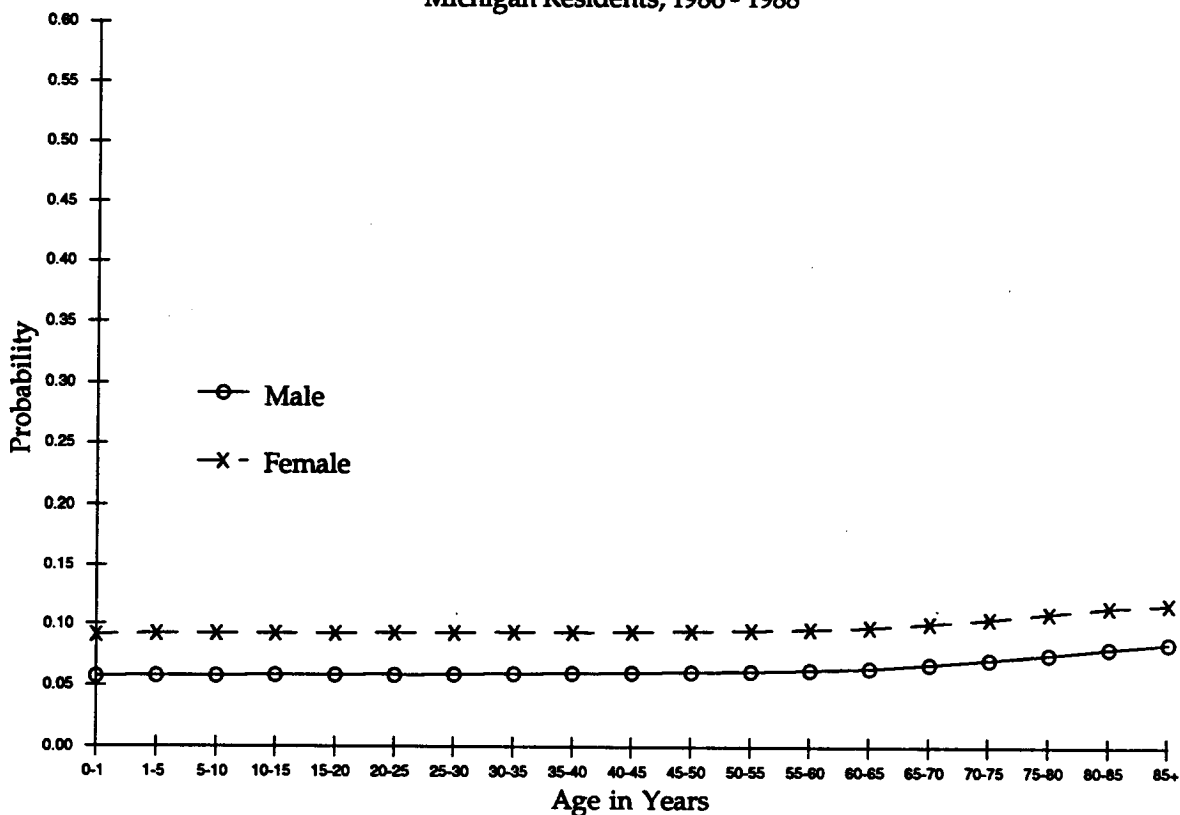
282 LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
154	Acute but Ill - Defined Cerebrovascular Disease	2,521	48.1
152	Cerebral Thrombosis and Unspecified Occlusion of Cerebral Arteries	952	18.2
150	Intracerebral and Other Intracranial Hemorrhage	785	15.0
155	Other and Late Effects of Cerebrovascular Diseases	650	12.4
149	Subarachnoid Hemorrhage	255	4.9
151	Occlusion and Stenosis of Precerebral Arteries	45	0.9
153	Cerebral Embolism	29	0.6
TOTAL		5,237	100.0

¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

Based upon the mortality experience of 1986 through 1988, at birth a Michigan male faces a 0.057 chance of dying from cerebrovascular disease while the probability for a female at birth is 0.091. For both sexes the probability of eventual death due to this cause increases with advancing age. At all ages females are

more likely to eventually die from this cause than are males (Figure 2.20). This results primarily from the higher risks from competing causes for males. At ages 60-64, the probabilities for both males and females start a slightly accelerated rise, reaching 0.084 and 0.116 respectively at ages 85 and above.

Figure 2.20
Probability of Eventually Dying from Cerebrovascular Disease by Age and Sex
Michigan Residents, 1986 - 1988¹



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

ACCIDENTS

Of all Michigan resident deaths in 1988, 4.0 percent were attributed to accidents. The total of 3,237 accidental deaths was 94 more than in 1987. In 1988, 66.5 percent of the total accidental deaths were to males.

The median age at death among accident victims was 37 years (Table 2.21). The median age among males was 34, 15 years lower than the 49 year median for females. This differential is predominantly traceable to the age at death distribution of white females. The median age of accidental death for white males was 34 years compared to 36 years for

black males and 24 years for males of other races. For white females who died from accidents the median of 52 years was 14 years higher than that for their black counterparts and 24 years higher than that for their counterparts of other races.

Accidental deaths among white males were especially concentrated in the 15-39 age range. These five age groups accounted for 50.5 percent of accidental deaths for white males compared to 43.0 percent for black males and 87.5 percent for males of other races. For the same age group for females, percentages were

Table 2.21
Deaths Due to Accidents by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	37	24	13	25	16	9	12	8	4	-	-	-
1 - 4	92	57	35	72	45	27	18	11	7	2	1	1
5 - 9	91	57	34	74	46	28	17	11	6	-	-	-
10 - 14	77	51	26	65	39	26	12	12	-	-	-	-
15 - 19	308	231	77	272	204	68	28	22	6	8	5	3
20 - 24	324	243	81	286	221	65	33	18	15	4	3	1
25 - 29	285	223	62	248	196	52	31	23	8	6	4	2
30 - 34	282	210	72	237	180	57	44	29	15	1	1	-
35 - 39	222	166	56	173	135	38	47	30	17	2	1	1
40 - 44	157	118	39	128	98	30	28	19	9	1	1	-
45 - 49	151	101	50	126	85	41	23	16	7	2	-	2
50 - 54	105	59	46	83	46	37	21	13	8	1	-	1
55 - 59	112	71	41	97	63	34	14	8	6	1	-	1
60 - 64	140	93	47	124	82	42	15	11	4	-	-	-
65 - 69	164	98	66	131	76	55	33	22	11	-	-	-
70 - 74	169	101	68	149	92	57	20	9	11	-	-	-
75 - 79	156	82	74	142	72	70	14	10	4	-	-	-
80 - 84	152	72	80	142	69	73	9	3	6	1	-	1
85 - 89	127	63	64	119	58	61	8	5	3	-	-	-
90 +	86	34	52	79	30	49	7	4	3	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	3,237	2,154	1,083	2,772	1,853	919	434	284	150	29	16	13
Median Age At Last Birthday	37	34	49	37	34	52	37	36	38	25	24	28

¹ Deaths with race and/or sex not stated are included only in the total column.

30.5 for white, 40.7 for black and 53.8 for other races, respectively.

The crude death rate from accidents for males was 2.1 times that for females. Age-specific accident death rates for males were greater than those for females in all age groups. The differentials between rates for males and females were greatest between ages 15 and 44. In the 25-34 year age group, the rate for males was 3.3 times that for females.

The differential between the rates for males and females narrowed above the age of 44. The age-adjusted death rate for males was 2.4 times that for females (Table 2.22).

Accident mortality rates by sex contained in Table 2.22 are displayed graphically in Figure 2.21. Although age-specific rates for males are generally greater than those for females, the patterns of change are quite similar. Mortality rates for children between 1 and 14

Table 2.22
Accident Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	35.0	47.9	22.8	35.1	48.0	22.8	35.6	49.4	23.2
Under 1	26.5	33.9	18.9	22.3	28.1	16.4	49.1	65.3	*
1 - 14	13.6	16.8	10.2	13.4	16.1	10.6	15.1	21.6	8.4
15 - 24	42.6	63.1	21.5	45.2	67.7	21.9	26.9	36.2	18.0
25 - 34	36.4	56.3	17.0	36.6	56.7	16.5	35.6	53.9	20.1
35 - 44	29.1	44.4	14.3	26.7	41.6	12.0	47.7	69.9	29.8
45 - 54	27.2	35.0	19.9	25.3	32.4	18.6	42.6	63.0	26.1
55 - 64	30.8	42.0	20.5	30.4	41.7	20.1	34.4	48.4	23.0
65 - 74	52.7	71.1	38.0	49.4	66.9	35.5	85.2	114.7	62.5
75 - 84	92.7	121.5	74.9	94.4	123.3	76.6	77.7	111.9	55.6
85 and Over	182.3	275.8	142.0	185.8	277.1	147.0	154.3	274.9	93.0
Age-Adjusted Rate ²	31.6	45.1	18.9	31.3	44.8	18.3	35.3	50.7	22.3

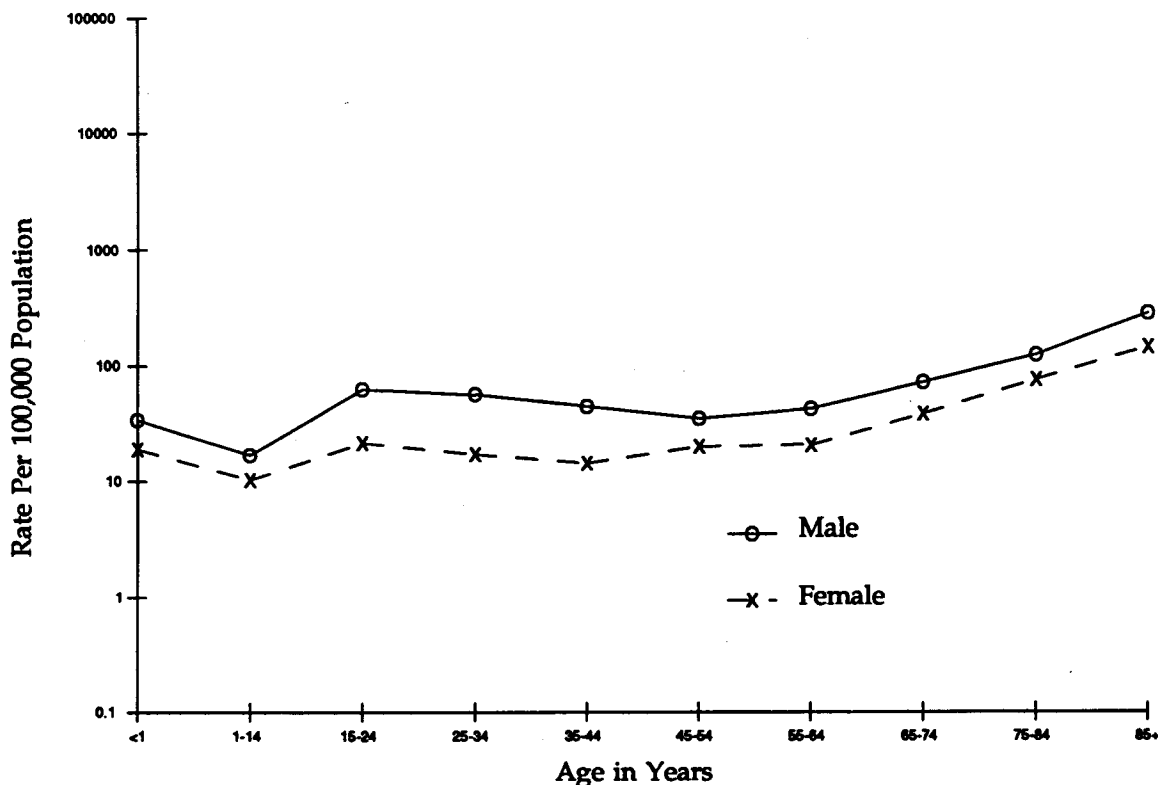
¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.21
Age - Specific Accident Death Rates¹ by Sex
 Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

years of age were less than those for infants under one year. The rates then rose sharply for both sexes in the 15-24 year age group. From this initial peak the rates for both groups declined somewhat, for males, declining through age 54 and, for females, declining through age 44. Beyond those ages, the rates for both sexes increased continuously.

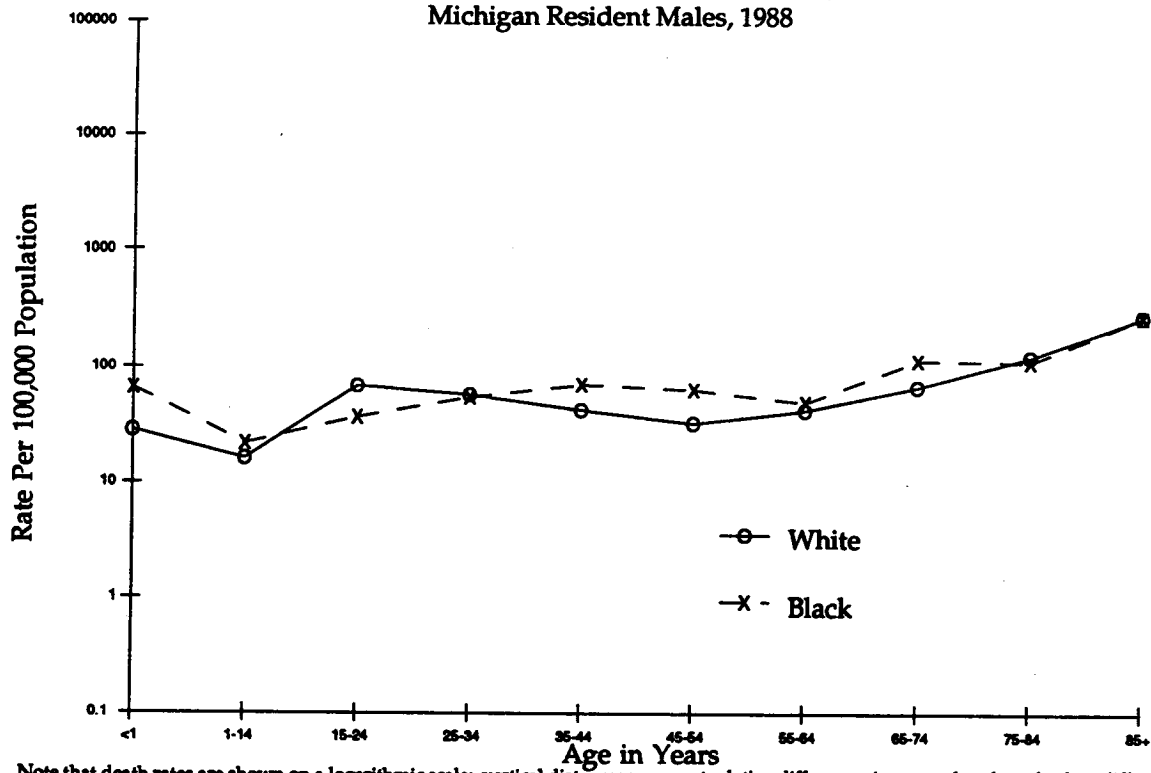
Age-specific accident death rates for white and black persons are graphically displayed in Figures 2.22 and 2.23. Rates for black males were higher than those for white males under 15 and for those age groups between 35 and 74 years of age (Table 2.22). Both the crude and age-adjusted accident death rates for

black males were somewhat higher than those for white males.

For those age groups for which rates could be calculated, rates for black females were higher than those for white females between 25 and 74 years of age. Between 1-24 years and above 74 years of age the rates for white females were higher. Both the crude and age-adjusted rates for black females were greater than the corresponding rates for white females.

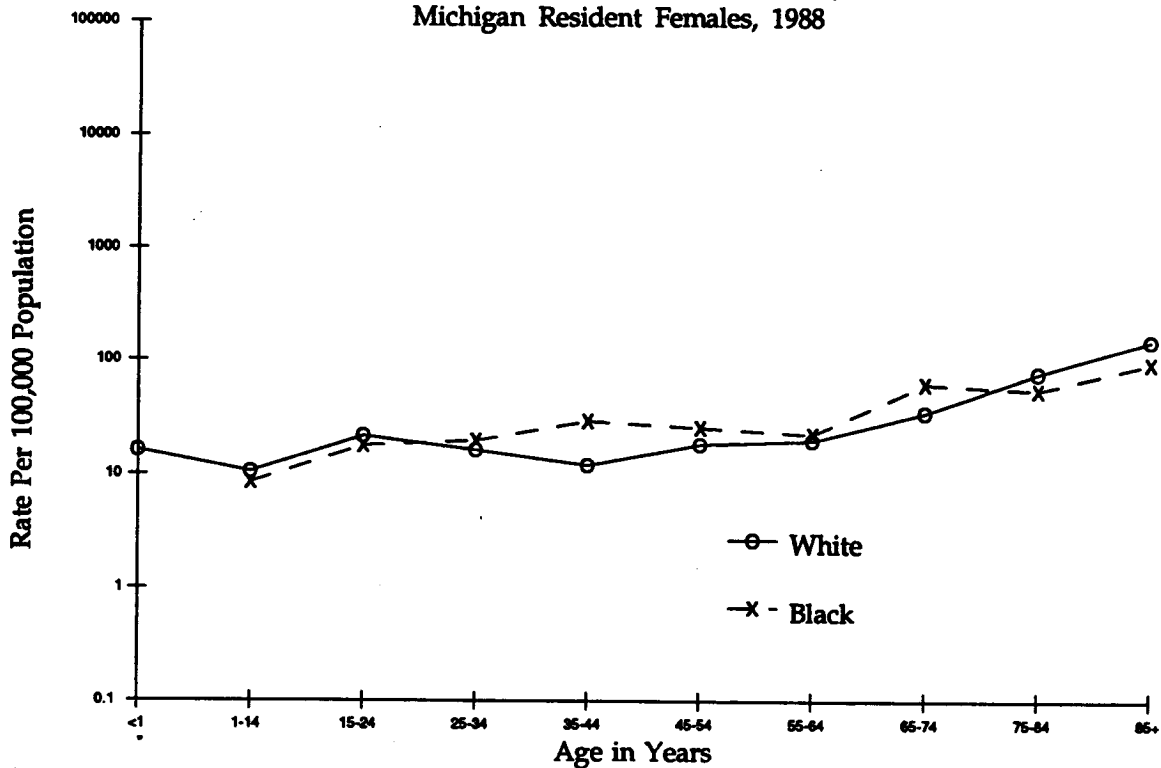
Michigan's accident death rate in 1900 was 71.9. The highest rate observed in this century was 103.1 in 1936. In seven of the last

Figure 2.22
 Age - Specific Accident Death Rates¹ by Race
 Michigan Resident Males, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

Figure 2.23
 Age - Specific Accident Death Rates¹ by Race
 Michigan Resident Females, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

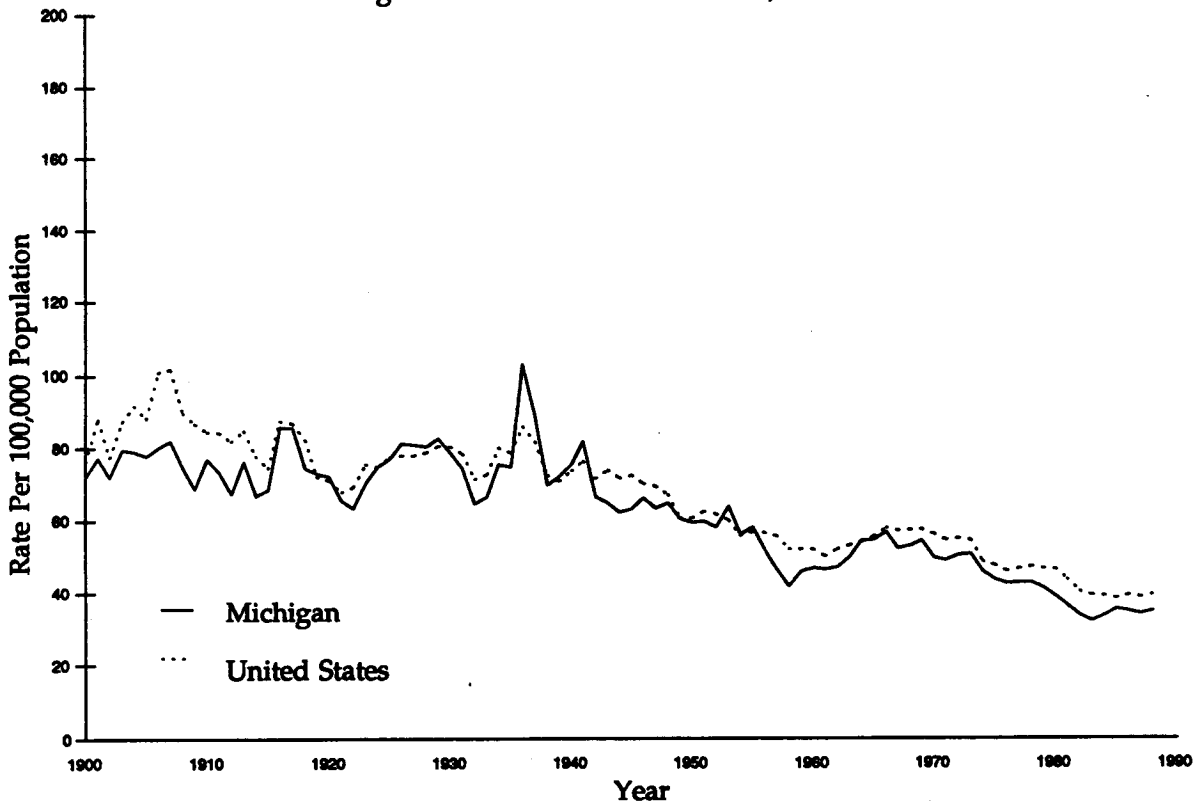
eleven years the accident death rates have fallen or remained the same. The rate of 32.2 in 1983 was the lowest rate of the century. The rate of 35.0 in 1988 was 8.7 percent higher than that of 1983 and was 2.3 percent more than the 1987 rate of 34.2.

The highest national accident death rate was 101.8 in 1907. The lowest national rate of the century was the rate of 38.6 for 1985. Michigan's rates have been below national rates fairly consistently since 1900. The last time Michigan's rate was above that of the United States was in 1964. The accident death rate for Michigan in 1988 was 11.8 percent below the provisional rate of 39.7 for the nation (Figure 2.24).

Michigan's age-adjusted death rates for accidental deaths have also been below the comparable national rates since 1970 (Table 2.23). Between 1970 and 1983 Michigan's age-adjusted rate declined by 38.3 percent. The Michigan rates then rose 5.3 percent between 1983 and 1988. Between 1970 and 1988 the national age-adjusted rate declined by 34.6 percent (see Technical Notes). Michigan's rate was 10.0 percent below the national provisional rate in 1988.

The age-adjusted rates by race and sex declined for each population subgroup between 1970 and 1988. Other than white female rates have fluctuated above and below those for white females since 1970, from about

Figure 2.24
Accident Death Rates
Michigan and United States¹ Residents, 1900 - 1988²



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

² Accidental death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration. See Technical Notes.

Table 2.23
Age - Adjusted Accident Death Rates¹ by Race and Sex
Michigan² and United States Residents, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	48.6	71.3	27.4	47.5	69.6	26.8	56.1	83.9	30.7
	1971	47.7	69.9	26.8	46.7	68.1	26.5	55.0	84.7	28.2
	1972	48.7	72.9	25.9	48.3	72.1	25.8	51.6	80.1	25.7
	1973	48.9	72.4	26.6	48.0	71.0	26.1	54.4	82.7	28.8
	1974	43.8	65.5	23.2	43.3	64.2	23.3	47.3	75.5	22.0
	1975	41.5	61.7	22.4	41.2	61.1	22.2	44.1	67.2	23.8
	1976	40.0	58.7	22.4	40.0	58.5	22.6	39.6	61.0	20.8
	1977	40.4	59.1	22.8	40.3	58.7	22.7	41.2	62.7	22.2
	1978	40.3	59.5	22.2	40.2	59.4	21.9	42.0	63.0	24.0
	1979	38.4	56.2	21.8	38.4	55.7	21.9	39.6	61.7	20.5
	1980	36.4	53.3	20.6	36.3	52.2	21.2	37.9	62.4	16.9
	1981	34.6	52.4	18.2	35.4	53.0	18.5	32.6	51.4	16.7
	1982	32.1	47.4	17.8	32.3	47.4	17.8	32.2	49.3	17.8
	1983	30.0	45.5	15.6	30.5	46.1	15.5	29.4	44.5	16.8
	1984	30.3	44.9	16.6	30.1	44.2	16.7	32.0	50.5	16.3
	1985	32.1	47.2	17.8	31.7	46.1	17.9	34.4	55.6	16.4
	1986	31.5	45.8	17.9	31.4	45.2	18.2	32.4	52.4	15.8
	1987	31.0	44.7	18.0	30.7	44.2	17.7	34.1	50.1	20.7
	1988	31.6	45.1	18.9	31.3	44.8	18.3	34.3	48.4	22.4
U.S.	1970	53.7	80.7	28.2	51.0	76.2	27.2	72.8	115.7	35.1
	1971	51.7	77.0	27.9	49.2	72.9	26.8	70.1	109.8	35.3
	1972	51.7	77.1	27.9	49.5	73.1	27.0	68.4	108.6	33.2
	1973	51.3	76.8	27.2	49.2	73.1	26.2	66.9	105.9	32.9
	1974	45.5	68.8	23.5	43.9	66.0	22.7	57.8	91.3	28.6
	1975	44.2	67.0	22.8	42.6	64.1	22.1	56.1	89.5	27.1
	1976	42.5	63.9	22.4	41.3	61.5	21.9	52.3	83.4	25.3
	1977	43.1	64.5	22.8	41.9	62.2	22.4	52.1	83.1	25.2
	1978	43.5	65.4	22.9	42.5	63.4	22.4	51.5	81.7	25.6
	1979	42.9	64.9	21.9	42.0	63.3	21.6	49.3	78.9	23.9
	1980	42.3	64.0	21.8	41.5	62.3	21.4	49.5	78.4	24.8
	1981	39.8	60.2	20.4	39.3	59.1	20.2	44.0	70.4	21.4
	1982	36.6	55.2	18.9	36.1	54.1	18.7	40.8	64.5	20.5
	1983	35.3	52.9	18.7	34.7	51.8	18.3	40.2	62.5	21.0
	1984	35.0	52.3	18.7	34.6	51.3	18.5	38.5	60.5	19.5
	1985	34.7	51.8	18.6	34.1	50.4	18.4	39.7	62.1	20.4
	1986	35.2	52.5	18.7	34.5	51.1	18.4	39.9	62.3	20.4
	1987	34.6	51.2	18.8	33.9	49.7	18.6	39.7	61.9	20.2
	1988 ³	35.1	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ Provisional data.

22.4 percent above in 1988 to 20.3 percent below the white female in rate in 1980. For males, other than white male rates have fluctuated from 3.5 percent below to 24.4 percent above the white male rates between 1970 and 1988. Generally the rates for other than white males have been higher than those for white males.

Nationally, the differential between other than white males and white males moved from 51.8 percent above in 1970 to 24.5 percent above in 1987, the last year for which such data were available. The rate for other than white females was 29.0 percent higher in 1970 and 8.6 percent higher in 1987 than the white female rate.

Of the total 3,237 accidental deaths, 1,778 or 54.9 percent of the accidents occurred on streets and highways (Table 2.24). The second

most common place of occurrence was the home with 621 deaths (19.2 percent). There were 81 deaths attributed to accidents at places for recreation and sport, 56 at industrial places or premises, 45 in resident institutions, 33 in public buildings and 31 on farms. Note that the place of injury was not specified for 14.0 percent of the accidental deaths.

Motor vehicle accidents involving collision with another motor vehicle were the largest single cause of accidental death in 1988, resulting in 843 deaths (Table 2.25). Deaths from all types of motor vehicle accidents accounted for 1,806 deaths in 1988. Accidental falls of all types resulted in 373 deaths. Accidents caused by fires and flames, accidental poisonings, choking on food or other objects and accidental drownings caused 188, 138, 132 and 114 deaths, respectively. Medical misadventures, water transport accidents and air and space transport accidents each accounted for 76, 28 and 23 deaths in 1988, respectively. Accidents caused by handguns and other firearms resulted in the deaths of 30 Michigan residents.

Table 2.24
Deaths Due to Accidents by Place of Injury
Michigan Residents, 1988

PLACE	NUMBER OF DEATHS
Street and Highway	1,778
Home	621
Place for Recreation and Sport	81
Industrial Place and Premises	56
Resident Institution	45
Public Building	33
Farm	31
Mine and Quarry	4
Other Specified Places	135
Place Not Specified	453
Total	3,237

Deaths from motor vehicle accidents accounted for 55.8 percent of all accidental deaths in 1988. After age 14, the proportion of motor vehicle accident deaths decreased by age group, from 80.5 percent for persons 15-24 years of age to a low of 30.4 percent of accident deaths for persons 65 years of age or over (Table 2.26).

Among children under 15 years the most frequent causes of accidental death were motor vehicle accidents, fire and drownings, resulting in 151, 50 and 30 deaths, respectively, in 1988. Motor vehicle accidents were also the leading cause of accidental death among persons 15 through 64 years of age. The next most frequent causes were accidental drownings for persons 15-24 years of age, accidental poisonings for persons 25-44 years of age and accidental falls for persons 45-64 years of age.

Table 2.25
Deaths Due to Accidents by Type of Accident
Michigan Residents, 1988

282 LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
236	Motor Vehicle Accidents Involving Collision with Another Motor Vehicle	843	26.0
239	Motor Vehicle Accidents Not Involving Collision on Highway	360	11.1
262	All Other Accidents, and Late Effects of Accidental Injury	267	8.2
252	Fracture, Cause Unspecified, and Other and Unspecified Falls	259	8.0
237	Motor Vehicle Accidents Involving Collision with Pedestrian	258	8.0
238	Motor Vehicle Accidents Involving Collision with Other Vehicle or Object	203	6.3
253	Accidents Caused by Fires and Flames	188	5.8
256	Inhalation and Ingestion of Food or Other Object Causing Obstruction of Respiratory Tract or Suffocation	132	4.1
255	Accidental Drowning and Submersion	114	3.5
250	Fall From One Level to Another	103	3.2
246	Accidental Poisoning by Drugs, Medicaments, and Biologicals	87	2.7
249	Misadventures During Medical Care, Abnormal Reactions, and Late Complications	76	2.3
240	Motor Vehicle Traffic Accidents of Unspecified Nature	67	2.1
241	Motor Vehicle Nontraffic Accidents	44	1.4
248	Accidental Poisoning by Gases and Vapors	43	1.3
235	Motor Vehicle Accidents Involving Collision with Train	31	1.0
243	Water Transport Accidents	28	0.9
258	Accidents Caused by All Other and Unspecified Firearms	25	0.8
244	Air and Space Transport Accidents	23	0.7
261	Accidents Caused by Electric Current	23	0.7
234	Railway Accidents	11	0.3
251	Fall on Same Level	11	0.3
247	Accidental Poisoning by Other Solid or Liquid Substances	8	0.2
259	Accidents Caused by Explosive Material	6	0.2
242	Other Road Vehicle Accidents	6	0.2
263	Drugs, Medicaments, and Biological Substances Causing Adverse Effects in Therapeutic Use	5	0.2
260	Accidents Caused by Hot Substance or Object, Caustic or Corrosive Material, Steam, and Exposure to Radiation	5	0.2
257	Accidents Caused by Handguns	5	0.2
254	Lightning	4	0.1
245	Vehicle Accidents Not Elsewhere Classifiable	2	0.1
TOTAL		3,237	100.0

¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

Table 2.26
Deaths Due to Accidents by Age at Death and Type of Accident
Michigan Residents, 1988

TYPE OF ACCIDENT	AGE AT DEATH IN YEARS					
	TOTAL	<15	15 - 24	25 - 44	45 - 64	65 +
Total	3,237	297	632	946	508	854
Motor Vehicle Accidents	1,806	151	509	624	262	260
Accidental Falls	373	7	9	41	50	266
Accidents Caused by Fire and Flames	188	50	17	38	31	52
Accidental Poisonings	138	5	10	70	31	22
Choking on Food or Other Object	132	8	1	18	29	76
Accidental Drownings	114	30	21	32	20	11
Misadventures During Medical Care, Abnormal Reactions, and Late Complications	76	2	1	8	17	48
Accidents Caused by Handguns and Other Firearms	30	5	14	9	1	1
Water Transport Accidents	28	3	5	9	5	6
Air and Space Transport Accidents	23	-	2	16	5	-
All Other Accidents	329	36	43	81	57	112

Accidental falls, which caused 11.5 percent of all accidental deaths, were the leading cause of the accidental deaths (31.1 percent) among persons 65 years of age or older.

Table 2.27 displays the distribution of motor vehicle accident deaths by the age of the deceased person and the type of involvement of the deceased in the accident. Of the 1,806 persons killed in motor vehicle accidents in 1988, 857 (47.5 percent) were driving motor vehicles other than motorcycles at the time of the fatal accident. There were 380 deaths of passengers in motor vehicles other than

motorcycles, while 271 pedestrians were killed in motor vehicle accidents. Motorcycle accidents resulted in the deaths of 74 motorcyclists and 6 motorcycle passengers. It should be noted that for 190 deaths (10.5 percent of the total) the type of involvement of the deceased in the accident was not stated.

The type of involvement of the deceased in the accident varied by age. The majority of children under age 15 killed in motor vehicle accidents were either passengers (40.4 percent) or pedestrians (40.4 percent). About

Table 2.27
Deaths From Motor Vehicle Accidents by Person Injured and Age at Death
Michigan Residents, 1988

PERSON INJURED	AGE AT DEATH IN YEARS					
	TOTAL	<15	15 - 24	25 - 44	45 - 64	65 +
Total	1,806	151	509	624	262	260
Driver of Motor Vehicle Other Than Motorcycle	857	5	256	332	138	126
Passenger in Motor Vehicle Other Than Motorcycle	380	61	132	82	47	58
Motorcyclist	74	1	28	38	7	-
Passenger on Motorcycle	6	-	3	2	1	-
Pedal Cyclist	28	15	7	3	1	2
Pedestrian	271	61	31	101	33	45
Other Unspecified Person	1	-	-	1	-	-
Unspecified Person	189	8	52	65	35	29

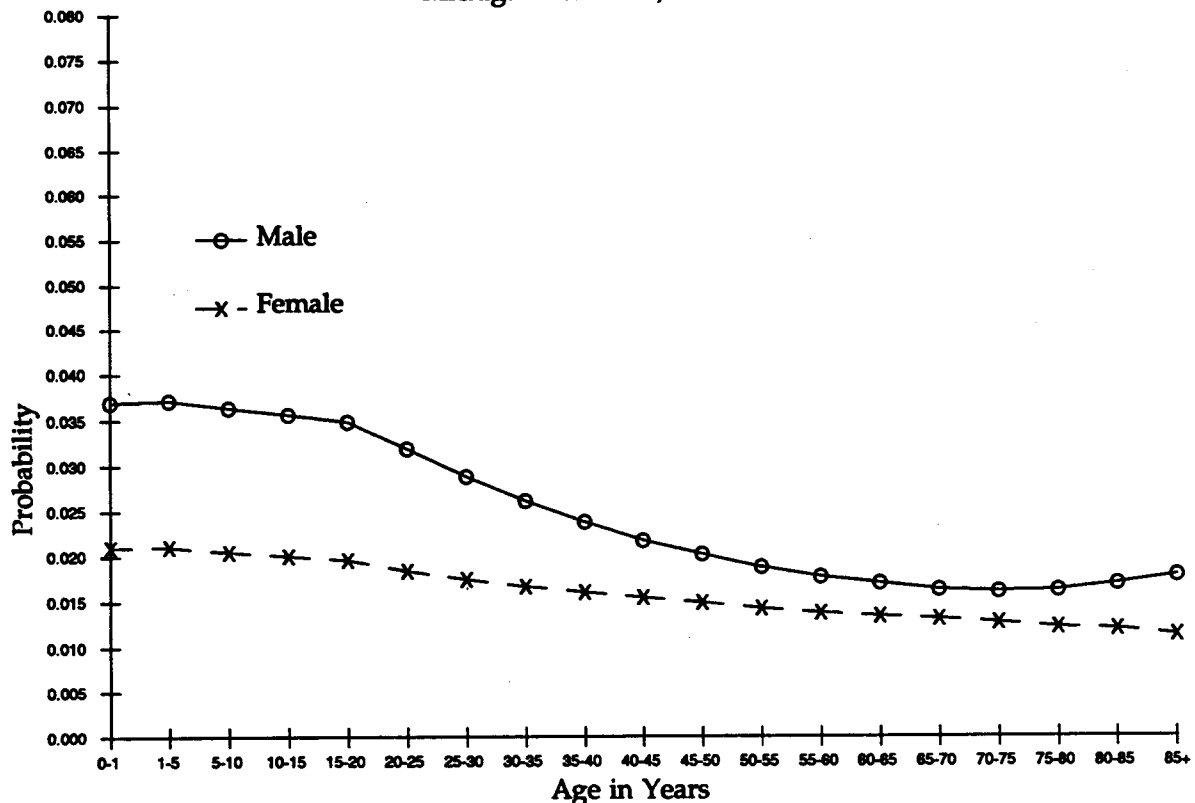
three-fourths of the persons 15-24 years of age who died in motor vehicle accidents in 1988 were either drivers (50.3 percent) or passengers (25.9 percent) of motor vehicles other than motorcycles. Among persons 25-44 years and 45-64 years of age 53.2 percent and 52.7 percent, respectively, were driving motor vehicles other than motorcycles at the time of the accident. Among persons over 64 years

less than half (48.5) percent) were driving and 22.3 percent were passengers in motor vehicles other than motorcycles. Pedestrians accounted for 17.3 percent of all motor vehicle accident deaths among persons 65 years of age and over, compared to 15.0 percent for persons of all ages. Of the 80 motorcyclists who died, 88.8 percent were between 15 and 44 years of age.

It can be seen from Figure 2.25 that the probability of eventually having an accidental death is greater for younger persons. According to Michigan mortality data from the years 1986 through 1988 the probability of eventually dying from accidental causes is 0.037 for males and 0.021 for females at birth. Probabilities for males decline slowly through

childhood and the teenage years, fall rapidly between ages 15 and 54, and thereafter decline more slowly until the lowest probability of 0.016 is reached at age 70-74. For females the probabilities decline more moderately and steadily. Probabilities for males remain much higher than for females until about age 50 and slightly higher after that age.

Figure 2.25
Probability of Eventually Dying from Accidental Causes by Age and Sex
Michigan Residents, 1986 - 1988¹



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

CHRONIC OBSTRUCTIVE PULMONARY DISEASES AND ALLIED CONDITIONS

The fifth leading cause of death in 1988 was chronic obstructive pulmonary diseases and allied conditions. This group of diseases caused 2,899 Michigan resident deaths. Of these deaths, 1,749 (60.3 percent) were to males (Table 2.28).

The median age at death of persons who died from these respiratory diseases was 74 years for both males and females. The median age for white persons (74 years) was

4 years higher than that for black persons (70 years).

The crude death rate for chronic obstructive pulmonary diseases and allied conditions was 31.4 per 100,000 population. The crude death rate for males was 1.6 times that for females (Table 2.29).

Age-specific rates for males and females from Table 2.29 are graphically presented in

Table 2.28
Deaths Due to Chronic Obstructive Pulmonary Diseases and Allied Conditions by
Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	2	1	1	1	-	1	1	1	-	-	-	-
1 - 4	1	1	-	1	1	-	-	-	-	-	-	-
5 - 9	2	2	-	3	-	-	2	2	-	-	-	-
10 - 14	4	1	3	-	1	2	1	-	1	-	-	-
15 - 19	5	1	4	2	-	2	3	1	2	-	-	-
20 - 24	4	2	2	4	2	2	-	-	-	-	-	-
25 - 29	6	3	3	5	3	2	1	-	1	-	-	-
30 - 34	5	1	4	5	1	4	-	-	-	-	-	-
35 - 39	10	7	3	6	4	2	4	3	1	-	-	-
40 - 44	15	8	7	9	5	4	6	3	3	-	-	-
45 - 49	30	16	14	23	14	9	7	2	5	-	-	-
50 - 54	61	33	28	55	30	25	6	3	3	-	-	-
55 - 59	136	75	61	116	62	54	20	13	7	-	-	-
60 - 64	269	166	103	242	148	94	27	18	9	-	-	-
65 - 69	389	240	149	357	215	142	32	25	7	-	-	-
70 - 74	561	344	217	521	316	205	39	27	12	1	1	-
75 - 79	553	332	221	520	306	214	32	25	7	1	1	-
80 - 84	474	304	170	445	282	163	27	20	7	2	2	-
85 - 89	235	144	91	225	136	89	10	8	2	-	-	-
90 +	137	68	69	128	65	63	9	3	6	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	2,899	1,749	1,150	2,668	1,591	1,077	227	154	73	4	4	-
Median Age At Last- Birthday	74	74	74	74	74	74	70	71	66	83	83	-

¹ Deaths with race and/or sex not stated are included only in the total column.

Table 2.29
**Death Rates for Deaths Due to Chronic Obstructive Pulmonary Diseases
 and Allied Conditions by Age, Race and Sex¹**
 Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	31.4	38.9	24.3	33.8	41.2	26.7	18.5	26.7	11.2
Under 1	*	*	*	*	*	*	*	*	*
1 - 14	0.4	*	*	*	*	*	*	*	*
15 - 24	0.6	*	0.8	0.5	*	*	*	*	*
25 - 34	0.7	*	0.9	0.8	*	0.9	*	*	*
35 - 44	1.9	2.3	1.5	1.3	1.6	1.1	6.4	8.6	*
45 - 54	9.7	10.7	8.7	9.5	10.9	8.1	12.6	10.9	13.9
55 - 64	49.4	61.8	38.2	49.3	60.4	39.1	53.9	78.9	33.4
65 - 74	150.2	208.7	103.8	155.0	211.4	110.0	114.1	192.4	54.0
75 - 84	309.0	502.0	190.1	320.6	514.2	202.0	199.4	387.4	77.9
85 and Over	318.3	602.8	195.8	331.2	633.0	203.2	195.4	336.0	124.1
Age-Adjusted Rate ²	19.2	27.2	13.5	19.5	27.4	14.0	16.8	26.3	9.9

¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race of distribution was modified to be consistent with the racial categories from the 1970 Census and categories used by state departments of health. This modified race distribution is inconsistent with official published data.

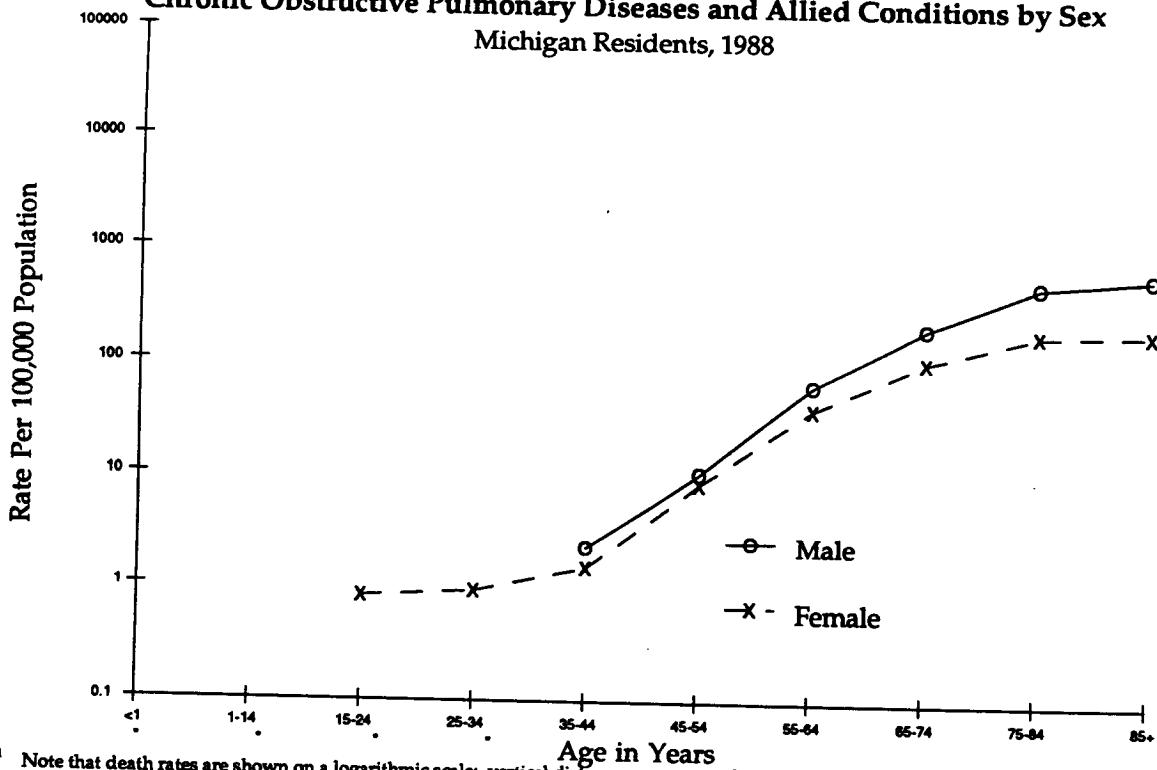
Figure 2.26. The strong association between increasing rates of chronic obstructive pulmonary diseases and allied conditions and age is clearly evident.

The age-specific rates for males were greater than those for females in all age groups for which rates can be calculated. Above age 54, the relative differential between rates for

males and females increased steadily with age. In the age group 85 years and over the rate for males was 3.1 times that for females. The age-adjusted death rate for this group of diseases was 2.0 times as high for males as it was for females.

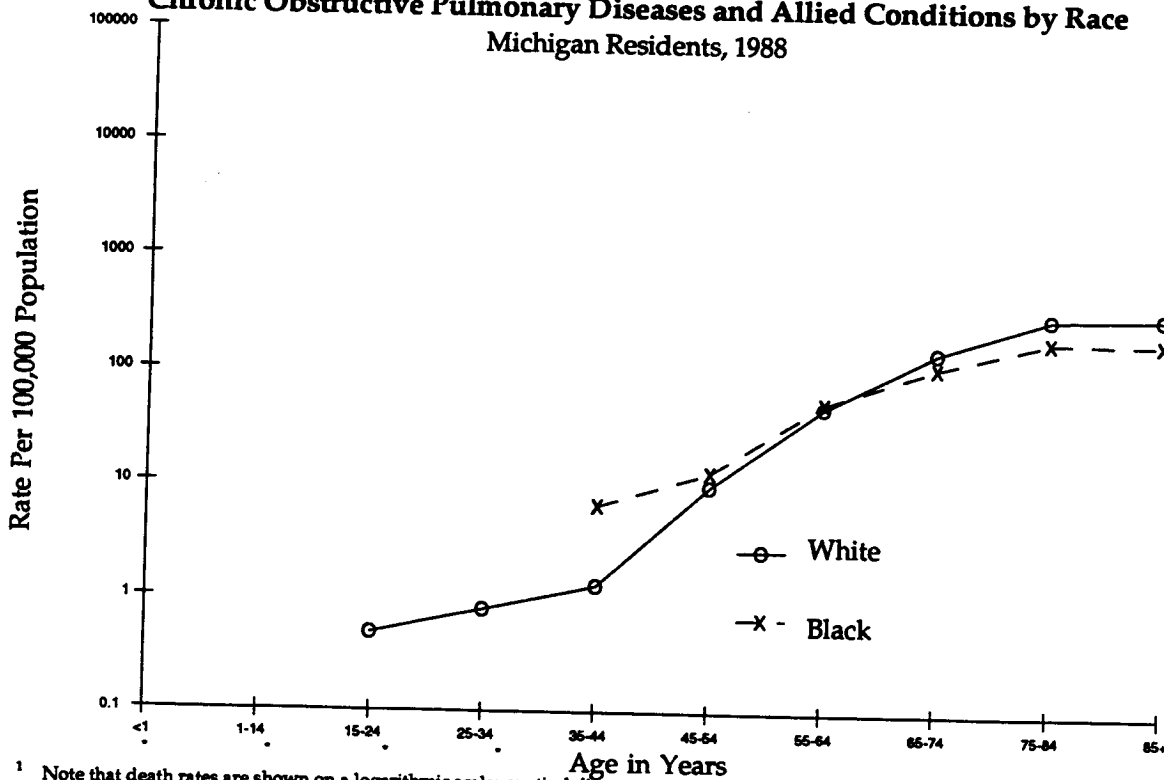
Age-specific rates for white and black persons are displayed in Figure 2.27. For those

Figure 2.26
**Age - Specific Death Rates¹ for Deaths Due to
 Chronic Obstructive Pulmonary Diseases and Allied Conditions by Sex**
 Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale; vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.27
**Age - Specific Death Rates¹ for Deaths Due to
 Chronic Obstructive Pulmonary Diseases and Allied Conditions by Race**
 Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale; vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

age groups with sufficient data to calculate rates, rates were higher for black persons through age 64, after which they were higher for white persons. The age-adjusted death rate for these respiratory diseases for white persons was 16.1 percent above that for black persons (Table 2.29).

Table 2.30 presents Michigan age-adjusted death rates by sex and race for the period 1970-1988 for deaths from this group of respiratory diseases. The age-adjusted death rates for males rose 9.2 percent over the period, while for females the rate in 1988 was 2.4 times the rate in 1970. The increase in age-adjusted rates for females was higher for white females (2.6 times) than for other than white females (1.4 times) between 1970 and 1988.

The age-adjusted death rate for the total population of Michigan from chronic obstructive pulmonary diseases and allied conditions

was the same as the United States provisional rate in 1988 (see Technical Notes).

Of the 2,899 Michigan resident deaths due to chronic obstructive pulmonary diseases and allied conditions, 1,905 (65.7 percent) were classified as chronic airways obstruction, not elsewhere classified. There were 700 deaths in 1988 due to emphysema, 153 due to asthma, and 141 due to bronchitis (Table 2.31).

Based on mortality data from 1986-1988, the probability of eventual death due to chronic obstructive pulmonary diseases and allied conditions is 0.045 for males and 0.028 for females at birth. The probability for males increases steadily to a peak of 0.054 at ages 70-74 and then declines in the last few age groups to 0.042. The probability for females remains stable from birth through ages 60-64 and then declines in the oldest age groups (Figure 2.28). By age 85 and over, the probability for females declines to 0.015.

Table 2.30
 Age - Adjusted Death Rates¹ for Deaths Due to Chronic Obstructive Pulmonary
 Diseases and Allied Conditions² by Race and Sex
 Michigan³ Residents, 1970 - 1988 and United States Residents, 1979 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	14.2	24.9	5.6	14.3	25.3	5.4	12.3	18.5	6.7
	1971	13.9	24.4	5.6	13.8	24.5	5.4	13.9	22.2	6.5
	1972	14.9	26.5	5.7	15.2	27.2	5.8	11.1	19.3	4.2
	1973	15.4	26.7	6.4	15.6	27.3	6.5	12.2	20.5	5.1
	1974	13.8	24.1	5.8	14.1	24.7	6.0	9.6	17.2	3.1
	1975	14.3	25.1	6.1	14.5	25.6	6.2	11.4	19.0	5.1
	1976	14.7	25.4	6.8	15.0	25.9	6.9	12.0	20.8	5.1
	1977	14.1	24.4	6.5	14.4	25.1	6.5	10.8	17.1	5.9
	1978	15.7	26.1	8.2	15.8	26.3	8.4	13.9	23.7	6.3
	1979	15.2	26.1	7.4	15.5	26.6	7.5	12.7	21.6	5.8
	1980	15.7	25.5	8.9	15.9	25.7	9.1	13.2	22.4	6.0
	1981	15.6	25.5	9.0	15.9	26.0	9.2	12.8	20.7	7.1
	1982	15.5	24.5	9.5	15.7	24.7	9.6	13.7	21.9	7.6
	1983	17.0	25.8	11.5	17.3	25.9	11.8	15.3	24.3	8.7
	1984	17.6	27.4	10.9	17.9	27.8	11.1	14.7	23.4	8.3
	1985	19.3	29.2	12.6	19.4	29.3	12.7	17.9	27.6	11.0
	1986	19.5	28.8	13.2	19.7	29.0	13.4	16.9	26.2	10.0
	1987	18.9	26.6	13.9	19.1	26.6	14.1	16.9	25.6	10.9
	1988	19.2	27.2	13.5	19.5	27.4	14.0	15.9	25.2	9.2
U.S.	1979	14.6	24.3	7.7	14.9	25.0	8.0	10.5	17.4	5.3
	1980	15.9	26.1	8.9	16.3	26.7	9.2	11.5	19.2	5.8
	1981	16.3	26.2	9.5	16.7	26.8	9.8	11.7	19.6	5.9
	1982	16.2	25.5	9.8	16.6	26.2	10.0	11.7	18.7	6.7
	1983	17.4	27.0	10.9	17.9	27.6	11.3	12.7	20.5	7.1
	1984	17.7	27.0	11.4	18.2	27.6	11.8	13.1	21.0	7.5
	1985	18.7	27.9	12.5	19.2	28.5	12.9	13.8	21.7	8.1
	1986	18.8	27.6	12.8	19.2	28.1	13.3	14.0	22.2	8.0
	1987	18.7	26.9	13.2	19.2	27.4	13.7	14.1	21.6	8.7
	1988 ⁴	19.2	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Categories used for 1970-1978 are 8th Revision ICDA codes 490-493 (bronchitis, emphysema, and asthma) and *519.3 (chronic obstructive lung disease without mention of asthma, bronchitis or emphysema). For years since 1979, 9th Revision ICD codes 490-496 are used. No single comparability ratio was developed for the 9th Revision category and the most nearly comparable 8th Revision categories. However, for the combined categories of bronchitis, emphysema, and asthma the provisional comparability ratio is 1.0002, and that for the remaining titles (chronic obstructive lung disease without mention of asthma, bronchitis, or emphysema under the 8th Revision and other chronic obstructive pulmonary diseases and allied conditions under the 9th Revision) is 1.0054. Thus, the comparability between the composite categories is quite good. The composite category was not used for ranking causes of death under the 8th Revision and thus appeared in 1979 for the first time among the 10 leading causes of death.

³ Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

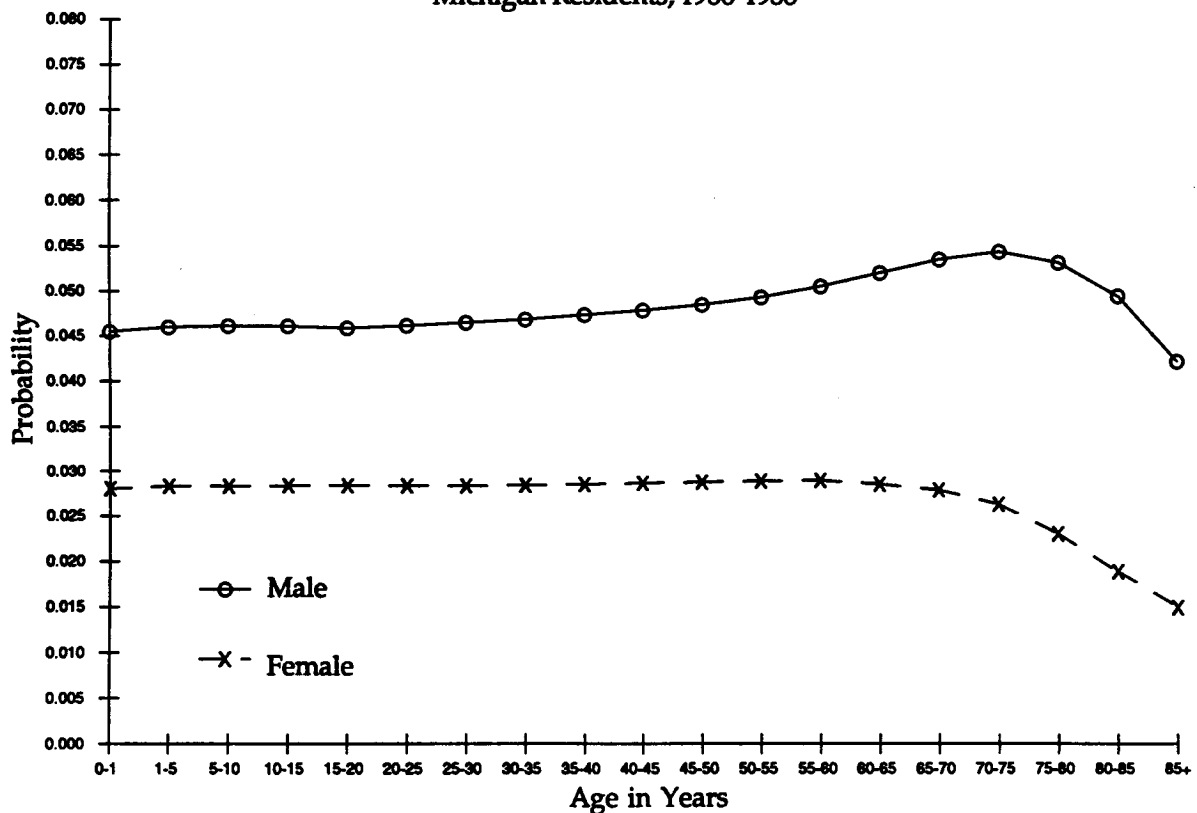
⁴ Provisional data.

Table 2.31
Deaths Due to Chronic Obstructive Pulmonary Diseases And Allied Conditions
by Specific Cause
Michigan Residents, 1988

282 LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
174	Chronic Airways Obstruction, not elsewhere classified	1,905	65.7
171	Emphysema	700	24.1
172	Asthma	153	5.3
170	Chronic Bronchitis	93	3.2
173	Bronchiectasis and Extrinsic Allergic Alveolitis	27	0.9
169	Bronchitis, not Specified as Acute or Chronic	21	0.7
TOTAL		2,899	100.0

¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

Figure 2.28
Probability of Eventually Dying from Chronic
Obstructive Pulmonary Diseases and Allied Conditions by Age and Sex
Michigan Residents, 1986-1988¹



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

PNEUMONIA AND INFLUENZA

One of every 30 deaths that occurred to Michigan residents in 1988 was due to pneumonia and influenza. There were a total of 2,684 such deaths of which 1,367 (50.9 percent) were to females (Table 2.32).

The overall median age at death in 1988 for those dying from pneumonia and influenza was 82 years. This is well above the median age of 74 years for all deaths. The median ages at death for white persons were significantly higher than those for black persons. The median age for white males (80) was 8

years greater than that for black males (72), while for white females the median of 85 years exceeded by 7 years that for black females. There were a total of fifteen deaths due to pneumonia and influenza for persons of other races. The median age at death for persons of other races dying from these diseases was 75 years.

The overall crude death rate for pneumonia and influenza deaths in 1988 was 29.0, compared to a rate of 25.8 in 1987. The crude rate for females (28.8) was 1.7 percent less than the

Table 2.32
Deaths Due to Pneumonia and Influenza by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	16	8	8	10	4	6	6	4	2	-	-	-
1 - 4	4	-	4	4	-	4	-	-	-	-	-	-
5 - 9	1	1	-	1	1	-	-	-	-	-	-	-
10 - 14	4	1	3	3	1	2	-	-	-	-	-	-
15 - 19	3	1	2	2	-	2	1	1	-	1	-	1
20 - 24	6	1	5	4	1	3	2	-	2	-	-	-
25 - 29	11	8	3	6	5	1	5	3	2	-	-	-
30 - 34	23	11	12	13	5	8	9	5	4	1	1	-
35 - 39	24	16	8	11	7	4	12	8	4	1	1	-
40 - 44	26	18	8	9	6	3	17	12	5	-	-	-
45 - 49	29	16	13	16	10	6	13	6	7	-	-	-
50 - 54	27	18	9	22	14	8	4	4	-	1	-	1
55 - 59	58	36	22	48	31	17	10	5	5	-	-	-
60 - 64	93	51	42	78	42	36	14	9	5	1	-	1
65 - 69	151	93	58	132	81	51	19	12	7	-	-	-
70 - 74	242	156	86	211	135	76	30	20	10	1	1	-
75 - 79	389	218	171	348	198	150	35	16	19	6	4	2
80 - 84	489	235	254	449	214	235	40	21	19	-	-	-
85 - 89	539	237	302	498	217	281	40	19	21	1	1	-
90 +	549	192	357	520	179	341	27	12	15	2	1	1
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	2,684	1,317	1,367	2,385	1,151	1,234	284	157	127	15	9	6
Median Age At Last Birthday	82	80	84	83	80	85	75	72	78	75	76	75

¹ Deaths with race and/or sex not stated are included only in the total column.

male rate (29.3). On an age-adjusted basis, the male rate exceeded the female rate by 67.3 percent (Table 2.33).

The age-specific death rates for males and females given in Table 2.33 are graphically displayed in Figure 2.29. Pneumonia and influenza death rates increased rapidly beyond age 54. Male rates were higher than female rates for ages above 24.

The crude rates given in Table 2.33 indicate that a greater proportion of the white population died of pneumonia and influenza in 1988 than was the case for the black population. On an age-adjusted basis, however, the rate for the black group was 43.4 percent above that for the white group. Age-specific data indicate that the rates for the black population were higher for all age groups with sufficient data to calculate rates up to age 74. Among

Table 2.33
Pneumonia and Influenza Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	29.0	29.3	28.8	30.2	29.8	30.6	23.2	27.2	19.6
Under 1	11.5	11.3	11.6	8.9	*	10.9	24.5	*	*
1 - 14	0.5	*	0.7	0.5	*	0.8	*	*	*
15 - 24	0.6	*	1.0	0.5	*	0.8	*	*	*
25 - 34	2.2	2.5	1.9	1.4	1.5	1.4	6.6	8.3	5.3
35 - 44	3.8	5.3	2.4	1.8	2.3	1.2	18.4	28.5	10.3
45 - 54	6.0	7.4	4.6	4.6	5.9	3.3	16.4	21.7	12.2
55 - 64	18.4	22.3	14.9	17.4	21.0	14.0	27.5	35.6	20.9
65 - 74	62.1	89.0	40.8	60.5	86.0	40.3	78.7	118.4	48.3
75 - 84	264.2	357.5	206.6	264.8	360.3	206.3	253.4	318.6	211.4
85 and Over	931.0	1,219.8	806.6	955.2	1,247.1	831.4	689.1	946.9	558.2
Age-Adjusted Rate ²	13.6	17.9	10.7	12.9	17.0	10.2	18.5	25.2	13.5

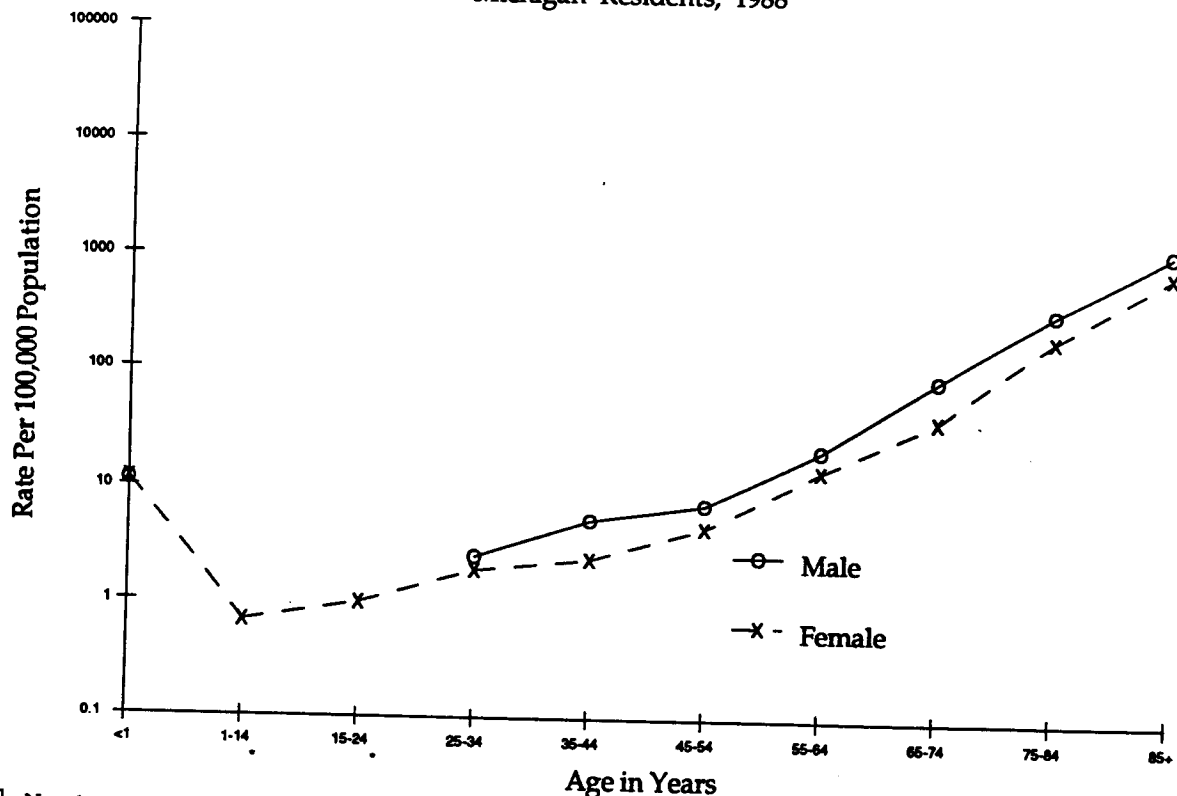
¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.29
Age - Specific Pneumonia and Influenza Death Rates¹ by Sex,
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

persons 75 years or over, the pneumonia and influenza death rate was higher for white persons (Figure 2.30).

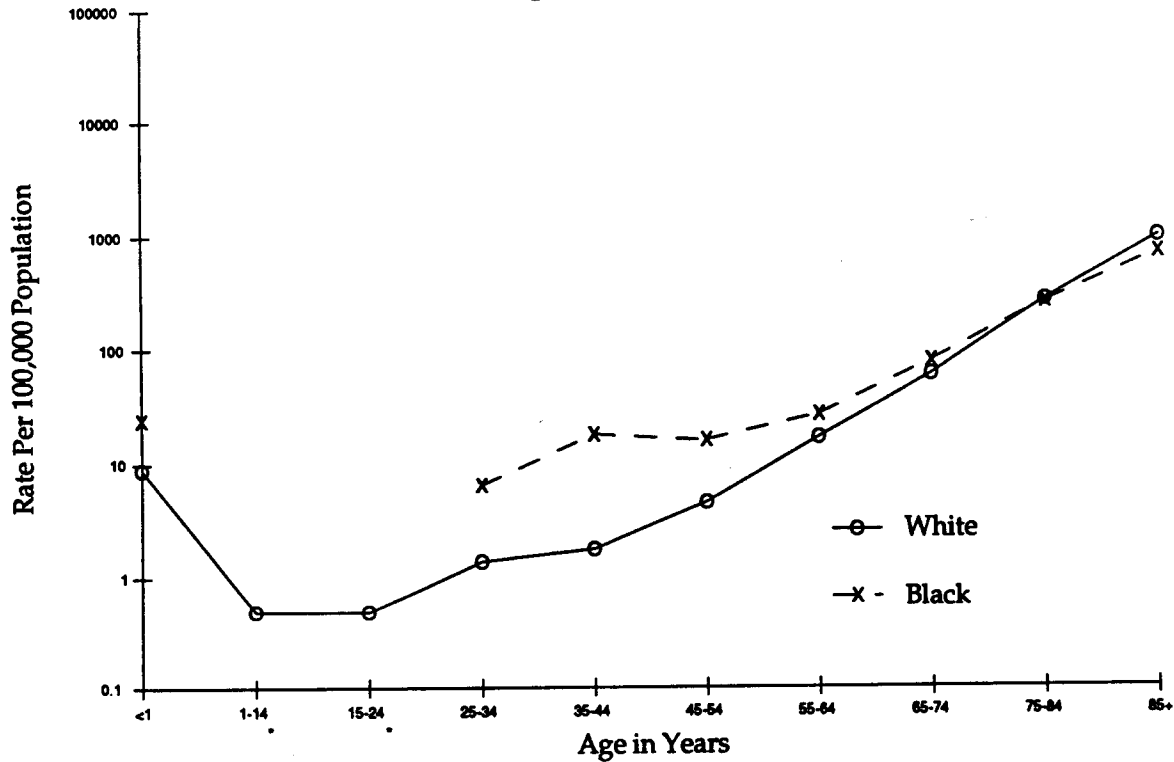
Pneumonia and influenza death rates have declined markedly since 1900 both nationally and in Michigan (Figure 2.31). Although the annual rate was quite erratic from 1900 through 1949, the Michigan rates declined 78.1 percent from a rate of 120.3 in 1900 to 26.3 in 1949. Nationally the rate declined 85.2 percent from a rate of 202.1 in 1900 to 30.0 in 1949. Since that time the rate has been fairly stable with mild year to year variation.

Michigan's rate of death due to this cause has been below the national rate every year throughout this century except 1920 and 1923.

In 1900, the rate in Michigan was 40.5 percent below the national statistic. The peak year for both was 1918 when the rates for the United States and Michigan were 588.5 and 399.8, respectively. In 1979 century low rates of 15.9 for Michigan and 20.1 for the nation were recorded. Michigan's rate of 29.0 in 1988 was 7.9 percent below the provisional rate of 31.5 for the United States.

Michigan's age-adjusted death rate for pneumonia and influenza has been below that for the nation every year between 1970 and 1988 except 1983 and 1986 (Table 2.34). In 1988 the Michigan age-adjusted rate was 4.2 percent below the provisional national rate. Between 1970 and 1988 the age-adjusted rate for Michigan declined by 29.2 percent.

Figure 2.30
Age - Specific Pneumonia and Influenza Death Rates¹ by Race
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

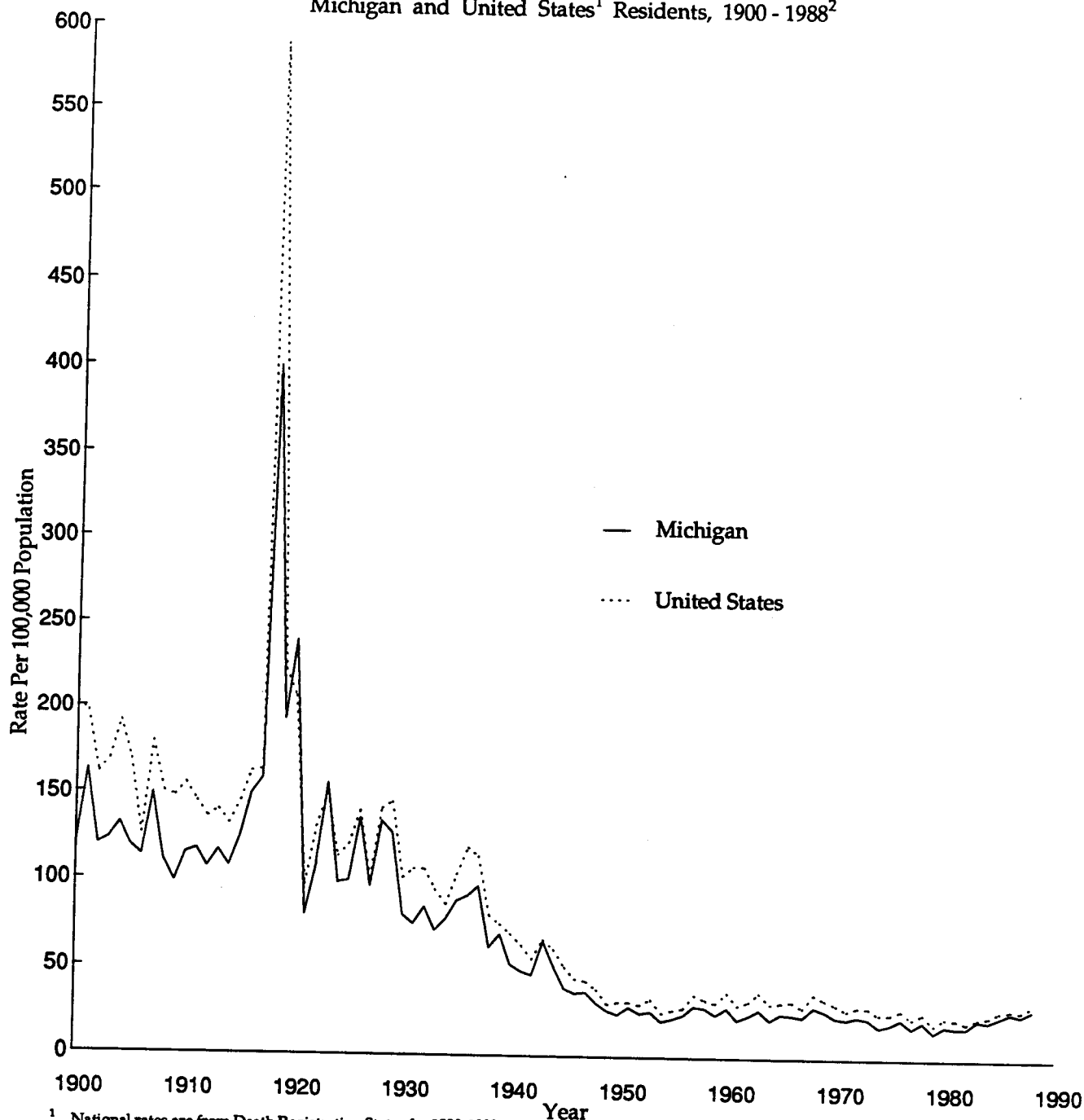
Age-adjusted rates for other than white persons declined more rapidly than rates for white persons. The decline was most pronounced for other than white females for whom the age-adjusted rate dropped 61.0 percent between 1970 and 1985. In 1986 the rate for other than white females was the highest rate since 1976. In 1988 the other than white female rate declined to 56.8 percent below the 1970 rate. The decline in the age-adjusted rate for other than white males was 48.9 percent between 1970 and 1988. The declines in rates for other than white males and females were mirrored by strong declines in the rates for the United States.

The majority of deaths due to pneumonia and influenza were not attributed to a specific organism. Pneumonia due to other and un-

specified organisms (2,304) accounted for 85.8 percent of all Michigan pneumonia and influenza deaths in 1988 (Table 2.35). Another 5.6 percent of the deaths were due to pneumococcal and other bacterial pneumonia, and 5.3 percent were due to bronchopneumonia, organism unspecified. These three most frequent categories of pneumonia and influenza deaths together accounted for 96.7 percent of all such deaths. Influenza was the direct cause of 2.2 percent of the pneumonia and influenza deaths in 1988, compared to 1.0 percent in 1987.

The likelihood of eventual death being caused by pneumonia and influenza from birth to age 49 is between 0.038 and 0.039 for females and 0.034 and 0.036 for males. The calculated probabilities for each sex increase

Figure 2.31
Pneumonia and Influenza Death Rates
 Michigan and United States¹ Residents, 1900 - 1988²



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

² Pneumonia and Influenza death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration. See Technical Notes.

after this age, with probabilities for males increasing more rapidly than those for females. Based on the Michigan mortality experience of 1986-1988 at ages 85 and above,

the chances of eventually dying from pneumonia and influenza are 0.070 for males and 0.058 for females (Figure 2.32).

Table 2.34
 Age - Adjusted Pneumonia and Influenza Death Rates¹ by Race and Sex
 Michigan² and United States Residents, 1970 - 1988³

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	19.2	24.7	14.6	16.7	21.8	12.5	38.8	47.9	30.8
	1971	17.7	23.9	12.7	15.4	20.6	11.3	36.0	50.7	23.1
	1972	18.7	25.7	12.9	16.8	23.1	11.8	33.1	47.3	20.7
	1973	17.0	21.9	13.2	14.9	19.4	11.5	34.2	43.3	26.5
	1974	13.3	17.7	10.0	12.0	15.7	9.5	22.9	34.0	13.7
	1975	14.0	18.6	10.6	13.0	17.1	10.0	21.8	29.6	15.1
	1976	15.7	20.8	12.0	14.8	19.5	11.5	22.2	30.5	15.4
	1977	12.2	17.6	8.2	11.4	16.4	7.8	17.8	26.1	11.0
	1978	14.1	18.1	11.2	13.7	17.6	11.0	16.2	21.1	12.3
	1979	9.6	13.3	7.1	8.9	12.3	6.7	14.4	19.9	9.8
	1980	11.7	16.1	8.6	10.8	14.5	8.2	18.8	28.4	11.2
	1981	10.2	14.4	7.4	9.3	13.0	7.0	16.6	24.8	10.3
	1982	10.1	14.4	7.4	9.5	13.6	7.0	14.2	20.1	9.8
	1983	12.0	16.8	8.8	11.3	15.5	8.4	17.4	25.9	10.9
	1984	12.0	16.8	8.8	11.3	15.9	8.3	17.3	23.7	12.4
	1985	12.4	16.8	9.4	11.8	16.2	8.9	15.9	21.0	12.0
	1986	13.7	18.1	10.7	12.9	17.3	10.1	18.3	23.6	14.4
	1987	12.8	16.3	10.3	11.9	15.2	9.8	18.5	25.0	13.7
	1988	13.6	17.9	10.7	12.9	17.0	10.2	18.0	24.5	13.3
U.S.	1970	22.1	28.8	16.7	19.8	26.0	15.0	38.1	50.1	27.9
	1971	19.2	25.1	14.6	17.5	22.8	13.4	31.6	42.2	22.6
	1972	20.7	27.5	15.5	19.0	25.3	14.4	32.4	44.3	22.6
	1973	19.9	26.4	15.0	18.3	24.4	13.9	31.0	42.0	22.2
	1974	16.8	22.4	12.6	15.6	20.8	11.8	25.1	34.9	17.2
	1975	16.4	22.2	12.1	15.4	20.8	11.5	23.6	33.4	15.8
	1976	17.1	22.9	13.0	16.1	21.5	12.4	24.0	33.5	16.5
	1977	13.9	19.1	10.2	13.0	17.8	9.6	20.6	29.5	13.6
	1978	15.1	20.6	11.3	14.2	19.3	10.7	21.4	30.8	14.2
	1979	11.2	15.4	8.2	10.5	14.4	7.8	15.8	22.8	10.5
	1980	12.9	17.4	9.8	12.2	16.2	9.4	18.0	26.1	11.9
	1981	12.3	16.6	9.2	11.6	15.6	9.0	16.3	24.0	10.5
	1982	10.9	15.2	8.0	10.3	14.3	7.6	14.4	21.1	9.5
	1983	11.8	16.2	8.8	11.3	15.3	8.6	14.9	22.1	9.6
	1984	12.2	16.7	9.1	11.6	15.8	8.8	15.8	23.0	10.5
	1985	13.4	18.2	10.1	12.8	17.4	9.8	16.8	24.2	11.4
	1986	13.5	18.4	10.3	12.9	17.5	9.9	17.1	24.3	11.8
	1987	13.1	17.7	10.0	12.5	16.8	9.7	16.4	23.5	11.1
	1988 ⁴	14.2	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ The introduction in 1979 of the 9th Revision of the International Classification of Diseases, WHO, for coding causes of death resulted in substantial changes in this category, making trend comparisons difficult. The estimated comparability ratio for this category is 0.9264. Note that comparability ratios were developed for comparing crude death rates, and they are not strictly applicable for comparing age-adjusted death rates. For further discussion of comparability ratios see Qualifications and Limitations of Data and Calculations.

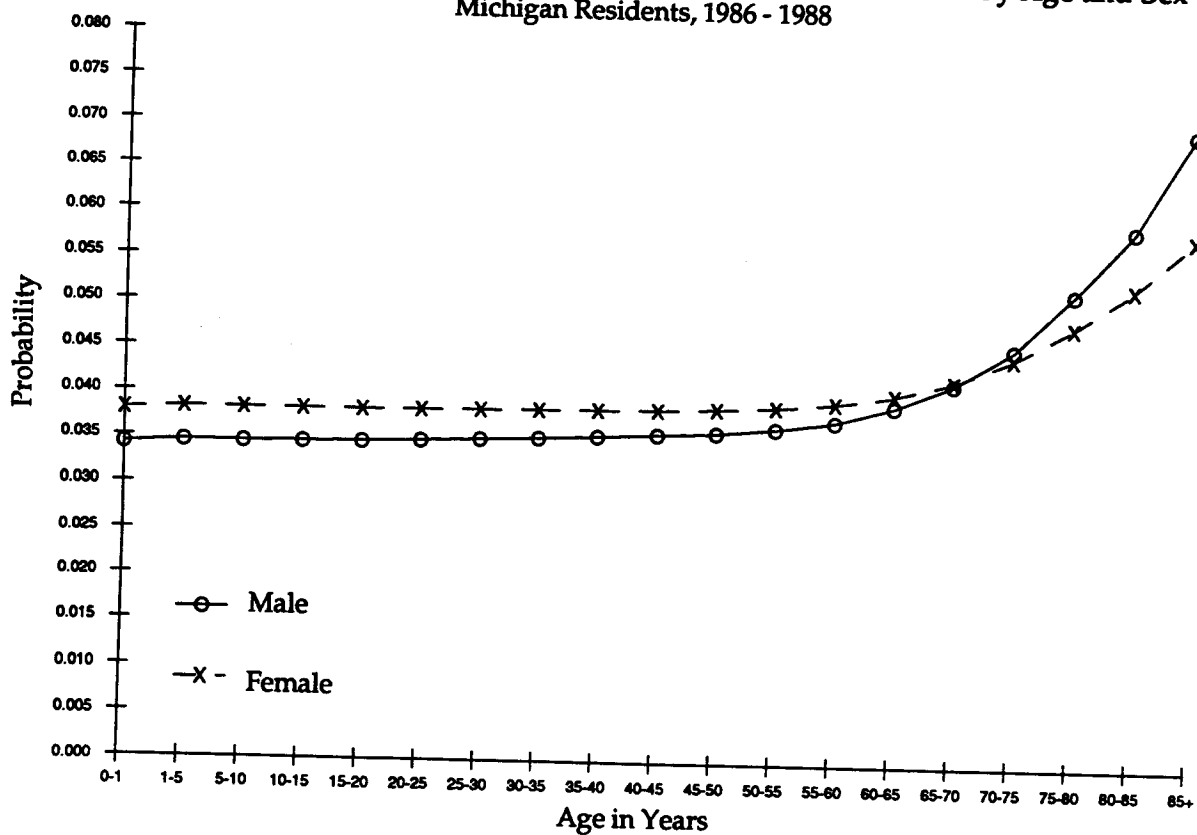
⁴ Provisional data.

Table 2.35
Deaths Due to Pneumonia and Influenza by Specific Cause
Michigan Residents, 1988

282 LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
167	Pneumonia due to Other and Unspecified Organism	2,304	85.8
165	Pneumococcal and Other Bacterial Pneumonia	149	5.6
166	Bronchopneumonia, Organism Unspecified	143	5.3
168	Influenza	58	2.2
164	Viral Pneumonia	30	1.1
TOTAL		2,684	100.0

¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

Figure 2.32
Probability of Eventually Dying from Pneumonia and Influenza by Age and Sex
Michigan Residents, 1986 - 1988



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

DIABETES MELLITUS

In 1988, 1,522 Michigan resident deaths were attributed to diabetes mellitus, the seventh leading cause of death. This was 43 more deaths than were caused by this disease in 1987. Deaths to females numbered 867 or 57.0 percent of all diabetes mellitus deaths.

The median age at death for persons dying from diabetes mellitus was 73 years (Table 2.36). This is one year less than the median age of all deaths. Males dying from this disease had a median age of 70 years, whereas the median for females was 75 years. The

median for white males was 71 years compared to 77 years for white females. For black males and females the medians were 66 and 71 years, respectively.

Diabetes mellitus death rates by age, race, and sex are presented in Table 2.37. The diabetes mellitus crude death rate was 16.5 in 1988. The crude rate for females was 18.3, 25.3 percent higher than the rate of 14.6 for males. When age-adjusted rates are examined, however, the rate for males was 12.1 percent higher than the rate for females.

Table 2.36
Deaths Due to Diabetes Mellitus by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	-	-	-	-	-	-	-	-	-	-	-	-
1 - 4	-	-	-	-	-	-	-	-	-	-	-	-
5 - 9	3	-	3	2	-	2	1	-	1	-	-	-
10 - 14	1	-	1	1	-	1	-	-	-	-	-	-
15 - 19	2	-	2	2	-	2	-	-	-	-	-	-
20 - 24	4	3	1	4	3	1	-	-	-	-	-	-
25 - 29	8	3	5	5	2	3	3	1	2	-	-	-
30 - 34	23	11	12	14	8	6	9	3	6	-	-	-
35 - 39	42	28	14	33	20	13	9	8	1	-	-	-
40 - 44	33	23	10	24	18	6	9	5	4	-	-	-
45 - 49	31	18	13	25	16	9	6	2	4	-	-	-
50 - 54	68	33	35	46	23	23	21	9	12	1	1	-
55 - 59	88	49	39	69	43	26	19	6	13	-	-	-
60 - 64	129	65	64	100	50	50	27	14	13	2	1	1
65 - 69	180	91	89	145	75	70	34	16	18	1	-	1
70 - 74	211	88	123	178	75	103	31	13	18	2	-	2
75 - 79	222	82	140	176	66	110	44	15	29	2	1	1
80 - 84	212	79	133	187	73	114	24	5	19	1	1	-
85 - 89	138	48	90	122	41	81	16	7	9	-	-	-
90 +	127	34	93	119	33	86	8	1	7	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,522	655	867	1,252	546	706	261	105	156	9	4	5
Median Age At Last Birthday	73	70	75	74	71	77	69	66	71	71	77	71

¹ Deaths with race and/or sex not stated are included only in the total column.

Age-specific mortality rates for males and females presented in Table 2.37 are graphically displayed in Figure 2.33. Rates for males were similar to or greater than those for females for all age groups with sufficient numbers of events to calculate rates. Rates for both sexes increased steadily with advancing age.

The crude diabetes mellitus death rate for black persons was 34.0 percent above that of white persons (21.3 compared to 15.9). The age-adjusted rate for the black population was about twice that of the white population. The age-adjusted rate for black females exceeded that of their white counterparts by 129.9 percent, while the age-adjusted rate for black

Table 2.37
Diabetes Mellitus Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	16.5	14.6	18.3	15.9	14.1	17.5	21.3	18.2	24.0
Under 1	*	*	*	*	*	*	*	*	*
1 - 14	*	*	*	*	*	*	*	*	*
15 - 24	0.4	*	*	0.5	*	*	*	*	*
25 - 34	2.0	1.8	2.2	1.4	1.5	1.4	5.7	*	7.0
35 - 44	5.7	8.0	3.6	5.1	6.8	3.4	11.4	18.5	5.7
45 - 54	10.5	11.2	9.9	8.6	9.6	7.6	26.1	23.9	27.9
55 - 64	26.5	29.2	24.0	23.3	26.7	20.1	52.8	50.9	54.3
65 - 74	61.8	64.0	60.1	57.0	59.7	54.8	104.5	107.3	102.3
75 - 84	130.6	127.1	132.7	120.6	121.6	120.0	229.8	172.2	267.0
85 and Over	226.8	233.2	224.0	226.1	233.0	223.2	246.8	244.3	248.1
Age-Adjusted Rate ²	10.5	11.1	9.9	9.4	10.2	8.7	19.6	19.0	20.0

¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.33
Age - Specific Diabetes Mellitus Death Rates¹ By Sex
Michigan residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

males was 86.3 percent greater than that of white males.

Age-specific rates for black persons were higher than those for white persons for all age groups with sufficient number of events to calculate rates (Figure 2.34). The greatest relative differential occurred for ages 45 through 54, where the rate for black persons was three times the rate for white persons.

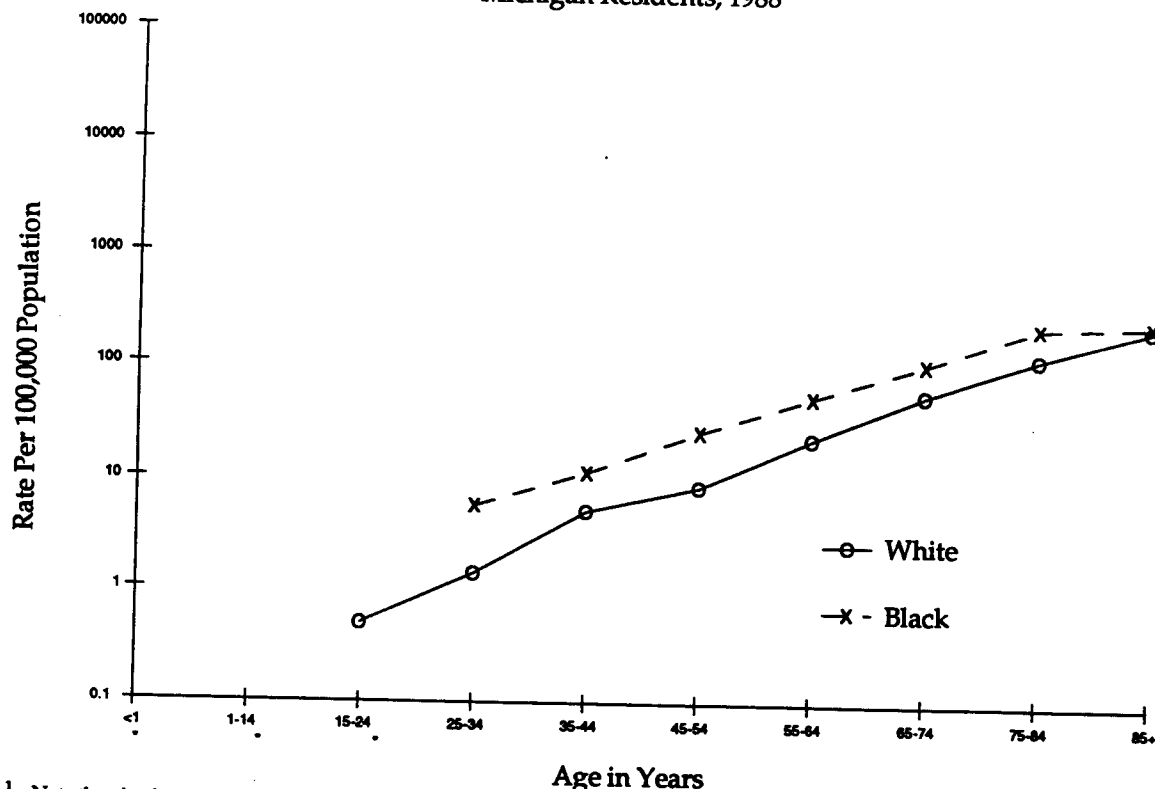
Diabetes mellitus death rates in Michigan rose steadily from a low of 9.3 in 1900 to a peak of 29.7 in 1949 (Figure 2.35). Adoption of the 6th revision of the International Classification of Diseases in 1950 caused a significant change in Michigan diabetes death rates. From 22.6 in 1950 the rate dipped

somewhat then rose to a peak of 27.0 in 1966. Since then the rate has declined 38.9 percent to 16.5 in 1988.

The national range in diabetes mellitus death rates in the first half of this century was from 11.0 in 1900 to 27.1 in 1943. The rate for the nation since 1949, though more stable than Michigan's rate, has tended to follow a similar pattern. A peak of 19.2 was reached in 1968. Since that time the rate for the nation has declined by 16.1 percent to a provisional rate of 16.1 in 1988.

The diabetes mellitus death rate for the nation was generally above Michigan's rate for the first 25 or so years in this century. For the 41 years from 1942 through 1982,

Figure 2.34
Age - Specific Diabetes Mellitus Death Rates¹ By Race
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

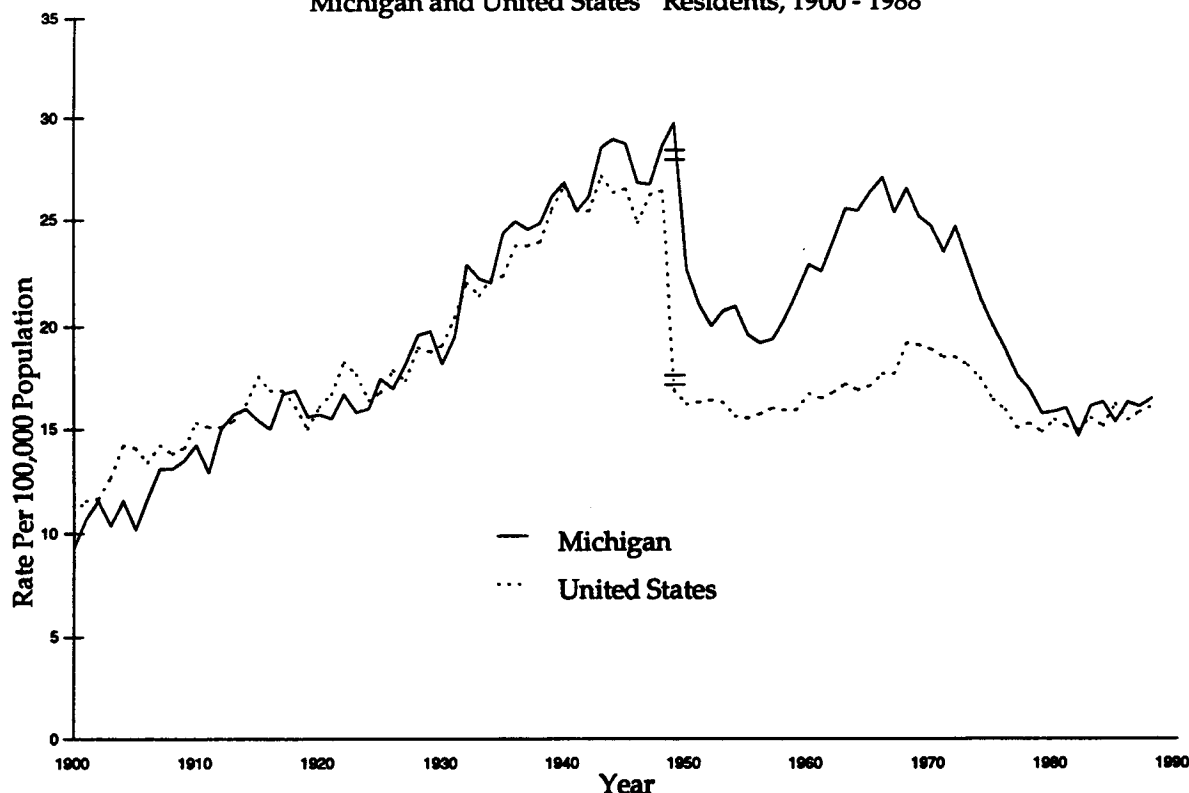
Michigan's rate was above that of the nation. Through the 1960's and early 1970's the differential between the rates for Michigan and the United States was quite large. In 1982 and again in 1985 the Michigan rates were below the United States rates. In 1988 Michigan's rate was 2.5 percent above the provisional rate for the United States.

Age-adjusted death rates for diabetes mellitus for the years 1970-1988 are presented in Table 2.38. These rates have generally declined both in Michigan and the United States for all population groups. The rate for the total population of Michigan has declined by 48.0 percent since 1970. The rate for the United States declined by 29.8 percent between 1970 and 1988.

The declines in the age-adjusted rates for other than white persons were much greater in Michigan than those observed for these groups nationally. Michigan's rates for other than white persons were higher than comparable rates for the nation in 1970, and were lower than those for the nation for each year from 1979 to 1987 except 1984. Age-adjusted rates for white persons in Michigan also declined more sharply than comparable rates for the nation. However, they remained higher than those of the nation throughout the period.

In 1988 74.9 percent of all diabetes mellitus deaths were without mention of complication. Diabetes with renal manifestations caused 104 deaths, while diabetes with peripheral cir-

Figure 2.35
Diabetes Mellitus Death Rates
 Michigan and United States¹ Residents, 1900 - 1988



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1967. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

² The comparability of diabetes mellitus death rates from the 5th revision of the ICDA coding procedures with those of the 6th revision is considered weak. The comparability ratio is estimated to be .55. The 6th revision was adopted in 1949 for national cause-of-death statistics and in 1950 for Michigan statistics. The comparability of diabetes mellitus death rates through the 6th, 7th, 8th and 9th revisions (1949 to date nationally and 1950 to date in Michigan) is high. General comparison before and after these dates of adoption can be made but detailed study requires special consideration. See Technical Notes.

culatory disorders resulted in an additional 100 deaths. There were 117 deaths in 1988 from diabetes with ketoacidosis or coma, which were deaths where a diabetic crisis was involved (Table 2.39).

At birth, the probability of eventual death due to diabetes mellitus is 0.015 for males and

0.022 for females (Figure 2.36). The probability of death from diabetes mellitus for females is relatively stable from birth to age 69 and declines after that age. In fact, females are less likely to eventually die from this cause at age 70 and over than when they were born. Probabilities for males are consistently less than those for females, but decline less, relatively, in the ages above 69.

Table 2.38
 Age - Adjusted Diabetes Mellitus Death Rates¹ by Race and Sex
 Michigan² and United States, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	20.2	20.8	19.8	18.8	19.9	17.7	34.3	29.1	39.4
	1971	18.9	17.4	20.1	17.5	16.6	18.1	31.2	23.8	37.7
	1972	19.6	18.7	20.2	18.1	17.7	18.4	32.0	27.5	36.2
	1973	18.0	17.4	18.2	16.7	16.4	16.8	28.3	25.5	30.6
	1974	16.2	16.0	16.3	15.7	15.8	15.5	20.2	17.5	22.5
	1975	14.9	14.8	14.9	14.2	14.2	14.0	21.1	19.8	22.3
	1976	13.8	13.7	13.8	12.7	12.6	12.7	22.7	22.5	22.9
	1977	12.9	13.3	12.5	12.1	12.6	11.6	19.8	19.3	20.3
	1978	12.1	12.3	11.8	11.1	11.7	10.4	20.6	16.7	23.5
	1979	11.2	11.1	11.2	10.7	11.2	10.3	14.7	10.5	18.2
	1980	11.2	11.0	11.3	10.5	10.6	10.4	16.8	14.5	18.5
	1981	10.7	11.5	10.3	10.1	11.0	9.5	15.7	15.3	16.2
	1982	9.6	10.0	9.3	9.1	9.7	8.6	13.8	12.6	14.9
	1983	10.7	10.6	10.9	10.2	10.0	10.3	15.4	14.8	15.6
	1984	10.8	11.2	10.5	9.9	10.7	9.2	17.7	15.1	19.6
	1985	10.0	10.5	9.5	9.0	9.8	8.4	16.8	15.8	17.7
	1986	10.8	11.2	10.4	10.0	10.4	9.5	17.1	17.2	17.0
	1987	10.2	10.6	9.8	9.3	9.7	8.8	17.6	17.8	17.4
	1988	10.5	11.1	9.9	9.4	10.2	8.7	18.9	18.2	19.3
U.S.	1970	14.1	13.5	14.4	12.9	12.7	12.8	25.2	20.4	29.3
	1971	13.7	13.2	14.0	12.3	12.4	12.2	25.6	20.3	30.0
	1972	13.5	13.1	13.7	12.2	12.2	12.0	25.9	21.1	29.7
	1973	13.0	12.8	13.1	11.7	11.9	11.5	25.0	21.0	28.2
	1974	12.4	12.1	12.6	11.2	11.4	11.0	23.1	18.7	26.6
	1975	11.4	11.3	11.4	10.3	10.6	10.0	21.3	17.8	23.9
	1976	10.9	10.8	10.9	9.8	10.0	9.5	20.5	17.4	22.9
	1977	10.2	10.3	10.1	9.2	9.7	8.8	19.0	16.2	21.2
	1978	10.2	10.3	10.0	9.2	9.7	8.8	18.5	16.2	20.2
	1979	9.8	10.0	9.5	8.8	9.3	8.3	18.1	16.1	19.5
	1980	10.1	10.2	10.0	9.1	9.5	8.7	18.8	16.4	20.6
	1981	9.8	10.0	9.6	8.8	9.3	8.4	17.9	15.6	19.5
	1982	9.6	9.8	9.3	8.7	9.2	8.3	16.7	14.7	18.1
	1983	9.9	9.9	9.8	8.9	9.2	8.6	17.8	16.0	19.0
	1984	9.5	9.8	9.2	8.5	9.0	8.0	17.4	16.0	18.4
	1985	9.6	9.9	9.4	8.6	9.2	8.1	17.7	16.1	18.9
	1986	9.6	9.9	9.3	8.5	9.1	8.1	17.8	16.1	19.0
	1987	9.8	10.3	9.3	8.7	9.5	8.1	17.9	16.4	18.9
	1988 ³	9.9	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

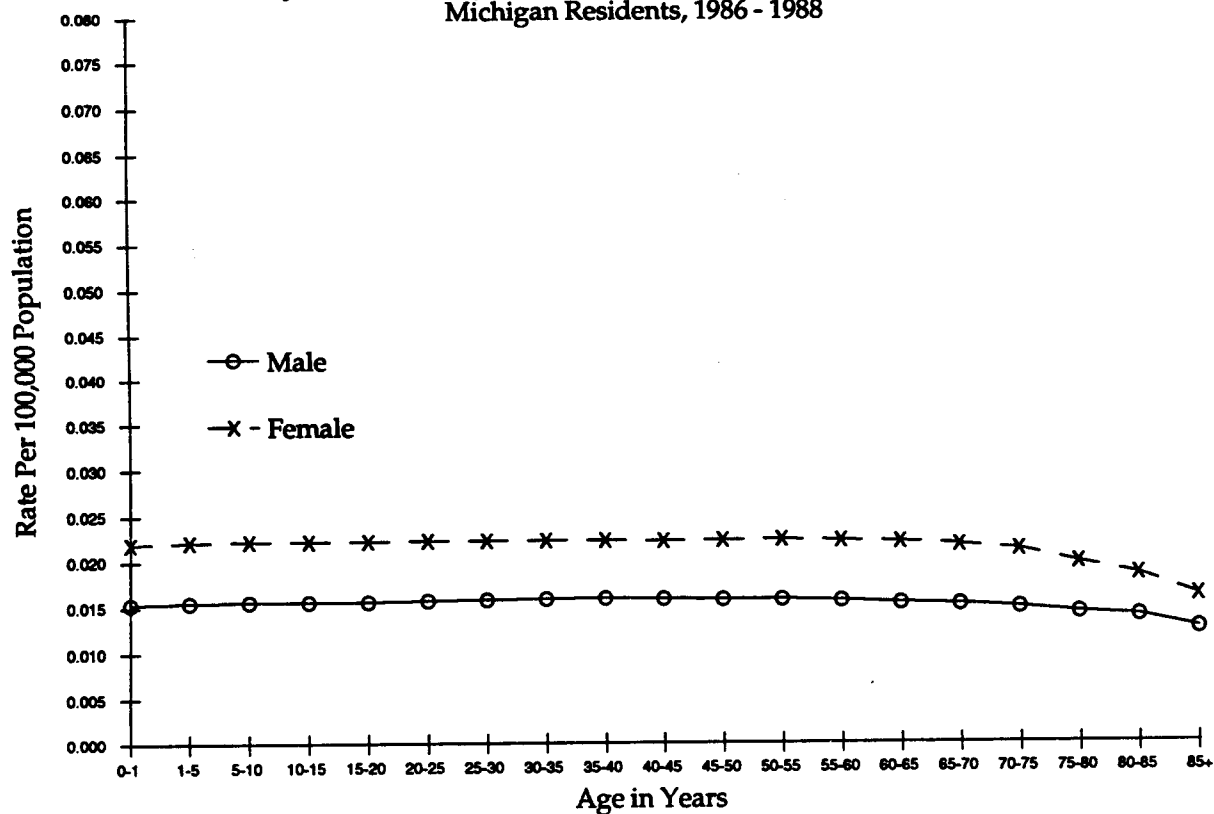
³ Provisional data.

Table 2.39
Deaths Due to Diabetes Mellitus by Detailed Cause
Michigan Residents, 1988

ICD LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
250.0	Diabetes Mellitus without Mention of Complications	1,140	74.9
250.3	Diabetes with Renal Manifestations	104	6.8
250.6	Diabetes with Peripheral Circulatory Disorders	100	6.6
250.1	Diabetes with Ketoacidosis	71	4.7
250.2	Diabetes with Coma	46	3.0
250.7	Diabetes with Other Specified Manifestations	38	2.5
250.5	Diabetes with Neurological Manifestations	13	0.9
250.4	Diabetes with Ophthalmic Manifestations	7	0.5
250.9	Diabetes with Unspecified Complications	3	0.2
TOTAL		1,522	100.0

¹ Detailed list of the 9th Revision of the *International Classification of Diseases*. WHO.

Figure 2.36
Probability of Eventually Dying from Diabetes Mellitus by Age and Sex
Michigan Residents, 1986 - 1988



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

ATHEROSCLEROSIS

There were a total of 1,187 Michigan resident deaths attributed to atherosclerosis in 1988, making this cause the 8th leading cause of death in the state. Atherosclerosis is the term under the 9th Revision (adopted in 1979) for the category most nearly comparable to arteriosclerosis under the 8th Revision. Of the deaths due to this cause in 1988, 63.8 percent were to females, whereas 48.2 percent of the deaths due to all causes were to females. Only 91 of the 1,187 deaths were to black persons and persons of other races. This is

7.7 percent of all atherosclerosis deaths, while 14.8 percent of all deaths were to these groups.

The majority of the atherosclerosis deaths were to persons of advanced ages. The median age of all deaths resulting from this disease was 85 years. The median age at death for males was 4 years lower than that for females, and the median for black persons was 5 years lower than that for white persons (Table 2.40).

Table 2.40
Deaths Due to Atherosclerosis by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	-	-	-	-	-	-	-	-	-	-	-	-
1 - 4	1	-	1	1	-	1	-	-	-	-	-	-
5 - 9	-	-	-	-	-	-	-	-	-	-	-	-
10 - 14	-	-	-	-	-	-	-	-	-	-	-	-
15 - 19	-	-	-	-	-	-	-	-	-	-	-	-
20 - 24	-	-	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-	-	-
30 - 34	-	-	-	-	-	-	-	-	-	-	-	-
35 - 39	-	-	-	-	-	-	-	-	-	-	-	-
40 - 44	3	3	-	3	3	-	-	-	-	-	-	-
45 - 49	2	2	-	2	2	-	-	-	-	-	-	-
50 - 54	8	7	1	7	6	1	1	1	-	-	-	-
55 - 59	11	8	3	10	7	3	1	1	-	-	-	-
60 - 64	22	13	9	18	11	7	4	2	2	-	-	-
65 - 69	44	22	22	36	18	18	8	4	4	-	-	-
70 - 74	75	42	33	67	37	30	8	5	3	-	-	-
75 - 79	138	58	80	120	50	70	18	8	10	-	-	-
80 - 84	242	94	148	224	90	134	17	4	13	1	-	1
85 - 89	238	76	162	226	71	155	11	5	6	1	-	1
90 +	403	105	298	381	101	280	21	4	17	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,187	430	757	1,095	396	699	89	34	55	2	-	2
Median Age At Last Birthday	85	83	87	86	83	87	81	78	83	85	-	85

¹ Deaths with race and/or sex not stated are included only in the total column.

Atherosclerosis resulted in 12.8 deaths per 100,000 Michigan residents in 1988, 0.8 percent higher than the 1987 rate of 12.7. Deaths to females from this disease were relatively more frequent than for males with crude mortality rates of 16.0 and 9.6, respectively (Table 2.41). The age-adjusted rate for males, however, was 17.8 percent greater than that for females. Age-specific atherosclerosis death rates rose sharply beyond age 54 for persons of both sexes. Rates for males were above those for

females for age groups below 85 where rates can be calculated (Figure 2.37).

The crude rate for deaths due to atherosclerosis for white persons was 1.9 times that for black persons. However, when the differing age distributions of the two groups are considered, the differential is greatly reduced (Table 2.41). The age-adjusted rate for white persons was 2.1 percent higher than the rate for black persons. Age

Table 2.41
Atherosclerosis Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	12.8	9.6	16.0	13.9	10.3	17.4	7.3	5.9	8.5
Under 1	*	*	*	*	*	*	*	*	*
1 - 14	*	*	*	*	*	*	*	*	*
15 - 24	*	*	*	*	*	*	*	*	*
25 - 34	*	*	*	*	*	*	*	*	*
35 - 44	*	*	*	*	*	*	*	*	*
45 - 54	1.1	2.0	*	1.1	2.0	*	*	*	*
55 - 64	4.0	5.4	2.8	3.9	5.2	2.6	5.7	*	*
65 - 74	18.8	22.9	15.6	18.2	21.9	15.2	25.7	33.3	19.9
75 - 84	114.3	120.0	110.9	114.3	122.4	109.3	118.3	103.3	127.9
85 and Over	548.5	514.7	563.1	570.5	541.7	582.8	329.1	274.9	356.6
Age-Adjusted Rate ²	4.9	5.3	4.5	4.9	5.4	4.5	4.8	5.0	4.5

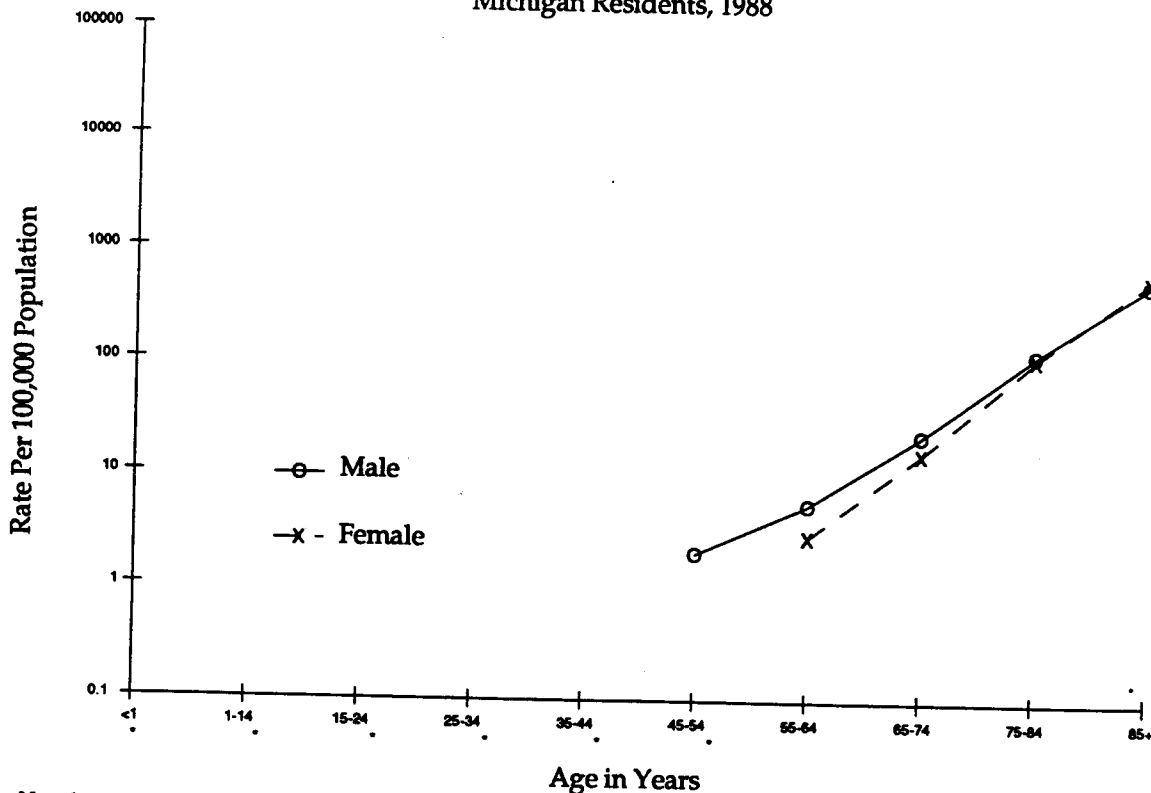
¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1960. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.37
Age - Specific Atherosclerosis Death Rates¹ by Sex
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

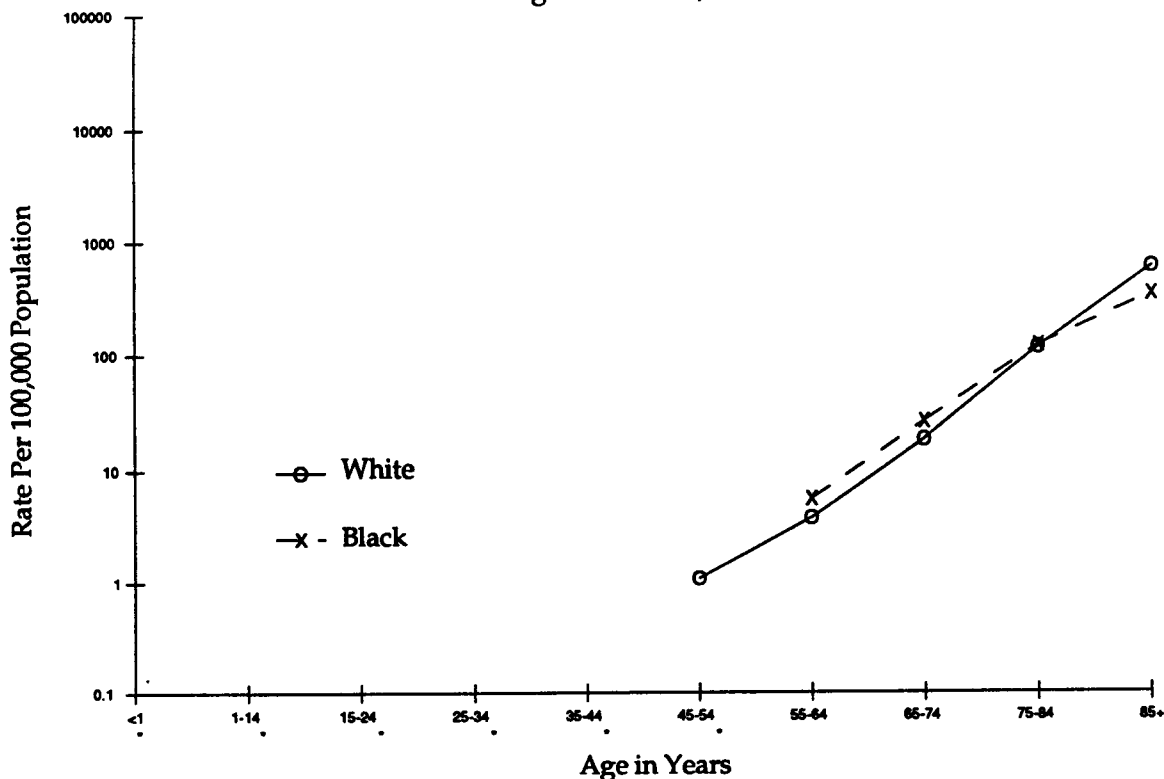
specific rates were higher for black males between ages 65 to 74 years and lower after age 74 than rates for white males. The age specific rates for black females were higher than rates for white females between ages 65 and 84 and lower after age 84.

Inspection of arteriosclerosis death rates since 1900 is far less informative than study of the historical data for other causes of death. The classification of this disease has been significantly altered several times since the inception of the ICD codes (see footnote of Figure 2.39). What can be seen in Figure 2.39 is a strong rise between 1900 and 1912. Rates in Michigan and the nation then stabilized and began declining. A coding revision in 1930 breaks comparability with 1929 rates.

The arteriosclerosis death rates from 1930 through 1948 show no clear direction. From 1950 through 1967 the rates for the nation held fairly stable while in Michigan the rates dropped and then returned to national levels. From 1968 through 1979 the death rates due to arteriosclerosis in Michigan were below national rates. Since 1980 the Michigan rate has exceeded the national rate. In 1988 the Michigan rate of 12.8 exceeded by 33.3 percent the provisional rate of 9.6 for the nation.

Age-adjusted atherosclerosis death rates have declined for all population groups in both Michigan and the United States since 1970 (Table 2.42). The rates for white Michigan residents were quite similar to those for the nation from 1970 through 1974. After

Figure 2.38
Age - Specific Atherosclerosis Death Rates¹ by Race
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

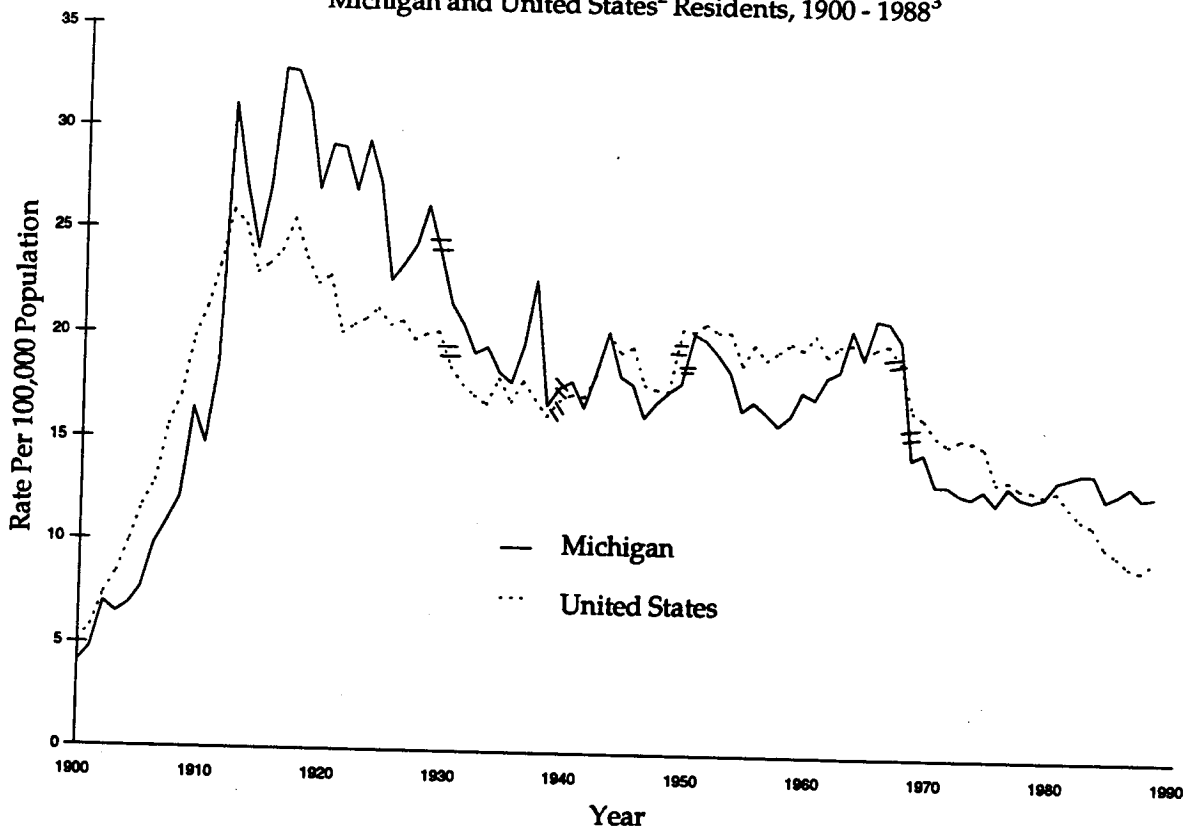
1974 the Michigan rates declined more slowly than the national rates. Michigan's rates for other than white persons have been stable since 1971. The Michigan rates remained below or equal to the comparable rates for the nation from 1970 through 1983 but were higher in 1984 through 1987 (see Technical Notes). Rates for other than white persons were consistently lower than those for white persons in Michigan while these rates were roughly similar across the nation.

Nearly all atherosclerosis deaths are reported as generalized and unspecified as to type. Only 35 of the 1,187 deaths were in

other classifications. Of these, 32 were attributed to atherosclerosis of arteries of the extremities (Table 2.43).

The 1986 through 1988 mortality data for Michigan indicate that females are more likely to eventually die from atherosclerosis than males. At birth, the likelihood for females is 0.024, while for males it is 0.013. These probabilities rise slowly through age 59 and increase rapidly beyond that age. By age 85, the probability of eventually dying from atherosclerosis is 0.042 for females and 0.032 for males (Figure 2.40).

Figure 2.39
Atherosclerosis¹ Death Rates
 Michigan and United States² Residents, 1900 - 1988³



¹ Prior to 1979 termed Arteriosclerosis.

² National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

³ Although Michigan and United States atherosclerosis death rates are comparable for any given year, changes in the International Classification of Diseases over the years have made historic comparison of these rates extremely difficult. Comparability breaks are especially pronounced in the 1930, 1939, 1949 and 1968 revisions. Analysis of atherosclerosis death rates over the time period 1900-1988 requires detailed study to maintain comparability.

Table 2.42
Age - Adjusted Atherosclerosis Death Rates¹ by Race and Sex
 Michigan² and United States Residents, 1970 - 1988³

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	8.1	8.9	7.4	8.2	9.1	7.5	6.2	6.3	5.9
	1971	7.9	9.0	7.1	8.2	9.3	7.3	4.5	4.6	4.4
	1972	7.4	8.7	6.4	7.6	9.0	6.6	4.1	4.1	4.0
	1973	7.2	8.4	6.3	7.5	8.8	6.4	4.0	3.4	4.4
	1974	7.3	8.1	6.7	7.6	8.5	6.9	4.1	4.0	4.1
	1975	6.7	7.5	6.0	6.9	7.7	6.2	4.2	5.0	3.4
	1976	7.0	8.4	6.0	7.3	8.8	6.2	3.0	3.6	2.5
	1977	6.6	7.5	6.0	6.9	7.8	6.2	3.5	3.5	3.6
	1978	6.4	7.2	5.8	6.6	7.4	5.9	4.0	4.6	3.6
	1979	6.3	7.1	5.7	6.3	7.2	5.8	5.3	6.3	4.5
	1980	6.6	7.5	6.0	6.7	7.7	6.0	5.4	5.7	5.2
	1981	5.8	6.8	5.2	6.1	7.1	5.4	3.0	3.5	2.6
	1982	5.8	6.8	5.1	6.1	7.1	5.3	3.5	4.3	2.8
	1983	5.6	6.2	5.2	5.8	6.5	5.4	3.5	3.8	3.3
	1984	5.5	6.5	4.8	5.6	6.6	4.9	4.4	5.2	3.8
	1985	5.3	6.3	4.7	5.4	6.2	4.7	5.1	6.5	4.2
	1986	5.5	6.2	5.0	5.5	6.1	5.1	4.6	6.1	3.4
	1987	5.1	5.5	4.8	5.2	5.6	4.8	4.7	4.8	4.6
	1988	4.9	5.3	4.5	4.9	5.4	4.5	4.6	4.7	4.4
U.S.	1970	8.4	9.5	7.5	8.4	9.6	7.5	8.2	9.1	7.5
	1971	8.1	9.2	7.4	8.1	9.3	7.3	7.8	8.3	7.3
	1972	8.2	9.3	7.4	8.1	9.2	7.3	8.4	9.6	7.4
	1973	7.9	8.9	7.2	7.9	8.9	7.2	7.7	8.5	7.1
	1974	7.5	8.5	6.8	7.5	8.6	6.8	7.3	8.2	6.5
	1975	6.5	7.4	5.8	6.5	7.4	5.9	6.1	7.0	5.3
	1976	6.3	7.2	5.7	6.4	7.3	5.7	5.7	6.3	5.2
	1977	6.1	7.0	5.4	6.1	7.1	5.4	5.6	6.5	5.0
	1978	5.9	6.8	5.2	5.9	6.8	5.3	5.5	6.3	4.9
	1979	5.7	6.5	5.0	5.6	6.5	5.0	5.6	6.3	5.1
	1980	5.7	6.6	5.0	5.6	6.5	5.0	5.9	6.8	5.2
	1981	5.2	6.0	4.6	5.2	6.0	4.5	5.2	5.8	4.7
	1982	4.8	5.7	4.2	4.8	5.7	4.2	4.6	5.4	4.0
	1983	4.6	5.3	4.1	4.6	5.3	4.1	4.3	5.1	3.7
	1984	4.2	4.8	3.7	4.2	4.8	3.7	3.8	4.4	3.3
	1985	4.0	4.6	3.5	4.0	4.6	3.5	3.9	4.4	3.4
	1986	3.7	4.3	3.3	3.7	4.3	3.2	3.7	4.4	3.1
	1987	3.6	4.1	3.2	3.6	4.2	3.2	3.4	3.8	3.0
	1988	3.7	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ The introduction in 1979 of the 9th Revision of the *International Classification of Diseases*, WHO, for coding causes of death resulted in substantial changes in this category, making trend comparisons difficult. The estimated comparability ratio for this category is 1.0649. Note that comparability ratios were developed for comparing crude death rates, and they are not strictly applicable for comparing age-adjusted death rates. For further discussion of comparability ratios see *Qualifications and Limitations of Data and Calculations*.

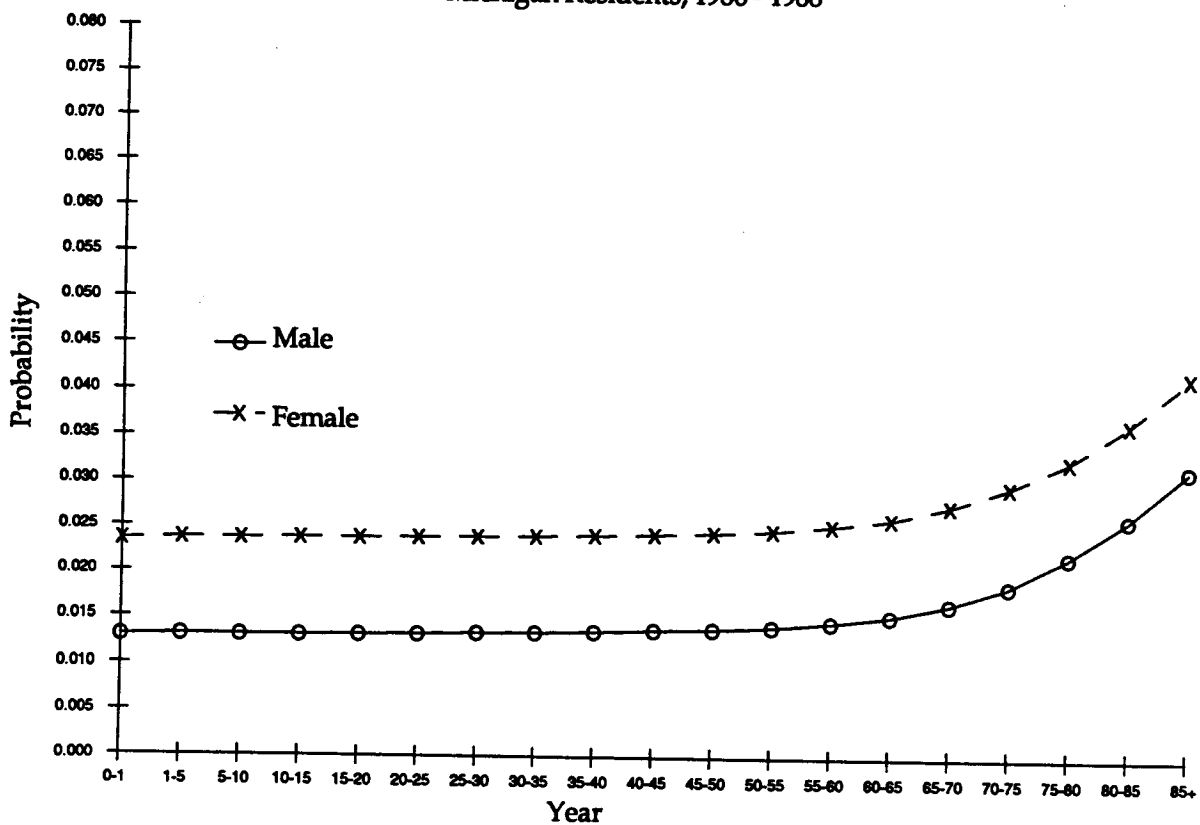
⁴ Provisional data.

Table 2.43
Deaths Due to Atherosclerosis by Detailed Cause
Michigan Residents, 1988

ICD LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
440.9	Generalized and Unspecified Atherosclerosis	1,152	97.1
440.2	Atherosclerosis of Arteries of the Extremities	32	2.7
440.0	Atherosclerosis of Aorta	3	0.3
TOTAL		1,187	100.0

¹ Detailed list of the 9th Revision of the International Classification of Diseases, WHO.

Figure 2.40
Probability of Eventually Dying from Atherosclerosis by Age and Sex
Michigan Residents, 1986 - 1988¹



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

SUICIDE

There were a total of 1,087 suicide deaths in 1988, making suicide the 9th leading cause of death. Of the deaths resulting from suicide 78.8 percent were among males. Of all suicide deaths 89.5 percent were to white persons.

More than fifty percent of all suicide deaths occurred at or below the age of 39. The median age at death for males was 38 years, 4 years below that for females. The median ages at death for white males and females were 39 and 43 years, respectively. For black males and females the median ages at death

were 31 and 40 years, respectively. There were 196 suicide deaths of white persons 65 years of age or older. This is 20.1 percent of all suicide deaths of white persons. Among black persons there were fourteen suicide deaths at age 65 or over or 13.3 percent of the total suicide deaths for black persons (Table 2.44).

The crude suicide death rate in 1988 was 11.8 per 100,000 population. The crude rate for males (19.0) was 3.9 times that for females (4.9). Age-specific rates for males were higher

Table 2.44
Deaths Due to Suicide by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	-	-	-	-	-	-	-	-	-	-	-	-
1 - 4	-	-	-	-	-	-	-	-	-	-	-	-
5 - 9	-	-	-	-	-	-	-	-	-	-	-	-
10 - 14	12	7	5	9	6	3	3	1	2	-	-	-
15 - 19	89	71	18	72	56	16	16	14	2	1	1	-
20 - 24	108	93	15	97	83	14	11	10	1	-	-	-
25 - 29	121	103	18	107	90	17	13	12	1	1	1	-
30 - 34	118	91	27	103	77	26	14	13	1	1	1	-
35 - 39	107	81	26	95	72	23	10	8	2	2	1	1
40 - 44	71	59	12	63	54	9	8	5	3	-	-	-
45 - 49	69	52	17	59	46	13	9	6	3	1	-	1
50 - 54	64	47	17	63	47	16	1	-	1	-	-	-
55 - 59	57	39	18	52	35	17	4	3	1	1	1	-
60 - 64	59	47	12	57	45	12	2	2	-	-	-	-
65 - 69	60	47	13	51	39	12	9	8	1	-	-	-
70 - 74	48	36	12	44	33	11	3	3	-	1	-	1
75 - 79	42	31	11	41	30	11	1	1	-	-	-	-
80 - 84	41	36	5	39	35	4	1	1	-	1	-	1
85 - 89	15	14	1	15	14	1	-	-	-	-	-	-
90 +	6	3	3	6	3	3	-	-	-	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,087	857	230	973	765	208	105	87	18	9	5	4
Median Age At Last Birthday	39	38	42	40	39	43	32	31	40	35	30	72

¹ Deaths with race and/or sex not stated are included only in the total column.

than female rates in all age groups (Table 2.45 and Figure 2.41). Suicide rates for males and females were highest among men and women aged 75 to 84. The greatest relative differentials by sex were for the ages 75 to 84 where the rates for males were nearly seven times that of females, and for age groups from 15

to 34 where the rates for males were over four times that of females.

The crude suicide death rate for the white population was 43.0 percent higher than that for the black population. The age-adjusted rate for white persons was 29.5 percent higher

Table 2.45
Suicide Death Rates by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	11.8	19.0	4.9	12.3	19.8	5.2	8.6	15.1	2.8
Under 1	*	*	*	*	*	*	*	*	*
1 - 14	0.6	0.7	0.5	0.6	0.7	*	*	*	*
15 - 24	13.3	21.8	4.5	13.7	22.2	4.9	11.7	21.2	*
25 - 34	15.4	25.2	5.7	15.9	25.2	6.5	12.8	25.9	*
35 - 44	13.6	21.9	5.7	14.0	22.5	5.6	11.4	18.5	5.7
45 - 54	14.2	21.7	7.0	14.8	23.0	6.9	9.7	13.0	*
55 - 64	14.2	22.0	7.0	15.0	23.0	7.7	6.9	12.7	*
65 - 74	17.1	29.7	7.1	16.8	28.7	7.3	19.3	40.7	*
75 - 84	25.0	52.9	7.8	26.6	56.8	8.0	*	*	*
85 and Over	18.0	48.3	*	19.7	53.5	*	*	*	*
Age-Adjusted Rate ²	11.1	18.1	4.5	11.4	18.5	4.8	8.8	15.6	3.0

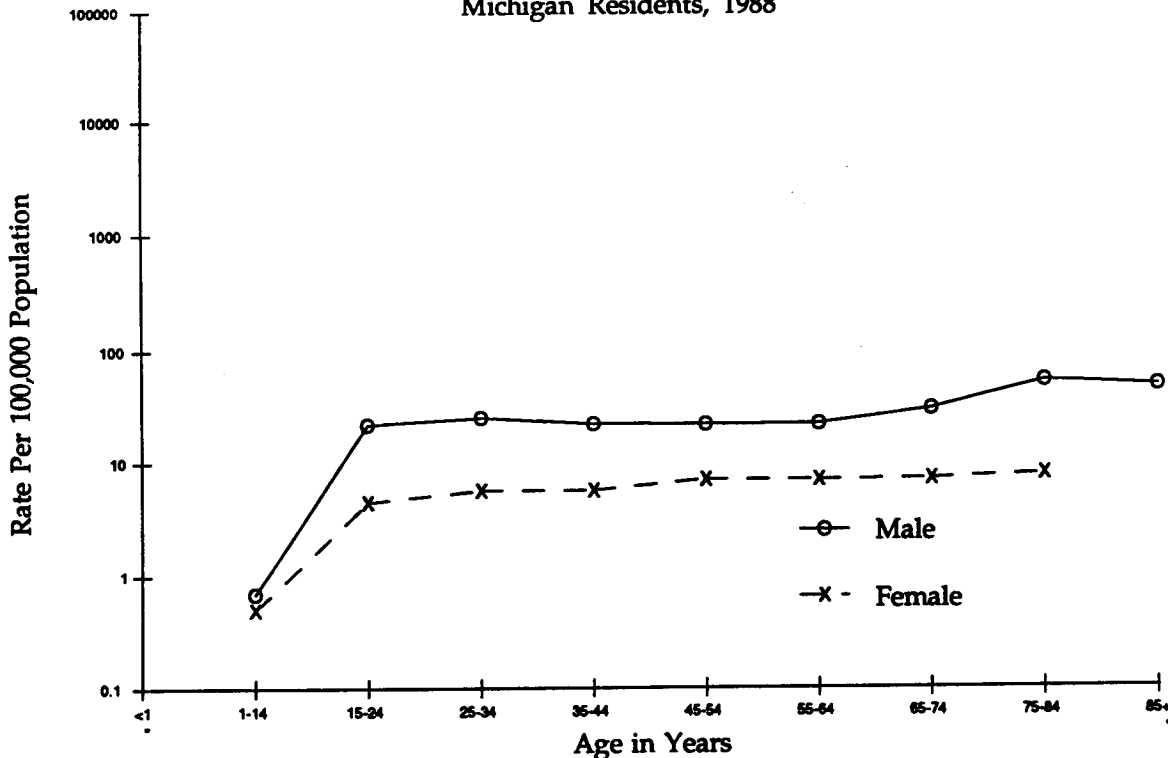
¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.41
Age - Specific Suicide Death Rates¹ by Sex,
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

• Rate is considered statistically unreliable.

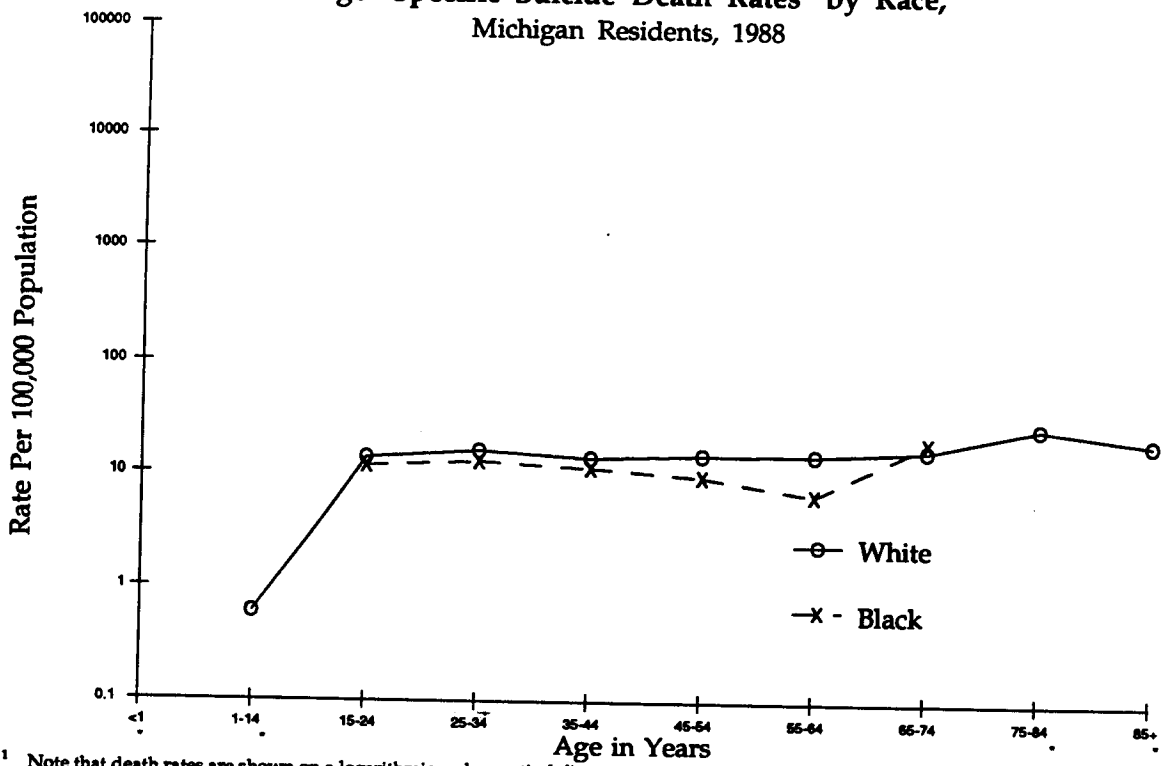
than that for black persons. Age-specific rates by race from Table 2.45 are displayed in Figure 2.42. Age-specific rates for white persons were greater than those for black persons below age 65 in all categories with sufficient events to calculate rates.

There is strong similarity in both the trend and magnitude of suicide death rates for Michigan and the United States in this century (Figure 2.43). There were two complete cycles of rising then falling rates in the period 1900 through 1944. The rates then held fairly stable for about 20 years. Between 1964 and 1977 the suicide death rate increased by 38.6 percent in Michigan, reaching 14.0, the highest rate since 1938. The highest rate during this century for Michigan was 18.8 in 1931, while the lowest was the rate of 8.8 in 1900. For the

nation high and low rates were observed in 1932 (17.4) and in 1957 (9.8). In 1988 the provisional rate for the United States was 12.3, 4.2 percent above the Michigan rate of 11.8.

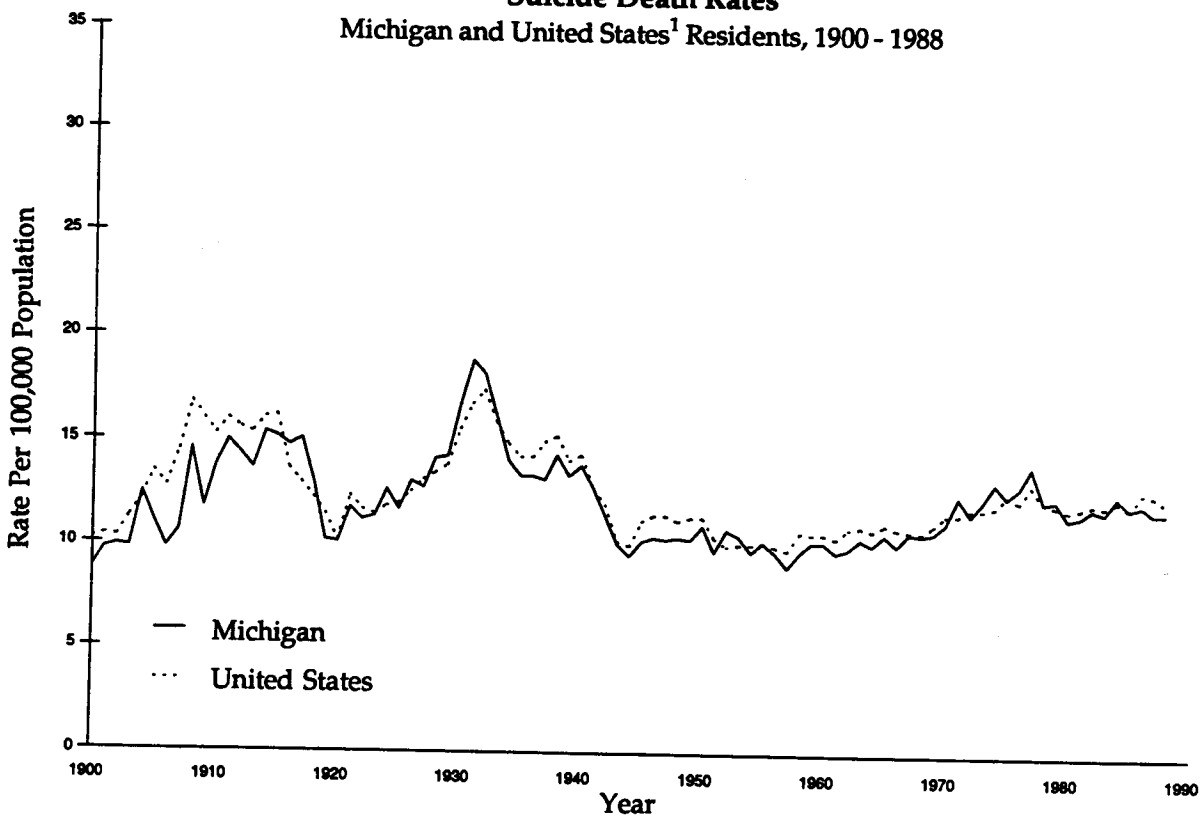
Age-adjusted suicide death rates by race and sex for Michigan and the United States are presented in Table 2.46. For white females in Michigan the age-adjusted rates for suicide remained quite stable from 1970 through 1977, and have since declined, while those for white males increased between 1970 and 1977, and held below the 1977 rate through 1988. The rates for other than white persons rose between 1970 and 1979 and have remained below the 1979 level through 1988. The rates for other than white persons were consistently less than those of their white counterparts during the nineteen year period.

Figure 2.42
 Age - Specific Suicide Death Rates¹ by Race,
 Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.
 * Rate is considered statistically unreliable.

Figure 2.43
 Suicide Death Rates
 Michigan and United States¹ Residents, 1900 - 1988



¹ National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.
² Suicide death rates since 1900 are suitable for general comparison over time but detailed study (such as time series) requires special consideration. See Technical Notes.

Table 2.46
Age - Adjusted Suicide Death Rates¹, by Race and Sex
 Michigan² and United States Residents, 1970 - 1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	11.9	17.3	6.9	12.4	17.9	7.3	7.4	11.8	3.4
	1971	13.0	18.2	8.4	13.2	18.4	8.6	10.7	16.0	6.1
	1972	12.1	17.9	6.9	12.6	18.4	7.2	8.3	12.9	4.3
	1973	12.8	19.3	6.7	13.2	19.8	7.0	9.6	15.8	4.2
	1974	13.6	19.9	8.0	14.2	20.6	8.3	9.2	13.8	5.3
	1975	12.9	19.4	6.8	13.2	19.8	7.1	9.8	15.7	4.7
	1976	13.2	19.8	7.0	13.5	20.2	7.2	10.6	16.7	5.3
	1977	13.9	21.4	7.1	14.4	22.0	7.4	10.0	16.2	4.7
	1978	12.2	18.8	6.2	12.5	19.2	6.2	10.2	15.5	5.8
	1979	12.2	18.6	6.3	12.3	18.7	6.4	11.4	18.0	5.6
	1980	11.2	17.7	5.2	11.7	18.2	5.6	7.9	13.7	2.9
	1981	11.6	17.9	5.9	12.3	18.6	6.4	7.2	13.0	2.3
	1982	11.9	18.9	5.5	12.6	19.8	5.9	7.4	12.8	2.7
	1983	11.9	19.1	5.3	12.5	19.6	5.7	8.6	15.9	2.6
	1984	12.1	19.0	5.9	12.8	20.0	6.1	8.2	12.7	4.4
	1985	11.5	19.5	4.1	11.9	19.9	4.4	8.7	16.5	2.1
	1986	11.5	18.3	5.3	11.9	18.9	5.4	9.0	14.5	4.4
	1987	11.3	18.2	4.8	11.5	18.4	5.0	9.3	16.6	3.1
	1988	11.1	18.1	4.5	11.4	18.5	4.8	8.7	15.0	3.3
U.S.	1970	11.8	17.3	6.8	12.4	18.2	7.2	6.5	10.3	3.3
	1971	11.8	17.2	7.0	12.4	18.0	7.4	6.7	10.1	3.8
	1972	12.1	17.8	6.9	12.6	18.4	7.3	7.4	11.8	3.6
	1973	11.9	17.8	6.6	12.5	18.6	7.0	7.1	11.5	3.3
	1974	12.1	18.1	6.6	12.7	18.9	7.0	7.1	11.6	3.2
	1975	12.5	18.8	6.8	13.2	19.6	7.3	7.4	11.9	3.5
	1976	12.1	18.3	6.6	12.7	19.0	7.0	7.4	12.1	3.4
	1977	12.8	19.4	6.7	13.5	20.3	7.1	7.6	12.2	3.6
	1978	11.9	18.2	6.1	12.5	19.0	6.6	7.2	11.9	3.2
	1979	11.7	17.9	5.9	12.2	18.6	6.3	7.7	12.7	3.3
	1980	11.4	18.0	5.4	12.1	18.9	5.7	6.7	11.3	2.8
	1981	11.5	18.0	5.7	12.2	18.9	6.0	6.8	11.2	3.0
	1982	11.6	18.3	5.4	12.4	19.4	5.8	6.4	10.8	2.6
	1983	11.4	18.2	5.2	12.2	19.3	5.6	6.4	10.7	2.6
	1984	11.6	18.7	5.2	12.4	19.7	5.6	6.6	11.2	2.7
	1985	11.5	18.8	4.9	12.3	19.9	5.3	6.7	11.3	2.5
	1986	11.9	19.3	5.1	12.7	20.5	5.4	6.8	11.5	2.7
	1987	11.7	19.1	4.9	12.5	20.1	5.3	6.9	11.9	2.5
	1988 ³	11.3	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

³ Provisional data.

Age-adjusted suicide death rates for the nation were more stable. For white and other than white females the rates are slowly declining. The rates for white males peaked in 1977 and have been below that level since that year with the exception of 1986. The rates for other than white males increased by 23.3 percent between 1970 and 1979. Since 1979 the national rate for other than white males has decreased by 6.3 percent.

The age-adjusted suicide death rates in Michigan for the other than white population were significantly higher than those of the nation. Rates in Michigan for the white population groups were similar to those of the nation. The age-adjusted rate for the total

population of Michigan was at or above the comparable national rate fifteen out of nineteen years from 1970 through 1988.

Suicides in Michigan were predominantly the result of one of four types of self-inflicted injury. Self-inflicted injury by firearms caused 598 deaths in 1988. Self-inflicted poisoning by gases and vapors resulted in 144 deaths. Hanging, strangulation and suffocation resulted in 182 deaths. There were 90 deaths due to poisoning by drugs, medicaments and biologicals. Together these four types of suicide accounted for 93.2 percent of all suicide deaths to Michigan residents in 1988 (Table 2.47).

Table 2.47
Deaths Due to Suicide by Detailed Cause
Michigan Residents, 1988

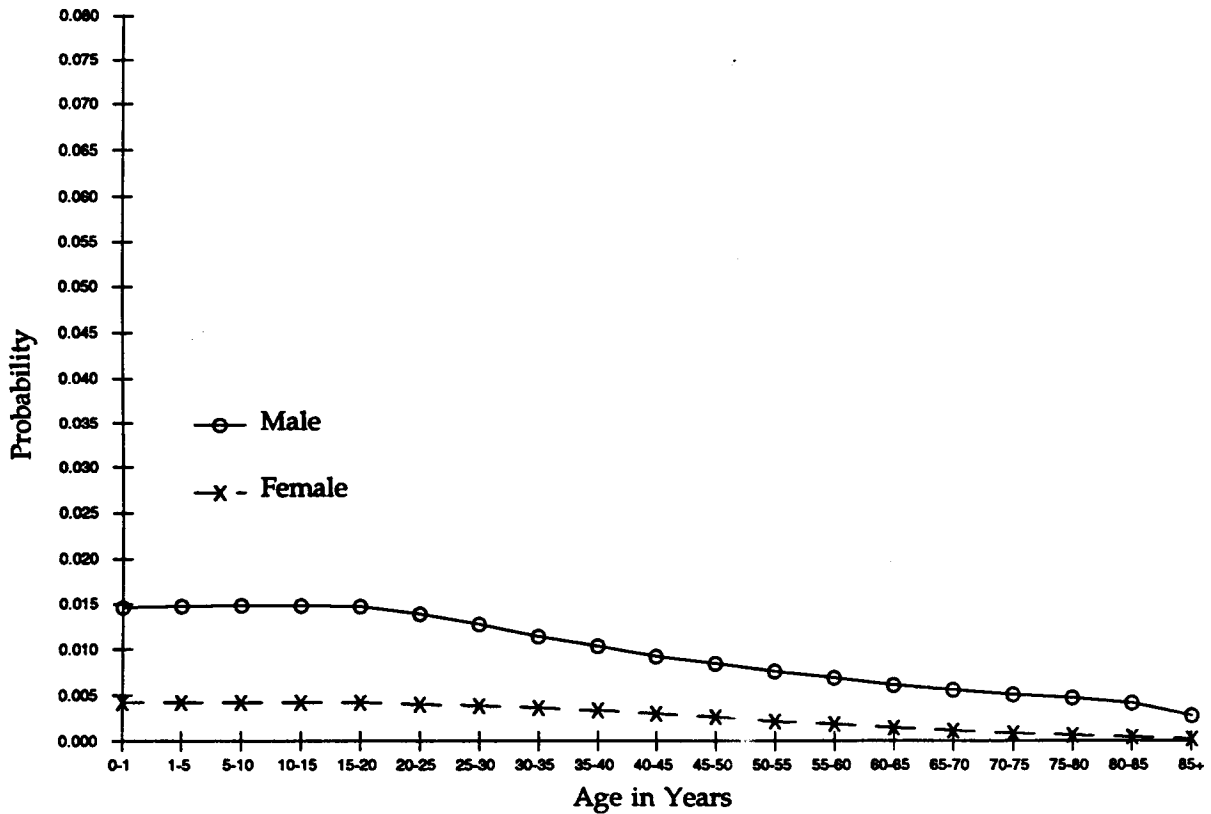
282 LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
269	Suicide by All Other and Unspecified Firearms	582	53.5
267	Suicide by Hanging, Strangulation and Suffocation	182	16.7
266	Suicide by Gases and Vapors	144	13.2
264	Suicide by Drugs, Medicaments, and Biologicals	90	8.3
270	Suicide by All Other Means and Late Effects of Self-Inflicted Injury	64	5.9
268	Suicide by Handguns	16	1.5
265	Suicide by Other Solid or Liquid Substances	9	0.8
Total		1,087	100.0

¹ List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

Using the Michigan mortality experience of 1986 through 1988, the chance of a male eventually dying from suicide is 0.015 at birth. The risk for females is 0.004. These prob-

abilities hold relatively constant up to age 20 then taper slowly with advancing age (Figure 2.44).

Figure 2.44
Probability of Eventually Dying from Suicide by Age and Sex
 Michigan Residents, 1986 - 1988



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

CHRONIC LIVER DISEASE AND CIRRHOSIS

The 10th leading cause of Michigan resident deaths in 1988 was chronic liver disease and cirrhosis. This category was termed cirrhosis of the liver prior to 1979. There were 1,080 deaths attributed to this category in 1988, of which 66.4 percent were to males.

The median age for deaths due to chronic liver disease and cirrhosis (59 years) was 15 years below that for deaths from all causes (Table 2.48). For deaths from this cause in 1988, the median age was 58 years for males and 61 years for females. The median ages at

death for white males and females were 61 and 65 years, respectively. The median ages at death were 49 years for black males and 51 years for black females.

Death rates for chronic liver disease and cirrhosis by age, race, and sex are presented in Table 2.49. In 1988 the crude rate for males was 2.1 times the rate for females while the age-adjusted rate for males was 2.4 times that for females. Age-specific rates for males ranged from 1.1 to 3.1 times as high as those for females (Figure 2.45). The highest rate for

Table 2.48
Deaths Due to Chronic Liver Disease and Cirrhosis by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	-	-	-	-	-	-	-	-	-	-	-	-
1 - 4	-	-	-	-	-	-	-	-	-	-	-	-
5 - 9	-	-	-	-	-	-	-	-	-	-	-	-
10 - 14	-	-	-	-	-	-	-	-	-	-	-	-
15 - 19	-	-	-	-	-	-	-	-	-	-	-	-
20 - 24	1	1	-	1	1	-	-	-	-	-	-	-
25 - 29	7	3	4	5	2	3	2	1	1	-	-	-
30 - 34	32	17	15	16	9	7	16	8	8	-	-	-
35 - 39	89	63	26	43	33	10	46	30	16	-	-	-
40 - 44	87	69	18	42	35	7	44	33	11	1	1	-
45 - 49	94	72	22	60	46	14	34	26	8	-	-	-
50 - 54	103	70	33	65	43	22	34	23	11	4	4	-
55 - 59	133	92	41	100	73	27	29	17	12	3	1	2
60 - 64	171	115	56	136	92	44	34	22	12	1	1	-
65 - 69	139	87	52	120	76	44	19	11	8	-	-	-
70 - 74	94	59	35	85	52	33	8	6	2	-	-	-
75 - 79	83	46	37	74	41	33	9	5	4	-	-	-
80 - 84	31	16	15	30	15	15	1	1	-	-	-	-
85 - 89	9	4	5	9	4	5	-	-	-	-	-	-
90 +	7	3	4	7	3	4	-	-	-	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,080	717	363	793	525	268	276	183	93	9	7	2
Median Age At Last Birthday	59	58	61	62	61	65	49	49	51	53	53	58

¹ Deaths with race and/or sex not stated are included only in the total column.

females was for the age group 75-84 years. The highest rates for males occurred in the age groups from 55 to 74 years.

The crude mortality rate for deaths due to chronic liver disease and cirrhosis for black persons was 2.2 times the rate for white persons. The age-adjusted rate for black

persons was 3.2 times the rate for white persons. The differential can be traced mainly to the rates for ages 25 through 64. The highest age-specific rate for white persons was 36.4 deaths per 100,000 population in the age group 65-74 years. For black persons the peak rate (72.3) was observed for the age group 55-64 years (Figure 2.46).

Table 2.49
Death Rates for Deaths Due to Chronic Liver Disease
And Cirrhosis by Age, Race and Sex¹
Michigan Residents, 1988

AGE IN YEARS	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	11.7	15.9	7.7	10.1	13.6	6.7	22.5	31.7	14.3
Under 1	*	*	*	*	*	*	*	*	*
1 - 14	*	*	*	*	*	*	*	*	*
15 - 24	*	*	*	*	*	*	*	*	*
25 - 34	2.5	2.6	2.4	1.6	1.7	1.5	8.5	9.3	7.9
35 - 44	13.5	20.6	6.6	7.5	12.2	3.0	57.2	89.8	31.0
45 - 54	21.0	31.1	11.4	15.2	22.0	8.6	65.8	106.5	33.1
55 - 64	37.1	53.1	22.6	32.6	47.7	18.8	72.3	99.3	50.1
65 - 74	36.8	52.2	24.7	36.4	51.4	24.4	43.4	62.9	28.4
75 - 84	34.3	48.9	25.3	34.6	49.0	25.7	33.8	51.7	*
85 and Over	13.7	19.9	11.0	15.0	22.0	12.0	*	*	*
Age-Adjusted Rate ²	10.2	14.7	6.1	8.1	11.8	4.8	25.6	38.5	15.3

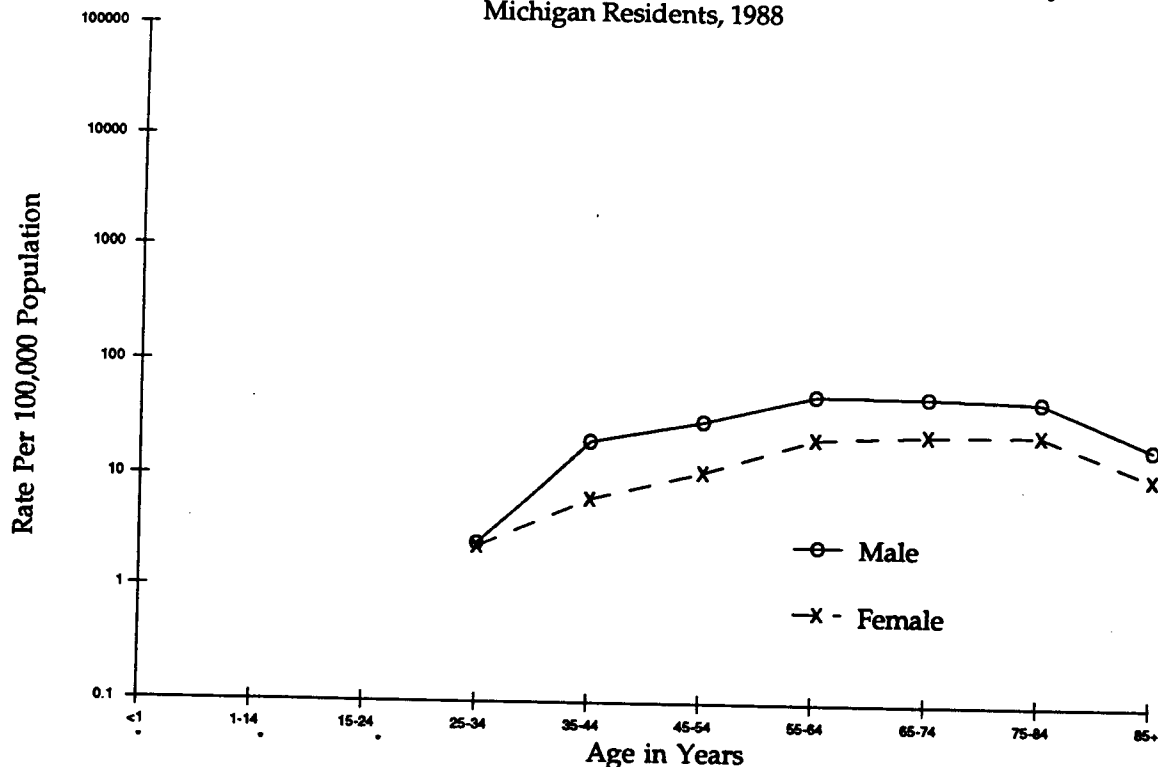
¹ Deaths with sex or race not stated were randomly allocated prior to computation of age-specific death rates. Deaths with age not stated were included in the category 85 and over.

² Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940.

* Rate is considered statistically unreliable.

Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state departments of health. This modified race distribution is inconsistent with official published data.

Figure 2.45
Age - Specific Chronic Liver Disease and Cirrhosis Death Rates¹ by Sex
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

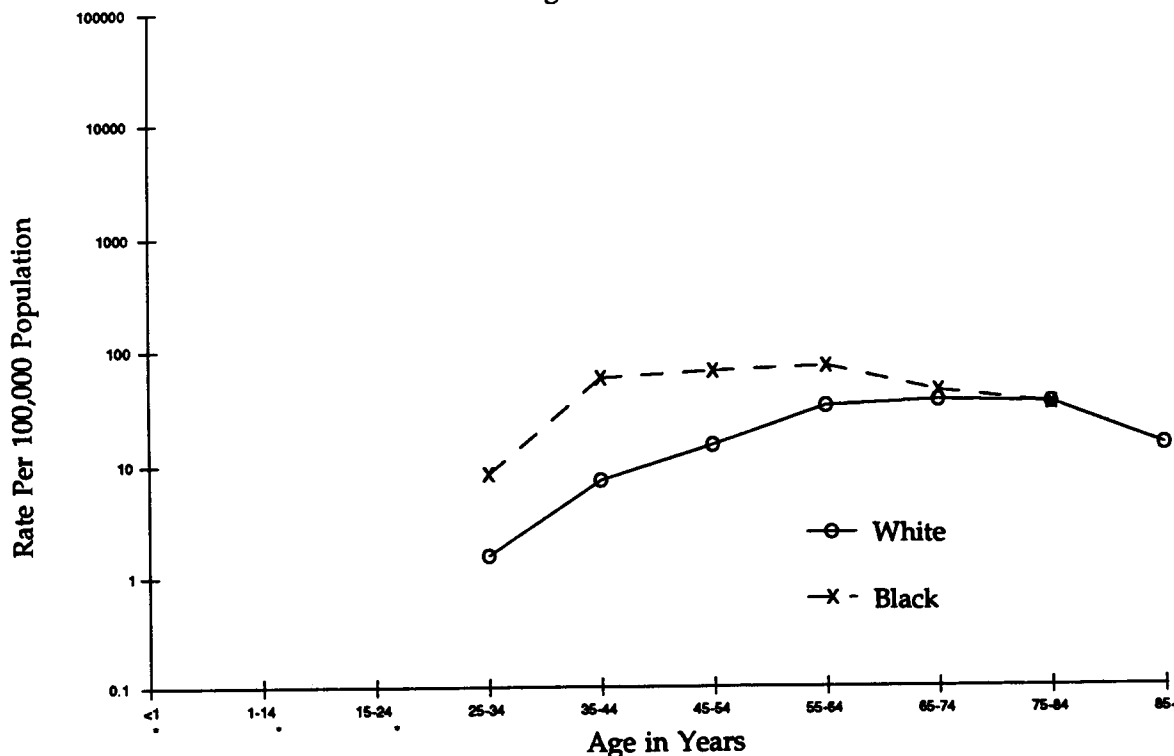
Cirrhosis of the liver was the cause of death for 7.9 of every 100,000 Michigan residents in 1900. Death rates due to this cause rose to a peak of 13.1 in 1916, after which the relative frequency of cirrhosis deaths fell sharply, dropping to 7.4 in 1919. The Michigan rates held stable from this point until 1936 when they began increasing slowly. A peak of 12.4 was reached by 1948.

The statistics for Michigan shown in Figure 2.47 after 1949 are not comparable with preceding years due to a revision of the underlying cause of death determination. By isolating the period 1950-1988, this problem can be ignored. Michigan's mortality rate for this disease doubled between 1950 and 1972, when the highest rate of the century was recorded (19.7). The rate of 11.7 in 1988 was 40.6 percent less than the rate of 1972.

The cirrhosis of the liver mortality rate for the United States was well above Michigan's rate early in this century. The highest rate for the nation during the first half of the century occurred in 1907 (14.8). The rates for Michigan and the nation were similar from about 1916 through 1968. Between 1969 and 1972, rates for Michigan rose above those for the nation. The sharp drop in Michigan's rate since 1972 has brought the statistic for the state closer to the national figure. In 1988 the chronic liver disease and cirrhosis death rate of 11.7 for Michigan was 10.4 percent above the provisional rate of 10.6 for the nation.

Age-adjusted death rates by sex and race for chronic liver disease and cirrhosis for the years 1970-1988 are displayed in Table 2.50 (see Technical Notes). These rates generally peaked about 1972 in Michigan and have

Figure 2.46
Age - Specific Chronic Liver Disease and Cirrhosis Death Rates¹ by Race
Michigan Residents, 1988



¹ Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

* Rate is considered statistically unreliable.

tended to decline since then. For the United States the increases observed in the early part of the 1970's were less pronounced, as were the declines after that time.

The age-adjusted rates in Michigan for other than white males have been higher than for all other race and sex groups, including the rates for other than white males observed nationally. The rates for other than white females in Michigan have also been higher than the comparable rates for the nation.

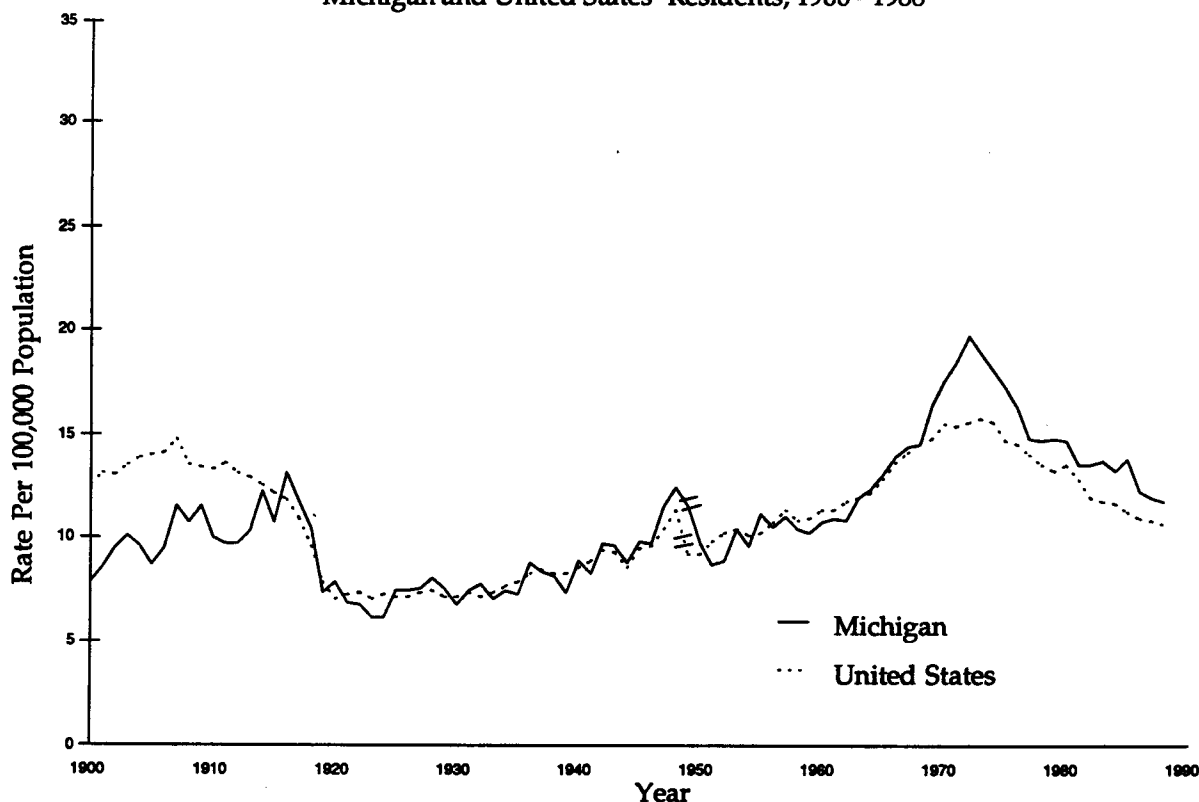
Age-adjusted death rates for chronic liver disease and cirrhosis for white males in Michigan were higher than rates for white males nationally. Through 1985 rates for white females in Michigan have been generally higher than for their counterparts in the nation. In recent years the rates for the two

groups have been similar. In 1988 the age-adjusted rate for the total Michigan population was 13.3 percent above the provisional rate for the United States.

Cirrhosis of the liver without mention of alcohol was the most frequently reported cause of deaths due to chronic liver disease and cirrhosis in 1988, resulting in 524 deaths (Table 2.51). The second largest category was alcoholic cirrhosis of the liver with 300 deaths. Including deaths due to alcoholic cirrhosis of the liver, alcoholic fatty liver, acute alcoholic hepatitis, and unspecified alcoholic liver damage, there were 502 deaths with mention of alcohol attributed to the category of chronic liver disease and cirrhosis.

The probability of eventually dying from chronic liver disease and cirrhosis, based

Figure 2.47
Chronic Liver Disease and Cirrhosis¹ Death Rates
 Michigan and United States² Residents, 1900 - 1988³



¹ Prior to 1979 termed Cirrhosis of Liver.

² National rates are from Death Registration States for 1900-1932 and the United States for 1933-1988. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1988 is provisional.

³ The comparability of cirrhosis of the liver death rates from the 5th revision of the ICDA coding procedures with those of the 6th revision is considered weak. The comparability ratio is estimated to be .80. The 6th revision was adopted in 1949 for national cause-of-death statistics and in 1950 for Michigan statistics. The comparability of cirrhosis of the liver death rates through the 6th, 7th, 8th and 9th revisions (1949 to date nationally and 1950 to date in Michigan) is high. General comparison before and after these dates of adoption can be made but detailed study requires special consideration. See Technical Notes.

upon Michigan mortality data from the years 1986-1988, is displayed in Figure 2.48 by age and sex. The risk for males of dying from a disease in this category is roughly double that for females. At birth, males have a probability of 0.015 of eventually dying from chronic liver disease and cirrhosis. For

females the probability is 0.008. These probabilities remain fairly constant for both sexes through age 39, whereupon the eventuality of death due to these diseases diminishes with advancing age. After age 85 the risk is 0.002 for males and 0.001 for females.

Table 2.50
**Age - Adjusted Death Rates¹ for Deaths Due to Chronic Liver Disease
 and Cirrhosis by Race and Sex**
 Michigan² and United States Residents, 1970-1988

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	17.7	24.9	11.2	15.6	22.0	9.7	34.8	48.3	22.5
	1971	18.7	25.6	12.3	16.2	22.2	10.7	37.7	53.3	23.7
	1972	19.8	27.8	12.5	17.0	24.4	10.3	41.2	54.9	28.8
	1973	18.8	26.7	11.7	16.3	23.2	10.1	37.9	54.2	23.4
	1974	17.9	25.8	10.8	14.7	21.5	8.7	41.8	59.7	25.9
	1975	17.1	23.9	11.1	14.4	20.2	9.2	37.5	52.1	24.6
	1976	15.9	23.0	9.6	13.6	19.8	8.0	32.9	47.2	20.4
	1977	14.5	20.6	9.1	12.1	17.6	7.2	31.7	42.9	22.0
	1978	14.2	19.6	9.3	12.0	16.9	7.8	29.6	40.9	20.0
	1979	14.2	21.1	8.2	11.4	17.1	6.4	34.1	50.4	20.1
	1980	14.1	19.7	9.1	11.6	16.5	7.3	31.1	43.7	20.5
	1981	12.7	17.9	8.2	10.9	15.6	6.7	25.0	34.1	17.5
	1982	12.4	17.5	8.0	10.6	15.2	6.6	24.9	34.2	17.2
	1983	12.5	18.6	7.2	10.6	15.6	6.1	25.0	39.5	13.3
	1984	11.8	16.6	7.7	9.9	14.0	6.3	25.1	35.8	16.2
	1985	12.3	17.5	7.6	9.9	14.0	6.3	28.4	43.3	16.1
	1986	10.7	15.8	6.2	8.9	12.8	5.4	22.7	37.0	11.0
	1987	10.4	15.0	6.3	8.3	12.1	4.9	24.5	36.6	14.8
	1988	10.2	14.7	6.1	8.1	11.8	4.8	24.1	36.1	14.3
U.S.	1970	14.7	20.2	9.8	13.4	18.8	8.7	23.8	31.3	17.4
	1971	14.6	20.2	9.7	13.5	18.9	8.7	23.4	31.0	16.9
	1972	14.9	20.8	9.6	13.5	19.0	8.5	25.3	35.0	17.1
	1973	15.0	20.8	9.8	13.6	19.3	8.7	25.1	33.7	17.9
	1974	14.7	20.6	9.6	13.4	19.0	8.5	24.8	33.9	17.2
	1975	13.7	19.4	8.8	12.5	17.8	7.9	22.9	32.0	15.3
	1976	13.5	19.0	8.6	12.2	17.4	7.7	22.9	32.1	15.1
	1977	13.0	18.3	8.3	11.7	16.6	7.4	22.2	31.2	14.7
	1978	12.4	17.5	8.0	11.2	16.0	7.1	20.7	29.0	13.9
	1979	12.0	17.0	7.7	11.0	15.6	7.0	19.7	28.2	12.8
	1980	12.2	17.1	7.9	11.0	15.7	7.0	20.0	28.1	13.5
	1981	11.4	16.0	7.4	10.5	14.8	6.7	17.6	24.7	11.9
	1982	10.5	14.9	6.7	9.8	14.1	6.1	14.9	20.9	10.1
	1983	10.2	14.3	6.6	9.5	13.4	6.0	14.7	20.5	10.0
	1984	10.0	14.1	6.4	9.3	13.2	5.9	14.3	20.2	9.5
	1985	9.6	13.6	6.1	8.9	12.6	5.6	14.4	20.7	9.3
	1986	9.2	13.0	5.9	8.6	12.2	5.4	12.9	18.4	8.5
	1987	9.1	13.0	5.6	8.4	12.1	5.1	13.2	19.1	8.3
	1988 ³	9.0	—	—	—	—	—	—	—	—

¹ Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940; see Technical Notes.

² Michigan rates for 1981-1985 have been revised based upon revisions to population estimates; see Technical Notes.

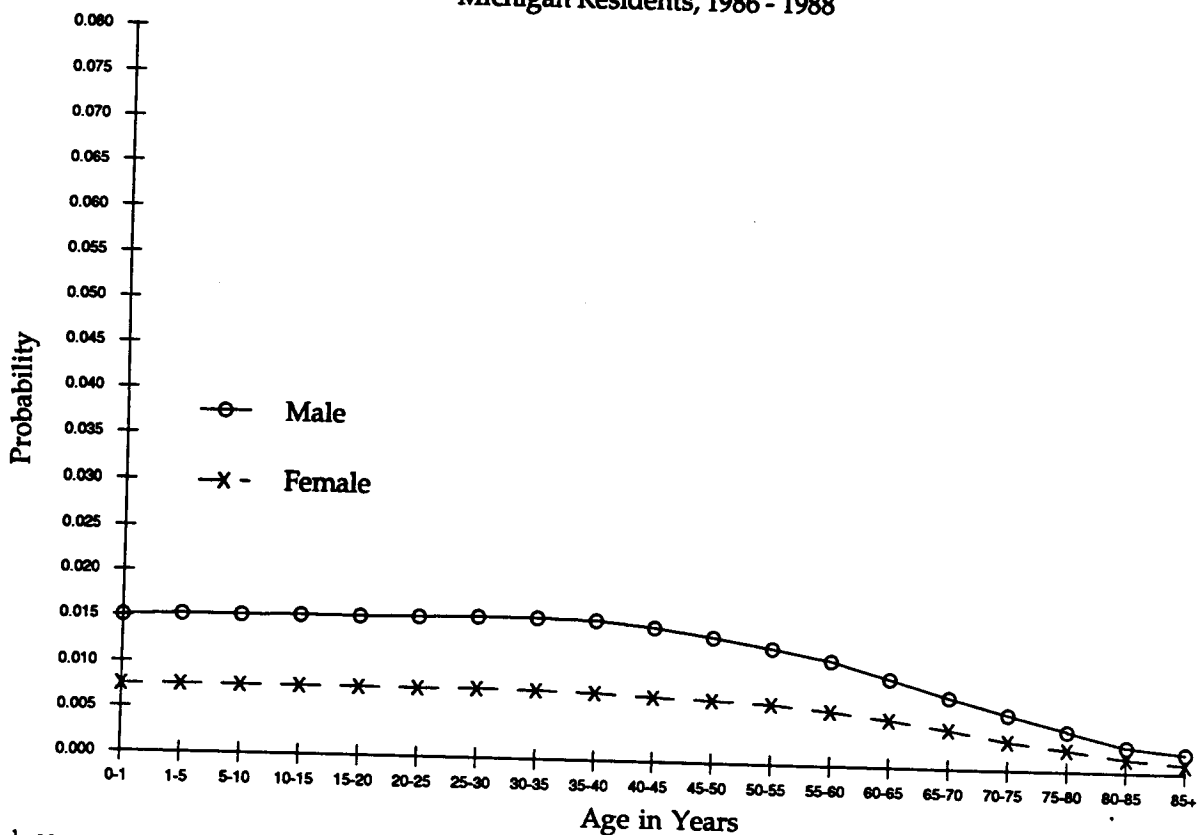
³ Provisional data.

Table 2.51
Deaths Due to Chronic Liver Disease and Cirrhosis by Detailed Cause
Michigan Residents, 1988

ICD LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
571.5	Cirrhosis of Liver Without Mention of Alcohol	524	48.5
571.2	Alcoholic Cirrhosis of Liver	300	27.8
571.0	Alcoholic Fatty Liver	120	11.1
571.3	Alcoholic Liver Damage, Unspecified	73	6.8
571.4	Chronic Hepatitis	23	2.1
571.6	Biliary Cirrhosis	16	1.5
571.1	Acute Alcoholic Hepatitis	9	0.8
571.9	Unspecified Chronic Liver Disease Without Mention of Alcohol	8	0.7
571.8	Other Chronic Nonalcoholic Liver Disease	7	0.6
TOTAL		1,080	100.0

¹ Detailed List of the 9th Revision of the International Classification of Diseases, WHO.

Figure 2.48
Probability of Eventually Dying From Chronic Liver Disease and Cirrhosis by Age and Sex
Michigan Residents, 1986 - 1988



¹ Note: Should comparisons be desired between this graph and a similar graph contained herein that pertains to some other specified cause of death, differences in scale may be encountered.

THE PROBABILITY AT BIRTH OF EVENTUAL DEATH DUE TO A SPECIFIED CAUSE

While cause-specific death rates are useful in gauging the frequency of death due to certain causes and in making comparisons between areas or populations, they do not relate the risk that the condition imposes on the population with clarity. Mortality data can be used to develop this risk in probabilistic terms. Through the application of life expectancy techniques, a probability of death due to a given cause can be estimated.

Such probabilities represent the average risk of eventual death being caused by a specified condition under an assumption that the mortality across all ages that was observed in a time period will remain unchanged through

the remaining life of the population. These probabilities can be estimated for any given age attained. The following table relates the probability at birth of dying from the ten leading causes of death based upon Michigan mortality experience for the years 1986 through 1988.

The 1986 through 1988 data would indicate that 85.3 percent of all males and females in Michigan will die from one of the ten leading causes if all things remain constant. Approximately four of every ten people will die from heart disease. Women face higher risks of death from heart disease, cerebrovascular disease, pneumonia and influenza, diabetes

DISEASE CATEGORY	PROBABILITY AT BIRTH OF EVENTUAL DEATH DUE TO CONDITION FOR:	
	Males	Female
Diseases of the Heart	.397	.425
Malignant Neoplasms	.225	.192
Cerebrovascular Diseases	.057	.091
Accidents and Adverse Effects	.037	.021
Chronic Obstructive Pulmonary Diseases and Allied Conditions	.045	.028
Pneumonia and Influenza	.034	.038
Diabetes Mellitus	.015	.022
Atherosclerosis	.013	.024
Suicide	.015	.004
Chronic Liver Disease and Cirrhosis	.015	.008
All Other Causes	.147	.147
Total	1.000	1.000

mellitus, and atherosclerosis than do males. At the same time, males are more likely to die from cancer, accidents, chronic obstructive pulmonary diseases and allied conditions, suicide, and chronic liver disease and cirrhosis.

Related to the probability at birth of eventual death due to a given cause is the hypothetical gain in life expectancy that would result if a given cause of death were eliminated. Based on 1986-1988 mortality data, the average number of years of life gained by eliminating deaths due to a major cause is given in the table that follows.

Deaths in infancy from all causes are added for comparative purposes.

The largest gains in life expectancy would result from the elimination of heart disease and cancer, the two leading causes of death. Considering the number of deaths involved, relatively large gains in life expectancy would result from the elimination of infant mortality, accidents, and suicide. Eliminating deaths in the younger age groups, where many of the deaths from these causes occur, has a greater impact on the potential number of years of life to be gained than eliminating deaths in the more advanced age groups.

YEARS GAINED IN
LIFE EXPECTANCY FOR:

DISEASE CATEGORY ELIMINATED

Males

Female

Diseases of the Heart	4.39	3.23
Malignant Neoplasms	2.94	2.93
Cerebrovascular Diseases	0.47	0.60
Accidents and Adverse Effects	1.11	0.54
Chronic Obstructive Pulmonary Diseases and Allied Conditions	0.42	0.32
Pneumonia and Influenza	0.23	0.21
Diabetes Mellitus	0.18	0.23
Atherosclerosis	0.06	0.08
Suicide	0.42	0.13
Chronic Liver Disease and Cirrhosis	0.29	0.15
All Causes of Infant Mortality	0.88	0.76

INFANT DEATHS

Of the 80,075 deaths occurring to Michigan residents in 1988, 1,542 occurred to individuals less than one year of age. The number of infant deaths declined steadily each year from 1958 through 1988, with the exception of three years when it rose, 1970, 1981 and 1988 and one year when the number held steady, 1986. Since 1970, when there were 3,492 such deaths, the frequency of infant deaths has declined by 55.8 percent (Table 2.52). Nationally, the provisional number of infant deaths in 1988 was 38,700. This was 48.2 percent below the number in 1970.

The rate of death for infants under the age of one year has dropped considerably since 1900. In that year there were 157.1 infant deaths for every 1,000 live births. This means that about 16 of every 100 infants did not survive their first year. This rate fell below 100 by 1914 (96.8), to less than 70 by 1927 (67.7), and to less than 50 by 1935 (47.7). During the 1940's the Michigan infant death rate declined from 40.6 in 1940 to 28.9 in 1949.

Relative declines in the infant death rate slowed considerably in the 1950's and 1960's.

Table 2.52
Infant Deaths and Infant Death Rates
 Michigan and United States Residents, 1970 - 1988

UNITED STATES		YEAR	MICHIGAN	
NUMBER	RATE		NUMBER	RATE
74,667	20.0	1970	3,492	20.3
67,981	19.1	1971	3,157	19.5
60,182	18.5	1972	2,801	19.1
55,581	17.7	1973	2,561	18.1
52,776	16.7	1974	2,387	17.4
50,525	16.1	1975	2,205	16.5
48,265	15.2	1976	1,978	15.1
46,975	14.1	1977	1,945	14.1
45,945	13.8	1978	1,931	13.9
45,665	13.1	1979	1,921	13.3
45,526	12.6	1980	1,851	12.8
43,305	11.9	1981	1,851	13.2
42,401	11.5	1982	1,672	12.1
40,627	11.2	1983	1,573	11.8
39,580	10.8	1984	1,595	11.7
40,030	10.6	1985	1,575	11.4
38,891	10.4	1986	1,565	11.4
38,408	10.1	1987	1,538	10.9
38,700 ¹	9.9 ¹	1988	1,542	11.0

¹ Provisional data.

It was not until 1971 that the rate dropped below 20 to 19.5. The rate of decline between 1970 and 1980 compares favorably with the rate of decline observed before 1950. The infant death rate for Michigan rose in 1981 for the first such increase since 1970. This rate then declined each year between 1982 and 1985. The 1986 infant mortality rate was the same as the 1985 rate. In 1987, the infant mortality rate declined to 10.9 and rose slightly to 11.0 in 1988 (Figure 2.49).

During the period 1915-1928, the rate for Michigan was above that for the United States 9 of 14 years. From 1929 through 1969, Michigan's infant death rate was consistently below the national statistic. From 1970 through 1975 the infant mortality rate in Michigan was slightly higher than the rate for the nation. From 1976 through 1980 the rates for the state and nation were similar. Since

1980 the rate for Michigan has been 5 to 11 percent above the national rate. The provisional rate for the United States in 1988 was 9.9

Table 2.53 shows the numbers of infant deaths and infant death rates by age at death for the period 1970-1988. The number of infants that died during the first week of life in 1988 (898) is greater than the number of deaths of infants aged 7-364 days (644). In 1988 69.3 percent of all infant deaths occurred within the first four weeks of life and 58.2 percent occurred in the first week. These percentages were 66.3 and 57.0 percent in 1978.

A review of Table 2.53 reveals that the 20.6 percent decline in the infant mortality rate since 1978 stems largely from reductions in the rate of death for those between 1 and 6

Figure 2.49
Infant Mortality Rates

Michigan Residents, 1900 - 1988 and United States¹ Residents, 1915 - 1988

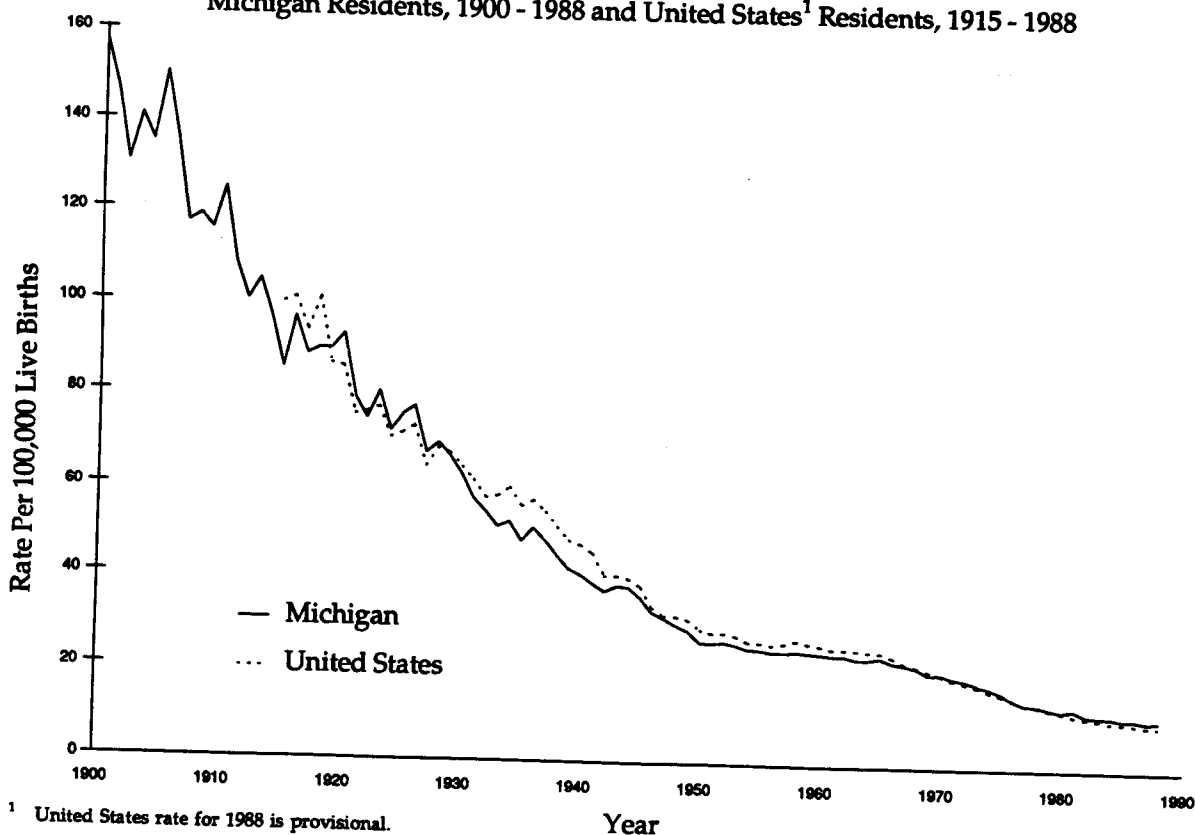


Table 2.53
Infant Deaths and Infant Death Rates by Age at Death
 Michigan Residents, 1970 - 1988

YEAR	AGE AT DEATH									
	TOTAL INFANT DEATHS		UNDER 1 DAY		1-6 DAYS		7-27 DAYS		28-364 DAYS	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1970	3,492	20.34	1,367	7.96	1,095	6.38	221	1.29	809	4.71
1971	3,157	19.46	1,191	7.34	1,025	6.32	196	1.21	745	4.59
1972	2,801	19.07	1,024	6.97	906	6.17	185	1.26	686	4.67
1973	2,561	18.09	1,131	7.99	579	4.09	192	1.36	659	4.66
1974	2,387	17.37	940	6.84	569	4.14	225	1.64	653	4.75
1975	2,205	16.46	856	6.39	461	3.44	246	1.84	642	4.79
1976	1,978	15.06	829	6.31	402	3.06	193	1.47	554	4.22
1977	1,945	14.05	794	5.74	374	2.70	199	1.44	578	4.18
1978	1,931	13.91	717	5.17	384	2.77	180	1.30	650	4.68
1979	1,921	13.30	754	5.22	356	2.46	185	1.28	626	4.33
1980	1,851	12.75	790	5.44	310	2.14	184	1.27	567	3.91
1981	1,851	13.17	815	5.80	296	2.11	170	1.21	570	4.05
1982	1,672	12.12	751	5.44	284	2.06	167	1.21	470	3.41
1983	1,573	11.82	672	5.05	238	1.79	157	1.18	506	3.80
1984	1,595	11.75	718	5.29	237	1.75	145	1.07	495	3.65
1985	1,575	11.41	697	5.05	217	1.57	157	1.14	504	3.65
1986	1,565	11.37	680	4.94	237	1.72	162	1.18	486	3.53
1987	1,538	10.95	660	4.70	217	1.54	152	1.08	509	3.62
1988	1,542	11.04	685	4.91	213	1.53	170	1.22	474	3.39

days, and 28 and 364 days of age. There are 2.87 fewer infant deaths per 1,000 live births in 1988 than in 1978. Of these, there were 1.24 and 1.29 fewer infant deaths per 1,000 live births, respectively, for ages 1 to 6 days and 28 to 364 days of life in 1988 than in 1978. They represented 88.2 percent of the reduction.

The death rate for infants during their first day of life declined 5.0 percent since 1978. The rate increased in the three years following

1978, and generally decreased since 1981. The death rate for ages 1-6 days has declined, generally steadily, by 44.8 percent between 1978 and 1988. The death rate for infants aged 7-27 days had a lesser decrease of 6.2 percent below the 1978 level. The 1988 rate was slightly higher than the rate observed in 1981 and 1982. The death rate for infants aged 28-364 days has generally decreased between 1978 and 1988. In 1988 the death rate for these infants was 3.39, which was 27.6 percent below the comparable rate for 1978.

Infant mortality rates have varied considerably by race. Rates for white, black and other race infants since 1970 are graphically displayed in Figure 2.50. Rates for black infants were higher than rates for both of the other groups throughout the period. Except for the years 1971 and 1976, the death rates for infants of other races were below those for white infants.

Although the rates for all three race groups have declined, those for infants of other races decreased by a relatively larger amount than those for white and black infants, while the rates for white infants decreased more than the rates for black infants. As a result, the racial differentials in infant mortality rates have increased since 1970.

The infant mortality rate for infants of other races dropped 55.7 percent between 1970 and

1988. In the same period the rate for white infants dropped by 53.5 percent, while for black infants the decline was 27.2 percent. The rate for black infants of 30.1 in 1970 was 62.7 percent higher than that for white infants (18.5) and 80.2 percent higher than the rate for infants of other races (16.7). The infant death rate for white infants in 1970 was 10.8 percent higher than the corresponding rate for infants of other races. In 1988 the rate for black infants of 21.9 was 2.5 times that for white infants (8.6) and 3.0 times that for infants of other races (7.4). The white infant death rate in 1988 was 16.2 percent higher than the rate for infants of other races.

Michigan resident infant deaths in 1988 are listed by cause of death classification and age at death in Table 2.54. Congenital anomalies caused the death of 292 infants and was the specific disease category most frequently

Figure 2.50
Infant Death Rates by Race
 Michigan Residents, 1970 - 1988

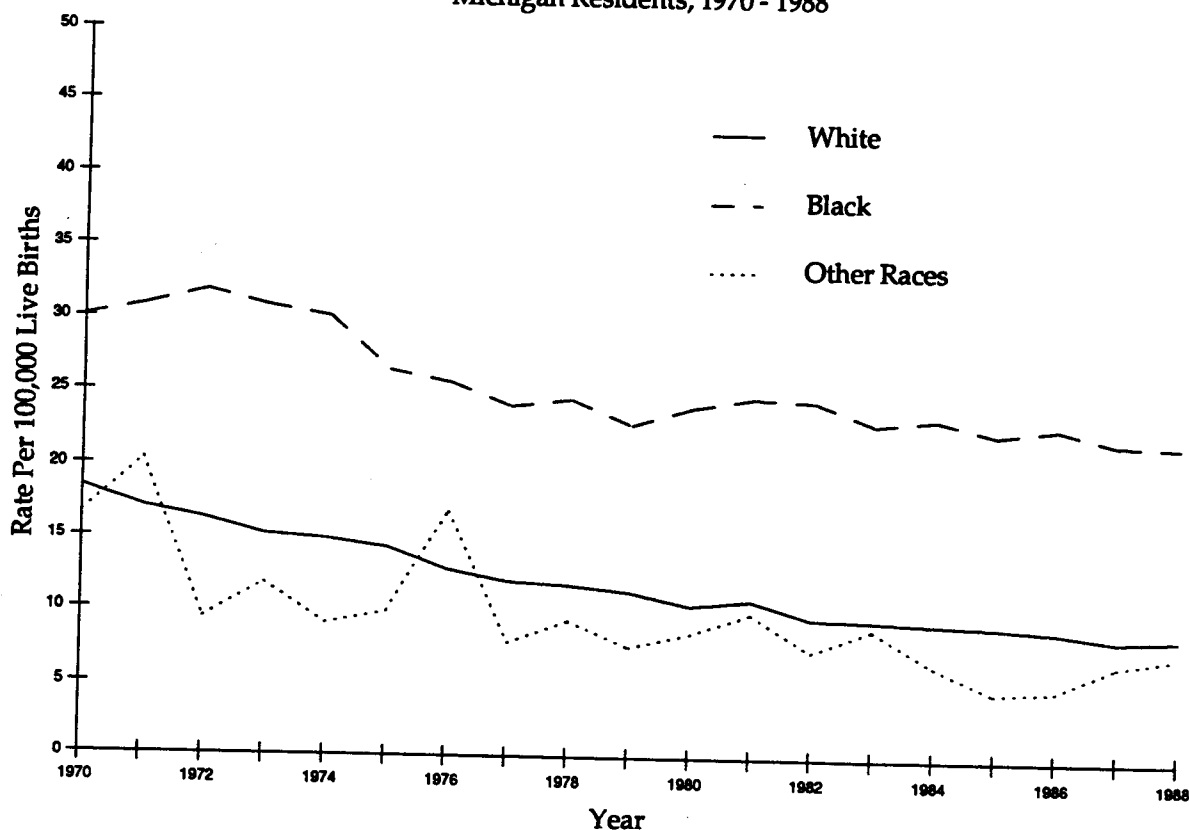


Table 2.54
 Infant Deaths by Age at Death and Underlying Cause
 Michigan Residents, 1988

ICD - 9 CODE	CAUSE OF DEATH	AGE AT DEATH					
		TOTAL UNDER 1 YEAR	<1 DAY	1-6 DAYS	7-27 DAYS	1-5 MONTHS	6-11 MONTHS
8, 9, 535, 555-558	Certain gastrointestinal diseases	5	-	-	-	5	-
38	Septicemia	5	-	-	-	5	-
1-7, 10-37, 39-139	Remainder of infectious and parasitic diseases	13	-	-	3	6	4
320-322	Meningitis	5	-	-	1	3	1
480-487	Pneumonia and influenza	16	-	-	1	11	4
740-759	Congenital anomalies	292	104	66	48	55	19
761	Newborn affected by maternal complications of pregnancy	64	62	2	-	-	-
762	Newborn affected by complications of placenta, cord and membranes	34	31	2	1	-	-
765	Disorders relating to short gestation and unspecified low birthweight	179	169	7	1	2	-
767	Birth trauma	11	1	6	1	2	1
768	Intrauterine hypoxia and birth asphyxia	26	13	7	4	1	1
769	Respiratory distress syndrome	136	53	43	32	8	-
770	Other respiratory conditions of newborn	148	76	26	23	17	6
771	Infections specific to the perinatal period	35	15	4	13	2	1
772	Neonatal hemorrhage	9	3	5	-	1	-
760, 763, 764, 766, 773-779	All other and ill-defined conditions originating in the perinatal period	202	147	34	15	6	-
760-779	Certain conditions originating in the perinatal period	844	570	136	90	39	9
798.0	Sudden infant death syndrome	202	-	1	17	168	16
E800-E949	Accidents and adverse effects	37	-	-	1	27	9
E960-E969	Homicide	8	-	-	-	6	2
Residual	All other causes	115	11	10	9	61	24
TOTAL		1,542	685	213	170	386	88

reported. Sudden infant death syndrome was responsible for 202 infant deaths in 1988, while disorders relating to short gestation and unspecified low birthweight was listed as the cause of 179 deaths.

Over half (54.7 percent) of all infant deaths were attributed to conditions originating in the perinatal period. This proportion was 83.2 percent for those infant deaths which occurred during the first day, 63.8 percent for deaths of infants at ages 1 through 6 days, and 52.9 percent for deaths of infants 7-27 days of age. This percentage was 10.1 percent for infants from 1-5 months and 10.2 percent for those 6-11 months of age.

The most frequent specific cause of death category during the first day was disorders relating to short gestation and unspecified low birthweight (24.7 percent). Congenital anomalies were responsible for 15.2 percent of the deaths during the first day of life. Newborn affected by maternal complications of pregnancy was the cause of 9.1 percent of the deaths to infants during the first day of life. Respiratory distress syndrome and other respiratory conditions of the newborn caused 7.7 and 11.1 percent of the deaths under 1 day of age, respectively.

Congenital anomalies and respiratory distress syndrome were the leading causes of death for infants 1-6 days of age (31.0 percent and 20.2 percent, respectively). For infants who died at 1-3 weeks of age the most frequent causes were congenital anomalies (28.2 percent) and respiratory distress syndrome (18.8 percent).

Sudden infant death syndrome was reported as the cause of 43.5 percent of the deaths to infants from 1-5 months of age. The leading causes of death for infants from 6-11 months of age were congenital anomalies (21.6 percent) and sudden infant death syndrome

(18.2 percent). The 9 deaths due to accidents to infants aged 6-11 months represent 10.2 percent of the total deaths in this age group, while accidental deaths represent only 2.4 percent of all infant deaths.

Infant deaths and death rates by cause are shown for white, black and other race infants in Table 2.55. The most frequent causes of death for white infants were congenital anomalies (227 deaths), sudden infant death syndrome (143 deaths), other respiratory conditions of newborn (100 deaths), respiratory distress syndrome (83 deaths) and disorders relating to short gestation and unspecified low birthweight (68 deaths). For black infants this latter grouping was the leading cause of death with 108 infant deaths. Other frequent causes were congenital anomalies (59 deaths), sudden infant death syndrome (55 deaths), respiratory distress syndrome (51 deaths) and other respiratory conditions of newborn (47 deaths). There were a total of 19 deaths for infants of other races, 7 of which (36.8 percent) were attributed to certain conditions originating in the perinatal period, and 6 attributed to congenital anomalies.

Cause-specific infant death rates for black infants were higher than white infants for all categories with sufficient events to calculate rates for racial groups. The infant death rate due to congenital anomalies for other races was higher than for white and black infants.

The infant death rate from all causes for males was 13.1 percent greater than that for females (Table 2.56). The death rates for males, due to congenital anomalies and sudden infant death syndrome were 19.1 percent and 19.0 percent greater, respectively than rates for females. The largest relative differential in rates by sex were for deaths due to intrauterine hypoxia and birth asphyxia where the rate for males was 2.2 times that for females (Table 2.56).

Table 2.55
Infant Deaths and Infant Death Rates by Race of Infant and Underlying Cause
 Michigan Residents, 1988

ICD - 9 Code	Cause of Death	Race of Infant							
		Total ¹		White		Black		All Other	
		Number	Rate ²	Number	Rate ²	Number	Rate ²	Number	Rate ²
8, 9, 535, 555 - 558 38	Certain gastrointestinal diseases	5	*	1	*	4	*	-	*
1-7, 10-37, 39 - 139	Septicemia	5	*	3	*	1	*	1	*
	Remainder of infectious and parasitic diseases	13	9.3	6	5.4	7	26.9	-	*
320 - 322	Meningitis	5	*	3	*	2	*	-	*
480 - 487	Pneumonia and influenza	16	11.5	10	9.0	6	23.0	-	*
740 - 759	Congenital anomalies	292	209.1	227	204.5	59	226.6	6	234.7
761	Newborn affected by maternal complications of pregnancy	64	45.8	36	32.4	27	103.7	1	*
762	Newborn affected by complications of placenta, cord, and membranes	34	24.3	23	20.7	10	38.4	1	*
765	Disorders relating to short gestation and unspecified low birthweight	179	128.2	68	61.3	108	414.8	3	*
767	Birth trauma	11	7.9	8	7.2	3	*	-	*
768	Intrauterine hypoxia and birth asphyxia	26	18.6	15	13.5	11	42.3	-	*
769	Respiratory distress syndrome	136	97.4	83	74.8	51	195.9	2	*
770	Other respiratory conditions of newborn	148	106.0	100	90.1	47	180.5	-	*
771	Infections specific to the perinatal period	35	25.1	21	18.9	14	53.8	-	*
772	Neonatal hemorrhage	9	6.4	5	*	4	*	-	*
760, 763, 764, 766, 773 - 779	All other and ill-defined conditions originating in the perinatal period	202	144.7	91	82.0	111	426.4	-	*
760 - 779	Certain conditions originating in the perinatal period	844	604.4	450	405.5	386	1,482.7	7	273.9
798.0	Sudden infant death syndrome	202	144.7	143	128.8	55	211.3	4	*
E800-E949	Accidents and adverse effects	37	26.5	25	22.5	12	46.1	-	*
E960-E969	Homicide	8	5.7	4	*	4	*	-	*
Residual	All other causes	115	82.4	80	72.1	34	130.6	1	*
TOTAL		1,542	1,104.3	952	857.8	570	2,189.4	19	743.3

¹ Records with race not stated are included only in total columns.

² Rates per 100,000 live births.

Table 2.56
Infant Deaths and Infant Death Rates by Sex of Infant and Underlying Cause
 Michigan Residents, 1988

ICD - 9 CODE	CAUSE OF DEATH	SEX OF INFANT					
		TOTAL ¹		MALE		FEMALE	
		NUMBER	RATE ²	NUMBER	RATE ²	NUMBER	RATE ²
8, 9, 535, 555-558	Certain gastrointestinal diseases	5	*	2	*	3	*
38	Septicemia	5	*	3	*	2	*
1-7, 10-37, 39-139	Remainder of infectious and parasitic diseases	13	9.3	7	9.8	6	8.8
320-322	Meningitis	5	*	4	*	1	*
480-487	Pneumonia and influenza	16	11.5	8	11.2	8	11.7
740-759	Congenital anomalies	292	209.1	162	226.9	130	190.5
761	Newborn affected by maternal complications of pregnancy	64	45.8	29	40.6	34	49.8
762	Newborn affected by complications of placenta, cord and membranes	34	24.3	20	28.0	14	20.5
765	Disorders relating to short gestation and unspecified low birthweight	179	128.2	88	123.2	88	129.0
767	Birth trauma	11	7.9	5	*	6	8.8
768	Intrauterine hypoxia and birth asphyxia	26	18.6	18	25.2	8	11.7
769	Respiratory distress syndrome	136	97.4	73	102.2	63	92.3
770	Other respiratory conditions of newborn	148	106.0	73	102.2	75	109.9
771	Infections specific to the perinatal period	35	25.1	18	25.2	17	24.9
772	Neonatal hemorrhage	9	6.4	3	*	6	8.8
760, 763, 764, 766, 773-779	All other and ill-defined conditions originating in the perinatal period	202	144.7	111	155.5	88	129.0
760-779	Certain conditions originating in the perinatal period	844	604.4	438	613.4	399	584.8
798.0	Sudden infant death syndrome	202	144.7	112	156.9	90	131.9
E800-E949	Accidents and adverse effects	37	26.5	24	33.6	13	19.1
E960-E969	Homicide	8	5.7	3	*	5	*
Residual	All other causes	115	82.4	69	96.6	46	67.4
TOTAL		1,542	1,104.3	832	1,165.2	703	1,030.4

¹ Records with sex not stated are included only in total columns.

² Rates per 100,000 live births.

Table 2.57
Infant Deaths, Live Births and Infant Death Rates² by Race
 Michigan Resident Infants Born in 1987

RACE	INFANT DEATHS	LIVE BIRTHS	INFANT DEATH RATE
All Races	1,527	140,466	10.9
White	935	112,167	8.3
Black	558	25,729	21.7
American Indian	11	777	14.2
Other Races	22	1,705	12.9
Unknown	1	88	*

Infant mortality rates by race are presented in Table 2.57. These data are from a file of merged live birth and infant death information. The rates presented are for Michigan residents born in 1987. Note that this matched file is approximately 99.9 percent complete and, therefore, the rates presented are only slightly understated.

The rate for black infants (21.7) was 2.6 times that for white infants (8.3). The rate for American Indians (14.2) was 71.1 percent more than the white infant death rate. The rate for other races (12.9) was 55.4 percent more than the white infant death rate.

The death rate for infants aged less than seven days (hebdomadal deaths) showed similar variations by race for those races with sufficient data to calculate rates (Table 2.58). The rate for black infants was 3.3 times that for white infants and the rate for other races was 47.7 percent higher than for white infants.

Data from the matched file on infant mortality rates by age of mother and race of child are presented in Table 2.59. Infant deaths display a parabolic relationship with mother's age. The rates were highest for infants born to mothers under age 15. The infant mortality rate of 18.2 for mothers under 15 years old was 95.7 percent higher than the lowest rate of 9.3 for mothers aged 30-39 years. The

infant mortality rate for mothers 40 or over was 59.1 percent greater than the lowest age-specific rate.

Rates for deaths of white infants generally followed a pattern of decreasing rates associated with increasing mother's age for age groups with sufficient data to calculate rates. For black infants, there was an increase in rates associated with mothers from 15 to 29 years of age followed by a decrease in rate associated with mothers 30-39 years of age. This was a departure from the pattern observed for white infants. Rates for black infants were significantly above those for the

Table 2.58
Hebdomadal Deaths¹ and Death Rates²
 by Race
 Michigan Resident Infants Born in 1987

Race	Hebdomadal Deaths	Hebdomadal Death Rate
All Races	891	6.3
White	499	4.4
Black	378	14.7
American Indian	2	*
Other Races	11	6.5
Unknown	1	*

¹ Deaths to infants less than seven days old.

² Per 1,000 live births.

white group in all categories with a sufficient number of events to calculate rates. The smallest differential was for mothers 15-19 years of age, where the death rate for black infants was 1.5 times the rate for white infants.

Table 2.60 displays the variation in infant death rates according to the number of the mother's prenatal visits. The infant death rate for mothers who had no prenatal care was 80.6, 14.4 times as high as the low rate of 5.6 for mothers who had 10-14 prenatal visits. The rate associated with mothers who had 1-4 visits (85.4) was 15.3 times the low rate, while the rate associated with mothers who had 5-9 visits was 3.2 times as high as the low rate. The infant death rate for mothers with 20 or more prenatal visits was 57.1 percent greater than the low rate, reflecting the likelihood that a high number of prenatal visits was connected with a problem pregnancy.

Infant death rates increased when the mother received less adequate prenatal care as measured by the Kessner Index (Table 2.61). The infant death rate was 3.0 times

greater for mothers with inadequate care (25.7 deaths per 1,000 live births) than for mothers with adequate care (8.6 deaths per 1,000 live births) and 1.7 times greater for mothers with intermediate care (14.8 deaths per 1,000 births). The pattern was similar for both white and black births.

When the mother received adequate care based on the number of visits, the month prenatal care began and the length of gestation, the infant death rate for black infants (16.7) was 2.4 times greater than for white infants (7.0 deaths per 1,000 live births) and 1.5 times greater than for infants of other races. For mothers with adequate care, the infant death rate for white infants was 36.9 percent smaller than the rate for infants of other races.

Mothers with fewer than ten prenatal visits (Table 2.60) had 19.8 percent of all live births but 52.5 percent of all infant deaths. Mothers who had ten or more prenatal visits had 78.0 percent of the live births and 41.8 percent of the infant deaths. The infant death rate for mothers who had fewer than ten prenatal

Table 2.59
Infant Deaths, Live Births and Infant Death Rates by Age of Mother and Race¹ of Infant
Michigan Resident Infants Born in 1987

Age of Mother	All Infants			White Infants			Black Infants			All Other Infants		
	Infant Deaths	Live Births	Death Rate	Infant Deaths	Live Births	Death Rate	Infant Deaths	Live Births	Death Rate	Infant Deaths	Live Births	Infant Death Rate
All Ages	1,527	140,466	10.9	935	112,167	8.3	558	25,729	21.7	33	2,482	13.3
Under 15	6	329	18.2	2	100	*	4	225	*	-	2	-
15 - 19	262	16,911	15.5	137	10,514	13.0	120	6,200	19.4	5	188	*
20 - 24	451	39,314	11.5	281	30,645	9.2	166	8,083	20.5	3	562	*
25 - 29	461	47,052	9.8	289	39,908	7.2	162	6,268	25.8	10	851	11.8
30 - 39	332	35,833	9.3	221	30,211	7.3	97	4,754	20.4	14	842	16.6
40 or More	15	1,015	14.8	5	779	*	9	197	45.7	1	37	*
Not Stated	-	12	-	-	10	-	-	2	-	-	-	-

¹ Race not stated included in total columns only.

Table 2.60
**Infant Deaths, Live Births and Infant Death Rates by Prenatal Visits and
 Race¹ of Infant**
 Michigan Resident Infants Born in 1987

Number of Visits	All Infants			White Infants			Black Infants			All Other Infants		
	Infant Deaths	Live Births	Infant Death Rate	Infant Deaths	Live Births	Infant Death Rate	Infant Deaths	Live Births	Infant Death Rate	Infant Deaths	Live Births	Infant Death Rate
Total	1,527	140,466	10.9	935	112,167	8.3	558	25,729	21.7	33	2,482	13.3
0	105	1,303	80.6	33	610	54.1	71	682	104.1	1	10	*
1 - 4	277	3,245	85.4	133	1,964	67.7	139	1,194	116.4	5	84	*
5 - 9	420	23,325	18.0	290	18,101	16.0	123	4,716	26.1	7	499	14.0
10 - 14	488	86,995	5.6	328	71,408	4.6	149	14,068	10.6	11	1,487	7.4
15 - 19	114	18,335	6.2	69	14,150	4.9	41	3,893	10.5	4	283	*
20 or More	37	4,199	8.8	31	3,459	9.0	5	671	*	1	66	*
Unknown	86	3,064	28.1	51	2,475	20.6	30	505	59.4	4	53	*

¹ Race not stated included in total columns only.

Table 2.61
**Infant Deaths, Live Births and Infant Death Rates by Level of Prenatal Care and
 Race¹ of Infant**
 Michigan Resident Infants Born in 1987

Level of Care (Kessner Index ²)	All Infants			White Infants			Black Infants			All Other Infants		
	Infant Deaths	Live Births	Infant Death Rate	Infant Deaths	Live Births	Infant Death Rate	Infant Deaths	Live Births	Infant Death Rate	Infant Deaths	Live Births	Infant Death Rate
Total	1,527	140,466	10.9	935	112,167	8.3	558	25,729	21.7	33	2,482	13.3
Adequate	878	102,617	8.6	594	84,954	7.0	265	15,908	16.7	19	1,713	11.1
Intermediate	391	26,422	14.8	220	19,186	11.5	161	6,692	24.1	9	534	16.9
Inadequate	221	8,614	25.7	104	5,820	17.9	113	2,611	43.3	4	177	*
Unknown	37	2,813	13.2	17	2,207	7.7	19	518	36.7	1	58	*

¹ Race not stated included in total columns only.

² The Kessner Index is a classification of prenatal care based on the month of pregnancy in which prenatal care began, the number of prenatal visits and the length of pregnancy (i.e., for shorter pregnancies, fewer prenatal visits constitute adequate care).

visits was 28.8. This was 5.0 times the rate of 5.8 for mothers who had ten or more prenatal visits.

While the overall rate for black infants was 2.6 times that for white infants, for mothers who had 5-9 prenatal visits the rate for black infants was close to the rate for white infants (63.1 percent greater). For mothers with fewer than ten prenatal visits, the infant mortality rate for white infants was 22.1 and that for black infants 50.5. For mothers with ten or more prenatal visits, the rate for white infants was 4.8 and for black infants 10.5.

The rate for black infants was, thus, 128.5 percent greater where the mother had fewer than ten prenatal visits and 118.8 percent greater where the mother had ten or more visits. Both of these racial differentials were less than the overall racial differential of 161.4 percent. This seemingly paradoxical result is explained by the differing distributions of the white and the black births. The overall infant mortality rate for each race is a weighted sum

of the infant mortality rates for the different prenatal care categories. The weight for each prenatal care category is the ratio of the number of live births in that category to the total number of live births. Since a greater proportion of the black live births are to mothers in the categories with fewer prenatal visits, the higher infant mortality rates in the categories with fewer prenatal visits are more heavily weighted for the black population.

When deaths under one week are added to fetal deaths, the total is called perinatal deaths. By placing a ceiling of six days for the infant component of perinatal deaths, most postnatal accidental and environmental causes of death are eliminated. In 1987, Michigan resident perinatal deaths numbered 1,715 and the perinatal death rate was 12.1 (Table 2.62). This rate was 12.8 in 1986 and 26.0 in 1970.

As with infant death rates, perinatal death rates vary considerably with race, age of mother, and number of prenatal visits. Tables

Table 2.62
Perinatal Deaths, Total Births and Perinatal Death Rates by Age of Mother and Race¹ of Infant or Fetus
Births to Michigan Residents in 1987

Age of Mother	All Infants			White Infants			Black Infants			All Other Infants		
	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate
All Ages	1,715	141,290	12.1	1,080	112,748	9.6	603	25,954	23.2	26	2,495	10.4
Under 15	11	335	32.8	4	102	*	7	229	30.6	-	2	-
15 - 19	273	17,047	16.0	143	10,594	13.5	129	6,255	20.6	-	188	-
20 - 24	432	39,504	10.9	254	30,774	8.3	172	8,140	21.1	5	566	*
25 - 29	522	47,306	11.0	350	40,102	8.7	164	6,325	25.9	8	854	9.4
30 - 39	445	36,048	12.3	317	30,377	10.4	114	4,796	23.8	12	847	14.2
40 or More	20	1,026	19.5	11	788	14.0	8	198	40.4	1	38	*
Not Stated	12	24	500.0	1	11	*	9	11	818.2	-	-	-

¹ Race not stated included in total columns only.

2.62 and 2.63 show perinatal deaths and rates by age of mother, the number of the mother's prenatal visits, and the race of the fetus or infant for fetal deaths and live births occurring in 1987. The data for hebdomadal deaths are drawn from a merged file of birth and death data. As a result, perinatal deaths and rates are slightly understated.

Table 2.62 displays the increased risk of death to fetuses and infants of mothers under 20 years of age or 40 or greater years of age. Minimum risk in 1987 was associated with mothers 20-24 years of age.

The overall perinatal mortality rate for black fetuses and infants was over 2.4 times the rate for white fetuses and infants. The highest perinatal death rate for both the black and white groups was associated with mothers 40 or more years of age. The minimum risk was associated with mothers 20-24 years of age for white fetuses and infants and with mothers 15-19 years of age for black fetuses and infants. The overall perinatal mortality rate

for fetuses and infants of races other than black and white was 8.3 percent more than the white infant and fetus rate, and 55.2 percent less than the rate for black fetuses and infants.

The perinatal death rate was over thirty-two times higher for fetuses and infants whose mothers had less than 5 prenatal visits than for those whose mothers had 10-14 visits (Table 2.63). The rate of death associated with 5-9 prenatal visits was 6.1 times higher than the rate for the lowest risk category (10-14 visits).

For both white and black fetuses and infants the highest mortality rates were associated with mothers who received less than 5 prenatal visits. The perinatal death rates were higher for black fetuses and infants than for white fetuses and infants for every category of the number of prenatal care visits where sufficient data were available to calculate rates. The highest differential was 113.3 percent when the mother had 15-19 visits. The

Table 2.63
Perinatal Deaths, Total Births and Perinatal Death Rates by Prenatal Visits and Race¹ of Infant or Fetus
Births to Michigan Residents in 1987

Number of Visits	All Infants			White Infants			Black Infants			All Other Infants		
	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate
Total	1,715	141,290	12.1	1,080	112,748	9.6	603	25,954	23.2	26	2,495	10.4
0	170	1,387	122.6	67	649	103.2	99	724	136.7	2	11	*
1 - 4	403	3,414	118.0	243	2,090	116.3	151	1,232	122.6	9	89	101.1
5 - 9	531	23,597	22.5	377	18,311	32.6	148	4,776	59.1	6	501	12.0
10 - 14	325	87,147	3.7	233	71,540	3.3	90	14,087	6.4	1	1,487	*
15 - 19	83	18,365	4.5	56	14,174	3.0	26	3,898	6.4	1	284	*
20 or Over	19	4,209	4.5	16	3,466	4.6	3	674	*	-	66	-
Unknown	184	3,171	58.0	88	2,518	34.9	86	563	152.8	7	57	122.8

¹ Race not stated included in total columns only.

differential was least for the 1-4 visits category where the black perinatal mortality rate was 5.4 percent more than the white rate.

The perinatal death rates increased for mothers with less than adequate prenatal care. The death rate was 4.5 times higher for mothers with inadequate care than for mothers with adequate care (38.2 vs 8.5 deaths per 1,000 live births and fetal deaths, respectively). The perinatal death rate of black fetuses and infants of mothers with adequate care was 2.1 times as high as the rate for white fetuses and infants and 2.6 times higher than the rate for fetuses and infants of races other than black and white with adequate prenatal care. The rate for black fetuses and infants of mothers with inadequate care was 2.0 times the rate for white fetuses and infants of mothers with inadequate care (Table 2.64).

The median birth weight of infants born in 1987 and dying prior to 1 year of age was 1,276 grams (Table 2.65). The median birth weight of all Michigan resident live births in 1987 was 3,400 grams. For all maternal age

groups, the median birth weight for infant deaths was well below the overall median birth weight for liveborn infants in 1987.

Infant death rates by race, birth weight and age at death are displayed in Table 2.66 for infants born in 1987. While the overall infant death rate for black infants was 2.6 times that of white infants, the rate for black infants was only 3.1 percent higher than for white infants born weighing 1,500 grams or less. The rate for white infants weighing 1,501-2,499 grams was 4.0 percent higher than the comparable rate for black infants. For infants weighing 2,500 grams or more the rate for black infants exceeded by 54.3 percent that for white infants. A large part of the difference between infant death rates for white and black infants was due to the fact that a greater proportion of the black infants were born at weights below 2,500 grams (14.4 percent for black infants compared to 5.5 percent for white infants).

Differentials in death rates by race for deaths under 28 days (neonatal deaths) and

Table 2.64
Perinatal Deaths, Total Births and Perinatal Death Rates by Level of Prenatal Care and Race¹ of Infant or Fetus
Births to Michigan Residents in 1987

Level of Care (Kessner Index ²)	All Infants			White Infants			Black Infants			All Other Infants		
	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate	Perinatal Deaths	Total Births	Perinatal Death Rate
Total	1,715	141,290	12.1	1,080	112,748	9.6	603	25,954	23.2	26	2,495	10.4
Adequate	875	103,009	8.5	626	85,272	7.3	239	15,976	15.0	10	1,719	5.8
Intermediate	391	26,597	14.7	229	19,315	11.9	153	6,736	22.7	7	535	13.1
Inadequate	336	8,792	38.2	168	5,914	28.4	156	2,685	58.1	8	183	43.7
Unknown	113	2,892	39.1	57	2,247	25.4	55	557	98.7	1	58	*

¹ Race not stated included in total columns only.

² The Kessner Index is a classification of prenatal care based on the month of pregnancy in which prenatal care began, the number of prenatal visits and the length of pregnancy (i.e., for shorter pregnancies, fewer prenatal visits constitute adequate care).

Table 2.65
Infant Deaths by Birth Weight and Mother's Age¹
 Michigan Resident Infants Born in 1987

BIRTH WEIGHT IN GRAMS	MOTHER'S AGE						
	TOTAL	UNDER 15	15-19	20-24	25-29	30-39	40 OR MORE
Total	1,527	6	262	451	461	332	15
500 or Less	324	-	44	84	105	89	2
501 - 1,000	366	5	74	107	91	82	7
1,001 - 1,500	108	-	23	31	35	18	1
1,501 - 2,000	92	-	16	25	27	23	1
2,001 - 2,499	115	-	19	28	39	27	2
2,500 - 3,000	154	-	34	40	52	27	1
3,001 - 3,500	181	1	28	62	63	26	1
3,501 - 4,000	123	-	12	56	33	22	-
4,001 - 4,500	38	-	4	13	11	10	-
4,501 and Over	9	-	3	2	2	2	-
Not Stated	17	-	5	3	3	6	-
Median Weight in Grams	1,276	600	1,191	1,531	1,446	907	630

¹ Age not stated included in total column only.

from 28-364 days (postneonatal deaths) departed somewhat from the pattern noted for all infant deaths. For infants weighing less than 1,501 grams, the neonatal rate for black infants was only 0.6 percent greater than for white infants. The postneonatal rate for black infants, however, was 34.8 percent higher than the comparable rate for white infants. The neonatal rate for white infants weighing 1501-

2,499 grams was 12.1 percent greater than the comparable rate for black infants while the postneonatal death rate for black infants in this birth weight category exceeded the comparable rate for white infants by 6.3 percent. For infants weighing 2,500 grams or more at birth, the rates were greater for black infants by 83.3 percent and 39.1 percent, respectively, for neonatal and postneonatal deaths.

Table 2.66
 Live Births by Birth Weight and Race of Infant and Infant Deaths and
 Infant Death Rates by Birth Weight, Age at Death, and Race of Infant
 Michigan Resident Infants Born in 1987

BIRTH WEIGHT	RACE OF INFANT	LIVE BIRTHS	AGE AT DEATH					
			UNDER 1 YEAR		UNDER 28 DAYS		28 - 364 DAYS	
			NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
Total	All Races	140,466	1,527	10.9	1,041	7.4	486	3.5
	White	112,167	935	8.3	605	5.4	330	2.9
	Black	25,729	558	21.7	417	16.2	141	5.5
	All Other ¹	2,482	33	13.3	18	7.3	15	6.0
Less Than 1,501 Grams	All Races	2,018	798	395.4	731	362.2	67	33.2
	White	1,081	421	389.5	390	360.8	31	28.7
	Black	904	363	401.5	328	362.8	35	38.7
	All Other ¹	32	13	406.3	12	375.0	1	*
1,501-2,499 Grams	All Races	8,077	207	25.6	114	14.1	93	11.5
	White	5,118	133	26.0	76	14.8	57	11.1
	Black	2,803	70	25.0	37	13.2	33	11.8
	All Other ¹	151	4	*	1	*	3	*
2,500 Grams Or Greater	All Races	130,331	505	3.9	182	1.4	323	2.5
	White	105,945	371	3.5	129	1.2	242	2.3
	Black	22,009	119	5.4	48	2.2	71	3.2
	All Other ¹	2,296	15	6.5	5	*	10	4.4
Unknown Birthweight	All Races	40	17	425.0	14	350.0	3	*
	White	23	10	434.8	10	434.8	-	-
	Black	13	6	461.5	4	*	2	*
	All Other ¹	3	1	*	-	-	1	*

¹ Race not stated included in total rows only.

COMMUNICABLE DISEASE DEATHS

Although comprising a smaller proportion of deaths than they have in the past, communicable disease deaths continue to be a public health concern. In 1988, deaths from all infectious and parasitic diseases numbered 1,308. As can be observed from Table 2.67, over three-fifths of these deaths were caused by septicemia (797 deaths). There were 216 deaths attributable to HTLV-III/LAV infection ("AIDS"). Mycoses and tuberculosis caused 75 and 42 deaths, respectively. When

deaths attributed to late effects of tuberculosis are included, the number of deaths from tuberculosis rises to 46. The number of AIDS deaths in 1988 was 35.0 percent higher than the 160 deaths reported in 1987.

The distribution of infectious and parasitic disease deaths by age, race, and sex for 1988 is given in Table 2.68, and the corresponding death rates are shown in Table 2.69. Note that deaths to black persons accounted for 25.0

Table 2.67
Deaths from Selected Infectious and Parasitic Diseases
Michigan Residents, 1988

ICD LIST ¹ NUMBER	CAUSE OF DEATH	FREQUENCY
038	Septicemia	797
042-044	HTLV-III/LAV Infection (AIDS)	216
110-118	Mycoses	75
010-018	Tuberculosis	42
070	Viral Hepatitis	32
135	Sarcoidosis	22
136.3	Pneumocystosis	10
046	Slow Virus Infection of Central Nervous System	9
040.0	Gas Gangrene	8
036	Meningococcal Infection	5
054	Herpes Simplex	5
053	Herpes Zoster	5
137	Late Effects of Tuberculosis	4
052	Chickenpox	4
Residual 000-139	All Other Infectious and Parasitic Diseases	74
Total		1,308

¹ Detailed list of the 9th revision of the International Classification of Diseases. WHO.

percent of all infectious and parasitic disease deaths but only 14.4 percent of deaths from all causes. The death rates were highest for persons aged 65 years and over (73.1 deaths per 100,000 population) and for infants under 1 year (14.3). Rates for black males were highest, followed by those for black females, white males and white females, respectively.

Deaths due to such diseases as diphtheria, scarlet fever, streptococcal sore throat, small pox, typhoid fever, measles, poliomyelitis and others have been virtually eliminated not only in Michigan, but across the nation. Table 4.7 illustrates trends in deaths from the major communicable diseases.

Table 2.68
Deaths Due to Infectious and Parasitic Diseases by Age, Race and Sex
Michigan Residents, 1988

AGE	TOTAL	MALE			FEMALE		
		WHITE	BLACK	OTHER RACES	WHITE	BLACK	OTHER RACES
All Ages	1,308	497	195	3	479	132	2
Under 1 Year	20	7	3	1	3	6	-
1 - 19 Years	23	8	3	1	9	1	1
20 - 44 Years	253	120	84	-	21	28	-
45 - 64 Years	221	94	44	-	55	27	1
65 or Over	791	268	61	1	391	70	-

Table 2.69
Infectious and Parasitic Disease Death Rates by Age, Race and Sex
Michigan Residents, 1988

AGE	TOTAL	MALE			FEMALE		
		WHITE	BLACK	OTHER RACES	WHITE	BLACK	OTHER RACES
All Ages	14.2	12.9	33.8	*	11.9	20.3	*
Under 1 Year	14.3	12.3	*	*	*	49.2	*
1 - 19 Years	0.9	0.7	*	*	0.9	*	*
20 - 44 Years	7.0	7.8	37.9	*	1.4	10.8	*
45 - 64 Years	12.6	12.5	51.6	*	6.9	25.7	*
65 or Over	73.1	67.5	145.5	*	67.8	117.4	*

INJURY AT WORK

There were 170 deaths reported as resulting from injuries at work in 1988, 1 less than in 1987 (Table 2.70). These include all cases in which the underlying cause of death was external and the injury was reported to have occurred at work, whether or not the injury was work-related.

Table 2.70 gives the frequency of deaths due to injuries at work by place of occurrence. The most common sites were industrial places and premises with 48 deaths. Injuries on streets and highways caused 34 deaths fol-

lowed by injuries in public buildings with 31 deaths. There were 16 deaths from injuries taking place on farms.

The most frequent cause of death associated with injuries at work was homicide and legal interventions which resulted in 30 deaths or 17.6 percent of all such deaths (Table 2.71). The second most common cause was motor vehicle traffic accidents, accounting for 28 deaths and 16.5 percent of the total. Accidents caused by machinery accounted for 20 deaths.

Table 2.70
Deaths Due to Injury at Work by Place of Injury
Michigan Residents, 1988

PLACE	NUMBER OF DEATHS
Industrial Place and Premises	48
Street and Highway	34
Public Building	31
Farm	16
Home	12
Place for Recreation and Sport	3
Mine and Quarry	3
Resident Institution	1
Other Specified Places	19
Place Not Specified	3
Total	170

Table 2.71
Deaths Due to Injury at Work by Cause of Death
Michigan Residents, 1988

ICD LIST ¹ NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
E960-E978	Homicide and Legal Intervention	30	17.6
E810-E819	Motor Vehicle Traffic Accidents	28	16.5
E919	Accidents Caused by Machinery	20	11.8
E916	Struck Accidentally by Falling Object	18	10.6
E880-E888	Accidental Falls	16	9.4
E925	Accidents Caused by Electric Current	11	6.5
E840-845	Air and Space Transport Accidents	7	4.1
E820-E825	Motor Vehicle Nontraffic Accidents	6	3.5
E890-E899	Accident Caused by Fire and Flames	4	2.4
E928	Other & Unspecified Environmental & Accidental Causes	3	1.8
E910	Accidental Drowning & Submersion	3	1.8
E950-E959	Suicide	2	1.2
E913	Accidental Mechanical Suffocation	2	1.2
E860-E869	Accidental Poisoning Caused by Gases & Vapors	2	1.2
Residual E800-E949	All Other Accidents	18	10.6
Total		170	100.0

¹ Detailed List of the 9th Revision of the International Classification of Diseases, WHO.

LIFE EXPECTANCY

The life expectancy of a Michigan resident at birth was 74.5 years, based on 1988 mortality and population data. Females demonstrated a significantly greater longevity than males. In 1988 the life expectancy at birth was 71.3 years for males and 77.6 years for females. This results from the higher mortality rates of males at all ages.

Life expectancies by sex in selected years for Michigan and United States residents are presented in Table 2.72. It can be seen that longevity has increased greatly in Michigan since 1901, by 17.9 years for males and by 22.5 years for females. Females born in Michigan in 1901 could expect to live 1.7 years longer than their male counterparts. By 1950 the differential in life expectancy between the sexes was 5.5 years. This disparity increased to 7.6 years by 1971, remained constant through 1973, and by 1988 had declined to 6.3 years similar to that in 1960. Between 1978 and 1988 life expectancy increased by 1.8 years for males and 1.2 years for females.

The life expectancy of Michigan residents was well above that for the nation in 1901, but this differential had virtually disappeared by 1950. From 1971 to 1979 both males and females in Michigan had a slightly lower life expectancy than males and females in the nation. In 1980 the life expectancy of males in Michigan was equal to that for males nationwide, at 70.0 years, while longevity for females residing in this state was 0.5 years below the average for the country.

Between 1981 and 1988 both males and females in Michigan again had lower life expectancy than both sex groups in the nation. By 1988 the life expectancies of males and females in Michigan were 0.1 and 0.7 years, respectively, below the national provisional life expectancy. Note that females have con-

Table 2.72
Life Expectancy at Birth by Sex
Michigan and United States Residents
Selected Years, 1901 - 1988³

UNITED STATES		YEAR	MICHIGAN	
MALE	FEMALE		MALE	FEMALE
47.6	50.6	1901	53.4	55.1
48.4	51.8	1910	53.9	56.2
53.6	54.6	1920	55.1 ¹	56.0 ¹
58.1	61.6	1930	59.8 ¹	53.8 ¹
60.8	56.2	1940	63.4 ¹	67.4 ¹
65.6	71.1	1950	65.7	71.2
66.6	73.1	1960	67.1	73.3
67.1	74.7	1970	67.2	74.6
67.4	75.0	1971	67.3	74.9
67.4	75.1	1972	67.3	74.9
67.6	75.3	1973	67.4	75.0
68.2	75.9	1974	68.0	75.3
68.8	76.6	1975	68.5	75.7
69.1	76.8	1976	69.0	75.9
69.5	77.2	1977	69.3	76.3
69.6	77.3	1978	69.5	76.4
70.0	77.8	1979	70.0	76.8
70.0	77.4	1980	70.0	76.9
70.4	77.8	1981	70.3	77.1
70.9	78.1	1982	70.6	77.4
71.0	78.1	1983	70.7	77.4
71.2	78.2	1984	70.8	77.2
71.2	78.2	1985	70.6	77.4
71.3	78.3	1986	70.7	77.4
71.5	78.4	1987	71.1	77.4
71.4 ²	78.3 ²	1988	71.3	77.6

¹ Michigan data for years 1920, 1930, and 1940 are for white persons only.

² Provisional data.

³ Data for 1981 - 1985 have been revised.

sistently demonstrated greater longevity than males both in Michigan and in the United States.

White persons displayed a life expectancy 7.2 years greater than persons of all other races in 1988. The life expectancy of white males was 8.4 years greater than all other males in 1988 compared to a differential of 5.8 years in 1950 (Table 2.73). In 1970 the differential was 7.2 years, due in part to an actual reduction in life expectancy for all other males between 1960 and 1970. Life expectancy for

males of all other races increased from 61.0 in 1970 to 65.3 years in 1982 and 1983 and decreased to 63.8 in 1986 and increased to 64.2 in 1988, while the life expectancy for white males rose from 68.2 in 1970 to 72.6 years in 1988. This is a reflection of the decline in mortality rates for several leading causes of death for these groups prior to 1981.

The differential by race for female life expectancies has declined over the 1950-1988 period. In 1950, Michigan resident white females had an average longevity 8.5 years

Table 2.73
Life Expectancy at Birth by Sex and Race
Michigan Residents, Selected Years, 1950 - 1988¹

POPULATION SUBGROUP	YEAR											
	1950	1960	1970	1980	1981	1982	1983	1984	1985	1986	1987	1988
Total Population	68.3	70.0	70.8	73.4	73.7	74.0	74.1	74.1	74.0	74.1	74.2	74.5
Total Male	65.7	67.1	67.2	70.0	70.3	70.6	70.7	70.8	70.6	70.7	71.1	71.3
Total Female	71.2	73.3	74.6	76.9	77.1	77.4	77.4	77.2	77.4	77.4	77.4	77.6
Total White	68.8	70.5	71.6	74.3	74.4	74.8	74.9	75.0	74.9	75.1	75.3	75.6
White Male	66.2	67.5	68.2	71.0	71.1	71.5	71.6	71.8	71.7	71.9	72.4	72.6
White Female	71.9	74.0	75.3	77.6	77.7	78.0	78.1	78.0	78.1	78.2	78.2	78.5
Total All Other	61.8	65.6	65.0	68.5	69.3	69.6	69.5	68.9	68.6	68.2	68.5	68.4
All Other Male	60.4	63.6	61.0	64.3	65.2	65.3	65.3	64.7	64.0	63.8	64.0	64.2
All Other Female	63.4	67.7	69.4	72.7	73.4	73.8	73.7	73.0	73.2	72.7	73.0	72.5

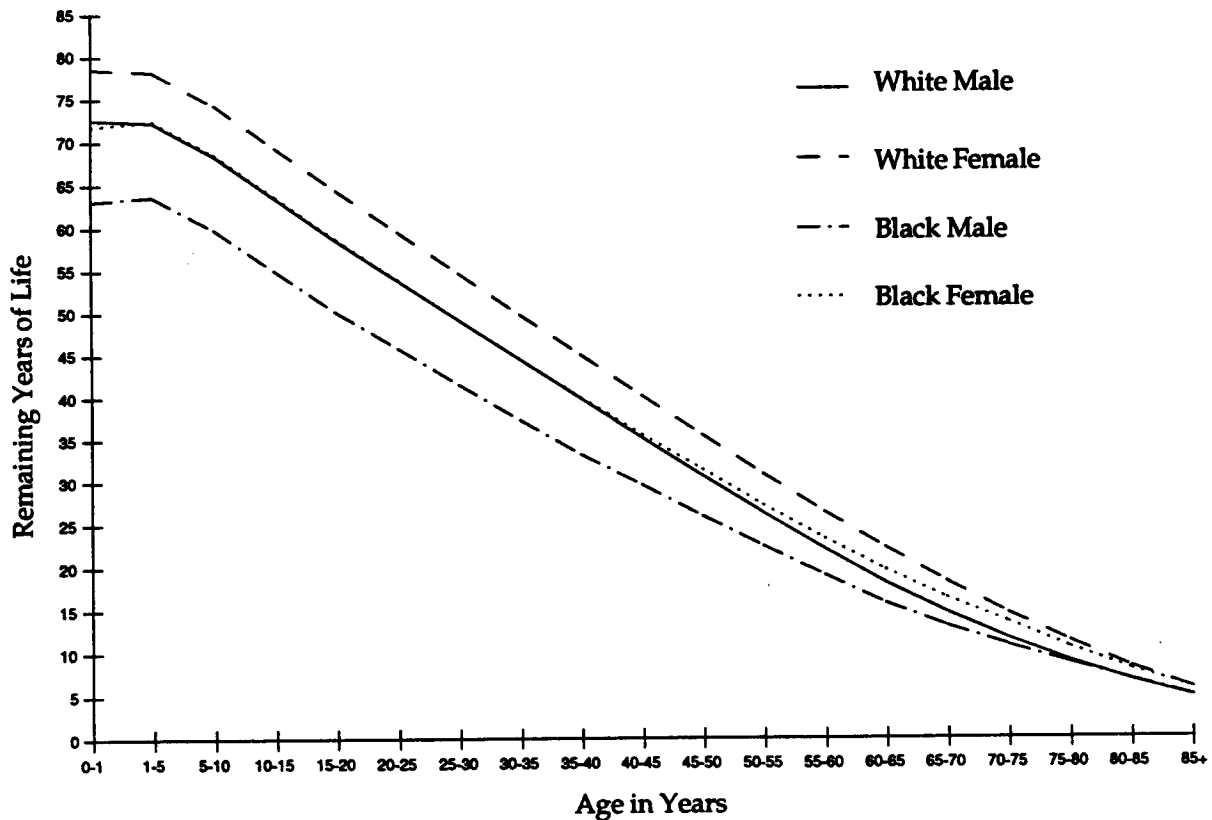
¹ Data for 1981 - 1985 have been revised.

greater than females of all other races. This disparity declined to 4.3 years by 1980 and increased to 6.0 years by 1988. Life expectancy generally increased for white females between 1950 and 1988, but it peaked for all other females in 1982 and has generally declined since then.

During 1980 through 1989, the life expectancy of white males and females increased by 2.3 and 1.2 percent, respectively; while the life expectancy of other than white males and females decreased by 0.2 and 0.3 percent.

The expected number of years of life remaining are presented graphically by age, race, and sex in Figure 2.51. The number of years of life remaining for females was greater than that for males throughout life. The average number of years remaining for white males and females surpassed or equaled that of their black counterparts for all age groups. However, black persons displayed similar life expectancies with their white counterparts in age intervals over 69 years.

Figure 2.51
 Remaining Years of Life by Age, Sex and Race
 Michigan Residents, 1988



PLACE OF OCCURRENCE

There were 2,251 Michigan resident deaths in 1988 that occurred outside the state. This represents 2.8 percent of all resident deaths. Of the 2,251 deaths among Michigan residents 476 (21.1 percent) occurred in the state of Ohio, more than in any other state. The state with the second highest number of Michigan resident deaths was Florida with 19.9 percent (447 deaths). The border areas of Illinois, Indiana, Ohio, Wisconsin, and Canada accounted for 52.3 percent of all resident deaths outside Michigan. In addition to the above-mentioned areas, over 50 Michigan resident

deaths occurred in each of the following states: California, Texas, Arizona and Minnesota. Michigan resident deaths occurred in 45 of the 50 states in 1988, the District of Columbia, and Canada (Table 2.74).

Of the 1,090 non-residents that died in Michigan in 1988, 46.6 percent were from the border areas while 21.9 percent were Floridians. Overall, non-residents who died in Michigan were residents of 40 states, the District of Columbia, Canada and at least four foreign countries.

Table 2.74
Michigan Resident Deaths
 Occurring Outside Michigan by Place of Occurrence and
 Occurring in Michigan to Non-Michigan Residents by
 Place of Residence, 1988

Geographic Area	Deaths of Residents Occurring Outside Michigan		Deaths of Non-Residents Occurring In Michigan	
	Number	Percent	Number	Percent
Total	2,251	100.0	1,090	100.0
Ohio	476	21.1	164	15.0
Florida	447	19.9	239	21.9
Indiana	308	13.7	64	5.9
Wisconsin	306	13.6	164	15.0
Illinois	83	3.7	83	7.6
Arizona	80	3.6	22	2.0
Minnesota	61	2.7	10	0.9
California	57	2.5	39	3.6
Texas	51	2.3	23	2.1
Tennessee	44	2.0	17	1.6
New York	15	0.7	22	2.0
Canada	4	0.2	34	3.1
Other Areas	319	14.2	209	19.2

YEARS OF POTENTIAL LIFE LOST

Another measure of the impact that causes of death have on a population, the years of potential life lost below age 65, is used by the National Centers for Disease Control. The years of potential life lost is calculated as the number of years between the age at death and 65 years of age for persons dying before their 65th year.

Table 2.75 includes the years of potential life lost to the Michigan population in 1988 for the ten leading causes of death and selected other

causes, as well as the rankings of these causes based on years of potential life lost for Michigan in 1987 and 1988 and the United States in 1987 the most recent year for which ranking was available. Accidents, with 80,067 total years lost in Michigan, was the leading cause of years of potential life lost in both Michigan and the United States. Homicide and suicide, combined, ranked third in Michigan and fourth in the United States. Three causes, congenital anomalies, prematurity and sudden infant death

Table 2.75
Years of Potential Life Lost Below Age 65
Due to the Ten Leading Causes of Death and Selected Other Causes
Michigan Residents, 1988

1988 RANK	CAUSE OF DEATH	YEARS OF POTENTIAL LIFE LOST			1987 RANK	
		TOTAL ¹	MALE	FEMALE	MICH.	U.S. ²
1	Accidents and Adverse Effects	80,067	57,758	22,309	1	1
2	Malignant Neoplasms	72,187	36,570	35,617	2	2
3	Homicide/Suicide	59,118	46,995	12,123	3	4
4	Diseases of the Heart	58,567	40,648	17,919	4	3
5	Congenital Anomalies	23,933	13,121	10,812	5	5
6	Prematurity ³	20,432	10,385	9,836	6	6
7	Sudden Infant Death Syndrome	13,464	7,512	5,952	7	8
8	Chronic Liver Disease and Cirrhosis	10,285	7,210	3,075	8	10
9	Cerebrovascular Diseases	10,054	5,930	4,124	9	9
10	Diabetes Mellitus	6,028	3,235	2,793	12	13
11	Pneumonia and Influenza	5,985	3,180	2,805	10	11
12	HTLV-III/LAV Infection (AIDS)	5,813	5,208	605	13	7
13	Chronic Obstructive Pulmonary Diseases and Allied Conditions	5,333	2,883	2,450	11	12
14	Atherosclerosis	447	315	132	14	⁴
	All Other	91,207	53,468	37,481		

¹ Total includes data for individuals with sex unspecified.

² U.S. rankings based on a 10 percent sample of provisional data.

³ Codes 765 and 769, detailed list of the 9th revision of the International Classification of Diseases, WHO.

⁴ Not reported by CDC.

syndrome (SIDS), associated with infancy, ranked as the fifth, sixth and seventh leading causes of potential life lost, respectively, in Michigan.

Rankings of the leading causes of potential life lost were reasonably similar for Michigan and the United States with the exception of AIDS. For Michigan, AIDS was the 13th leading cause of years of potential life lost in 1987. In 1988, AIDS was ranked 12th in Michigan. For the United States, AIDS ranked seventh as a cause of years of potential life lost in 1987.

Besides the difference in ranking noted for AIDS, other changes occurred in the Michigan rankings of leading causes of years of potential life lost between 1987 and 1988 for rankings above the 9th leading cause. Diabetes mellitus which was 12th in 1987, was 10th in 1988; pneumonia and influenza

dropped from 10th to 11th; and chronic obstructive pulmonary diseases and allied conditions dropped from 11th to 13th.

For all causes of death listed in Table 2.75, Michigan males lost more potential years of life than Michigan females. The ranking of the leading causes of years of potential life lost was different from the ranking of numbers of deaths presented in Table 2.7. Diseases of the heart was the leading cause of death but was the fourth leading cause of years of potential life lost. Accidents and adverse effects, which was the fourth leading cause of death, was the leading cause of years of potential life lost. Chronic obstructive pulmonary disease, pneumonia and influenza, and atherosclerosis, which were among the ten leading causes of death, were not among the ten leading causes of years of potential life lost.

MARRIAGE & DIVORCE

SECTION III



MARRIAGE AND DIVORCE

AN OVERVIEW, 1988

TOTAL MARRIAGES	75,386
TOTAL DIVORCES AND ANNULMENTS	40,103
MARRIAGE RATE ¹	16.3
DIVORCE RATE ¹	8.7
MEDIAN AGE OF THE BRIDE	25
MEDIAN AGE OF THE GROOM	27

¹ Number of persons married or divorced per 1,000 population.

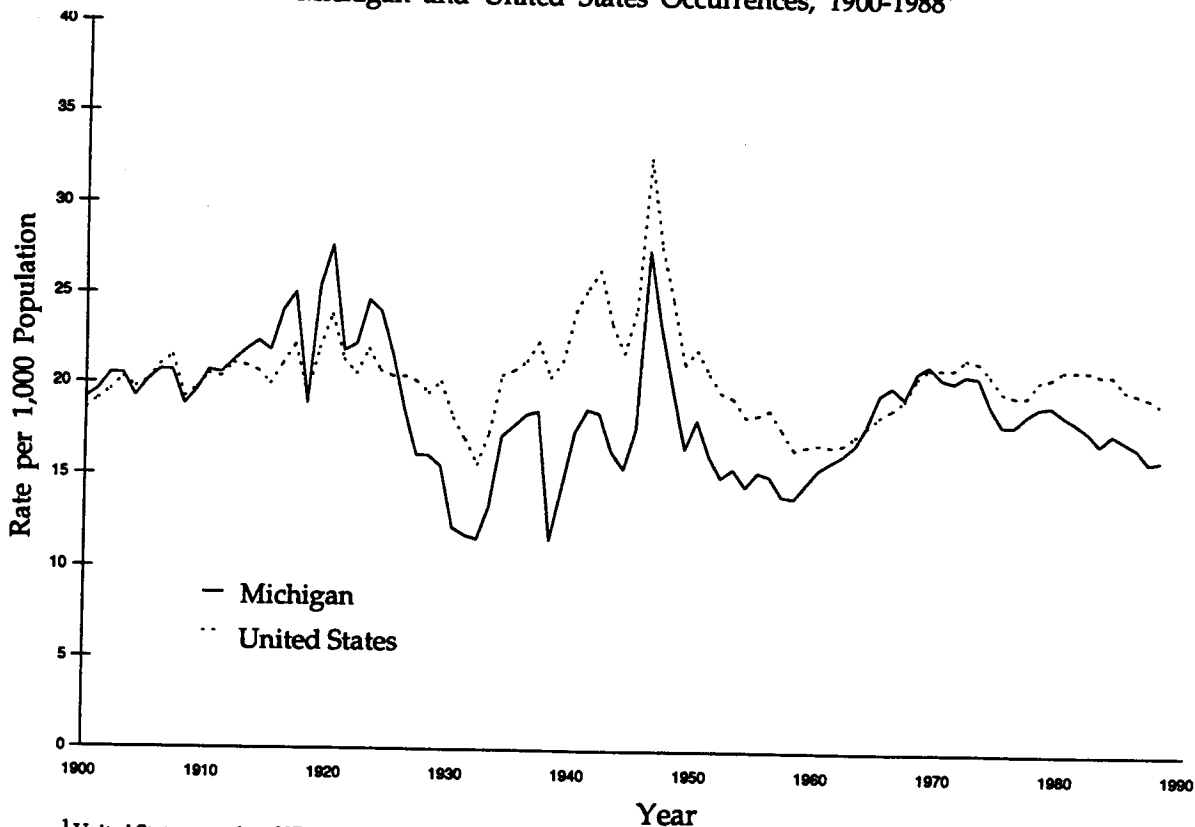
The number of marriages and divorces occurring in Michigan has increased considerably since 1900. While the frequency of marriage has generally followed the growth

of Michigan's population, the rate of persons dissolving their marriages has increased over fourfold since 1900.

The smallest number of marriages in the years 1900 to 1988 was 23,295 in 1900, while the largest number was 94,486 in 1973 (Table 3.1). The number in 1988 was 75,386. The marriage rate was 16.3 per 1,000 population (Figure 3.1).

The number of divorces and annulments increased from a low of 2,435 in 1900 to a high of 45,047 in 1980. In 1988 the number of divorces and annulments was 40,103. The divorce rate was 8.7 per 1,000 populations.

Figure 3.1
Marriage Rates
Michigan and United States Occurrences, 1900-1988¹



¹ United States rates for 1987 and 1988 are provisional.

Table 3.1
Marriages and Marriage Rates¹
Michigan and United States Occurrences
 Selected Years, 1900 - 1988

UNITED STATES		YEAR	MICHIGAN	
NUMBER	RATE		NUMBER	RATE
709,000	18.6	1900	23,295	19.2
948,000	20.5	1910	29,039	20.7
1,274,476	23.9	1920	50,805	27.7
1,126,856	18.3	1930	29,482	12.2
1,595,879	24.2	1940	46,342	17.6
1,667,231	22.1	1950	58,180	18.3
1,523,000	17.0	1960	61,090	15.6
1,548,000	16.9	1961	63,320	16.0
1,577,000	17.0	1962	65,002	16.4
1,654,000	17.5	1963	68,160	17.0
1,725,000	18.0	1964	73,911	18.2
1,800,000	18.6	1965	81,247	19.8
1,857,000	19.0	1966	83,903	20.2
1,927,000	19.5	1967	84,363	19.6
2,069,000	20.7	1968	90,984	21.0
2,145,000	21.2	1969	93,392	21.4
2,158,802	21.2	1970	91,933	20.7
2,190,481	21.2	1971	92,134	20.5
2,282,154	21.8	1972	94,447	20.9
2,284,108	21.6	1973	94,486	20.8
2,229,667	20.9	1974	88,023	19.3
2,152,662	20.0	1975	82,856	18.2
2,154,807	19.8	1976	82,753	18.2
2,178,367	19.8	1977	86,088	18.8
2,282,272	20.6	1978 ²	88,333	19.2
2,331,337	20.8	1979	89,450	19.3
2,390,252	21.2	1980	86,898	18.8
2,422,145	21.2	1981	85,252	18.4
2,456,278	21.2	1982	82,633	17.9
2,445,604	21.0	1983	78,910	17.2
2,477,192	21.0	1984	80,810	17.8
2,412,625	20.2	1985	79,022	17.4
2,407,099	20.0	1986	77,815	17.0
2,421,000Pr.	19.8Pr.	1987	74,418	16.2
2,389,000Pr.	19.4Pr.	1988	75,386	16.3

¹ Number of persons married per 1,000 population.

² Beginning with 1978, marriage data for the United States include nonlicensed marriages registered in California. If nonlicensed marriages were included in the 1977 total, the marriage rate would increase from 19.8 to 20.1.

MARRIAGES

Since 1900 there have been noticeable changes in the marriage rates both nationally and in Michigan (Figure 3.1). The marriage rates observed for the state have generally followed the pattern of rising and falling rates observed nationally. Strong historic shifts in rates have been related most notably to the factors of war and the economy. The highest rates observed during this century were for the years immediately following the end of the two World Wars (27.7 in 1920 and 27.6 in 1946). The lowest rates occurred during the Great Depression of the 1930's.

The number of persons married each year per 1,000 population was higher in Michigan than in the country for 19 of the 26 years from 1900 through 1925. Since 1926, Michigan's marriage rate has been lower than the national rate, except during 1964 through 1969.

The gap between the marriage rate for Michigan and that for the nation has increased in recent years. In 1977 the United States rate (including nonlicensed marriages registered in California) was 6.9 percent above that of Michigan. By 1980, this percent increased to 12.8 and in 1988 the provisional rate for the nation was 19.0 percent above Michigan's rate.

The marriage rate for Michigan in 1988 was 16.3, 0.6 percent higher than the 1987 rate of 16.2. The provisional rate for the nation in 1988 was 19.4.

RESIDENCE OF COUPLES MARRYING IN MICHIGAN

When presenting statistics of births, deaths and fetal deaths it is possible to provide total resident figures due to an interstate agreement for exchange of nonresident event information. Thus, should a Michigan resident give birth in some other state, the state will forward the information to Michigan. No such agreement exists for marriages. This is an important consideration when analyzing marriage statistics. The marriage data presented are drawn from all marriages performed in the state regardless of the couple's residence.

Table 3.2 indicates that, in general, most of the couples marrying in Michigan are residents of the state. For marriages occurring in Michigan in 1988, 95.4 percent of the brides were residents of Michigan, while 92.9 percent of the grooms were residents of the state.

Table 3.2
Marriages by Residence Status of Bride and Groom
 Michigan Occurrences, 1978 and 1988

RESIDENCE STATUS	1978		1988	
	NUMBER	PERCENT	NUMBER	PERCENT
Both Bride and Groom Residents	83,035	94.0	69,460	92.1
Bride Resident, Groom Non-Resident	2,954	3.3	2,500	3.3
Groom Resident, Bride Non-Resident	651	0.7	616	0.8
Both Bride and Groom Non-Resident	1,692	1.9	2,806	3.7
Residence Status Not Stated	1	0.0	4	0.0
Total	88,333	100.0	75,386	100.0

These figures are slightly lower than those for marriages occurring in Michigan in 1978. Over the decade the proportion of marriages where both the bride and groom are not residents has increased slightly. These data indicate that the general characteristics of marriages occurring in Michigan should be representative of marriage patterns for Michigan residents.

There were a total of 3,423 non-resident brides married in Michigan in 1988. The figure for grooms was considerably greater than that of brides, numbering 5,309. Table 3.3 shows the most frequent residences of non-resident brides and grooms married in Michigan. The nearby states of Illinois, In-

diana, Ohio and Wisconsin were the states of residence for 33.2 percent of all non-resident grooms and 36.8 percent of non-resident brides. About twenty-seven percent of the non-resident brides and grooms were from California, Florida, New York and Texas.

MONTH OF MARRIAGE

The number of marriages occurring in Michigan varies with the seasons (Table 3.4). The most popular months for marriages in 1988 were June and August, with 8,883 and 9,024 marriage ceremonies being performed during these months respectively. About 2 out of every 3 marriages occurred in the six

Table 3.3
Place of Residence of Non-Resident
Brides and Grooms
Marriages Occurring in Michigan, 1988

GEOGRAPHIC AREA	NON-RESIDENT BRIDE	NON-RESIDENT GROOM
Arizona	73	99
California	330	475
Colorado	89	101
Florida	274	395
Georgia	96	154
Illinois	464	632
Indiana	247	383
Minnesota	75	113
New York	99	225
North Carolina	51	115
Ohio	336	478
Texas	209	314
Virginia	88	143
Wisconsin	213	272
Other U.S. Places	653	1,180
Foreign Countries	126	230
Total	3,423	5,309

Table 3.4
Marriages by Month
Michigan Occurrences, 1988

MONTH	NUMBER	PERCENT
January	2,645	3.5
February	3,639	4.8
March	3,627	4.8
April	5,731	7.6
May	7,553	10.0
June	8,883	11.8
July	8,167	10.8
August	9,024	12.0
September	8,202	10.9
October	8,074	10.7
November	4,854	6.4
December	4,987	6.6
January - December	75,386	100.0

months between May and October. Fewer marriages occurred during the winter months. The lowest figure was for January, with 29.3 percent of the number which occurred in August (Table 3.4).

AGE AT MARRIAGE

Examination of the data in Table 3.5 reveals that females generally marry at a younger age than do males. The number of females who marry before the age of 20 was 2.7 times the corresponding number of males in 1988. Between ages 20 and 24, 23.2 percent more brides than grooms married. Among persons 25 and over, males married more frequently than females. The median age of brides (25 years) marrying in Michigan was two years

lower than the median age for grooms (27 years).

Since 1978, there have been significant declines in the marriage rates for persons of both sexes under the age of 25 years. The largest decline observed was for males under the age of 20 years for whom the marriage rate has dipped 55.1 percent. The comparable decline for females was 51.1 percent. The marriage rate declined by 41.5 percent and 23.2 percent respectively for males and females between the ages of 20 and 24. For males between the ages of 25 and 34 the rate of marriage has decreased by 12.3 percent since 1978. For females within the same age category, the rate of marriage has increased 12.6 percent. For individuals between 35 and 44 years of age, the marriage rate for males

Table 3.5
Number of Marriages and Marriage Rates¹ by Age and Sex
Michigan Occurrences, 1978 and 1988

AGE IN YEARS	MALES			FEMALES		
	RATE 1978	NUMBER OF MARRIAGES 1988	RATE 1988	RATE 1978	NUMBER OF MARRIAGES 1988	RATE 1988
Under 20 ²	17.6	2,909	7.9	44.8	7,785	21.9
20 - 24	93.3	20,800	54.6	88.2	25,625	67.7
25 - 34	48.9	32,996	42.9	31.7	28,087	35.7
35 - 44	16.3	10,988	17.2	13.8	9,014	13.6
45 or Over	5.9	7,689	6.0	3.4	4,868	2.2
Not Stated	000	4	000	000	7	000
Total	19.5	75,386	16.8	18.9	75,386	15.9
Median Age at Last Birthday	27			25		

¹ Number of persons married per 1,000 population.

² 15 - 19 population used to obtain rate.

increased and the rate for females decreased. The rates for persons 45 and over were about the same for males and somewhat lower for females.

The distribution of marriages by the age of bride and groom is shown in Table 3.6.

REMARRIAGES

Between 1978 and 1988 the percent of all marriages that were remarriages increased from 30.9 to 33.2 for brides and from 33.3 to 34.0 for grooms (Tables 3.7 and 3.8). The proportion of all marriages which were remarriages is displayed graphically in Figure 3.2 for the period 1960-1988. Between 1960 and 1965, the proportion of remarriages dropped. Since 1965, this proportion has increased. The

increase in the period 1972 through 1975 was especially marked for both sexes.

The number of remarriages among females decreased by 8.1 percent between 1978 and 1988, while the number of brides who had been married at least three times previously increased by 9.8 percent (Table 3.9). Total remarriages for grooms decreased by 13.0 percent and third or higher order marriages increased in frequency by 6.9 percent between 1978 and 1988 (Tables 3.10).

As remarriages can only occur when a prior marriage has been terminated by a divorce, an annulment or the death of a spouse, it is apparent that persons remarrying will be generally older. Tables 3.9 and 3.10 demonstrate that the order of marriage has a strong positive relationship with the age of

Table 3.6
Marriages by Age of Bride and Age of Groom
Michigan Occurrences, 1988

AGE OF GROOM	AGE OF BRIDE													70 And Over	Not Stated
	Total	Under 20	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69			
Total	75,386	7,785	25,625	18,360	9,727	5,605	3,409	2,037	1,038	574	530	332	357	7	
Under 20	2,909	2,192	627	64	18	3	4	1	-	-	-	-	-	-	
20 - 24	20,800	4,415	13,385	2,386	460	115	26	13	-	-	-	-	-	-	
25 - 29	21,494	968	8,863	8,902	2,082	512	133	27	5	1	-	-	-	1	
30 - 34	11,502	159	1,976	4,556	3,363	1,106	280	52	6	1	1	-	-	2	
35 - 39	6,630	27	512	1,566	2,138	1,655	553	149	19	6	2	1	-	2	
40 - 44	4,358	17	166	586	1,039	1,208	956	306	66	10	4	-	-	-	
45 - 49	2,707	5	70	185	392	581	746	543	147	28	10	-	-	-	
50 - 54	1,710	2	13	66	149	261	386	465	282	52	22	7	5	-	
55 - 59	1,159	-	5	32	58	103	201	264	232	171	63	20	10	-	
60 - 64	903	-	4	11	20	43	81	138	183	174	173	52	24	-	
65 - 69	555	-	4	4	4	12	27	54	67	85	144	110	44	-	
70 or Over	655	-	-	1	3	6	16	24	31	46	111	142	274	1	
Not Stated	4	-	-	1	1	-	-	1	-	-	-	-	-	1	

Table 3.7
 Age at First Marriage and Remarriage: Bride
 Michigan Occurrences, 1978 and 1988

AGES	1978				1988			
	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED
Under 20 ..	21,127	20,858	229	40	7,785	7,722	62	1
Percent .	23.9	34.2	0.8	40.8	10.3	15.3	0.2	33.3
20 - 24 ...	34,824	30,356	4,431	37	25,625	23,919	1,706	-
Percent .	39.4	49.8	16.2	37.8	34.0	47.5	6.8	-
25 - 29 ...	14,357	7,412	6,928	17	18,360	13,299	5,060	1
Percent .	16.3	12.2	25.4	17.3	24.4	26.4	20.2	33.3
30 - 34 ...	6,945	1,469	5,476	-	9,727	3,891	5,836	-
Percent .	7.9	2.4	20.1	-	12.9	7.7	23.3	-
35 - 44 ...	6,169	583	5,584	2	9,014	1,301	7,712	1
Percent .	7.0	1.0	20.5	2.0	12.0	2.6	30.8	33.3
45 or Over .	4,908	277	4,629	2	4,868	191	4,677	-
Percent .	5.6	0.5	17.0	2.0	6.5	0.4	18.7	-
Not Stated .	3	1	2	-	7	1	6	-
Percent .	0.0	0.0	0.0	-	0.0	0.0	0.0	-
Total	88,333	60,956	27,279	98	75,386	50,324	25,059	3
Percent .	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Median Age at Last Birthday . . .	23	21	32	20	25	23	34	26

Table 3.8
Age at First Marriage and Remarriage: Groom
 Michigan Occurrences, 1978 and 1988

AGES	1978				1988			
	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED
Under 20 . .	8,303	8,267	27	9	2,909	2,906	3	-
Percent . .	9.4	14.1	0.1	9.5	3.9	5.8	0.0	-
20 - 24 . . .	35,113	32,900	2,161	52	20,800	20,140	659	1
Percent . .	39.8	55.9	7.3	54.7	27.6	40.5	2.6	20.0
25 - 29 . . .	19,510	13,026	6,466	18	21,494	17,968	3,523	3
Percent . .	22.1	22.2	22.0	18.9	28.5	36.1	13.8	60.0
30 - 34 . . .	9,294	2,996	6,291	7	11,502	6,218	5,284	-
Percent . .	10.5	5.1	21.4	7.4	15.3	12.5	20.6	-
35 - 44 . . .	8,471	1,094	7,374	3	10,988	2,196	8,791	1
Percent . .	9.6	1.9	25.1	3.2	14.6	4.4	34.3	20.0
45 or Over .	7,642	523	7,113	6	7,689	350	7,339	-
Percent . .	8.7	0.9	24.2	6.3	10.2	0.7	28.7	-
Not Stated .	-	-	-	-	4	2	2	-
Percent . .	-	-	-	-	0.0	0.0	0.0	-
Total	88,333	58,806	29,432	95	75,386	49,780	25,601	5
Percent . .	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Median Age at Last Birthday . . .	25	23	35	23	27	25	38	27

Table 3.9
Remarriages of Brides by Age and Order of Marriage
Michigan Occurrences, 1978 and 1988

AGES	1978				1988			
	ALL MAR-RIAGES	SECOND MAR-RIAGES	THIRD MAR-RIAGES	FOURTH OR MORE MARRIAGES	ALL MAR-RIAGES	SECOND MAR-RIAGES	THIRD MAR-RIAGES	FOURTH OR MORE MARRIAGES
All Ages . . .	88,333	21,850	4,442	987	75,386	19,099	4,706	1,254
Under 20 . . .	21,127	225	4	-	7,785	61	1	-
20 - 24	34,824	4,237	186	8	25,625	1,651	54	1
25 - 29	14,357	6,121	732	75	18,360	4,588	425	47
30 - 34	6,945	4,270	1,018	188	9,727	4,662	1,000	174
35 - 39	3,804	2,376	824	185	5,605	3,182	1,128	278
40 - 44	2,365	1,475	547	177	3,409	2,024	818	282
45 or Over . .	4,908	3,144	1,131	354	4,868	2,926	1,279	472
Not Stated . .	3	2	-	-	7	5	1	-
Median Age at Last Birthday	23	30	36	40	25	33	38	41

Table 3.10
Remarriages of Grooms by Age and Order of Marriage
Michigan Occurrences, 1978 and 1988

AGES	1978				1988			
	ALL MAR-RIAGES	SECOND MAR-RIAGES	THIRD MAR-RIAGES	FOURTH OR MORE MARRIAGES	ALL MAR-RIAGES	SECOND MAR-RIAGES	THIRD MAR-RIAGES	FOURTH OR MORE MARRIAGES
All Ages . .	88,333	23,490	4,897	1,045	75,386	19,249	5,058	1,294
Under 20 . .	8,303	27	-	-	2,909	3	-	-
20 - 24 . . .	35,113	2,109	51	1	20,800	645	14	-
25 - 29 . . .	19,510	5,916	514	36	21,494	3,296	219	8
30 - 34 . . .	9,294	5,197	952	142	11,502	4,500	707	77
35 - 39 . . .	5,201	3,270	916	215	6,630	3,639	1,046	204
40 - 44 . . .	3,270	2,115	704	154	4,358	2,588	1,041	273
45 or Over .	7,642	4,856	1,760	497	7,689	4,577	2,031	731
Not Stated .	-	-	-	-	4	1	-	1
Median Age at Last Birthday	25	33	40	43	27	36	42	45

both brides and grooms. Note, however, the upward shift between 1978 and 1988 in the age distribution for first and higher order marriages for brides.

The median age of brides at marriage for first marriages increased by two years during this period. For second marriages, the median age of brides at marriage increased by three years. For third and higher order marriages the median age for brides increased by two and one year respectively.

For grooms the median age increased two years for first marriages, three years for second marriages and two years for third marriages and fourth and higher order marriages.

Changes in the frequency of remarriages have varied substantially in different age groups. Among persons under age 25 the

number of remarriages declined between 1978 and 1988 by 62.1 percent for females and 69.7 percent for males. The number of brides between ages 25 and 29 who had previously been married decreased by 27.0 percent between 1978 and 1988, while that of grooms declined 45.5 percent.

The greatest relative increase in numbers of remarriages for females and males occurred in the age group 35-44 years. The numbers of remarriages increased 38.1 percent for females and 19.2 percent for males. For females and males 45 and over the number of remarriages increased slightly.

The most frequent age interval for remarriage among males was 35-44 years of age in 1978 and 1988. Among females in 1978 the most frequent age interval for remarriage was 25-29 years of age. It was 35-44 years of age in 1988 (Table 3.7 and 3.8).

Figure 3.2
Percent of All Marriages that are Remarriages
Michigan Occurrences, 1960 - 1988



FIRST MARRIAGES

First marriages are an interesting component of all marriages in that they constitute an event that can never be duplicated. The frequency of first marriages can not be directly affected by rates of divorce or deaths to married persons and as such reflects the propensity of the population as a whole to enter into marital agreements.

There has been a general decline in both the number and rate of first marriages between 1978 and 1988. The number of first marriages dropped 17.4 percent for women and 15.3 percent for men. The rate of first marriages dropped by 17.8 percent for women and 15.3 percent for men (Tables 3.11).

Changes in the frequency of first marriages have varied in different age groups. The greatest decline in first marriages occurred in the under 20 age group for both brides and grooms, between 1978 and 1988. The number

of first marriages in the under 20 age group dropped by 63.0 percent for brides and by 64.8 percent for grooms between 1978 and 1988 while the corresponding rate of first marriages dropped 53.7 percent for brides and 56.8 percent for grooms. The number and rate of first marriages also declined for brides and declined substantially for grooms in the 20-24 year age group.

There were significant increases in the number and rate of first marriages of both brides and grooms between ages 25 and 44. Between 1978 and 1988 the number of first marriages increased by 37.9 percent, 107.5 percent, 118.4 percent and 53.2 percent for grooms aged 25-29, 30-34, 35-39 and 40-44 years, respectively. For brides the comparable figures were 79.4 percent, 164.9 percent, 143.1 percent and 72.7 percent. Since 1978 the number of first marriages has declined for persons aged 45 or over.

Table 3.11
Number of First Marriages and Rates by Age of Bride and Groom
Michigan Occurrences 1978 and 1988

AGES	1978				1988			
	Bride		Groom		Bride		Groom	
	Number	Rate	Number	Rate	Number	Rate	Number	Rate
All Ages . . .	60,956	12.9	58,806	13.1	50,324	10.6	49,780	11.1
15 - 19	20,858	46.9	8,267	18.3	7,722	21.7	2,906	7.9
20 - 24	30,356	69.1	32,900	78.1	23,919	63.2	20,140	52.9
25 - 29	7,412	19.1	13,026	34.2	13,299	33.5	17,968	46.1
30 - 34	1,469	4.3	2,996	9.1	3,891	10.0	6,218	16.4
35 - 39	418	1.5	797	3.0	1,016	2.8	1,741	5.0
40 - 44	165	0.7	297	1.3	285	0.9	455	1.5
45 - 49	104	0.4	183	0.8	96	0.4	151	0.6
50 or Over . .	173	0.1	340	0.3	95	0.1	199	0.2
Not Stated . .	1	*	-	-	1	*	2	*

MEDIAN AGE AT FIRST MARRIAGE

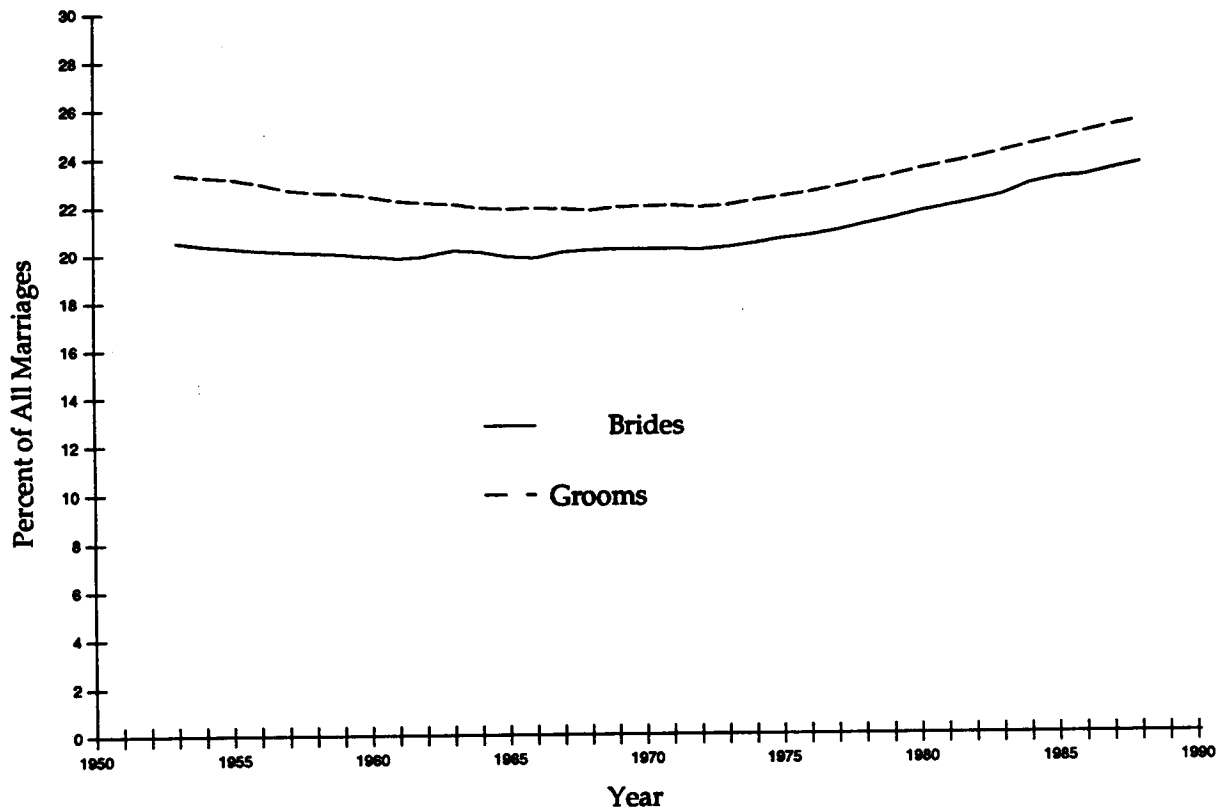
The median age at first marriage declined for both brides and grooms between 1953 and the mid-1960's (Figure 3.3). The initial decline was greater for males than for females.

Grooms were 34 months older than brides at the median in 1953, 23 months older in 1963 and 20 months older in 1968. During the past fifteen years, the median age at first marriage has increased by about the same amount for

both males and females. Grooms were 21 months older than brides at the median in 1988.

The median age at first marriage in 1988 was 23 years 8 months for brides and 25 years 5 months for grooms. The 1988 figures are the highest median ages at first marriage recorded during the period 1953-1988.

Figure 3.3
Median Age at First Marriage by Sex
Michigan Occurrences, 1953 - 1988



DIVORCES AND ANNULMENTS

The number of reported divorces and annulments reached a record high in 1980, in Michigan and in 1981 in the nation (Table 3.12). Between 1980 and 1984, the Michigan frequency declined. The number then increased to 40,103 in 1988. The 1988 frequency was 11.0 percent below the 1980 frequency and 0.6 percent greater than the 1987 frequency. Nationally, the provisional number of divorces in 1988 was 2.5 percent below the record high figure set in 1981.

The number of divorces and annulments reported for Michigan in 1988 was 2.4 times the number for 1960. Between 1960 and 1970 the number of divorces and annulments increased by 79.7 percent. Between 1970 and 1975 the number of divorces and annulments increased by 36.2 percent, and from 1975 to 1980 the increase was 10.5 percent. During the latter period the first annual declines since 1963 occurred. The number of divorces and annulments declined steadily between 1980 and 1984, then increased again each year from 1985 through 1988.

The number of persons divorced in Michigan per thousand population generally increased from 2.0 in 1900 to the then century high of 5.1 in 1929, then declined between 1930 and 1933 to 3.1 (Figure 3.4). Between 1934 and 1946 the rate generally increased, peaking at 10.2 in 1946. The rate of divorces and annulments decreased to 3.6 in 1958, increased to a high of 9.8 in 1978, decreased to 8.3 in 1983 and increased to 8.7 in 1988.

The national rates generally followed the same pattern, reaching a provisional rate of 9.6 in 1988. Michigan's divorce rate was higher than that for the United States each year from 1900 through 1947. In the following 41 years the Michigan divorce rate has been at or below the national rate 34 times, includ-

Table 3.12
Number of Divorces and Annulments
Divorce and Annulment Rates¹
Michigan and United States Occurrences
Selected Years, 1900 - 1988

UNITED STATES		YEAR	MICHIGAN	
NUMBER	RATE		NUMBER	RATE
56,000	1.5	1900	2,435	2.0
83,000	1.8	1910	3,716	2.6
170,505	3.2	1920	8,679	4.7
195,961	3.2	1930	10,639	4.4
264,000	4.0	1940	12,054	4.6
385,144	5.1	1950	15,979	5.0
393,000	4.4	1960	16,656	4.3
414,000	4.5	1961	16,219	4.1
413,000	4.4	1962	17,500	4.4
428,000	4.5	1963	17,479	4.4
450,000	4.7	1964	19,400	4.8
479,000	4.9	1965	20,305	5.0
499,000	5.1	1966	21,727	5.2
523,000	5.3	1967	23,620	5.5
584,000	5.8	1968	25,400	5.9
639,000	6.3	1969	28,347	6.5
708,000	7.0	1970	29,934	6.7
773,000	7.5	1971	31,790	7.1
845,000	8.1	1972	35,505	7.9
915,000	8.7	1973	37,128	8.2
977,000	9.2	1974	39,940 ²	8.8 ²
1,036,000	9.6	1975	40,782	9.0
1,083,000	10.0	1976	43,101	9.5
1,091,000	9.9	1977	43,036	9.4
1,130,000	10.2	1978	45,029	9.8
1,181,000	10.5	1979	44,242	9.6
1,189,000	10.5	1980	45,047	9.7
1,213,000	10.6	1981	43,167	9.3
1,170,000	10.0	1982	39,739	8.6
1,158,000	9.8	1983	37,991	8.3
1,169,000	10.0	1984	37,563	8.3
1,190,000	10.0	1985	38,775	8.5
1,178,000	9.8	1986	39,553	8.7
1,157,000Pr.	9.6Pr.	1987	39,857	8.7
1,183,000Pr.	9.6Pr.	1988	40,103	8.7

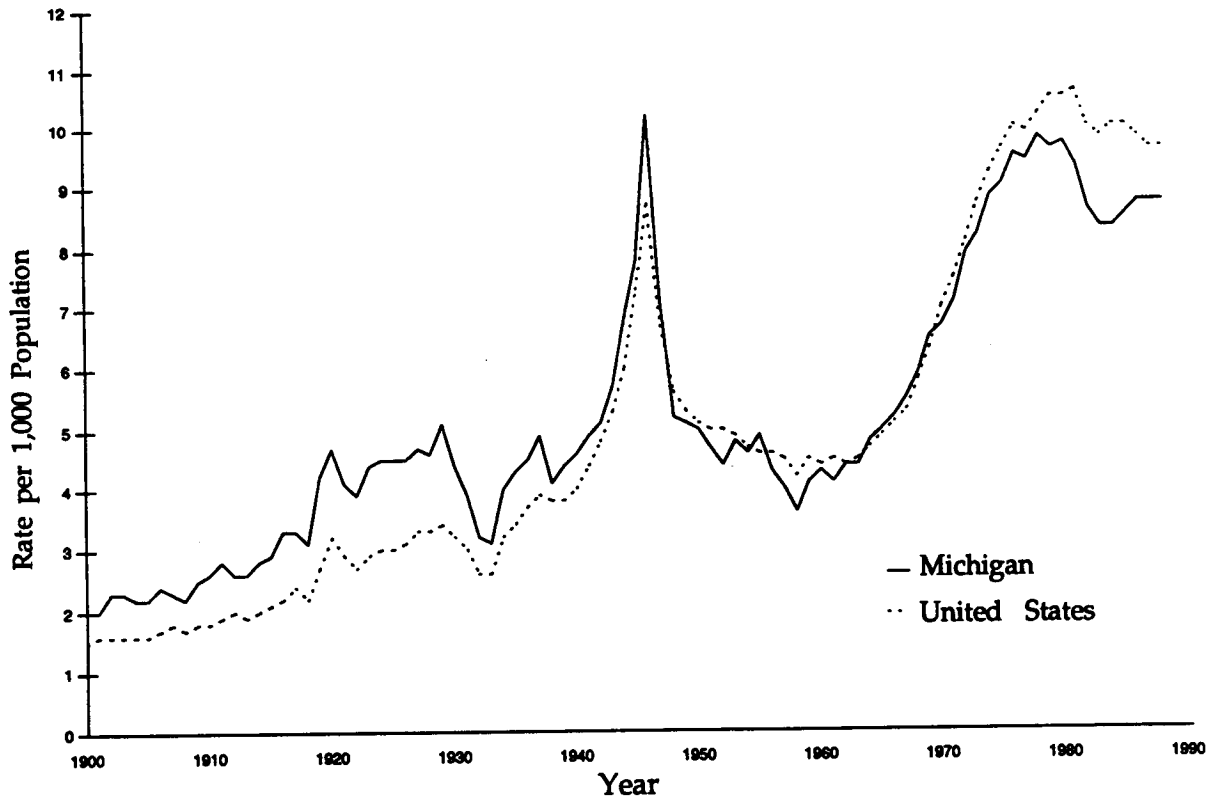
¹ Number of persons whose marriages ended in divorce or annulment per 1,000 population.

² Estimate.

ing each of the past 19 years. The lowest national rate was 1.5 in 1900. The highest

national divorce rate during this century was recorded in 1981 (10.6).

Figure 3.4
Divorce Rates
 Michigan and United States Occurrences, 1900-1988¹



¹ United States rates for 1987 and 1988 are provisional.

The number of children under 18 of couples dissolving marriages in 1988 was at least 39,635 (Table 3.13). This is 18.3 percent below the number in 1978. The number of children affected by divorce has, however, increased as a proportion of all children. This ratio increased from 6.5 per 1,000 Michigan children in 1960 to 12.5 in 1970 and to 18.2 by 1981 (Table 3.14). It declined to 14.8 in 1984 and increased to 15.9 in 1988.

The average number of children per divorce has, nonetheless, dropped from a high of 1.37 children in 1971 to a low of 0.99 in 1988. The decline primarily reflects a decline in the proportion of divorces involving three or more children. It should be noted that Michigan live birth data indicate that there has been a decline in the relative proportion of women having third or higher order live births over the past decade. Data for the United States indicate a similar pattern.

Table 3.13
Divorces and Annulments by Children Under 18 Present
Michigan Occurrences, 1978 and 1988

NUMBER OF CHILDREN	DIVORCES AND ANNULMENTS				ESTIMATED TOTAL CHILDREN (MINIMUM) ¹	
	NUMBER		PERCENT		1978	1988
	1978	1988	1978	1988		
Zero	18,532	14,386	41.2	35.9	-	-
One	11,133	9,759	24.7	24.3	11,133	9,759
Two	9,273	8,767	20.6	21.9	18,546	17,534
Three	3,626	2,850	8.1	7.1	10,878	8,550
Four	1,206	677	2.7	1.7	4,824	2,708
Five or More	576	201	1.3	0.5	3,129	1,060
Not Stated	683	3,463	1.5	8.6	-	-
Total	45,029	40,103	100.0	100.0	48,510	39,635

¹ Total children for marriages involving 6 or more children under 18 is not available.

Table 3.14
Estimated Number of Children Involved in Divorces and Annulments
Average Number of Children Per Decree, and
Rate Per 1,000 Children Under 18 Years of Age
Michigan and United States, Selected Years 1960 - 1988

MICHIGAN			Year	UNITED STATES		
Estimated Number of Children Involved	Average Number of Children Per Decree	Rate Per 1,000 Under 18 Years of Age		Estimated Number of Children Involved	Average Number of Children Per Decree	Rate Per 1,000 Under 18 Years of Age
19,209	1.15	6.5	1960	463,000	1.18	7.2
40,596	1.36	12.5	1970	870,000	1.22	12.5
43,430	1.37	13.4	1971	946,000	1.22	13.6
46,538	1.31	14.4	1972	1,021,000	1.20	14.7
48,153	1.18	15.8	1975	1,123,000	1.08	16.7
49,555	1.15	16.6	1976	1,117,000	1.03	16.9
47,569	1.11	16.3	1977	1,095,000	1.00	16.7
48,510	1.08	17.0	1978	1,147,000	1.01	17.7
47,019	1.07	16.8	1979	1,181,000	1.00	18.4
46,603	1.04	16.9	1980	1,174,000	0.98	17.3
45,461	1.05	18.2	1981	1,180,000	0.97	18.7
41,156	1.04	16.9	1982	1,108,000	0.94	17.6
38,712	1.02	16.2	1983	1,091,000	0.94	17.4
37,629	1.00	14.8	1984	1,081,000	0.92	17.2
38,673	1.00	15.3	1985	1,091,000	0.92	17.3
39,378	1.00	15.7	1986	1,064,000	0.90	16.8
39,321	1.00	14.8	1987	---	---	---
39,635	0.99	15.9	1988 ¹	---	---	---

¹ There were 3,463 records on which the number of children under 18 years of age was not stated, compared to 3,390 in 1987.

The majority of husbands and wives divorced in 1988 in Michigan were from 25 to 39 years of age (Table 3.15). The median age for husbands was 35 years and 3 months, while the median age for wives was 28 months younger (32 years and 11 months).

Wives under 25 years of age accounted for 13.0 percent of the wives divorced compared to only 7.0 percent of the husbands. Conversely, 5.9 percent of the wives divorced in 1988 were 50 years of age or over compared to 9.9 percent of the husbands.

Table 3.15
Divorces and Annulments by Age of Husband and Wife
at Time of Decree
Michigan Occurrences, 1988

AGE	HUSBAND		WIFE	
	NUMBER	PERCENT ¹	NUMBER	PERCENT ¹
Total	40,103	100.0	40,103	100.0
Under 20	77	0.2	365	0.9
20 - 24	2,740	6.8	4,843	12.1
25 - 29	7,092	17.7	8,237	20.5
30 - 34	7,982	19.9	7,825	19.5
35 - 39	6,624	16.5	6,048	15.1
40 - 44	4,978	12.4	4,200	10.5
45 - 49	3,173	7.9	2,337	5.8
50 - 54	1,736	4.3	1,108	2.8
55 - 59	1,037	2.6	611	1.5
60 - 64	592	1.5	325	0.8
65 - 69	318	0.8	198	0.5
70 - 74	147	0.4	75	0.2
75 +	122	0.3	59	0.1
Unknown	3,485	8.7	3,872	9.7
Median Age	35 Years, 3 Months		32 Years, 11 Months	

¹ Based on records with known age only.

In 9.9 percent of the marriages dissolved in Michigan in 1988 the couple separated less than one year after the marriage took place. In 41.7 percent of the marriages ended by divorce or annulment the separation took place within five years of the date of marriage (Table 3.16). The median duration of mar-

riage at the time of dissolution was 7 years and 6 months. For over fifty percent of the marriages ended by divorce or annulment in 1988, the length of time between the date of separation and the date of dissolution was 12 months or less.

Table 3.16
Divorces and Annulments by Duration of Marriage
at Time of Separation and at Time of Dissolution
Michigan Occurrences, 1988

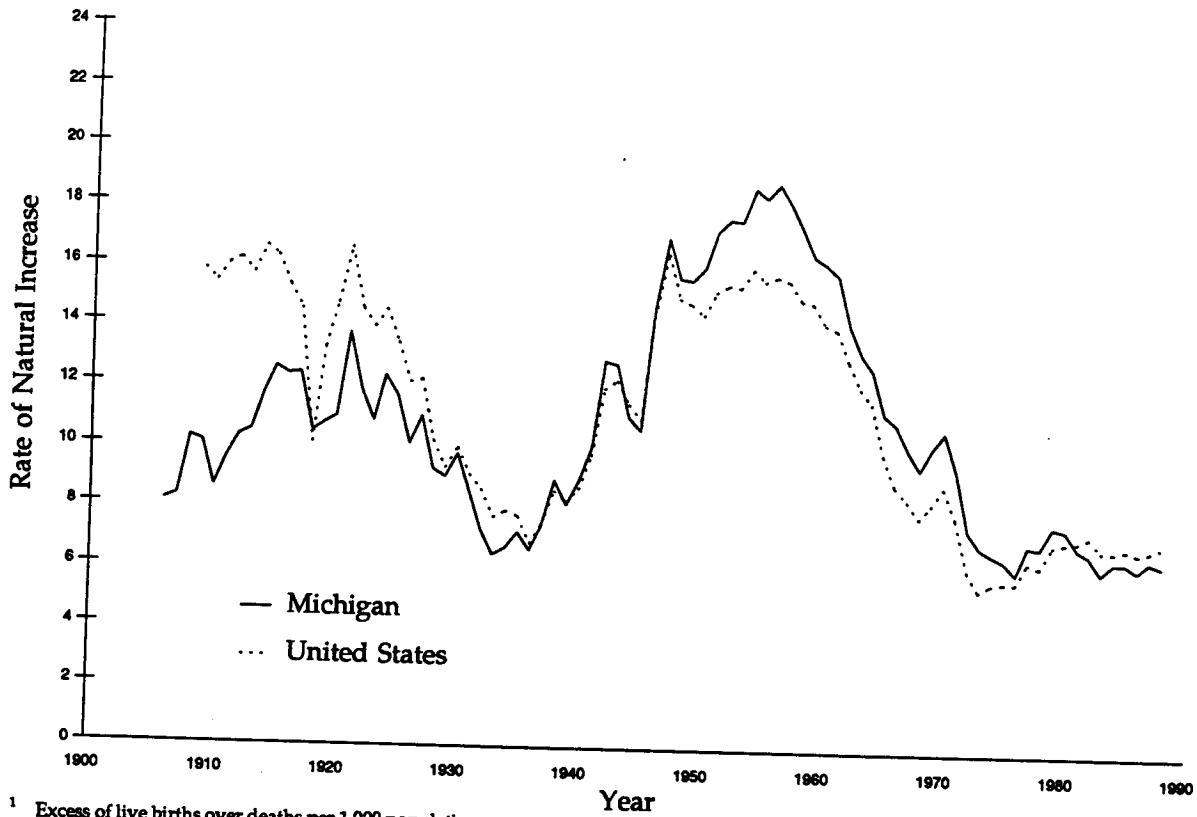
DURATION IN YEARS	AT TIME OF SEPARATION		AT TIME OF DISSOLUTION	
	NUMBER	PERCENT ¹	NUMBER	PERCENT ¹
Less Than 1	3,983	9.9	1,192	3.0
1 - 4	12,743	31.8	12,364	30.8
5 - 9	8,458	21.1	11,188	27.9
10 - 14	4,524	11.3	5,979	14.9
15 - 19	3,070	7.7	4,143	10.3
20 - 24	1,795	4.5	2,589	6.5
25 - 29	851	2.1	1,274	3.2
30 - 34	418	1.0	655	1.6
35 - 39	176	0.4	337	0.8
40 - 44	57	0.1	127	0.3
45 - 49	24	0.1	52	0.1
50 +	9	0.0	19	0.0
Unknown	3,995	10.0	184	0.5
Total	40,103	100.0	40,103	100.0
Median Duration	5 Years, 7 Months		7 Years, 6 Months	

¹ Based on records with known duration only.

REFERENCE APPENDIX
SECTION IV



Figure 4.1
Rate of Natural Increase¹
 Michigan, 1906 - 1988 and the United States, 1909 - 1988²



¹ Excess of live births over deaths per 1,000 population.

² Rates for the United States for 1909 - 1932 are based on death rates from the Death Registration States and estimated birth rates for the United States, adjusted for under-registration. For 1933 - 1959 rates are based on registered deaths in the United States and births adjusted for under-registration. After 1959 rates are based on registered births and deaths.

Table 4.1
 Population, Live Births, Deaths (All Ages, Infant, Neonatal, Postneonatal, Perinatal, Fetal and Maternal), Marriages and Divorces
 Michigan, 1900 - 1988

Year	Population ¹	Live Births	Deaths							Marriages	Divorces	
			All Ages	Under 1 Year	Under 28 Days ²	28-364 Days	Perinatal	Fetal	Maternal			
1900	2,420,982	43,699	32,453	6,866					1,325	452	23,295	2,435
1901	2,459,901	43,221	32,834	6,319					1,501	531	24,079	2,448
1902	2,498,820	45,546	31,472	5,949					1,793	468	25,653	2,828
1903	2,537,739	46,020	33,176	6,488					1,814	427	26,029	2,945
1904	2,576,658	47,508	34,494	6,419					1,911	436	24,918	2,808
1905	2,615,578	46,976	34,679	7,054					2,044	416	26,307	2,825
1906	2,654,497	58,599	37,033	7,952					2,358	400	27,519	3,192
1907	2,693,416	59,029	36,701	6,906					2,358	391	27,940	3,107
1908	2,732,335	64,772	36,761	7,697					2,694	440	25,765	3,020
1909	2,771,254	64,323	36,313	7,443					2,540	405	27,353	3,516
1910	2,810,173	64,109	39,913	7,998					2,559	431	29,039	3,716
1911	2,895,997	65,756	38,007	7,131					2,716	451	29,859	4,125
1912	2,981,821	69,537	38,804	6,985					2,906	396	31,694	3,838
1913	3,067,645	73,058	40,827	7,659					2,953	528	33,529	3,978
1914	3,153,469	76,761	39,906	7,431					3,113	507	35,316	4,395
1915	3,239,293	81,100	40,441	6,943					3,357	488	35,527	4,757
1916	3,325,116	87,062	46,047	8,415					3,689	503	40,143	5,540
1917	3,410,940	89,419	47,236	7,916					3,550	586	42,791	5,627
1918	3,496,764	91,261	54,617	8,197					3,686	709	33,260	5,493
1919	3,582,588	84,062	45,636	7,560					3,361	578	45,579	7,469
1920	3,668,412	92,245	51,982	8,587					3,770	795	50,805	8,679
1921	3,785,799	96,035	44,186	7,584					3,669	605	41,508	7,676
1922	3,903,186	90,042	43,817	6,730					3,779	551	43,561	7,591
1923	4,020,573	92,956	49,333	7,477					3,657	583	49,569	8,745
1924	4,137,960	98,187	47,304	7,088					3,703	636	49,788	9,400
1925	4,255,347	98,983	49,417	7,498				6,791	3,703	629	46,276	9,650
1926	4,372,734	98,289	54,080	7,620				6,667	3,670	629	46,276	9,650
1927	4,490,121	99,940	50,600	6,766				6,773	3,816	631	39,788	9,795
1928	4,607,508	97,462	54,755	6,806				6,794	3,834	667	36,276	10,617
1929	4,724,895	98,695	56,117	6,605				6,594	3,701	603	37,300	10,615
1930	4,842,325	98,882	51,561	6,213				6,613	3,710	617	36,816	12,094
1931	4,883,703	90,547	49,068	5,187				6,518	3,714	597	29,482	10,639
1932	4,925,081	85,254	49,569	4,630				5,643	3,220	539	28,856	9,507
1933	4,966,459	80,482	48,507	4,094				5,210	2,980	493	28,552	7,889
1934	5,007,837	83,944	50,440	4,377				4,906	2,776	447	33,132	7,671
1935	5,049,216	87,403	51,051	4,170				4,781	2,607	450	43,241	10,124
1936	5,090,594	88,457	54,777	4,479				4,832	2,717	438	45,313	10,844
1937	5,131,972	91,566	53,468	4,374				4,726	2,625	425	47,023	11,419
1938	5,173,350	96,962	50,678	4,319				4,919	2,707	326	47,954	12,472
1939	5,214,728	94,432	52,017	3,952				4,984	2,732	345	30,105	10,646
								4,706	2,572	280	37,725	11,589

Table 4.1 (continued)
 Population, Live Births, Deaths (All Ages, Infant, Neonatal, Postneonatal, Perinatal, Fetal and Maternal), Marriages and Divorces
 Michigan, 1900 - 1988
 (Deaths exclusive of fetal deaths. Perinatal deaths include deaths under 1 week and fetal deaths. Divorces include annulments.)

Year	Population ¹	Live Births	Deaths							Marriages	Divorces
			All Ages	Under 1 Year	Under 28 Days ²	28-364 Days	Perinatal	Fetal	Maternal		
1940	5,256,106	99,106	52,092	4,022	2,629	1,393	4,749	2,602	292	46,342	12,054
1941	5,437,546	107,498	52,671	4,166	2,687	1,479	4,991	2,769	298	50,989	13,317
1942	5,538,856	124,068	52,738	4,606	3,091	1,515	5,581	3,067	260	51,582	14,085
1943	5,377,329	125,441	56,774	4,804	2,979	1,825	5,563	3,213	237	44,385	15,259
1944	5,377,329	113,586	54,016	4,326	2,784	1,542	5,140	2,874	198	41,678	18,356
1945	5,435,092	111,557	53,641	4,008	2,670	1,338	4,906	2,703	166	48,329	18,356
1946	5,708,415	138,572	54,856	4,541	3,323	1,218	5,978	3,168	163	78,808	29,158
1947	6,069,000	160,275	56,807	5,055	3,677	1,378	6,583	3,422	173	71,319	21,386
1948	6,195,000	153,726	56,520	4,617	3,352	1,265	5,968	3,132	120	61,986	21,386
1949	6,352,000	156,469	57,107	4,520	3,232	1,288	5,746	2,994	105	53,109	16,274
1950	6,371,766	160,055	57,567	4,214	3,043	1,171	5,781	3,095	91	58,180	15,979
1951	6,545,000	172,451	59,181	4,505	3,296	1,209	6,088	3,158	94	53,411	15,446
1952	6,708,000	177,835	59,138	4,689	3,414	1,275	6,266	3,224	82	50,487	14,925
1953	6,852,000	182,968	62,087	4,728	3,369	1,339	6,188	3,180	79	53,308	16,537
1954	7,024,000	192,104	60,706	4,795	3,560	1,235	6,415	3,249	94	51,243	16,281
1955	7,236,000	196,294	63,087	4,873	3,707	1,166	6,381	3,029	61	55,698	17,676
1956	7,516,000	206,068	64,352	5,047	3,796	1,251	6,655	3,245	84	57,068	16,228
1957	7,803,000	208,488	66,435	5,093	3,884	1,209	6,668	3,154	79	55,121	15,442
1958	7,866,000	202,690	65,899	4,980	3,789	1,191	6,516	3,101	69	55,159	14,040
1959	7,960,000	198,301	66,812	4,846	3,674	1,172	6,250	2,928	72	58,826	16,168
1960	7,823,194	195,056	67,912	4,702	3,580	1,122	6,247	3,008	75	61,090	16,656
1961	7,909,000	192,825	67,375	4,604	3,475	1,129	5,875	2,735	78	63,320	16,219
1962	7,939,000	182,790	70,049	4,367	3,251	1,116	5,669	2,703	56	65,002	17,500
1963	8,030,000	178,871	72,438	4,150	3,109	1,041	5,407	2,540	71	68,160	17,479
1964	8,100,000	175,103	72,129	4,043	3,071	972	5,293	2,466	62	73,911	19,400
1965	8,199,283	166,464	73,665	3,936	2,909	1,027	5,139	2,475	54	81,247	20,305
1966	8,314,070	165,794	74,596	3,751	2,830	921	4,909	2,295	54	83,903	21,727
1967	8,615,000	162,756	75,360	3,595	2,714	881	4,693	2,195	52	84,363	23,620
1968	8,675,000	159,058	76,855	3,438	2,617	821	4,476	2,064	44	90,894	25,400
1969	8,734,000	165,760	76,693	3,356	2,550	806	4,488	2,175	27	93,392	28,347
1970	8,875,083	171,667	76,321	3,492	2,671	821	4,522	2,060	29	91,933	29,934
1971	8,972,000	162,244	77,395	3,157	2,412	745	4,139	1,923	32	92,134	31,790
1972	9,025,000	146,854	79,210	2,801	2,115	686	3,700	1,765	35	94,447	35,505
1973	9,072,000	141,550	78,522	2,561	1,902	659	3,392	1,682	26	94,486	37,128
1974	9,109,000	137,414	76,143	2,387	1,734	653	2,947	1,438	19	88,023	39,940 ³
1975	9,108,000	133,931	74,522	2,205	1,563	642	2,673	1,356	16	82,856	40,782
1976	9,117,000	131,378	74,522	1,978	1,367	554	2,495	1,264	14	82,753	43,101
1977	9,157,000	138,416	74,144	1,945	1,367	578	2,452	1,284	11	86,088	43,036
1978	9,202,000	138,802	74,773	1,931	1,281	650	2,302	1,201	15	88,333	45,029
1979	9,249,000	144,452	73,480	1,921	1,295	626	2,285	1,175	11	89,450	44,242

Table 4.1 (continued)
Population, Live Births, Deaths (All Ages, Infant, Neonatal, Postneonatal, Perinatal, Fetal and Maternal), Marriages and Divorces
 Michigan, 1900 - 1988
(Deaths exclusive of fetal deaths. Perinatal deaths include deaths under 1 week and fetal deaths. Divorces include annulments.)

Year	Population ¹	Live Births	Deaths							Marriages	Divorces
			All Ages	Under 1 Year	Under 28 Days ²	28-364 Days	Perinatal	Fetal	Maternal		
1980	9,262,078	145,162	74,991	1,851	1,284	567	2,235	1,135	16	86,898	45,047
1981	9,270,000	140,579	75,818	1,851	1,281	570	2,151	1,040	7	85,252	43,167
1982	9,227,327	137,950	75,536	1,672	1,202	470	1,989	954	11	82,633	39,739
1983	9,155,480	133,026	76,639	1,573	1,067	506	1,843	933	6	78,910	37,991
1984	9,074,622	135,782	76,401	1,595	1,100	495	1,884	929	4	80,810	37,563
1985	9,088,341	138,052	78,635	1,575	1,071	504	1,867	953	9	79,022	38,775
1986	9,144,545	137,626	80,177	1,565	1,079	486	1,782	865	11	77,815	39,553
1987	9,199,871	140,466	79,795	1,538	1,029	509	1,701	824	8	74,418	39,857
1988	9,239,811	139,635	80,075	1,542	1,068	474	1,659	761	11	75,386	40,103

¹ 1971-1979 population estimates have been revised by the U.S. Census Bureau.

² For Years prior to 1950 deaths under 1 month of age are included in deaths under 28 days.

³ Estimate.

Table 4.2
 Live Birth Rates, Death Rates (All Ages, Infant, Neonatal, Postneonatal, Perinatal and Maternal), Fetal Death Ratios, Marriage and Divorce Rates
 Michigan, 1900 - 1988¹

(Birth rate, death rate for all ages, rate of persons married and rate of persons divorced per 1,000 population. Fetal death ratio, mortality rates for deaths under 1 year, under 28 days, and from 28-364 days per 1,000 live births. Maternal mortality rate per 10,000 live births. Perinatal mortality rate per 1,000 live births and fetal deaths.)

Year	Live Births	Deaths							Marriages	Divorces
		All Ages	Under 1 Year	Under 28 Days ²	28-364 Days	Perinatal	Fetal	Maternal		
1900	18.1	13.4	157.1				30.3	103.4	19.2	2.0
1901	17.6	13.3	146.2				34.7	122.9	19.6	2.0
1902	18.2	12.6	130.6				39.4	102.8	20.5	2.3
1903	18.1	13.1	141.0				39.4	92.8	20.5	2.3
1904	18.4	13.4	135.1				43.5	91.8	19.3	2.2
1905	18.0	13.3	150.2				40.2	88.6	20.1	2.2
1906	22.1	14.0	135.7				39.9	66.2	20.7	2.4
1907	21.9	13.6	117.0				41.6	66.2	20.7	2.3
1908	23.7	13.5	118.8				39.5	67.9	18.9	2.2
1909	23.2	13.1	115.7				39.5	63.0	19.7	2.5
1910	22.8	14.2	124.8				39.9	67.2	20.7	2.6
1911	22.7	13.1	108.4				41.3	68.6	20.6	2.8
1912	23.3	13.0	100.4				41.8	56.9	21.3	2.6
1913	23.8	13.3	104.8				40.4	72.3	21.9	2.6
1914	24.3	12.7	96.8				40.6	66.0	22.4	2.8
1915	25.0	12.5	85.6				41.4	60.2	21.9	2.9
1916	26.2	13.8	96.7				42.4	57.8	24.1	3.3
1917	26.2	13.8	88.5				39.7	65.5	25.1	3.3
1918	26.1	15.6	89.8				40.4	77.7	19.0	3.1
1919	23.5	12.7	89.9				40.0	68.8	25.4	4.2
1920	25.1	14.2	93.1				40.9	86.2	27.7	4.7
1921	25.4	11.7	79.0				38.2	63.0	21.9	4.1
1922	23.1	11.2	74.7				42.0	61.2	22.3	3.9
1923	23.1	12.3	80.4				39.3	62.7	24.7	4.4
1924	23.7	11.4	72.2	30.2			37.7	64.8	24.1	4.5
1925	23.3	11.6	75.7	35.1			37.1	63.5	21.7	4.5
1926	22.5	12.4	77.5	40.6			38.8	64.2	18.7	4.5
1927	22.3	11.3	67.7	41.2			38.4	66.7	16.2	4.7
1928	21.2	11.9	69.8	28.5			38.0	61.9	16.2	4.6
1929	20.9	11.9	66.9	31.5			37.6	62.5	15.6	5.1
			38.3	28.7						
1930	20.4	10.6	62.8	26.2			37.6	60.4	12.2	4.4
1931	18.5	10.1	57.3	34.1			35.6	59.5	11.8	3.9
1932	17.3	10.1	54.3	23.2			35.0	57.8	11.6	3.2
1933	16.2	9.8	50.9	21.5			34.5	55.5	13.3	3.1
1934	16.8	10.1	52.1	18.7			31.1	53.6	17.3	4.0
			32.4	19.8						

Table 4.2 (continued)
 Live Birth Rates, Death Rates (All Ages, Infant, Neonatal, Postneonatal, Perinatal and Maternal), Fetal Death Ratios, Marriage and Divorce Rates
 Michigan, 1900 - 1988¹

Year	Live Births	Deaths							Maternal	Marriages	Divorces
		All Ages	Under 1 Year	Under 28 Days ²	28-364 Days	Perinatal	Fetal				
1935	17.3	10.1	47.7	29.2	18.5	53.6	31.1	50.1	17.9	4.3	
1936	17.4	10.8	50.6	29.9	20.7	51.9	29.7	48.0	18.5	4.5	
1937	17.8	10.4	47.8	29.5	18.3	52.2	29.6	35.6	18.7	4.9	
1938	18.7	9.8	44.5	28.2	16.3	50.0	28.2	35.6	11.6	4.1	
1939	18.1	10.0	41.8	27.5	14.4	48.5	27.2	29.6	14.5	4.4	
1940	18.9	9.9	40.6	26.5	14.1	46.7	26.3	29.5	17.6	4.6	
1941	19.8	9.7	38.8	25.0	13.8	45.3	25.8	27.7	18.8	4.9	
1942	22.4	9.5	37.1	24.9	12.2	43.9	24.7	21.0	18.6	5.1	
1943	23.3	10.6	38.3	23.7	14.5	43.2	25.6	18.9	16.5	5.7	
1944	21.1	10.0	38.1	24.5	13.6	44.1	25.3	17.4	15.5	6.8	
1945	20.5	9.9	35.9	23.9	12.0	42.9	24.2	14.9	17.8	7.8	
1946	24.3	9.6	32.8	24.0	8.8	42.2	22.9	11.8	27.6	10.2	
1947	26.4	9.4	31.5	22.9	8.6	40.2	21.4	10.8	23.5	7.1	
1948	24.8	9.1	30.0	21.8	8.2	38.0	20.4	7.8	20.0	5.2	
1949	24.6	9.0	28.9	20.7	8.2	36.0	19.1	6.7	16.7	5.1	
1950	25.1	9.0	26.3	19.0	7.3	35.4	19.3	5.7	18.3	5.0	
1951	26.3	9.0	26.1	19.1	7.0	34.7	18.3	5.5	16.3	4.7	
1952	26.5	8.8	26.4	19.2	7.2	34.6	18.1	4.6	15.1	4.4	
1953	26.7	9.1	25.8	18.5	7.3	33.2	17.4	4.3	15.6	4.8	
1954	27.3	8.6	25.0	18.5	6.4	32.8	16.9	4.9	14.6	4.6	
1955	27.1	8.7	24.8	18.9	5.9	32.0	15.4	3.1	15.4	4.9	
1956	27.4	8.6	24.5	18.4	6.1	31.8	15.7	4.1	15.2	4.3	
1957	26.7	8.5	24.4	18.6	5.8	31.5	15.1	3.8	14.1	4.0	
1958	25.8	8.4	24.6	18.7	5.9	31.7	15.3	3.4	14.0	3.6	
1959	24.9	8.4	24.4	18.5	5.9	31.1	14.8	3.6	14.8	4.1	
1960	24.9	8.7	24.1	18.4	5.8	31.5	15.4	3.8	15.6	4.3	
1961	24.4	8.5	23.9	18.0	5.9	30.0	14.2	4.0	16.0	4.1	
1962	23.0	8.8	23.9	17.8	6.1	30.6	14.8	3.1	16.4	4.4	
1963	22.3	9.0	23.2	17.4	5.8	29.8	14.2	4.0	17.0	4.4	
1964	21.6	8.9	23.1	17.5	5.6	29.8	14.1	3.5	18.2	4.8	
1965	20.3	9.0	23.6	17.1	6.2	30.4	14.9	3.2	19.8	5.0	
1966	19.9	9.0	23.6	17.1	5.6	29.2	13.8	3.3	20.2	5.2	
1967	18.9	8.7	22.1	16.7	5.4	28.4	13.5	3.2	19.6	5.5	
1968	18.3	8.9	21.6	16.5	5.2	27.8	13.0	2.8	21.0	5.9	
1969	19.0	8.8	20.2	15.4	4.9	26.7	13.1	1.6	21.4	6.5	

Table 4.2 (continued)
 Live Birth Rates, Death Rates (All Ages, Infant, Neonatal, Postneonatal, Perinatal and Maternal), Fetal Death Ratios, Marriage and Divorce Rates
 Michigan, 1900 - 1988¹

Year	Live Births	Deaths								Maternal	Marriages	Divorces
		All Ages	Under 1 Year	Under 28 Days ²	28-364 Days	Perinatal	Fetal					
1970	19.3	8.6	20.3	15.6	4.8	26.0	12.0	1.7	20.7	6.7		
1971	18.1	8.6	19.5	14.9	4.6	25.2	11.9	2.0	20.5	7.1		
1972	16.3	8.8	19.1	14.4	4.7	24.9	12.0	2.4	20.9	7.9		
1973	15.6	8.7	18.1	13.4	4.7	23.7	11.9	1.8	20.8	8.2		
1974	15.1	8.4	17.4	12.6	4.8	21.2	10.5	1.4	19.3	8.8 ³		
1975	14.7	8.2	16.5	11.7	4.8	19.8	10.1	1.2	18.2	9.0		
1976	14.4	8.3	15.1	10.8	4.2	18.8	9.6	1.1	18.2	9.5		
1977	15.1	8.1	14.1	9.9	4.2	17.6	9.3	0.8	18.8	9.4		
1978	15.1	8.1	13.9	9.2	4.7	16.4	8.7	1.1	19.2	9.8		
1979	15.6	7.9	13.3	9.0	4.3	15.7	8.1	0.8	19.3	9.6		
1980	15.7	8.1	12.8	8.8	3.9	15.3	7.8	1.1	18.8	9.7		
1981	15.2	8.2	13.2	9.1	4.1	15.2	7.4	0.5	18.4	9.3		
1982	15.0	8.2	12.1	8.7	3.4	14.3	6.9	0.8	17.9	8.6		
1983	14.5	8.4	11.8	8.0	3.8	13.8	7.0	0.5	17.2	8.3		
1984	15.0	8.4	11.7	8.1	3.6	13.8	6.8	0.3	17.8	8.3		
1985	15.2	8.7	11.4	7.8	3.7	13.4	6.9	0.7	17.4	8.5		
1986	15.1	8.8	11.4	7.8	3.5	12.9	6.3	0.8	17.0	8.7		
1987	15.3	8.7	10.9	7.3	3.6	12.0	5.7	0.6	16.2	8.7		
1988	15.1	8.7	11.0	7.6	3.4	11.9	5.4	0.8	16.3	8.7		

¹ 1971-1979 birth, death, marriage and divorce rates have been recalculated using revised population estimates.

² For years prior to 1950 deaths under 1 month of age are included in deaths under 28 days.

³ Estimate.

Table 4.3
Number of Live Births by Age of Mother
Michigan Residents, 1920 - 1988

Year	All Ages ¹	Age of Mother								Age Not Stated
		10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 +	
1920	92,740	34	8,129	26,344	26,251	17,521	10,427	3,523	336	175
1921	96,322	39	8,747	26,583	27,292	18,433	11,150	3,572	337	169
1922	90,209	28	8,125	24,575	25,154	17,690	10,584	3,485	343	225
1923	93,066	37	8,725	25,887	25,459	18,072	10,770	3,476	382	258
1924	98,025	38	9,877	28,000	25,781	18,707	11,395	3,682	321	224
1925	99,220	62	10,248	28,116	26,204	18,869	11,406	3,695	379	241
1926	98,781	76	10,496	28,479	25,876	18,444	11,219	3,568	354	269
1927	100,178	59	10,685	29,302	25,707	18,790	11,287	3,722	332	294
1928	97,797	54	10,788	28,895	25,003	17,953	10,913	3,558	315	318
1929	99,134	56	11,312	30,582	25,557	16,957	10,555	3,523	293	299
1930	99,325	60	11,476	29,956	25,861	17,125	10,684	3,582	291	290
1931	90,929	61	10,109	27,255	23,806	15,937	9,905	3,317	302	237
1932	85,736	62	9,297	25,686	22,608	14,988	9,314	3,250	291	240
1933	80,923	52	8,642	23,874	21,618	14,298	8,795	3,173	261	210
1934	83,925	48	9,039	25,458	22,507	14,968	8,391	3,050	259	205
1935	87,446	47	9,808	27,631	22,938	15,026	8,473	3,029	284	210
1936	88,427	53	9,764	28,681	23,584	14,814	8,194	2,866	274	197
1937	91,539	54	10,524	30,532	24,366	15,022	7,949	2,653	242	197
1938	96,963	64	11,024	32,581	26,116	15,690	8,397	2,698	253	140
1939	94,302	51	10,368	31,036	26,095	15,976	8,021	2,416	209	130
1940	99,021	51	10,671	32,960	27,860	16,549	8,146	2,390	202	192
1941	107,458	50	11,309	36,833	31,067	17,132	8,351	2,361	200	155
1942	123,886	66	12,721	43,947	36,034	19,367	8,985	2,445	202	119
1943	125,778	67	11,934	41,627	37,773	21,449	9,980	2,615	184	149
1944	114,700	76	10,113	36,096	33,654	21,094	10,636	2,714	182	135
1945	112,655	73	9,294	32,790	33,143	22,831	11,185	2,970	229	140
1946	139,277	72	10,899	45,999	41,985	25,184	11,811	3,002	223	102
1947	161,085	91	15,594	55,954	47,793	26,296	12,009	3,073	182	93
1948	154,730	95	16,245	53,520	45,059	25,268	11,391	2,888	173	91
1949	157,178	117	16,404	53,608	46,363	25,971	11,565	2,906	181	63
1950	160,955	111	16,310	53,442	48,186	27,422	12,392	2,831	169	92
1951	173,506	104	17,974	57,340	52,044	29,674	13,086	3,040	160	84
1952	178,634	134	17,206	59,012	54,198	31,756	13,880	3,176	220	52
1953	182,810	166	18,510	58,070	54,734	32,948	14,798	3,350	190	44
1954	197,332	208	20,522	60,776	55,962	35,152	15,862	3,598	220	32
1955	196,623	195	21,417	61,952	56,462	35,968	16,554	3,862	198	15
1956	206,226	192	22,808	66,332	58,392	36,870	17,282	4,172	164	14
1957	208,808	190	23,798	67,086	58,424	36,980	17,956	4,160	200	14
1958	202,900	222	23,034	65,834	55,130	36,278	17,892	4,296	196	18
1959	198,576	200	21,922	65,426	53,434	34,934	18,030	4,424	198	8

Table 4.3 (continued)
 Number of Live Births by Age of Mother
 Michigan Residents, 1920 - 1988

Year	All Ages ¹	Age of Mother								Age Not Stated
		10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 +	
1960	195,056	186	22,786	65,108	51,842	33,228	17,410	4,288	202	6
1961	192,825	212	23,891	64,336	50,277	32,456	17,067	4,363	203	20
1962	182,790	268	22,702	62,243	47,109	29,817	16,160	4,250	224	17
1963	178,871	210	21,686	62,834	46,063	28,364	15,117	4,359	229	9
1964	175,103	264	22,526	62,196	44,671	26,542	14,509	4,162	220	13
1965	166,464	267	24,653	59,439	40,693	23,767	13,528	3,886	211	20
1966	165,794	310	28,690	60,711	39,225	21,205	11,846	3,547	223	37
1967	162,756	316	27,267	61,541	40,052	19,840	10,479	3,059	178	24
1968	159,058	400	26,390	60,072	41,561	18,613	9,095	2,739	163	25
1969	165,760	421	28,061	63,376	44,615	18,535	8,157	2,433	134	28
1970	171,667	489	29,764	65,892	46,262	19,003	7,904	2,223	118	12
1971	162,244	472	28,480	62,367	43,639	18,259	6,975	1,926	112	14
1972	146,854	503	28,108	54,199	40,442	16,133	5,805	1,555	95	14
1973	141,550	569	27,808	51,284	39,845	15,520	5,163	1,277	62	22
1974	137,414	501	25,977	49,975	40,215	15,317	4,291	1,063	50	25
1975	133,931	463	24,509	48,675	40,061	14,891	4,273	982	54	23
1976	131,378	404	47,161	41,412	41,412	14,893	4,053	799	47	16
1977	138,416	426	49,740	43,346	43,346	17,293	4,178	771	51	26
1978	138,802	345	21,487	49,498	43,744	18,367	4,562	729	50	20
1979	144,452	355	21,239	51,319	46,084	19,962	4,720	715	41	17
1980	145,162	331	20,000	51,218	47,113	21,024	4,692	740	22	22
1981	140,579	300	18,397	47,737	46,527	22,178	4,701	695	34	10
1982	137,950	319	17,344	45,586	45,995	22,564	5,395	711	29	7
1983	133,026	328	16,589	42,034	45,065	22,505	5,669	791	38	7
1984	135,782	341	16,442	41,664	45,908	24,320	6,295	780	30	2
1985	138,052	352	16,279	41,125	47,049	25,491	6,864	851	36	5
1986	137,626	335	16,536	39,611	46,421	26,331	7,503	842	35	12
1987	140,466	329	16,911	39,314	47,052	27,795	8,038	969	46	12
1988	139,635	371	17,003	37,529	45,924	28,469	8,553	1,094	54	638

¹ Total live births for the years 1920 through 1959 differ from figures in Table 4.1 as they are derived from outside sources. Live births by age of mother were not tabulated in Michigan prior to 1960. These data were obtained from the following sources:

- 1920-1923: Unpublished tables from the National Center for Health Statistics.
- 1924-1932: Bureau of the Census publication, Birth, Stillbirth and Infant Mortality Statistics for Birth Registration Areas of the United States.
- 1933-1936: Unpublished tables from the National Center for Health Statistics.
- 1937-1949: Bureau of the Census publication, Vital Statistics of the United States series.
- 1950-1959: Department of Health Education and Welfare publication, Vital Statistics of the United States series.

Table 4.4
Live Birth Rates by Age of Mother
 Michigan Residents, 1920 - 1988
(Live birth rates are per 1,000 women per year. Total fertility rate is total children to 1,000 women in their lifetime assuming constant live birth rates.)

Year	Age of Mother								Total Fertility Rate
	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45+ ¹	
1920	0.2	55.7	173.1	164.0	124.2	83.8	34.3	3.8	3,195.5
1921	0.2	56.9	167.3	165.5	125.8	84.8	32.8	3.6	3,184.5
1922	0.2	50.8	149.6	149.1	117.3	77.1	30.7	3.5	2,891.5
1923	0.2	52.6	152.6	147.5	116.5	75.4	29.3	3.8	2,889.5
1924	0.2	57.4	160.0	146.1	117.3	76.7	29.9	3.1	2,953.5
1925	0.3	57.4	155.9	145.4	115.2	73.9	28.8	3.5	2,902.0
1926	0.4	56.9	153.3	140.5	109.7	70.1	26.8	3.2	2,804.5
1927	0.3	56.0	153.3	136.8	108.9	68.1	27.0	2.9	2,766.5
1928	0.2	54.8	147.1	130.3	101.5	63.7	25.0	2.6	2,626.0
1929	0.2	55.7	151.5	130.6	93.6	59.6	23.9	2.4	2,587.5
1930	0.3	55.2	145.5	130.2	92.8	58.9	23.7	2.3	2,544.5
1931	0.3	47.8	130.4	118.3	85.3	54.3	21.5	2.3	2,301.0
1932	0.3	43.4	121.5	111.2	79.4	50.8	20.8	2.2	2,148.0
1933	0.2	39.7	111.6	105.2	75.0	47.7	20.0	1.9	2,006.5
1934	0.2	41.0	117.6	108.4	77.8	45.3	18.9	1.8	2,055.0
1935	0.2	43.9	126.2	109.4	77.4	45.5	18.5	2.0	2,115.5
1936	0.2	43.1	129.5	111.4	75.5	43.8	17.3	1.8	2,113.0
1937	0.2	45.9	136.4	113.9	75.9	42.3	15.8	1.6	2,160.0
1938	0.3	47.4	143.9	120.9	78.5	44.4	15.8	1.6	2,264.0
1939	0.2	44.1	135.6	119.6	79.2	42.3	14.0	1.3	2,181.5
1940	0.2	44.9	142.8	126.8	81.5	42.8	13.7	1.2	2,269.5
1941	0.2	48.1	157.8	137.1	81.6	42.5	13.2	1.2	2,408.5
1942	0.3	54.5	186.6	155.3	89.9	44.7	13.4	1.2	2,729.5
1943	0.3	51.6	175.1	159.0	97.1	48.6	14.1	1.1	2,734.5
1944	0.3	44.1	150.5	138.5	93.2	50.6	14.3	1.0	2,462.5
1945	0.3	40.8	135.5	133.4	98.5	52.1	15.4	1.3	2,386.5
1946	0.3	48.3	188.5	165.3	106.2	53.8	15.3	1.2	2,894.5
1947	0.4	69.7	227.3	184.2	108.4	53.6	15.4	1.0	3,300.0
1948	0.4	73.2	215.5	170.0	101.9	49.8	14.2	1.0	3,130.0
1949	0.5	74.6	214.0	171.4	102.5	49.6	14.1	1.0	3,138.5
1950	0.5	74.6	212.0	175.5	106.5	52.3	13.6	0.9	3,179.5
1951	0.4	79.1	229.0	192.2	114.4	53.9	14.1	0.8	3,419.5
1952	0.5	73.5	233.0	202.5	121.7	56.1	14.4	1.1	3,514.0
1953	0.6	76.8	234.5	207.0	125.5	58.7	14.9	0.9	3,594.5
1954	0.7	82.8	246.8	214.1	133.1	61.8	15.6	1.1	3,780.0
1955	0.6	84.1	253.0	218.6	135.4	63.4	16.4	0.9	3,862.0
1956	0.6	87.2	272.4	228.9	138.0	65.0	17.4	0.8	4,051.5
1957	0.6	88.6	277.1	231.8	137.6	66.4	17.0	0.9	4,100.0
1958	0.6	83.6	273.4	221.5	134.3	65.0	17.2	0.9	3,982.5
1959	0.6	77.6	273.3	217.4	128.6	64.4	17.3	0.9	3,900.5

Table 4.4 (continued)
Live Birth Rates by Age of Mother
 Michigan Residents, 1920 - 1988
(Live birth rates are per 1,000 women per year. Total fertility rate is total children to 1,000 women in their lifetime assuming constant live birth rates.)

Year	Age of Mother							Total Fertility Rate	
	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44		45+ ¹
1960	0.5	79.3	273.1	213.0	121.8	61.4	16.6	0.9	3,833.0
1961	0.6	78.1	252.0	200.7	120.2	61.3	16.8	0.9	3,653.0
1962	0.7	70.7	231.5	183.9	111.4	58.9	16.3	0.9	3,371.5
1963	0.5	64.6	222.5	175.9	107.0	55.9	16.6	0.9	3,219.5
1964	0.6	64.2	210.1	167.0	101.0	54.4	15.8	0.9	3,070.0
1965	0.6	67.4	192.0	149.0	91.2	51.5	14.7	0.8	2,836.0
1966	0.7	75.4	187.9	140.7	82.1	45.8	13.4	0.9	2,734.5
1967	0.7	69.0	182.8	140.8	77.6	41.2	11.5	0.7	2,621.5
1968	0.9	64.3	171.5	143.2	73.4	36.3	10.2	0.6	2,502.0
1969	0.9	66.0	174.2	150.8	73.8	33.1	9.1	0.5	2,542.0
1970	1.0	68.2	176.0	154.0	76.1	32.4	8.3	0.4	2,582.0
1971	1.0	63.6	157.3	142.4	71.2	29.0	7.4	0.4	2,361.5
1972	1.1	61.6	137.4	122.7	60.8	24.2	6.1	0.4	2,071.5
1973	1.2	59.9	128.0	117.3	55.2	21.5	5.1	0.2	1,942.0
1974	1.1	55.3	122.3	113.7	52.4	17.7	4.4	0.2	1,835.5
1975	1.0	52.0	116.8	109.3	49.6	17.5	4.2	0.2	1,753.0
1976	0.9	48.0	111.0	107.5	49.1	16.3	3.4	0.2	1,682.0
1977	1.0	48.4	114.3	112.7	52.9	16.3	3.3	0.2	1,745.5
1978	0.8	46.5	111.5	111.6	54.5	16.8	3.1	0.2	1,725.0
1979	0.9	46.7	114.0	114.9	57.0	16.8	3.0	0.2	1,767.5
1980	0.8	44.8	113.1	115.6	58.4	16.4	3.1	0.1	1,761.5
1981	0.8	41.3	103.5	110.8	59.5	16.2	3.0	0.2	1,676.5
1982	0.9	39.2	98.0	107.6	59.2	18.4	3.1	0.1	1,632.5
1983	0.9	37.9	89.8	104.0	58.0	19.3	3.6	0.2	1,722.5
1984	1.0	43.8	103.8	111.4	65.2	19.3	3.0	0.1	1,738.0
1985	1.0	43.9	104.1	115.1	67.1	20.5	3.1	0.2	1,775.0
1986	1.0	45.2	101.6	114.4	68.3	21.8	2.9	0.1	1,776.5
1987	1.0	46.9	102.3	117.1	71.5	22.9	3.3	0.2	1,826.0
1988	1.1	47.8	99.2	115.8	73.0	23.9	3.6	0.2	1,823.0

¹ Number of live births to women aged 45 and over per 1,000 women 45-49 years of age.

SOURCE: Population figures used for 1920-1970 rates are from General Population Characteristics Michigan, USBC, 1971, with arithmetic extrapolation between census years. For 1971-1988 population source, see Technical Notes.

Table 4.5
 Reported Cases of Certain Communicable Diseases
 Michigan Residents, 1900 - 1988

Year	Diphtheria	Smallpox	Typhoid Fever	Whooping Cough	Measles	Hepatitis, All Types	TB ² (all forms)	Meningo- ¹ coccal Infections	Polio	Syphilis	Gonorrhea	Acquired Immune Deficiency Syndrome
1900	2,706	694	5,122	3,375	20,356		2,721	654				
1901	2,498	5,088	3,002	2,955	4,629		2,915	506				
1902	2,993	7,086	2,456	3,534	11,978		2,658	528				
1903	3,670	6,341	2,840	4,172	8,941		2,745	525				
1904	3,510	5,753	3,028	1,779	10,386		2,928	448				
1905	2,159	2,985	2,774	1,196	6,061		2,590	577				
1906	3,648	1,240	3,163	1,364	7,403		2,653	533				
1907	2,935	1,712	1,953	872	12,139		2,699	575				
1908	2,658	2,306	2,656	1,248	4,775		2,705	487				
1909	3,109	1,533	2,694	1,054	9,047		3,423	457				
1910	3,433	3,319	3,361	1,136	13,934		4,415	522	104			
1911	3,762	898	2,660	1,897	9,639		5,254	478	68			
1912	3,294	1,127	2,847	1,255	2,834		1,958	88	78			
1913	5,505	1,995	2,253	929	9,185		1,920	165	56			
1914	5,149	1,527	2,167	1,822	11,356		2,566	205	49			
1915	4,386	1,094	1,956	2,258	4,438		3,648	107	95			
1916	5,625	1,581	2,513	1,837	12,143		7,076	163	598			
1917	8,499	3,674	1,723	3,211	14,472		4,856	75	91			
1918	6,128	5,241	1,339	2,563	6,726		3,655	95	121			
1919	7,896	2,381	1,254	1,829	8,885		4,231	75	155			
1920	10,360	4,818	1,421	7,171	22,364		4,994	203	67			
1921	12,075	4,512	1,837	6,696	3,043		5,708	173	483			
1922	8,513	1,230	1,108	5,642	12,107		5,573	159	43			
1923	7,725	2,311	982	7,617	30,041		5,471	186	39			
1924	6,011	4,527	782	4,364	18,290		5,570	157	647			
1925	3,925	794	962	7,576	10,332		5,785	128	99			
1926	5,377	549	583	8,776	39,946		5,387	96	107			
1927	4,575	1,467	581	6,818	8,303		5,406	138	282			
1928	3,724	1,335	390	9,700	27,039		5,885	276	77			
1929	4,618	2,410	310	9,340	18,040		6,248	1,864	180			
1930	3,206	2,375	504	7,937	28,129		5,128	901	208			
1931	1,831	915	424	11,448	6,212		6,132	293	1,137			
1932	1,188	222	513	13,091	42,129		7,103	129	112			
1933	1,152	46	453	11,720	21,654		6,624	86	93			
1934	614	49	486	11,255	6,528		5,264	53	230			
										5,077	7,910	
										8,117	11,463	
										7,421	9,774	
										7,900	9,717	
										10,480	9,597	
										13,000	10,490	
										14,668	10,660	
										14,872	10,707	
										15,713	9,318	
										15,323	8,592	
										16,606	9,661	
										16,538	8,554	
										14,662	7,843	
										11,969	6,963	
										7,691	6,447	
										6,483	6,188	

Table 4.5 (continued)
 Reported Cases of Certain Communicable Diseases
 Michigan Residents, 1900 - 1988

Year	Diphtheria	Smallpox	Typhoid Fever	Whooping Cough	Measles	Hepatitis, All Types	TB ² (all forms)	Meningo- coccal Infections	Polio	Syphilis	Gonorrhea	Acquired Immune Deficiency Syndrome
1935	645	16	355	13,427	79,061		4,642	113	614	6,416	6,372	
1936	661	32	287	14,287	2,453		5,157	120	152	6,401	6,460	
1937	842	152	241	11,426	6,154		6,469	87	421	8,708	7,072	
1938	619	274	285	14,563	79,400		6,335	69	59	14,684	7,046	
1939	452	371	177	8,997	12,948		6,119	46	904	13,144	6,364	
1940		76	120	11,757	20,206		6,063	49	1,228	9,999	7,650	
1941	264	114	147	16,512	70,748		5,371	49	270	11,370	8,767	
1942	243	17	74	11,602	8,569		5,720	66	162	12,461	8,753	
1943	281	18	115	12,091	51,764		6,546	757	255	15,933	9,526	
1944	419	10	78	4,049	26,711		6,419	857	884	17,288	11,987	
1945	630	16	59	5,339	6,328	134	5,471	270	215	16,046	12,565	
1946	385	3	85	8,116	42,261	34	5,548	185	1,091	18,051	12,635	
1947	238	1	77	10,472	9,574	14	6,470	113	646	15,276	10,989	
1948	126	-	49	2,668	42,952	9	6,109	107	775	12,100	9,448	
1949	119	-	48	4,157	20,279	28	5,953	120	2,909	8,740	9,427	
1950	84	-	43	9,184	38,245	48	5,538	133	2,029	8,830	8,678	
1951	48	-	33	3,156	15,227	325	6,144	138	1,463	6,532	8,494	
1952	45	-	53	1,992	32,941	283	6,152	169	3,912	7,377	7,691	
1953	12	-	31	2,932	23,334	868	5,643	151	2,346	5,619	8,790	
1954	57	-	30	5,620	40,725	1,419	5,764	150	2,168	4,686	9,940	
1955	59	-	24	4,249	23,882	1,244	5,488	170	1,177	4,865	10,306	
1956	220	-	56	1,907	41,966	814	5,515	182	656	4,785	9,598	
1957	130	-	12	1,363	19,070	657	5,011	175	498	4,571	8,428	
1958	6	-	18	1,233	41,448	688	5,587	228	1,228	4,267	8,621	
1959	3	-	8	3,001	12,234	1,136	4,743	141	448	3,421	8,033	
1960	9	-	14	1,129	36,161	2,113	4,127	169	88	3,647	8,372	
1961	3	-	7	639	29,391	4,607	3,838	253	40	3,309	9,505	
1962	4	-	12	1,756	25,303	3,280	3,474	139	21	4,331	11,654	
1963	5	-	14	1,410	48,752	2,661	3,298	104	18	5,512	11,043	
1964	1	-	13	957	30,897	2,472	3,047	80	3	5,220	12,028	
1965	-	-	7	612	28,132	2,625	3,069	107	1	5,638	14,319	
1966	-	-	7	653	15,251	2,589	3,259	135	1	5,842	15,424	
1967	1	-	8	1,058	1,048	2,951	2,951	76	3	5,581	17,088	
1968	-	-	1	429	353	2,356	2,618	94	3	5,351	18,153	
1969	-	-	6	192	401	3,359	2,133	114	1	3,809	18,534	

Table 4.5 (continued)
Reported Cases of Certain Communicable Diseases
 Michigan Residents, 1900 - 1988

Year	Diphtheria	Smallpox	Typhoid Fever	Whooping Cough	Measles	Hepatitis, All Types	TB ² (all forms)	Meningo- ¹ coccal Infections	Polio	Syphilis	Gonorrhea	Acquired Immune Deficiency Syndrome
1970	-	-	14	195	1,834	4,594	1,992	69	2	3,920	20,359	
1971	1	-	10	140	2,659	4,828	1,789	64	-	4,800	22,260	
1972	1	-	7	116	2,353	4,322	1,632	55	1	4,891	24,750	
1973	-	-	14	86	4,552	3,872	1,473	54	-	4,375	31,086	
1974	-	-	11	104	2,365	3,599	1,431	54	2	2,722	32,067	
1975	1	-	10	98	3,253	2,877	1,271	76	-	1,638	32,583	
1976	-	-	10	70	6,139	2,645	1,349	65	1	1,089	34,836	
1977	-	-	13	73	1,392	2,686	1,290	51	-	1,185	36,794	
1978	-	-	15	47	8,006	2,174	1,260	87	1	1,133	36,647	
1979	-	-	14	102	869	2,036	1,052	79	-	1,260	36,624	
1980	1	-	12	38	250	1,799	1,168	77	1	1,163	34,951	2
1981	-	-	26	30	34	1,700	931	93	-	1,053	32,524	2
1982	-	-	14	34	64	1,745	864	81	-	921	32,848	16
1983	-	-	10	43	8	1,788	790	91	-	731	34,065	42
1984	-	-	9	31	464	1,728	661	90	-	749	34,839	85
1985	-	-	8	54	60	1,490	535	107	-	656	33,516	146
1986	-	-	5	35	106	1,266	619	81	-	584	37,929	224
1987	-	-	5	54	42	1,610	540	111	1	621	46,348	362
1988	-	-	5	38	31	1,202	509	92	-	1,020	37,435	

¹ Meningococcal infections prior to 1952 data were for meningococcal meningitis.

² Effective January 1975, a new diagnostic classification system for tuberculosis was adopted. As a result, case counts and rates prior to 1975 are not directly comparable to the figures in 1975 and later years.

Source: Bureau of Disease Control and Laboratory Services, Division of Epidemiology, MDPH.

Table 4.6
Case Rates of Certain Reported Communicable Diseases
Michigan Residents, 1900 - 1988
(Rates per 100,000 population)

Year	Diphtheria	Smallpox	Typhoid Fever	Whooping Cough	Measles	Hepatitis, All Types	TB ² (all forms)	Meningo-coccal Infections	Polio	Syphilis	Gonorrhea	Acquired Immune Deficiency Syndrome
1900	111.8	28.7	211.6	139.4	840.8		112.4	27.0				
1901	101.5	206.8	122.0	120.1	188.2		118.5	20.6				
1902	119.8	283.6	98.3	141.4	479.3		106.4	21.1				
1903	144.6	249.9	111.9	164.4	352.3		108.2	20.7				
1904	136.2	223.3	117.5	69.0	403.1		113.6	17.4				
1905	82.5	114.1	106.1	45.7	231.7		99.0	22.1				
1906	137.4	46.7	119.2	51.4	278.9		99.9	20.1				
1907	109.0	63.6	72.5	32.4	450.7		100.2	21.3				
1908	97.3	84.4	97.2	45.7	174.8		99.0	17.8				
1909	112.2	55.3	97.2	38.0	326.5		123.5	16.5				
1910	122.2	118.1	119.6	40.4	495.8		157.1	18.6	3.7			
1911	129.9	31.0	91.8	65.5	332.8		181.4	16.5	2.3			
1912	110.5	37.8	95.5	42.1	95.0		65.7	3.0	2.6			
1913	179.5	65.0	73.4	30.3	299.4		62.6	5.4	1.8			
1914	163.3	48.4	68.7	57.8	360.1		81.4	6.5	1.6			
1915	135.4	33.8	60.4	69.7	137.0		112.6	3.3	2.9			
1916	169.2	47.5	75.6	55.2	365.2		212.8	4.9	18.0			
1917	249.2	107.7	50.5	94.1	424.3		142.4	2.2	2.7			
1918	175.2	149.9	38.3	73.3	192.4		104.5	2.7	3.5			
1919	220.4	66.5	35.0	51.1	248.0		118.1	2.1	4.3	141.7	220.8	
1920	282.4	131.3	38.7	195.5	609.6		136.1	5.5	1.8	221.3	312.5	
1921	318.9	119.2	48.5	176.9	80.4		150.8	4.6	12.8	196.0	258.2	
1922	218.1	31.5	28.4	144.5	310.2		142.8	4.1	1.1	202.4	248.9	
1923	192.1	57.5	24.4	189.5	747.2		136.1	4.6	1.0	260.7	238.7	
1924	145.3	109.4	18.9	105.5	442.0		134.6	3.8	15.6	314.2	253.5	
1925	92.2	18.4	22.6	178.0	242.8		135.9	3.0	2.3	344.7	250.5	
1926	123.0	12.6	13.3	200.7	913.5		123.2	2.2	2.4	340.1	244.9	
1927	101.9	32.7	12.9	151.8	184.9		120.4	3.1	6.3	349.9	207.5	
1928	80.8	29.0	8.5	210.5	586.9		127.7	6.0	1.7	332.6	186.5	
1929	97.7	51.0	6.6	197.7	381.8		132.2	39.4	3.8	351.4	204.5	
1930	66.2	49.0	10.4	163.9	580.9		105.9	18.6	4.3	341.5	176.6	
1931	37.5	18.7	8.7	234.4	127.2		125.6	6.0	23.3	300.2	160.6	
1932	24.1	4.5	10.4	265.8	855.4		144.2	2.6	2.3	243.0	141.4	
1933	23.2	0.9	9.1	236.0	436.0		133.4	1.7	1.9	154.9	129.8	
1934	12.3	1.0	9.7	224.8	130.4		105.1	1.1	4.6	129.5	123.6	

Table 4.6 (continued)
 Case Rates of Certain Reported Communicable Diseases
 Michigan Residents, 1900 - 1988 (Rates per 100,000 population)

Year	Diphtheria	Smallpox	Typhoid Fever	Whooping Cough	Measles	Hepatitis, All Types	TB ² (all forms)	Meningo- ¹ coccal Infections	Polio	Syphilis	Gonorrhea	Acquired Immune Deficiency Syndrome
1935	12.8	0.3	7.0	265.9	1,565.8		91.9	2.2	12.2	127.1	126.2	
1936	13.0	0.6	5.6	280.7	48.2		101.3	2.4	3.0	125.7	126.9	
1937	16.4	3.0	4.7	222.6	119.9		126.1	1.7	8.2	169.7	137.8	
1938	12.0	5.3	5.5	281.5	1,534.8		122.5	1.3	1.1	283.8	136.2	
1939	8.7	7.1	3.4	172.5	248.3		117.3	0.9	17.3	252.0	122.0	
1940	5.0	1.4	2.3	223.7	384.4		115.3	0.9	23.4	190.2	145.5	
1941	4.5	2.1	2.7	303.7	1,301.1		98.8	0.9	5.0	209.1	161.2	
1942	4.4	0.3	1.3	209.5	154.7		103.3	1.2	2.9	225.0	158.0	
1943	5.2	0.3	2.1	224.8	962.6		121.7	14.1	4.7	296.3	177.1	
1944	7.8	0.2	1.5	75.3	496.7		119.4	15.9	16.4	321.5	222.9	
1945	11.6	0.3	1.1	98.2	116.4	2.5	100.7	5.0	4.0	295.2	231.2	
1946	6.7	0.1	1.5	142.2	740.3	0.6	97.2	3.2	19.1	316.2	221.3	
1947	3.9	0.0	1.3	172.5	157.8	0.2	106.6	1.9	10.6	251.7	181.1	
1948	2.0	-	0.8	43.1	693.3	0.1	98.6	1.7	12.5	195.3	152.5	
1949	1.9	-	0.8	65.4	319.3	0.4	93.7	1.9	45.8	137.6	148.4	
1950	1.3	-	0.7	144.1	600.2	0.8	86.9	2.1	31.8	138.6	136.2	
1951	0.7	-	0.5	48.2	232.7	5.0	93.9	2.1	22.4	99.8	129.8	
1952	0.7	-	0.8	29.7	491.1	4.2	91.7	2.5	58.3	110.0	114.7	
1953	0.2	-	0.5	42.8	340.5	12.7	82.4	2.2	34.2	82.0	128.3	
1954	0.8	-	0.4	80.0	579.8	20.2	82.1	2.1	30.9	66.7	141.5	
1955	0.8	-	0.3	58.7	330.0	17.2	75.8	2.3	16.3	67.2	142.4	
1956	2.9	-	0.7	25.4	558.4	10.8	73.4	2.4	8.7	63.7	127.7	
1957	1.7	-	0.2	17.5	244.4	8.4	64.2	2.2	6.4	58.6	108.0	
1958	0.1	-	0.2	15.7	526.9	8.7	71.0	2.9	15.6	54.2	109.6	
1959	0.0	-	0.1	37.7	153.7	14.3	59.6	1.8	5.6	43.0	100.9	
1960	0.1	-	0.2	14.4	462.2	27.0	52.8	2.2	1.1	46.6	107.0	
1961	0.0	-	0.1	371.9	371.9	58.3	48.6	3.2	0.5	41.9	120.3	
1962	0.1	-	0.2	22.1	318.7	41.3	43.8	1.8	0.3	54.6	146.8	
1963	0.1	-	0.2	17.6	607.1	33.1	41.1	1.3	0.2	68.6	137.5	
1964	0.0	-	0.2	11.8	381.4	30.5	37.6	1.0	0.0	64.4	148.5	
1965	-	-	0.1	7.5	343.1	32.0	37.4	1.3	0.0	68.8	174.6	
1966	0.0	-	0.1	7.9	183.4	31.1	39.2	1.6	0.0	70.3	185.5	
1967	0.0	-	0.1	12.3	12.2	22.2	34.2	0.9	0.0	64.8	198.4	
1968	-	-	0.0	4.9	4.1	27.2	30.2	1.1	0.0	61.7	209.3	
1969	-	-	0.1	2.2	4.6	38.5	24.4	1.3	0.0	43.6	212.2	

Table 4.6 (continued)
Case Rates of Certain Reported Communicable Diseases
 Michigan Residents, 1900 - 1988 (Rates per 100,000 population)

Year	Diphtheria	Smallpox	Typhoid Fever	Whooping Cough	Measles	Hepatitis, All Types	TB ² (all forms)	Meningo-coccal Infections	Polio	Syphilis	Gonorrhea	Acquired Immune Deficiency Syndrome
1970	-	-	0.2	2.2	20.7	51.8	22.4	0.8	0.0	44.2	229.4	
1971	0.0	-	0.1	1.6	29.6	53.8	19.9	0.7	-	53.5	248.1	
1972	0.0	-	0.1	1.3	26.1	47.9	18.1	0.6	0.0	54.2	274.2	
1973	-	-	0.2	0.9	50.2	42.7	16.2	0.6	-	48.2	342.7	
1974	-	-	0.1	1.1	26.0	39.5	15.7	0.6	0.0	29.9	352.0	
1975	0.0	-	0.1	1.1	35.7	31.6	14.0	0.8	-	18.0	357.7	
1976	-	-	0.1	0.8	67.3	29.0	14.8	0.7	0.0	11.9	382.1	
1977	-	-	0.1	0.8	15.2	29.3	14.1	0.6	-	12.9	401.8	
1978	-	-	0.2	0.5	87.0	23.6	13.7	0.9	0.0	12.3	398.3	
1979	-	-	0.2	1.1	9.4	22.0	11.4	0.9	-	13.6	396.0	
1980	0.0	-	0.1	0.4	2.7	19.4	12.6	0.8	0.0	12.6	377.4	0.0
1981	-	-	0.3	0.3	0.4	18.3	10.0	1.0	-	11.4	350.9	0.0
1982	-	-	0.2	0.4	0.7	18.9	9.4	0.9	-	10.0	356.0	0.0
1983	-	-	0.1	0.5	0.1	19.5	8.6	1.0	-	8.0	372.1	0.2
1984	-	-	0.1	0.3	5.1	19.0	7.3	1.0	-	8.3	383.9	0.5
1985	-	-	0.1	0.6	0.7	16.4	5.9	1.2	-	7.2	368.8	0.9
1986	-	-	0.1	0.4	0.2	13.8	6.8	0.9	-	6.4	414.8	1.6
1987	-	-	0.1	0.6	0.5	17.5	5.9	1.2	0.0	6.8	503.8	2.4
1988	-	-	0.1	0.4	0.3	13.0	5.5	1.0	-	11.0	405.1	3.9

¹ Meningococcal infections prior to 1952 data were for meningococcal meningitis.

² Effective January, 1975, a new diagnostic classification system for tuberculosis was adopted. As a result, case counts and rates prior to 1975 are not directly comparable to the figures in 1975 and later years.

SOURCE: Bureau of Disease Control and Laboratory Services, Division of Epidemiology, MDPH.

Table 4.7
Number of Deaths and Death Rates for Certain Communicable Diseases
 Michigan Residents, 1900 - 1988
(Rates per 100,000 population)

Year	Diphtheria		Strep. Sore Throat Incl. Scarlet Fever		Smallpox		Typhoid Fever		Whooping Cough		Measles		TB of the Respiratory System		Tuberculosis ² (all forms)		Poliomyelitis		Syphilis		Gonorrhea	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1900	529	21.9	272	11.2	9	0.4	869	35.9	208	8.6	342	14.1	2,018	83.4	2,500	103.3			88	3.6		
1901	502	20.4	312	12.7	27	1.1	645	26.2	163	6.6	79	3.2	2,152	87.5	2,548	103.6			114	4.6		
1902	504	20.2	277	11.1	42	1.7	608	24.3	289	11.6	238	9.5	2,088	83.6	2,462	98.5			130	5.2		
1903	686	27.0	200	7.9	29	1.1	606	23.9	383	15.1	176	6.9	2,155	84.9	2,562	101.0			101	4.0		
1904	515	20.0	210	8.1	26	1.0	641	24.9	148	5.7	194	7.5	2,306	89.5	2,761	107.2			89	3.5		
1905	478	18.3	123	4.7	74	2.8	636	24.3	131	5.0	123	4.7	2,288	87.5	2,732	104.5			89	3.4		
1906	472	17.8	227	8.6	3	0.1	721	27.2	469	17.7	251	9.5	2,303	86.8	2,728	101.3			94	3.6		
1907	421	15.6	159	5.9	8	0.3	594	22.1	223	8.3	256	9.5	2,338	86.8	2,706	99.0			118	4.5		
1908	343	12.6	194	7.1	11	0.4	687	25.1	305	11.2	121	4.4	2,249	82.3	2,706	99.0			127	4.8		
1909	395	14.3	275	9.9	4	0.1	653	23.6	217	7.8	270	9.7	2,237	80.7	2,629	94.9						
1910	495	17.6	297	10.6	121	4.3	654	23.3	318	11.3	251	8.9	2,273	80.9	2,756	98.1	52	1.9	65	2.3		
1911	473	16.3	208	7.2	7	0.2	551	19.0	254	8.8	200	6.9	2,284	78.9	2,766	95.5	55	1.9	104	3.6		
1912	465	15.6	186	6.2	3	0.1	534	17.9	252	8.5	118	4.0	2,289	76.8	2,744	92.0	48	1.7	90	3.1		
1913	676	22.0	283	9.2	5	0.2	538	17.5	292	9.5	258	8.4	2,243	73.1	2,703	88.1	43	1.5	136	4.6		
1914	507	16.1	177	5.6	2	0.1	400	12.7	304	9.6	180	5.7	2,325	73.7	2,799	88.8	41	1.4	160	5.3		
1915	354	10.9	107	3.3	5	0.2	353	10.9	236	7.3	101	3.1	2,527	78.0	2,986	92.2	36	1.2	163	5.3		
1916	507	15.2	177	5.3	2	0.1	424	12.8	228	6.9	363	10.9	2,573	77.4	3,070	92.3	141	4.6	206	6.7		
1917	851	24.9	340	10.0	9	0.3	386	11.3	360	10.6	259	7.6	2,779	81.5	3,310	97.0	44	1.4	224	7.1		
1918	686	19.6	181	5.2	18	0.5	337	9.6	496	14.2	270	7.7	3,059	87.5	3,612	103.3	58	1.8	290	9.1		
1919	764	21.3	179	5.0	10	0.3	272	7.6	172	4.8	183	5.1	2,620	73.1	3,127	87.3	80	2.2	299	8.2		
1920	888	24.2	305	8.3	14	0.4	297	8.1	511	13.9	436	11.9	2,645	72.1	3,149	85.8	30	0.8	314	8.4	14	0.4
1921	954	25.2	334	8.8	12	0.3	285	7.5	316	8.3	58	1.5	2,285	60.4	2,736	72.3	100	2.6	226	5.9	6	0.2
1922	620	15.9	217	5.6	20	0.5	192	4.9	232	5.9	232	5.9	2,232	57.2	2,654	68.0	21	0.5	186	4.7	5	0.1
1923	675	16.8	304	7.6	13	0.3	202	5.0	323	8.0	258	6.4	2,410	59.9	2,837	70.6	18	0.5	262	6.8	5	0.1
1924	470	11.4	265	6.4	226	5.5	149	3.6	169	4.1	221	5.3	2,474	59.8	2,952	71.3	116	3.0	271	7.0	13	0.3
1925	358	8.4	208	4.9	22	0.5	157	3.7	260	6.1	69	1.6	2,410	56.6	2,830	66.5	31	0.7	282	6.6	27	0.6
1926	677	15.5	235	5.4	4	0.1	119	2.7	355	8.1	577	13.2	2,601	59.5	3,041	69.5	34	0.8	327	7.5	12	0.3
1927	516	11.5	168	3.7	-	-	94	2.1	201	4.5	67	1.5	2,514	56.0	2,952	65.7	69	1.5	305	6.8	16	0.4
1928	384	8.3	178	3.9	2	0.0	83	1.8	219	4.8	303	6.6	2,647	57.4	3,108	67.5	27	0.6	384	8.4	19	0.4
1929	498	10.5	145	3.1	9	0.2	81	1.7	255	5.4	146	3.1	2,685	56.8	3,140	66.5	50	1.1	397	8.4	19	0.4
1930	299	6.2	130	2.7	9	0.2	87	1.8	176	3.6	231	4.8	2,443	50.5	2,912	60.1	39	0.8	395	8.2	12	0.2
1931	172	3.5	122	2.5	4	0.1	73	1.5	190	3.9	28	0.6	2,263	46.3	2,660	54.5	108	2.2	361	7.4	3	0.1
1932	106	2.2	112	2.3	1	0.0	56	1.1	199	4.0	183	3.7	2,101	42.7	2,463	50.0	23	0.5	377	7.7	2	0.0
1933	112	2.3	157	3.2	-	-	50	1.0	153	3.1	111	2.2	1,996	40.2	2,348	47.3	5	0.1	327	6.6	7	0.1
1934	38	0.8	171	3.4	-	-	65	1.3	141	2.8	36	0.7	1,909	38.1	2,199	43.9	25	0.5	402	8.0	10	0.2

Table 4.7 (continued)
 Number of Deaths and Death Rates for Certain Communicable Diseases
 Michigan Residents, 1900 - 1988 (Rates per 100,000 population)

Year	Diphtheria		Strep. Sore Throat Incl. Scarlet Fever		Smallpox		Typhoid Fever		Whooping Cough		Measles		TB of the Respiratory System		Tuberculosis ² (all forms)		Poliomyelitis		Syphilis		Gonorrhea		
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.
1935	58	1.1	98	1.9	-	-	34	0.7	132	2.6	184	3.6	1,741	34.5	2,044	40.5	32	0.6	393	7.8	3	0.1	
1936	52	1.0	114	2.2	1	0.0	37	0.7	107	2.1	12	0.2	1,816	35.7	2,100	41.3	21	0.4	394	7.7	6	0.1	
1937	72	1.4	148	2.9	-	-	29	0.6	132	2.6	11	0.2	1,860	36.2	2,119	41.3	51	1.0	401	7.8	8	0.2	
1938	44	0.9	87	1.7	-	-	23	0.4	116	2.2	100	1.9	1,633	31.6	1,866	36.1	10	0.2	401	7.8	8	0.2	
1939	25	0.5	69	1.3	-	-	25	0.5	76	1.5	29	0.6	1,651	31.7	1,881	36.1	40	0.8	389	7.5	4	0.1	
1940	20	0.4	41	0.8	1	0.0	11	0.2	59	1.1	19	0.4	1,547	29.4	1,752	33.3	72	1.4	591	11.2	3	0.0	
1941	18	0.3	32	0.6	1	0.0	14	0.3	91	1.7	65	1.2	1,532	28.2	1,723	31.7	18	0.3	537	9.9	1	0.0	
1942	24	0.4	23	0.4	-	-	5	0.1	72	1.3	8	0.1	1,630	29.4	1,827	33.0	10	0.2	559	10.1	7	0.1	
1943	21	0.4	11	0.2	-	-	9	0.2	101	1.9	89	1.7	1,588	29.5	1,802	33.5	27	0.5	579	10.8	3	0.0	
1944	32	0.6	7	0.1	1	0.0	7	0.1	33	0.6	49	0.9	1,544	28.7	1,748	32.5	45	0.8	543	10.1	2	0.0	
1945	46	0.8	9	0.2	-	-	3	0.1	36	0.7	10	0.2	1,591	29.3	1,758	32.3	20	0.4	527	9.7	2	0.0	
1946	27	0.5	3	0.1	-	-	6	0.1	44	0.8	47	0.8	1,645	28.8	1,843	32.3	89	1.6	547	9.6	-	-	
1947	23	0.4	6	0.1	-	-	5	0.1	63	1.0	5	0.1	1,483	24.4	1,643	27.1	29	0.5	502	8.3	3	0.0	
1948	8	0.1	1	0.0	-	-	4	0.1	9	0.1	43	0.7	1,395	22.5	1,561	25.2	54	0.9	512	8.3	-	-	
1949	11	0.2	4	0.1	-	-	1	0.0	22	0.3	33	0.5	1,254	19.7	1,400	22.0	216	3.4	455	7.2	-	-	
1950	2	0.0	1	0.0	-	-	5	0.1	28	0.4	28	0.4	1,134	17.8	1,270	19.9	128	2.0	325	5.1	1	0.0	
1951	6	0.1	-	-	-	-	1	0.0	21	0.3	11	0.2	1,049	16.0	1,154	17.6	67	1.0	299	4.6	1	0.0	
1952	2	0.0	-	-	-	-	-	-	8	0.1	17	0.3	689	10.3	775	11.6	213	3.2	174	2.6	2	0.0	
1953	2	0.0	1	0.0	-	-	-	-	11	0.2	16	0.2	536	7.8	607	8.9	108	1.6	182	2.7	1	0.0	
1954	3	0.0	3	0.0	-	-	-	-	17	0.2	17	0.2	471	6.7	530	7.5	89	1.3	139	2.0	2	0.0	
1955	1	0.0	1	0.0	-	-	1	0.0	8	0.1	10	0.1	435	6.0	477	6.6	32	0.4	115	1.6	1	0.0	
1956	6	0.1	3	0.0	-	-	-	-	6	0.1	26	0.3	426	5.7	466	6.2	22	0.3	114	1.5	4	0.1	
1957	1	0.0	-	-	-	-	-	-	6	0.1	23	0.3	403	5.2	442	5.7	15	0.2	105	1.3	4	0.1	
1958	-	-	-	-	-	-	-	-	1	0.0	18	0.2	357	4.5	395	5.0	37	0.5	84	1.1	8	0.1	
1959	1	0.0	2	0.0	-	-	1	0.0	5	0.1	11	0.1	335	4.2	370	4.6	17	0.2	84	1.1	4	0.1	
1960	2	0.0	1	0.0	-	-	-	-	1	0.0	17	0.2	364	4.7	390	5.0	4	0.1	79	1.0	7	0.1	
1961	1	0.0	1	0.0	-	-	-	-	2	0.0	13	0.2	307	3.9	332	4.2	-	-	71	0.9	7	0.1	
1962	2	0.0	1	0.0	-	-	-	-	2	0.0	8	0.1	307	3.9	331	4.2	2	0.0	94	1.2	3	0.0	
1963	-	-	-	-	-	-	-	-	-	-	27	0.3	276	3.4	299	3.7	1	0.0	72	0.9	1	0.0	
1964	-	-	-	-	-	-	-	-	2	0.0	11	0.1	288	3.6	315	3.9	1	0.0	66	0.8	3	0.0	
1965	1	0.0	-	-	-	-	-	-	-	-	5	0.1	261	3.2	285	3.5	-	-	65	0.8	2	0.0	
1966	-	-	-	-	-	-	-	-	-	-	7	0.1	284	3.4	301	3.6	-	-	63	0.8	-	-	
1967	-	-	-	-	-	-	-	-	-	-	3	0.0	206	2.4	226	2.6	-	-	44	0.5	1	0.0	
1968	-	-	1	0.0	-	-	-	-	-	-	-	-	203	2.3	262	3.0	2	0.0	29	0.3	-	-	
1969	-	-	-	-	-	-	-	-	-	-	-	-	147	1.7	201	2.3	-	-	26	0.3	1	0.0	

Table 4.7 (continued)
 Number of Deaths and Death Rates for Certain Communicable Diseases
 Michigan Residents, 1900 - 1988 (Rates per 100,000 population)

Year	Diphtheria		Strep. Sore Throat Incl. Scarlet Fever		Smallpox		Typhoid Fever		Whooping Cough		Measles		TB of the Respiratory System		Tuberculosis ² (all forms)		Poliomyelitis		Syphilis		Gonorrhea		
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.
1970	-	-	2	0.0	-	-	-	-	-	-	1	0.0	134	1.5	180	2.0	-	-	17	0.2	2	0.0	
1971	-	-	4	0.0	-	-	-	-	-	-	-	-	122	1.4	173	1.9	-	-	18	0.2	-	-	
1972	-	-	1	0.0	1	0.0	-	-	-	-	-	-	111	1.2	157	1.7	1	0.0	12	0.1	-	-	
1973	-	-	-	-	-	-	-	-	1	0.0	2	0.0	101	1.1	138	1.5	3	0.0	12	0.1	-	-	
1974	-	-	1	0.0	-	-	-	-	2	0.0	-	-	109	1.2	142	1.6	3	0.0	11	0.1	-	-	
1975	-	-	-	-	-	-	-	-	1	0.0	1	0.0	81	0.9	110	1.2	5	0.1	10	0.1	-	-	
1976	-	-	-	-	-	-	-	-	-	-	-	-	80	0.9	102	1.1	6	0.1	11	0.1	1	0.0	
1977	-	-	1	0.0	-	-	-	-	1	0.0	-	-	67	0.7	97	1.1	6	0.1	3	0.0	-	-	
1978	-	-	-	-	-	-	-	-	-	-	1	0.0	60	0.7	80	0.9	2	0.0	5	0.1	-	-	
1979	-	-	-	-	-	-	-	-	-	-	-	-	47	0.5	62	0.7	2	0.0	9	0.1	-	-	
1980	-	-	-	-	-	-	-	-	-	-	-	-	51	0.6	61	0.7	-	-	1	0.0	1	0.0	
1981	-	-	-	-	1	0.0	-	-	-	-	-	-	41	0.4	53	0.6	-	-	4	0.0	1	0.0	
1982	-	-	-	-	-	-	-	-	-	-	-	-	30	0.3	41	0.4	-	-	-	-	-	-	
1983	-	-	-	-	-	-	-	-	-	-	1	0.0	28	0.3	39	0.4	-	-	3	0.0	-	-	
1984	-	-	1	0.0	-	-	-	-	-	-	1	0.0	47	0.5	59	0.7	-	-	2	0.0	-	-	
1985	-	-	-	-	-	-	-	-	-	-	-	-	37	0.4	46	0.5	-	-	3	0.0	-	-	
1986	-	-	-	-	-	-	-	-	-	-	-	-	36	0.4	44	0.5	-	-	2	0.0	-	-	
1987	-	-	-	-	-	-	-	-	-	-	-	-	39	0.4	46	0.5	-	-	2	0.0	-	-	
1988	-	-	1	0.0	-	-	-	-	1	0.0	-	-	36	0.4	42	0.5	-	-	2	0.0	-	-	

¹ From 1901 through 1920, syphilis includes all other venereal diseases, beginning with 1968 excludes aortic aneurysms not specified as syphilitic.
² Effective January 1975, a new diagnostic classification system for tuberculosis was adopted. As a result, deaths and rates prior to 1975 are not directly comparable to the figures in 1975 and later years.

Table 4.8
 Number of Deaths and Death Rates by Specified Causes
 Michigan Residents, 1900 - 1988
 (Rates per 100,000 population)

Year	Heart Disease		Cancer (all forms) ¹		Cerebrovascular Disease		Accidents (all forms) ³		Motor Vehicle Accidents ⁴		Diabetes		Pneumonia		Chronic Liver Disease & Cirrhosis ⁵		Atherosclerosis ⁶	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1900	2,836	117.1	1,460	60.3	2,136	88.2	1,740	71.9			224	9.3	2,388	98.6				
1901	3,040	123.6	1,484	60.3	2,147	87.3	1,901	77.3			264	10.7	2,901	117.9				
1902	3,302	132.1	1,483	59.3	2,097	83.9	1,796	71.9			289	11.6	2,637	105.5				
1903	3,702	145.9	1,694	66.8	2,321	91.5	2,017	79.5			265	10.4	2,607	102.7				
1904	3,981	154.5	1,728	67.1	2,431	94.3	2,035	79.0			298	11.6	2,646	102.7				
1905	3,715	142.0	1,693	64.7	2,405	91.9	2,034	77.8			267	10.2	2,417	92.4				
1906	3,933	148.2	1,736	65.4	2,554	96.2	2,126	80.1			311	11.7	2,621	98.7				
1907	4,269	158.5	1,747	64.9	2,690	99.9	2,209	82.0			352	13.1	3,018	112.0				
1908	4,202	153.8	1,921	70.3	2,680	96.3	2,036	74.5			359	13.1	2,313	84.7				
1909	4,354	157.1	1,948	70.3	2,739	98.8	1,903	68.7			374	13.5	2,265	81.7				
1910	4,581	163.0	2,105	74.9	3,091	110.0	2,158	76.8	49	1.7	398	14.2	2,785	99.1	282	10.0		
1911	4,639	160.2	2,142	74.0	2,916	100.7	2,121	73.2	44	1.5	373	12.9	2,763	95.4				
1912	5,324	178.5	2,291	76.8	2,707	90.8	2,005	67.2	75	2.5	448	15.0	2,796	93.8				
1913	4,908	160.0	2,388	77.8	2,834	92.4	2,333	76.1	132	4.3	483	15.7	3,082	100.5				
1914	5,124	162.5	2,414	76.6	2,993	94.9	2,108	66.8	120	3.8	503	16.0	2,909	92.2				
1915	5,538	171.0	2,567	79.2	3,384	104.5	2,219	68.5	190	5.9	498	15.4	3,229	99.7				
1916	5,819	175.0	2,710	81.5	3,559	107.0	2,853	85.8	257	7.7	500	15.0	3,698	111.2				
1917	6,103	178.9	2,765	81.1	3,703	108.6	2,925	85.8	335	9.8	569	16.7	4,455	130.6				
1918	6,091	174.2	2,931	83.8	3,493	99.9	2,599	74.3	279	8.0	591	16.9	7,238	207.0				
1919	5,651	157.7	2,990	83.5	3,483	97.2	2,612	72.9	328	9.2	559	15.6	4,081	113.9				
1920	6,732	183.5	3,158	86.1	3,876	105.7	2,646	72.1	397	10.8	577	15.7	5,794	157.9				
1921	6,176	163.1	3,373	89.1	3,931	103.8	2,476	65.4	403	10.6	586	15.5	2,849	75.3				
1922	6,897	176.7	3,481	89.2	4,041	103.5	2,475	63.4	529	13.6	650	16.7	3,728	95.5	261	6.9		
1923	7,266	180.7	3,545	88.2	4,420	109.9	2,826	70.3	677	16.8	635	15.8	4,719	117.4	267	6.8		
1924	6,985	168.8	3,824	92.4	4,241	102.5	3,090	74.7	1,001	24.2	661	16.0	3,332	80.5	251	6.2		
1925	7,540	177.2	3,858	90.7	4,623	108.6	3,278	77.0	1,103	25.9	746	17.5	3,294	77.4	256	6.2		
1926	8,281	189.4	4,087	93.5	4,663	106.6	3,557	81.3	1,221	27.9	743	17.0	4,440	101.5	319	7.5		
1927	8,780	195.5	4,264	95.0	4,378	97.5	3,634	80.9	1,389	30.9	819	18.2	3,543	78.9	326	7.5		
1928	9,786	212.4	4,381	95.1	4,718	102.4	3,704	80.4	1,429	31.0	905	19.6	4,518	98.1	340	7.6		
1929	10,185	215.6	4,571	96.7	4,694	99.3	3,913	82.8	1,552	32.8	935	19.8	4,216	89.2	373	8.1		
1930	9,947	205.4	4,572	94.4	4,533	93.6	3,805	78.6	1,572	32.5	880	18.2	3,321	68.6	361	7.6		
1931	10,206	209.0	4,763	97.5	4,388	89.8	3,630	74.3	1,516	31.0	950	19.5	2,883	59.0	329	6.8	1,047	21.6
1932	11,162	226.6	4,935	100.2	4,518	91.7	3,179	64.5	1,229	25.0	1,121	22.8	3,238	65.7	365	7.5	1,005	20.6
1933	11,509	231.7	5,055	101.8	4,318	86.9	3,304	66.5	1,278	25.7	1,103	22.2	2,756	55.5	386	7.8	948	19.2
1934	11,824	236.1	5,370	107.2	4,485	89.6	3,774	75.4	1,511	30.2	1,100	22.0	3,466	69.2	354	7.1	966	19.5
1935															378	7.5	914	18.3

Table 4.8 (continued)
 Number of Deaths and Death Rates by Specified Causes
 Michigan Residents, 1900 - 1988
 (Rates per 100,000 population)

Year	Heart Disease		Cancer (all forms) ¹		Cerebrovascular Disease		Accidents (all forms) ³		Motor Vehicle Accidents ⁴		Diabetes		Pneumonia		Chronic Liver Disease & Cirrhosis ⁵		Atherosclerosis ⁶	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1935	12,456	246.7	5,399	106.9	4,420	87.5	3,771	74.7	1,676	33.2	1,228	24.3	3,801	75.3	368	7.3	897	17.8
1936	13,374	262.7	5,752	113.0	4,705	92.4	5,246	103.1	1,924	37.8	1,266	24.9	4,096	80.5	446	8.8	997	19.6
1937	13,233	257.8	5,732	111.7	4,378	85.3	4,580	89.2	2,187	42.6	1,255	24.5	4,098	79.8	430	8.4	1,168	22.8
1938	13,887	268.4	6,059	117.1	4,543	87.8	3,608	69.7	1,490	28.8	1,283	24.8	2,869	55.5	424	8.2	869	16.8
1939	14,898	285.7	6,296	120.7	4,415	84.7	3,761	72.1	1,553	29.8	1,360	26.1	2,803	53.8	387	7.4	918	17.6
1940	15,480	294.5	6,513	123.9	4,690	89.2	3,961	75.4	1,743	33.2	1,408	26.8	2,478	47.1	468	8.9	941	17.9
1941	15,761	289.8	6,551	120.5	4,698	86.4	4,450	81.8	2,156	39.6	1,382	25.4	2,235	41.1	450	8.3	906	16.7
1942	16,016	289.2	6,646	120.0	4,841	87.4	3,685	66.5	1,368	24.7	1,448	26.1	2,349	42.4	535	9.7	1,015	18.3
1943	17,816	331.3	7,127	132.5	5,311	98.8	3,480	64.7	1,025	19.1	1,535	28.5	2,931	54.5	518	9.6	1,092	20.3
1944	17,004	316.2	7,277	135.3	4,954	92.1	3,350	62.3	1,103	20.5	1,554	28.9	2,369	44.1	471	8.8	980	18.2
1945	17,421	320.5	7,486	137.7	5,295	97.4	3,432	63.1	1,199	22.1	1,561	28.7	1,932	35.5	535	9.8	970	17.8
1946	17,691	309.9	7,845	137.4	5,224	91.5	3,776	66.1	1,506	26.4	1,530	26.8	1,891	33.1	554	9.7	933	16.3
1947	18,412	303.4	8,188	134.9	5,426	89.4	3,848	63.4	1,499	24.7	1,618	26.7	2,089	34.4	697	11.5	1,031	17.0
1948	18,726	302.3	8,336	134.6	5,272	85.1	4,017	64.8	1,545	24.9	1,771	28.6	1,853	29.9	771	12.4	1,085	17.5
1949	19,137	301.3	8,697	136.9	5,438	85.6	3,838	60.4	1,493	23.5	1,884	29.7	1,885	29.7	730	11.5	1,135	17.9
1950	20,521	322.1	8,685	136.3	6,376	100.1	3,783	59.4	1,680	26.4	1,438	22.6	1,358	21.3	616	9.7	1,296	20.3
1951	21,118	322.6	9,187	140.4	6,579	100.5	3,916	59.8	1,806	27.6	1,374	21.0	1,619	24.7	569	8.7	1,312	20.0
1952	21,247	316.8	9,256	138.0	6,521	97.2	3,901	58.2	1,815	27.1	1,339	20.0	1,571	23.4	599	8.9	1,294	19.3
1953	22,425	327.3	9,904	144.5	7,045	102.8	4,375	63.8	2,051	29.9	1,419	20.7	1,538	22.4	715	10.4	1,270	18.5
1954	22,362	318.4	10,105	143.9	6,964	99.1	3,948	56.2	1,916	27.3	1,469	20.9	1,380	19.6	677	9.6	1,170	16.7
1955	23,440	323.9	10,297	142.3	7,362	101.7	4,213	58.2	2,129	29.4	1,415	19.6	1,538	21.3	805	11.1	1,237	17.1
1956	24,661	328.1	10,489	139.6	7,114	94.7	3,975	52.2	1,826	24.3	1,443	19.2	1,723	22.9	788	10.5	1,251	16.6
1957	25,369	325.1	10,810	138.5	7,632	97.8	3,643	46.7	1,680	21.5	1,510	19.4	2,045	26.2	861	11.0	1,248	16.0
1958	25,215	320.6	10,946	139.2	7,547	95.9	3,306	42.0	1,466	18.6	1,595	20.3	2,076	26.4	818	10.4	1,300	16.5
1959	25,323	318.1	11,113	139.6	7,700	96.7	3,666	46.1	1,587	19.9	1,715	21.5	1,810	22.7	815	10.2	1,403	17.6
1960	25,728	328.9	11,331	144.8	7,682	98.2	3,688	47.1	1,710	21.9	1,784	22.8	2,002	25.6	840	10.7	1,352	17.3
1961	25,519	322.9	11,476	145.2	7,745	98.0	3,692	46.7	1,656	21.0	1,778	22.5	1,692	21.4	858	10.9	1,448	18.3
1962	27,226	342.9	11,752	148.0	7,783	98.0	3,758	47.3	1,668	21.0	1,908	24.0	1,824	23.0	859	10.8	1,477	18.6
1963	27,483	342.3	12,078	150.4	8,168	101.7	4,033	50.2	2,005	25.0	2,049	25.5	1,995	24.8	958	11.9	1,652	20.6
1964	27,496	339.5	12,087	149.2	7,940	98.0	4,036	54.5	2,286	28.2	2,055	25.4	1,714	21.2	995	12.3	1,559	19.2
1965	28,134	343.1	12,419	151.5	7,769	94.8	4,494	54.8	2,271	27.7	2,153	26.3	1,987	24.2	1,068	13.0	1,726	21.1
1966	28,277	340.1	12,506	150.4	7,732	93.0	4,737	57.0	2,407	29.0	2,243	27.0	2,026	24.4	1,152	13.9	1,745	21.0
1967	28,757	333.8	13,030	151.2	7,846	91.1	4,519	52.4	2,265	26.3	2,182	25.3	2,073	22.9	1,240	14.4	1,730	20.1
1968	29,680	342.1	13,292	153.2	7,913	91.2	4,603	53.1	2,466	28.4	2,298	26.5	2,341	27.0	1,259	14.5	1,262	14.5
1969	29,396	336.6	13,328	152.6	7,706	88.2	4,766	54.6	2,579	29.5	2,188	25.1	2,229	25.5	1,430	16.4	1,289	14.8

Table 4.8 (continued)
Number of Deaths and Death Rates by Specified Causes
 Michigan Residents, 1900 - 1988
(Rates per 100,000 population)

Year	Heart Disease		Cancer (all forms) ¹		Cerebrovascular Disease		Accidents (all forms) ³		Motor Vehicle Accidents ⁴		Diabetes		Pneumonia		Chronic Liver Disease & Cirrhosis ⁵		Atherosclerosis ⁶	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
1970	29,204	329.1	13,551	152.7	7,691	86.7	4,428	49.9	2,309	26.0	2,180	24.6	2,004	22.6	1,558	17.6	1,174	13.2
1971	30,095	335.4	13,594	151.5	7,826	87.2	4,426	49.3	2,274	25.3	2,103	23.4	1,981	22.1	1,657	18.5	1,187	13.2
1972	30,865	342.0	14,045	155.6	7,999	88.6	4,566	50.6	2,450	27.1	2,222	24.6	2,009	22.3	1,778	19.7	1,153	12.8
1973	29,944	330.1	14,220	156.7	7,987	88.0	4,630	51.0	2,389	26.3	2,074	22.9	1,958	21.6	1,711	18.9	1,142	12.6
1974	29,220	320.8	14,241	156.3	7,645	83.9	4,211	46.2	1,929	21.2	1,940	21.3	1,637	18.0	1,650	18.1	1,187	13.0
1975	28,298	310.7	14,445	158.6	7,262	79.7	4,002	43.9	1,841	20.2	1,819	20.0	1,690	18.6	1,574	17.3	1,119	12.3
1976	29,233	320.6	14,880	163.2	7,354	80.7	3,912	42.9	1,993	21.9	1,719	18.9	1,812	19.9	1,486	16.3	1,207	13.2
1977	28,895	315.6	15,125	165.2	6,818	74.5	3,945	43.1	1,993	21.8	1,615	17.6	1,639	17.9	1,356	14.8	1,164	12.7
1978	29,406	319.6	15,249	165.7	6,520	70.9	3,970	43.1	2,138	23.2	1,551	16.9	1,828	19.9	1,351	14.7	1,146	12.5
1979	29,296	316.7	15,409	166.6	6,067	65.6	3,839	41.5	1,967	21.3	1,449	15.7	1,454	15.7	1,367	14.8	1,173	12.7
1980	29,790	321.6	15,828	170.9	6,164	66.6	3,627	39.2	1,880	20.3	1,467	15.8	1,712	18.5	1,362	14.7	1,254	13.5
1981	30,172	325.5	16,142	174.1	6,121	66.0	3,390	36.6	1,727	18.6	1,487	16.0	1,644	17.7	1,253	13.5	1,270	13.7
1982	30,099	326.2	16,566	179.5	5,839	63.3	3,113	33.7	1,555	16.9	1,347	14.6	1,665	18.0	1,244	13.5	1,284	13.9
1983	30,412	332.2	16,785	183.3	5,721	62.5	2,947	32.2	1,419	15.5	1,470	16.1	2,007	21.9	1,250	13.7	1,269	13.9
1984	30,100	331.7	16,907	186.3	5,631	62.1	3,049	33.6	1,630	18.0	1,476	16.3	1,987	21.9	1,194	13.2	1,142	12.6
1985	30,618	336.9	17,281	190.1	5,528	60.8	3,228	35.5	1,676	18.4	1,387	15.3	2,193	24.1	1,256	13.8	1,173	12.9
1986	31,270	342.0	17,321	189.4	5,421	59.3	3,202	35.0	1,736	19.0	1,494	16.3	2,389	26.1	1,120	12.2	1,214	13.3
1987	30,521	331.8	17,669	192.1	5,481	59.6	3,143	34.2	1,725	18.8	1,479	16.1	2,354	25.6	1,099	11.9	1,168	12.7
1988	30,218	327.0	17,890	193.6	5,237	56.7	3,237	35.0	1,806	19.5	1,522	16.5	2,626	28.4	1,080	11.7	1,187	12.8

¹ Cancer includes leukemias, aleukemias, and Hodgkin's disease beginning with 1921.

² Cerebrovascular disease was called Vascular Lesions Affecting-Central Nervous System prior to 1968.

³ Accidents exclude injuries undetermined whether accidentally or purposely inflicted since 1968.

⁴ Motor vehicle accidents do not include collision with heavier vehicles from 1910 through 1922. Motorcycle accidents are included beginning 1923.

⁵ Chronic liver disease and cirrhosis was called Cirrhosis of the Liver prior to 1979.

⁶ Atherosclerosis was called General Arteriosclerosis prior to 1968 and was called Arteriosclerosis from 1968-1978.

Table 4.9
Selected Vital Statistics by County
Michigan Residents, 1988

Area	Population Estimate	Live Births	Low Weight Live Births	Deaths	Infant Deaths	Neonatal Deaths	Perinatal Deaths	Fetal Deaths	Marriages ¹	Divorces ¹
Michigan	9,239,811	139,635	10,237	80,075	1,542	1,068	1,659	761	75,386	40,103
Alcona	10,631	93	5	137	2	1	1	-	81	42
Alger	8,742	98	5	110	2	1	1	-	66	39
Allegan	90,249	1,414	73	677	9	8	15	9	727	363
Alpena	31,471	345	20	306	5	3	5	2	283	135
Antrim	17,660	242	16	201	4	1	1	-	152	97
Arenac	15,816	204	15	165	2	1	-	-	108	54
Baraga	8,253	102	2	104	-	-	-	-	58	39
Barry	49,649	695	28	358	8	5	9	5	362	216
Bay	115,518	1,603	111	1,004	12	7	14	9	963	427
Benzie	11,597	163	12	131	-	-	-	-	114	52
Berrien	166,558	2,559	207	1,603	28	16	35	25	1,448	796
Branch	40,721	617	32	405	1	1	4	3	390	204
Calhoun	139,199	2,017	146	1,394	27	14	19	9	1,212	857
Cass	49,508	591	36	437	3	2	1	1	400	293
Charlevoix	21,246	318	21	205	9	4	5	1	216	103
Cheboygan	21,435	282	21	247	3	2	4	2	173	84
Chippewa	30,129	356	14	282	3	1	2	1	267	104
Clare	26,357	342	20	312	3	-	2	2	220	128
Clinton	58,006	746	31	372	2	1	5	4	439	199
Crawford	10,790	185	12	140	6	1	2	1	119	56
Delta	38,382	463	19	371	5	4	4	1	272	138
Dickinson	26,184	302	14	282	3	3	2	-	258	134
Eaton	94,026	1,159	85	618	8	5	10	5	749	448
Emmet	24,763	401	20	242	4	2	2	1	258	141
Genesee	430,749	6,703	556	3,537	85	52	72	27	3,634	1,933
Gladwin	22,795	305	18	206	2	-	1	1	181	79
Gogebic	18,159	185	12	254	1	-	1	1	119	52
Grand Traverse	63,300	931	53	488	3	2	-	-	667	399
Gratiot	39,472	531	34	409	6	4	6	3	342	146
Hillsdale	43,346	639	40	361	2	2	8	6	324	215
Houghton	35,769	412	20	417	3	1	1	-	217	98
Huron	36,618	477	19	401	3	2	3	2	263	110
Ingham	276,338	4,464	289	1,781	40	22	49	31	2,704	1,349
Ionia	56,208	864	53	454	6	5	6	1	442	200
Iosco	30,437	531	22	303	4	2	3	1	311	173
Iron	13,527	128	9	220	-	2	-	-	97	51
Isabella	54,014	655	23	279	3	2	4	4	410	184
Jackson	149,457	2,123	144	1,296	26	16	25	14	1,213	691
Kalamazoo	217,906	3,355	218	1,631	28	18	29	16	2,061	1,095
Kalkaska	12,563	202	8	112	1	-	-	-	105	63
Kent	484,626	9,066	552	3,630	90	59	99	50	4,938	2,309
Keweenaw	2,019	12	1	39	-	-	-	-	11	8

Table 4.9 (continued)
Selected Vital Statistics by County
Michigan Residents, 1988

Area	Population Estimate	Live Births	Low Weight Live Births	Deaths	Infant Deaths	Neonatal Deaths	Perinatal Deaths	Fetal Deaths	Marriages ¹	Divorces ¹
Lake	8,953	127	3	130	-	-	1	1	56	34
Lapeer	74,528	1,030	48	459	9	7	9	3	715	322
Leelanau	15,545	238	10	128	-	-	1	1	147	71
Lenawee	90,969	1,282	55	814	8	4	14	12	673	415
Livingston	113,461	1,499	65	643	12	11	10	3	898	586
Luce	5,848	69	4	66	1	-	1	1	54	38
Mackinac	10,563	157	10	108	3	3	2	-	167	30
Macomb	706,872	9,626	573	5,632	89	58	93	41	6,395	3,196
Manistee	22,377	213	9	267	-	-	3	3	143	93
Marquette	70,040	975	62	519	8	6	8	3	568	285
Mason	26,315	351	20	311	4	4	3	-	226	139
Mecosta	38,297	441	31	287	7	5	7	4	275	106
Menominee	25,886	311	20	273	4	2	2	-	286	99
Midland	75,166	1,054	54	496	11	5	7	-	562	361
Missaukee	11,568	151	7	109	1	1	1	-	100	52
Monroe	136,446	1,867	117	1,053	14	9	8	2	1,028	554
Montcalm	53,522	793	54	463	11	10	19	11	480	228
Montmorency	8,416	86	5	129	1	-	-	-	50	22
Muskegon	161,316	2,580	192	1,382	18	11	18	7	1,471	881
Newaygo	39,488	647	33	359	4	3	4	3	424	180
Oakland	1,052,475	15,639	1,007	7,941	153	121	182	75	9,539	5,075
Oceana	23,400	354	19	238	5	4	6	2	172	109
Ogemaw	18,743	257	16	215	1	-	2	2	180	66
Ontonagon	9,055	91	7	117	2	1	1	1	82	36
Osceola	21,054	294	16	208	3	1	1	1	174	100
Oscoda	7,428	108	6	114	1	-	1	1	62	27
Oshtemo	16,854	244	9	153	2	-	-	-	152	61
Ottawa	180,586	3,004	122	1,137	18	13	20	10	1,444	-
Presque Isle	14,202	130	10	162	1	1	1	-	82	34
Roscommon	20,590	210	10	273	2	2	2	1	167	97
Saginaw	215,474	3,352	300	1,850	48	35	57	28	1,670	904
St. Clair	145,787	1,970	113	1,314	20	16	17	9	1,224	647
St. Joseph	59,979	913	56	529	8	3	10	7	514	333
Sanilac	41,354	533	29	445	6	2	4	2	321	141
Schoolcraft	8,260	108	7	95	-	-	1	1	54	26
Shiawassee	70,896	970	56	544	10	7	17	10	557	376
Tuscola	56,642	784	46	467	12	9	11	4	460	196
Van Buren	69,439	1,087	74	677	14	10	14	6	604	354
Washtenaw	267,822	3,638	232	1,380	26	21	42	24	2,457	1,237
Wayne	2,122,827	35,115	3,669	22,414	550	412	602	235	13,113	8,113
Wexford	27,175	456	25	237	3	1	3	2	266	175
County Not Stated	-	1	-	16	-	-	4	4	-	-

¹ By county of occurrence rather than county of residence.

Table 4.10
Selected Vital Statistics Rates by County
Michigan Residents, 1988

Area	Live Births	Low Weight Live Births	Deaths	Infant Deaths	Neonatal Deaths	Perinatal Deaths	Fetal Deaths	Marriages ²	Divorces ¹
Michigan	15.1	73.3	8.7	11.0	7.6	11.9	5.4	16.3	8.7
Alcona	8.7	53.8	12.9	21.5	10.8	10.8	0.0	15.2	7.9
Alger	11.2	51.0	12.6	20.4	10.2	10.2	0.0	15.1	8.9
Allegan	15.7	51.6	7.5	6.4	5.7	10.6	0.0	16.1	8.0
Alpena	11.0	58.0	9.7	14.5	8.7	14.5	5.8	18.0	8.6
Antrim	13.7	66.1	11.4	16.5	4.1	4.1	0.0	17.2	11.0
Arenac	12.9	73.5	10.4	9.8	4.9	0.0	0.0	13.7	6.8
Baraga	12.4	19.6	12.6	0.0	0.0	0.0	0.0	14.1	9.5
Barry	14.0	40.3	7.2	11.5	7.2	12.9	7.2	14.6	8.7
Bay	13.9	69.2	8.7	7.5	4.4	8.7	5.6	16.7	7.4
Benzie	14.1	73.6	11.3	0.0	0.0	0.0	0.0	19.7	9.0
Berrien	15.4	80.9	9.6	10.9	6.3	13.7	9.8	17.4	9.6
Branch	15.2	51.9	9.9	1.6	1.6	6.5	4.9	19.2	10.0
Calhoun	14.5	72.4	10.0	13.4	6.9	9.4	4.5	17.4	12.3
Cass	11.9	60.9	8.8	5.1	3.4	1.7	1.7	16.2	11.8
Charlevoix	15.0	66.0	9.6	28.3	12.6	15.7	3.1	20.3	9.7
Cheboygan	13.2	74.5	11.5	10.6	7.1	14.2	7.1	16.1	7.8
Chippewa	11.8	39.3	9.4	8.4	2.8	5.6	2.8	17.7	6.9
Clare	13.0	58.5	11.8	8.8	0.0	5.8	5.8	16.7	9.7
Clinton	12.9	41.6	6.4	2.7	1.3	6.7	5.4	15.1	6.9
Crawford	17.1	64.9	13.0	32.4	5.4	10.8	5.4	22.1	10.4
Delta	12.1	41.0	9.7	10.8	8.6	8.6	2.2	14.2	7.2
Dickinson	11.5	46.4	10.8	9.9	9.9	6.6	0.0	19.7	10.2
Eaton	12.3	73.3	6.6	6.9	4.3	8.6	4.3	15.9	9.5
Emmet	16.2	49.9	9.8	10.0	5.0	5.0	2.5	20.8	11.4
Genesee	15.6	82.9	8.2	12.7	7.8	10.7	4.0	16.9	9.0
Gladwin	13.4	59.0	9.0	6.6	0.0	3.3	3.3	15.9	6.9
Gogebic	10.2	64.9	14.0	5.4	0.0	5.4	5.4	13.1	5.7
Grand Traverse	14.7	56.9	7.7	3.2	2.1	0.0	0.0	21.1	12.6
Gratiot	13.5	64.0	10.4	11.3	7.5	11.3	5.6	17.3	7.4
Hillsdale	14.7	62.6	8.3	3.1	3.1	12.5	9.4	14.9	9.9
Houghton	11.5	48.5	11.7	0.0	0.0	0.0	0.0	12.1	5.5
Huron	13.0	39.8	11.0	6.3	4.2	6.3	4.2	14.4	6.0
Ingham	16.2	64.7	6.4	9.0	4.9	11.0	6.9	19.6	9.8
Ionia	15.4	61.3	8.1	6.9	5.8	6.9	1.2	15.7	7.1
Iosco	17.4	41.4	10.0	7.5	3.8	5.6	1.9	20.4	11.4
Iron	9.5	70.3	16.3	0.0	0.0	0.0	0.0	14.3	7.5
Isabella	12.1	35.1	5.2	4.6	3.1	6.1	6.1	15.2	6.8
Jackson	14.2	67.8	8.7	12.2	7.5	11.8	6.6	16.2	9.2
Kalamazoo	15.4	65.0	7.5	8.3	5.4	8.6	4.8	18.9	10.1
Kalkaska	16.1	39.6	8.9	5.0	0.0	0.0	0.0	16.7	10.0
Kent	18.7	60.9	7.5	9.9	6.5	10.9	5.5	20.4	9.5
Keweenaw	5.9	83.3	19.3	0.0	0.0	0.0	0.0	10.9	7.9

Table 4.10 (continued)
Selected Vital Statistics Rates by County
Michigan Residents, 1988

Area	Live Births	Low Weight Live Births	Deaths	Infant Deaths	Neonatal Deaths	Perinatal Deaths	Fetal Deaths	Marriages ²	Divorces ¹
Lake	14.2	23.6	14.5	0.0	0.0	7.9	7.9	12.5	7.6
Lapeer	13.8	46.6	6.2	8.7	6.8	8.7	2.9	19.2	8.6
Leelanau	15.3	42.0	8.2	0.0	0.0	4.2	4.2	18.9	9.1
Lenawee	14.1	42.9	8.9	6.2	3.1	10.9	9.4	14.8	9.1
Livingston	13.2	43.4	5.7	8.0	7.3	6.7	2.0	15.8	10.3
Luce	11.8	58.0	11.3	14.5	0.0	14.5	14.5	18.5	13.0
Mackinac	14.9	63.7	10.2	19.1	19.1	12.7	0.0	31.6	5.7
Macomb	13.6	59.5	11.9	9.2	6.0	9.7	4.3	18.1	9.0
Manistee	9.5	42.3	11.9	0.0	0.0	14.1	14.1	12.8	8.3
Marquette	13.9	63.6	7.4	8.2	6.2	8.2	3.1	16.2	8.1
Mason	13.3	57.0	11.8	11.4	11.4	8.5	0.0	17.2	10.6
Mecosta	11.5	70.3	7.5	15.9	11.3	15.9	9.1	14.4	5.5
Menominee	12.0	64.3	10.5	12.9	6.4	6.4	0.0	22.1	7.6
Midland	14.0	51.2	6.6	10.4	4.7	6.6	2.8	15.0	9.6
Missaukee	13.1	46.4	9.4	6.6	6.6	6.6	0.0	17.3	9.0
Monroe	13.7	62.7	7.7	7.5	4.8	4.3	1.1	15.1	8.1
Montcalm	14.8	68.1	8.7	13.9	12.6	24.0	13.9	17.9	8.5
Montmorency	10.2	58.1	15.3	11.6	0.0	0.0	0.0	11.9	5.2
Muskegon	16.0	74.4	8.6	11.6	0.0	0.0	0.0	18.2	10.9
Newaygo	16.4	51.0	9.1	6.2	4.6	6.2	4.6	21.5	9.1
Oakland	14.9	64.4	7.5	9.8	7.7	11.6	4.8	18.1	9.6
Oceana	15.1	53.7	10.2	14.1	11.3	16.9	5.6	14.7	9.3
Ogemaw	13.7	62.3	11.5	3.9	0.0	7.8	7.8	19.2	7.0
Ontonagon	10.0	76.9	12.9	22.0	11.0	11.0	11.0	18.1	8.0
Osceola	14.0	54.4	9.9	10.2	3.4	3.4	3.4	16.5	9.5
Oscoda	14.5	55.6	15.3	9.3	0.0	9.3	9.3	16.7	7.3
Osego	14.5	36.9	9.1	8.2	0.0	0.0	0.0	18.0	7.2
Ottawa	16.6	40.6	6.3	6.0	4.3	6.7	3.3	16.0	0.0
Presque Isle	9.2	76.9	11.4	7.7	7.7	7.7	0.0	11.5	4.8
Roscommon	10.2	47.6	13.3	9.5	9.5	9.5	4.8	16.2	9.4
Saginaw	15.6	89.5	8.6	14.3	10.4	17.0	8.4	15.5	8.4
St. Clair	13.5	57.4	9.0	10.2	8.1	8.6	4.6	16.8	8.9
St. Joseph	15.2	61.3	8.8	8.8	3.3	11.0	7.7	17.1	11.1
Sanilac	12.9	54.4	10.8	11.3	3.8	7.5	3.8	15.5	6.8
Schoolcraft	13.1	64.8	11.5	0.0	0.0	9.3	9.3	13.1	6.3
Shiawassee	13.7	57.7	7.7	10.3	7.2	17.5	10.3	15.7	10.6
Tuscola	13.8	58.7	8.2	15.3	11.5	14.0	5.1	16.2	6.9
Van Buren	15.7	68.1	9.7	12.9	9.2	12.9	5.5	17.4	10.2
Washtenaw	13.6	63.8	5.2	7.1	5.8	11.5	6.6	18.3	9.2
Wayne	16.5	104.5	10.6	15.7	11.7	17.1	6.7	12.4	7.6
Wexford	16.8	54.8	8.7	6.6	2.2	6.6	4.4	19.6	12.9

¹ Ratio per 1,000 live births.

² By county of occurrence rather than county of residence. Rate of persons per 1,000 population rather than events per population.

Table 4.11
Live Births with Selected Risk Factors by County of Residence
Michigan Residents, 1988

Area	Complications Reported		Congenital Anomalies Reported		4th Birth or Higher		Mother's Education 11th Grade or Less		Inadequate Prenatal Care ¹		Mothers Under 18 Years of Age	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Michigan	42,965	30.8	746	0.5	13,350	9.6	26,387	18.9	8,702	6.2	6,636	4.8
Alcona	50	53.8	-	-	7	7.5	22	23.7	3	3.2	6	6.5
Alger	44	44.9	1	1.0	13	13.3	13	13.3	8	8.2	2	2.0
Allegan	361	25.5	13	0.9	141	10.0	234	16.5	86	6.1	54	3.8
Alpena	229	66.4	5	1.4	19	5.5	64	18.6	4	1.2	14	4.1
Antrim	67	27.7	3	1.2	22	9.1	43	17.8	21	8.7	14	5.8
Arenac	66	32.4	2	1.0	19	9.3	40	19.6	10	4.9	5	2.5
Baraga	35	34.3	1	1.0	18	17.6	22	21.6	12	11.8	9	8.8
Barry	387	55.7	10	1.4	49	7.1	92	13.2	18	2.6	23	3.3
Bay	372	23.2	6	0.4	149	9.3	290	18.1	66	4.1	67	4.2
Benzie	32	19.6	1	0.6	13	8.0	38	23.3	14	8.6	5	3.1
Berrien	819	32.0	18	0.7	250	9.8	668	26.1	197	7.7	180	7.0
Branch	148	24.0	1	0.2	64	10.4	134	21.7	41	6.6	25	4.1
Calhoun	424	21.0	4	0.2	165	8.2	453	22.5	162	8.0	141	7.0
Cass	263	44.5	3	0.5	46	7.8	161	27.2	48	8.1	26	4.4
Charlevoix	134	42.1	3	0.9	31	9.7	45	14.2	13	4.1	12	3.8
Cheboygan	114	40.4	6	2.1	29	10.3	46	16.3	16	5.7	5	1.8
Chippewa	104	29.2	5	1.4	33	9.3	81	22.8	34	9.6	15	4.2
Clare	111	32.5	5	1.4	38	11.1	83	24.3	17	5.0	24	7.0
Clinton	283	37.9	4	0.5	72	9.7	67	9.0	40	5.4	15	2.0
Crawford	92	49.7	3	1.6	17	9.2	46	24.9	9	4.9	8	4.3
Delta	128	27.6	5	1.1	47	10.2	58	12.5	27	5.8	17	3.7
Dickinson	57	18.9	1	0.3	25	8.3	36	11.9	12	4.0	10	3.3
Eaton	471	40.6	8	0.7	87	7.5	107	9.2	51	4.4	34	2.9
Emmet	156	38.9	-	-	25	6.2	41	10.2	9	2.2	10	2.5
Genesee	2,674	39.9	13	0.2	616	9.2	1,548	23.1	230	3.4	418	6.2
Gladwin	114	37.4	1	0.3	43	14.1	83	27.2	30	9.8	16	5.2
Gogebic	96	51.9	1	0.5	24	13.0	22	11.9	7	3.8	7	3.8
Grand Traverse	254	27.3	6	0.6	92	9.9	113	12.1	85	9.1	22	2.4
Gratiot	168	31.6	2	0.4	53	10.0	83	15.6	32	6.0	26	4.9
Hillsdale	234	36.6	5	0.8	72	11.3	139	21.8	34	5.3	27	4.2
Houghton	161	39.1	4	1.0	84	20.4	35	8.5	21	5.1	12	2.9
Huron	141	29.6	3	0.6	50	10.5	62	13.0	16	3.4	15	3.1
Ingham	1,593	35.7	22	0.5	362	8.1	741	16.6	303	6.8	193	4.3
Ionia	300	34.7	8	0.9	93	10.8	175	20.3	46	5.3	33	3.8
Iosco	241	45.4	8	1.5	40	7.5	85	16.0	18	3.4	13	2.4
Iron	51	39.8	1	0.8	12	9.4	15	11.7	6	4.7	3	2.3
Isabella	234	35.7	6	0.9	73	11.1	96	14.7	39	6.0	19	2.9
Jackson	1,047	49.3	18	0.8	218	10.3	443	20.9	161	7.6	124	5.8
Kalamazoo	1,164	34.7	22	0.7	259	7.7	593	17.7	166	4.9	165	4.9
Kalkaska	60	29.7	3	1.5	21	10.4	53	26.2	22	10.9	10	5.0
Kent	2,217	24.5	49	0.5	856	9.4	1,446	15.9	376	4.1	371	4.1
Keweenaw	2	16.7	-	-	3	25.0	1	8.3	1	8.3	-	-

Table 4.11 (continued)
Live Births with Selected Risk Factors by County of Residence
Michigan Residents, 1988

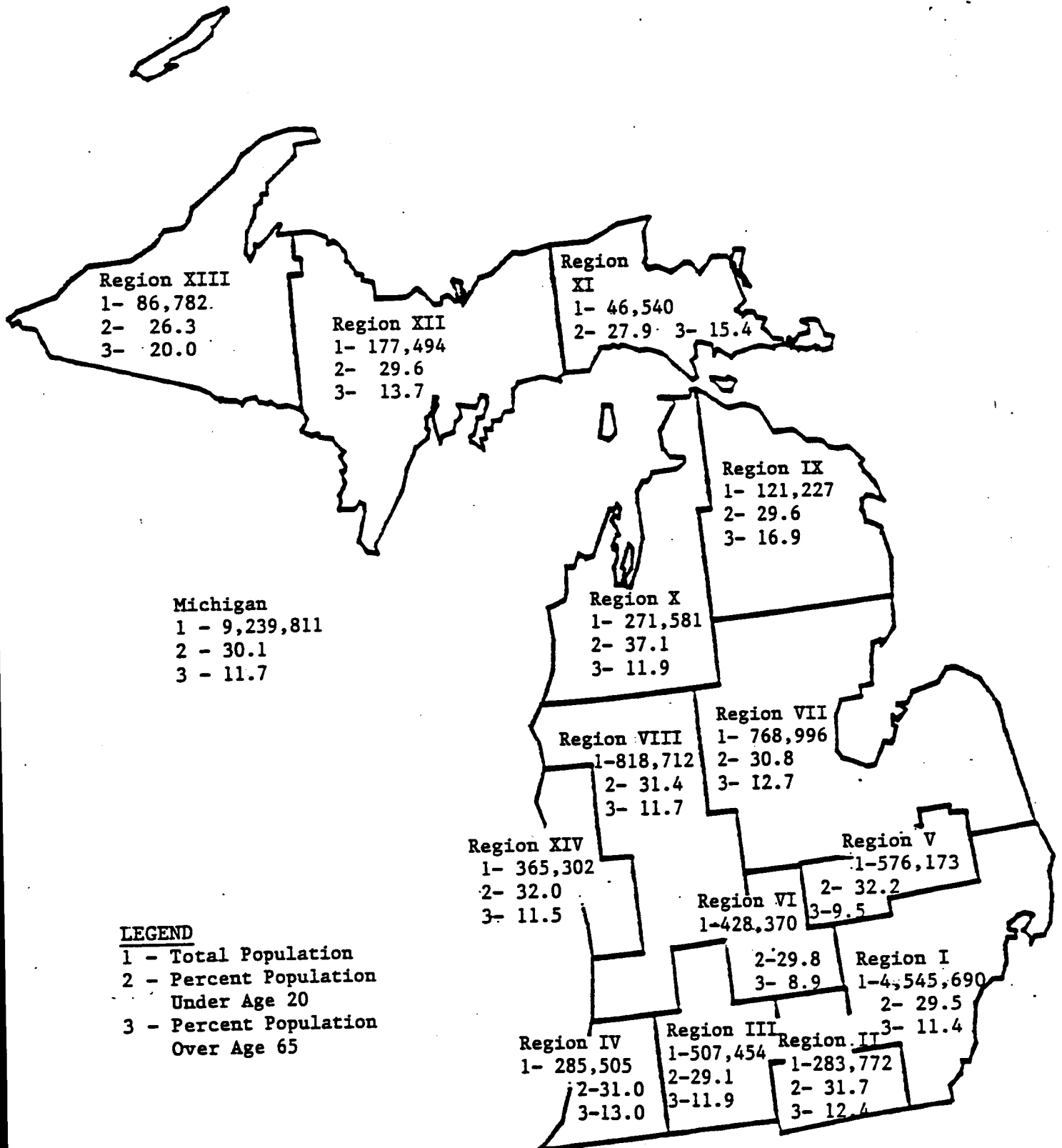
Area	Complications Reported		Congenital Anomalies Reported		4th Birth or Higher		Mother's Education 11th Grade or Less		Inadequate Prenatal Care ¹		Mothers Under 18 Years of Age	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Lake	47	37.0	5	3.9	18	14.2	34	26.8	20	15.7	11	8.7
Lapeer	285	27.7	5	0.5	80	7.8	166	16.1	31	3.0	42	4.1
Leelanau	53	22.3	2	0.8	22	9.2	21	8.8	28	11.8	4	1.7
Lenawee	392	30.6	5	0.4	128	10.0	259	20.2	65	5.1	51	4.0
Livingston	470	31.4	8	0.5	134	8.9	117	7.8	59	3.9	24	1.6
Luce	26	37.7	-	-	6	8.7	18	26.1	2	2.9	3	4.3
Mackinac	56	35.7	2	1.3	19	12.1	20	12.7	13	8.3	6	3.8
Macomb	2,614	27.2	48	0.5	643	6.7	1,053	10.9	386	4.0	186	1.9
Manistee	41	19.2	1	0.5	15	7.0	38	17.8	28	13.1	10	4.7
Marquette	526	53.9	10	1.0	77	7.9	69	7.1	37	3.8	29	3.0
Mason	115	32.8	5	1.4	30	8.5	69	19.7	24	6.8	20	5.7
Mecosta	139	31.5	17	3.9	44	10.0	58	13.2	36	8.2	16	3.6
Menominee	106	34.1	5	1.6	27	8.7	32	10.3	11	3.5	12	3.9
Midland	520	49.3	11	1.0	83	7.9	114	10.8	32	3.0	23	2.2
Missaukee	52	34.4	2	1.3	14	9.3	24	15.9	2	1.3	4	2.6
Monroe	818	43.8	7	0.4	194	10.4	337	18.1	75	4.0	81	4.3
Montcalm	296	37.3	12	1.5	87	11.0	187	23.6	62	7.8	49	6.2
Montmorency	44	51.2	1	1.2	8	9.3	13	15.1	4	4.7	6	7.0
Muskegon	629	24.4	11	0.4	289	11.2	551	21.4	1,079	41.8	152	5.9
Newaygo	241	37.2	6	0.9	63	9.7	158	24.4	45	7.0	28	4.3
Oakland	3,657	23.4	58	0.4	1,153	7.4	1,864	11.9	557	3.6	400	2.6
Oceana	112	31.6	4	1.1	46	13.0	82	23.2	42	11.9	9	2.5
Ogemaw	37	14.4	1	0.4	28	10.9	66	25.7	5	1.9	7	2.7
Ontonagon	39	42.9	2	2.2	11	12.1	15	16.5	9	9.9	7	7.7
Osceola	118	40.1	5	1.7	38	12.9	65	22.1	11	3.7	18	6.1
Oscoda	29	26.9	-	0.0	14	13.0	33	30.6	8	7.4	1	0.9
Osego	79	32.4	1	0.4	22	9.0	33	13.5	13	5.3	8	3.3
Ottawa	680	22.6	10	0.3	273	9.1	333	11.1	153	5.1	74	2.5
Presque Isle	68	52.3	1	0.8	19	14.6	16	12.3	7	5.4	3	2.3
Roscommon	98	46.7	4	1.9	20	9.5	45	21.4	8	3.8	6	2.9
Saginaw	873	26.0	13	0.4	366	10.9	747	22.3	213	6.4	226	6.7
St. Clair	692	35.1	15	0.8	177	9.0	396	20.1	79	4.0	69	3.5
St. Joseph	313	34.3	8	0.9	101	11.1	214	23.4	61	6.7	42	4.6
Sanilac	225	42.2	7	1.3	55	10.3	107	20.1	39	7.3	17	3.2
Schoolcraft	29	26.9	-	0.0	13	12.0	20	18.5	4	3.7	-	-
Shiawassee	303	31.2	7	0.7	63	6.5	192	19.8	44	4.5	58	6.0
Tuscola	199	25.4	4	0.5	78	9.9	136	17.3	46	5.9	33	4.2
Van Buren	353	32.5	5	0.5	97	8.9	298	27.4	95	8.7	60	5.5
Washtenaw	1,100	30.2	9	0.2	254	7.0	350	9.6	110	3.0	93	2.6
Wayne	10,614	30.2	149	0.4	4,151	11.8	9,327	26.6	2,622	7.5	2,531	7.2
Wexford	178	39.0	5	1.1	40	8.8	93	20.4	26	5.7	22	4.8
County Not Stated	1	100.0	-	-	-	-	-	-	-	-	-	-

¹ The Kessner Index is a classification of prenatal care based on the month of pregnancy prenatal care began, the number of prenatal visits and the length of pregnancy.

Table 4.12
Live Births by Age of Mother and County of Residence
Michigan Residents, 1988

Area	Total	Age of Mother											40 and Over	Age Not Stated
		Under 15	15	16	17	18	19	15-19	20-24	25-29	30-34	35-39		
Michigan	139,635	371	874	1,893	3,498	4,844	5,894	17,003	37,529	45,924	28,469	8,553	1,148	638
Alcona	93	-	1	-	5	3	7	16	36	23	14	3	1	-
Alger	98	-	-	-	2	1	5	8	30	32	19	6	3	-
Allegan	1,414	2	3	10	39	45	52	149	461	467	260	67	7	1
Alpena	345	1	2	5	6	11	14	38	102	127	63	12	2	-
Antrim	242	-	3	4	7	7	10	31	83	69	44	14	1	-
Arenac	204	-	1	2	2	5	5	15	67	81	35	6	-	-
Baraga	102	-	1	2	6	1	5	15	31	29	18	9	-	-
Barry	695	1	2	7	13	30	32	84	209	246	131	21	3	-
Bay	1,608	4	6	15	42	59	80	202	439	567	291	90	10	-
Benzie	163	-	2	-	3	4	9	18	50	48	37	8	2	-
Berrien	2,559	3	35	66	76	132	122	431	653	658	348	118	18	330
Branch	617	-	-	5	20	26	21	72	214	196	93	20	2	20
Calhoun	2,017	9	24	43	65	75	124	331	673	580	321	84	18	1
Cass	591	2	1	9	14	16	30	33	150	108	46	15	1	199
Charlevoix	318	1	-	4	7	10	12	33	102	98	57	24	3	-
Cheboygan	282	-	-	2	3	10	14	31	98	94	46	10	3	-
Chippewa	356	-	1	5	9	15	26	56	121	111	55	13	-	-
Clare	342	1	1	9	13	24	15	62	131	102	32	13	1	1
Clinton	746	-	1	6	9	24	24	60	187	276	168	41	13	1
Crawford	185	-	1	5	2	7	9	24	69	51	36	5	-	-
Delta	463	1	2	6	8	10	22	48	125	152	100	33	4	-
Dickinson	302	-	1	1	8	8	10	28	76	114	63	19	2	-
Eaton	1,159	1	3	10	20	22	45	100	299	424	259	69	7	-
Emmet	401	-	2	1	7	7	12	31	91	147	91	37	4	-
Genesee	6,703	30	50	115	223	272	370	1,030	2,089	2,084	1,143	283	41	3
Gladwin	305	-	1	4	11	11	21	48	106	87	44	15	5	-
Gogebic	185	-	1	1	5	4	8	19	58	60	30	17	1	-
Grand Traverse	931	2	1	5	14	28	36	84	228	315	225	70	7	-
Gratiot	531	2	1	6	17	24	29	77	175	173	89	13	2	-
Hillsdale	639	-	1	8	19	23	41	91	222	203	82	31	7	3
Houghton	412	-	3	3	6	10	12	34	134	114	85	38	7	-
Huron	477	-	1	4	10	21	17	53	123	175	86	34	6	-
Ingham	4,464	10	19	63	101	153	177	513	1,132	1,458	953	344	52	2
Ionia	864	3	3	5	23	35	47	113	289	287	133	37	3	-
Iosco	531	-	4	4	5	23	28	64	190	185	78	11	3	-
Iron	128	-	-	2	1	3	5	17	37	38	28	8	-	-
Isabella	655	1	3	3	12	18	26	62	216	219	122	33	2	-
Jackson	2,123	6	17	35	66	95	92	305	666	663	349	116	16	2
Kalamazoo	3,355	7	19	55	84	110	140	408	833	1,114	769	189	33	2
Kalkaska	202	-	2	5	3	15	12	37	66	61	28	9	1	-
Kent	9,066	20	47	103	201	279	321	951	2,443	3,182	1,879	537	52	2
Keweenaw	12	-	-	-	-	-	1	1	4	2	2	3	-	-

Figure 4.2
 Total Population, Percent Under Age 20 and Percent Age 65 and Over by Region
 Michigan, 1988



LEGEND

- 1 - Total Population
- 2 - Percent Population Under Age 20
- 3 - Percent Population Over Age 65

Table 4.13
Vital Statistics for Residents of Selected Michigan Cities¹
 1988

Area	Live Births	Deaths	Infant Deaths		Fetal Deaths	
			Number	Rate	Number	Rate
Allen Park	367	339	3	8.2	1	2.7
Ann Arbor	1,312	407	10	7.6	10	7.6
Battle Creek ²	1,070	654	21	19.6	4	3.7
Bay City	709	463	6	8.5	6	8.4
Burton City	375	242	5	13.3	2	5.3
Dearborn	1,365	970	11	8.1	4	2.9
Dearborn Heights	713	636	7	9.8	4	5.6
Detroit	19,729	12,598	413	20.9	165	8.3
East Detroit	464	411	6	12.9	2	4.3
East Lansing	423	124	3	7.1	1	2.4
Farmington Hills	900	478	6	6.7	1	1.1
Ferndale	470	289	9	19.1	3	6.3
Flint	3,180	1,564	49	15.4	11	3.4
Garden City	433	229	3	6.9	1	2.3
Grand Rapids	4,226	1,898	45	10.6	22	5.2
Highland Park	395	319	16	40.5	3	7.5
Holland	648	273	6	9.3	1	1.5
Inkster	536	325	10	18.7	2	3.7
Jackson	780	429	10	12.8	4	5.1
Kalamazoo	1,557	733	24	15.4	7	4.5
Kentwood	456	140	3	6.6	3	6.5
Lansing	2,618	1,016	21	8.0	18	6.8
Lincoln Park	589	412	4	6.8	2	3.4
Livonia	1,287	877	12	9.3	5	3.9
Madison Heights	514	283	5	9.7	1	1.9
Midland	520	273	5	9.6	2	3.8
Muskegon	936	491	5	5.3	3	3.2
Oak Park	494	287	9	18.2	1	2.0
Pontiac	1,758	717	32	18.2	21	11.8
Portage	535	190	1	1.9	2	3.7
Port Huron	613	418	6	9.8	2	3.3
Roseville	706	470	7	9.9	3	4.2
Royal Oak	977	612	9	9.2	-	0.0
Saginaw	1,561	740	32	20.5	20	12.7
St. Clair Shores	814	732	8	9.8	4	4.9
Southfield	892	770	6	6.7	3	3.4
Southgate	382	262	1	2.6	1	2.6
Sterling Heights	1,471	654	10	6.8	7	4.7
Taylor	1,221	501	11	9.0	4	3.3
Troy	908	365	7	7.7	1	1.1
Warren	1,896	1,396	18	9.5	6	3.2
Westland	1,240	673	6	4.8	8	6.4
Wyandotte	492	357	3	6.1	-	0.0
Wyoming	1,098	378	10	9.1	5	4.5

¹ 25,000 population or over according to the 1980 Census.

² On January 1, 1983, Battle Creek City annexed Battle Creek Township. The data shown for Battle Creek in this table are for the current boundaries of Battle Creek, and thus are not comparable to data for Battle Creek for earlier years. The infant death rate in 1982 for the area which is now Battle Creek was 15.9.

Table 4.14
 Number of Deaths by Underlying Cause and County of Residence
 Michigan Residents, 1988

Area	All Causes	T.B. / All Forms	All Other Infectious and Parasitic Diseases	Malignant Neoplasms							Total	Digestive Organs and Peritoneum	Respiratory and Intrathoracic Organs	Breast	Genital Organs	Urinary Organs	Leukemia	Other
				Respiratory and Intrathoracic Organs	Breast	Genital Organs	Urinary Organs	Leukemia	Other									
Michigan	80,075	42	1,266	17,890	4,244	5,121	1,599	2,005	704	662	3,555							
Alcona	137	-	3	38	12	10	3	4	2	1	6							
Alger	110	-	1	22	6	5	4	3	-	-	4							
Allegan	677	-	10	138	21	39	12	15	4	3	44							
Alpena	306	-	4	61	12	24	2	9	2	5	7							
Antrim	201	-	3	51	12	16	3	7	1	2	10							
Arenac	165	-	2	32	5	14	3	5	-	1	4							
Baraga	104	-	1	16	4	2	2	2	1	2	3							
Barry	358	-	5	86	18	31	9	7	1	3	17							
Bay	1,004	-	6	226	52	70	22	25	11	9	37							
Benzie	131	-	1	32	6	11	2	5	2	1	5							
Berrien	1,603	2	18	363	92	103	31	40	10	9	78							
Branch	405	-	4	97	29	22	9	12	4	3	18							
Calhoun	1,394	1	24	272	68	73	27	27	15	12	50							
Cass	437	1	7	118	28	32	11	13	6	6	22							
Charlevoix	205	-	5	51	13	14	4	7	1	5	15							
Cheboygan	247	1	3	60	13	21	6	10	1	4	11							
Chippewa	282	-	6	76	13	18	7	6	3	1	16							
Clare	312	-	4	67	15	15	6	10	2	2	16							
Clinton	372	-	3	67	16	15	6	10	2	2	16							
Crawford	140	-	1	37	12	11	1	3	2	-	8							
Delta	371	-	5	100	29	22	13	11	6	1	18							
Dickinson	282	-	2	65	15	22	6	4	4	2	12							
Eaton	618	-	16	143	35	31	10	16	8	9	34							
Emmet	242	-	3	57	14	16	3	6	2	-	16							
Genesee	3,537	5	52	814	202	258	63	83	36	26	146							
Gladwin	206	-	3	54	12	18	5	8	2	1	8							
Gogebic	254	1	3	59	13	12	5	8	5	2	14							
Grand Traverse	488	-	6	109	24	32	10	14	9	3	17							
Gratiot	409	-	6	80	18	23	2	13	4	6	14							
Hillsdale	361	-	5	79	21	22	8	11	4	-	13							
Houghton	417	-	1	101	28	29	10	7	3	5	19							
Huron	401	-	3	81	22	16	4	12	5	3	19							
Ingham	1,781	2	41	391	89	112	27	42	6	20	95							
Ionia	454	-	3	108	22	28	14	16	-	6	22							
Iosco	303	-	5	61	11	16	10	4	5	6	9							
Iron	220	-	2	47	10	15	1	9	3	1	15							
Isabella	279	-	3	73	22	18	6	18	2	6	15							
Jackson	1,296	-	15	307	64	84	27	45	14	5	68							
Kalamazoo	1,631	-	26	375	92	94	29	44	22	15	79							
Kalkaska	112	-	-	27	5	8	2	3	1	-	8							
Kent	3,630	2	43	820	175	216	72	99	38	30	190							

Table 4.14 (continued)
 Number of Deaths by Underlying Cause and County of Residence
 Michigan Residents, 1988

Area	All Causes	T.B. All Forms	All Other Infectious and Parasitic Diseases	Malignant Neoplasms								
				Total	Digestive Organs and Peritoneum	Respiratory and Intrathoracic Organs	Breast	Genital Organs	Urinary Organs	Leukemia	Other	
Keweenaw	39	-	-	10	5	4	-	1	-	-	-	-
Lake	130	-	1	28	8	10	2	1	1	1	1	5
Lapeer	459	-	15	82	18	25	6	6	6	6	3	18
Leelanau	128	-	3	26	2	7	3	5	5	1	1	7
Lenawee	814	-	6	155	34	41	17	19	15	9	6	29
Livingston	643	-	8	149	38	40	21	15	3	3	3	29
Luce	66	-	1	15	4	5	1	2	1	1	1	1
Mackinac	108	-	1	33	11	7	3	6	1	1	2	3
Macomb	5,632	3	75	1,343	321	371	139	144	58	2	50	260
Manistee	267	-	1	57	11	17	1	11	2	4	4	11
Marquette	519	-	6	90	28	25	4	7	4	4	3	19
Mason	311	-	2	71	11	25	5	11	2	2	2	15
Mecosta	287	-	2	64	11	24	3	8	2	2	-	16
Menominee	273	-	2	64	18	10	8	11	3	2	2	12
Midland	496	-	10	134	27	34	6	16	7	7	5	39
Missaukee	109	-	-	23	8	8	4	-	1	1	-	2
Monroe	1,053	-	6	255	53	82	28	16	13	13	14	49
Montcalm	463	1	7	87	19	25	2	7	3	3	5	26
Montmorency	129	-	1	36	7	10	5	3	5	5	1	5
Muskegon	1,382	2	13	328	81	99	19	41	11	11	13	64
Newaygo	359	-	1	91	25	26	5	14	6	6	1	14
Oakland	7,941	3	126	1,907	418	548	190	211	67	85	388	388
Oceana	238	-	3	47	16	13	3	4	4	2	2	9
Ogemaw	215	-	1	47	12	13	3	2	2	3	5	9
Ontonagon	117	-	1	25	7	3	2	5	1	1	1	6
Oscoda	208	-	2	42	5	12	2	7	1	1	1	6
Oscoda	114	-	-	31	3	14	3	4	4	1	1	14
Osego	153	-	4	32	7	11	2	4	1	1	1	6
Ottawa	1,137	1	19	274	62	57	39	38	11	13	54	54
Presque Isle	162	-	-	37	7	15	2	3	3	10	10	10
Roscommon	273	-	2	84	23	32	2	4	5	1	1	17
Saginaw	1,850	2	19	416	112	115	33	51	22	16	67	67
St. Clair	1,314	2	13	287	68	86	23	43	11	7	49	49
St. Joseph	529	-	13	117	31	26	11	7	7	5	30	30
Sanilac	445	-	4	84	27	20	3	11	3	4	16	16
Schoolcraft	95	-	1	25	6	12	1	1	1	1	3	3
Shiawassee	544	-	5	125	34	30	9	21	6	4	21	21
Tuscola	467	2	4	98	26	21	13	11	4	4	4	19
Van Buren	677	-	6	150	34	44	11	11	4	4	4	44
Washtenaw	1,380	-	37	309	70	77	30	35	9	4	44	44
Wayne	22,414	11	488	4,699	1,156	1,405	436	508	163	13	75	75
Wexford	237	-	3	53	10	17	4	10	5	5	871	871
County Not Stated	16	-	-	1	-	1	-	-	-	-	5	5

Table 4.14 (continued)
 Number of Deaths by Underlying Cause and County of Residence
 Michigan Residents, 1988

Area	Diabetes Mellitus	Nutritional Deficiencies	Major Cardiovascular Diseases						Pneumonia and Influenza	C.O.P.D. and Allied Diseases	Ulcer of Stomach and Duodenum	Chronic Liver Disease and Cirrhosis
			Total	Diseases of the Heart	Hypertension with or without Renal Disease	Cerebrovascular Disease	Atherosclerosis	Other Diseases of Arteries, Arterioles, and Capillaries				
Michigan	1,522	119	37,840	30,218	307	5,237	1,187	891	2,684	2,899	253	1,080
Alcona	4	-	59	49	-	10	-	-	8	6	1	1
Alger	6	-	51	43	-	8	-	-	3	2	-	1
Allegan	9	-	321	259	1	31	22	8	41	26	3	3
Alpena	5	-	149	130	-	13	3	3	12	11	3	3
Antrim	6	-	101	68	-	17	6	10	6	4	1	2
Arenac	-	-	93	79	-	8	4	2	8	10	1	1
Baraga	-	-	63	50	1	9	-	3	3	8	1	-
Barry	5	-	147	118	1	19	6	3	20	8	-	2
Bay	18	2	542	429	3	59	35	16	18	40	3	17
Benzie	1	-	66	48	1	10	4	3	5	5	-	1
Berrien	39	1	748	554	14	134	26	20	59	61	4	14
Branch	19	-	180	148	-	25	5	2	18	21	2	5
Calhoun	32	1	622	480	3	85	29	25	72	62	7	18
Cass	3	-	202	161	2	33	2	4	18	16	4	7
Charlevoix	1	-	80	64	-	11	-	5	7	12	1	-
Cheboygan	4	-	116	97	-	18	-	1	7	10	-	3
Chippewyan	15	1	119	96	1	18	1	3	11	12	1	3
Clare	4	-	155	134	-	14	4	3	11	14	1	4
Clinton	7	2	188	149	1	27	7	4	12	19	2	3
Crawford	1	2	63	47	-	7	7	2	2	6	-	3
Delta	6	-	162	113	1	36	8	4	9	10	1	4
Dickinson	3	-	144	103	2	30	4	5	13	15	3	1
Eaton	10	2	272	203	3	37	19	10	15	30	5	5
Emmet	3	-	105	91	-	10	2	2	9	11	1	1
Genesee	78	5	1,679	1,331	11	259	52	26	84	142	9	39
Gladwin	2	-	108	79	-	20	7	2	8	10	-	-
Gogebic	3	-	110	84	-	22	-	4	15	6	1	3
Grand Traverse	9	4	230	177	-	40	6	7	26	22	2	1
Gratiot	6	-	207	152	3	45	5	2	25	17	-	-
Hillsdale	18	-	161	134	3	21	-	3	13	22	-	-
Houghton	6	-	211	168	4	28	7	4	23	10	1	2
Huron	8	-	213	162	3	40	6	6	17	15	1	4
Ingham	35	3	785	619	6	122	19	19	60	73	5	18
Ionia	14	1	196	142	2	37	8	7	16	18	1	4
Iosco	2	-	151	119	-	21	6	5	14	12	1	2
Iron	4	1	108	86	-	19	1	2	9	11	2	1
Isabella	3	-	136	101	-	20	13	2	12	14	-	2
Jackson	26	-	582	452	5	79	23	23	56	64	2	11
Kalamazoo	26	6	742	589	8	112	14	14	80	70	3	13
Kalkaska	2	-	63	41	2	9	10	1	3	4	-	2
Kent	54	7	1,702	1,272	13	282	85	50	143	124	8	29

Table 4.14 (continued)
 Number of Deaths by Underlying Cause and County of Residence
 Michigan Residents, 1988

Area	Nephritis, Nephrotic Syndrome & Nephrosis	Complica- tions of Preg- nancy, Child- birth and the Puerperium	Congenital Anomalies	Certain Conditions Originating in the Peri- natal Period	Symptoms, Signs, and Ill-Defined Conditions	All Other Disease	Accidents			Suicide	Homicide and Legal Inter- vention	All Other External Causes
							Total	Motor Vehicle	All Other			
Michigan	852	11	455	858	354	6,452	3,237	1,806	1,431	1,087	1,060	114
Alcona	-	-	-	1	1	10	4	2	2	-	1	-
Alger	1	-	1	-	2	10	6	2	4	3	1	-
Allegan	6	-	6	4	1	47	51	29	22	7	3	1
Alpena	1	-	2	2	2	39	10	8	2	2	-	-
Antrim	4	-	-	2	2	15	3	1	2	1	-	-
Arenac	1	-	1	-	1	6	7	4	3	2	-	-
Baraga	-	-	-	-	-	7	5	2	3	-	-	-
Barry	5	-	2	4	4	39	22	13	9	8	1	-
Bay	13	-	5	4	5	54	38	23	15	12	1	-
Benzie	3	-	-	-	-	11	3	1	2	2	1	-
Berrien	17	-	11	8	11	132	79	43	36	26	10	-
Branch	7	-	4	1	-	35	5	3	2	6	1	-
Calhoun	20	2	5	11	10	131	74	36	38	19	11	-
Cass	10	-	1	1	2	29	15	11	4	2	1	-
Charlevoix	4	-	1	6	1	21	10	6	4	5	1	-
Cheboygan	5	-	1	2	1	16	10	10	-	2	2	-
Chippewa	2	-	-	1	1	28	16	8	8	6	-	-
Clare	4	-	1	-	-	18	14	10	4	5	2	-
Clinton	3	-	1	1	2	31	23	11	12	7	1	-
Crawford	1	-	-	1	3	10	1	1	-	2	3	-
Delta	4	-	2	2	3	35	19	8	11	8	1	-
Dickinson	2	-	1	3	-	21	8	3	5	-	1	-
Eaton	5	-	2	4	6	67	27	17	10	9	1	-
Emmet	4	-	3	1	1	29	10	6	4	4	-	-
Genesee	32	-	19	47	22	259	139	74	65	50	58	4
Gladwin	-	-	-	-	1	11	6	2	4	3	-	-
Gogebic	3	-	-	-	-	34	17	5	12	2	-	-
Grand Traverse	4	-	1	2	-	45	19	11	8	5	1	2
Gratiot	2	-	2	3	2	29	22	11	11	5	-	-
Hillsdale	3	-	1	1	2	37	14	7	7	4	1	-
Houghton	1	-	1	1	1	34	20	9	11	4	-	-
Huron	1	-	1	2	1	30	13	7	6	11	-	-
Ingham	26	-	18	18	15	156	88	47	41	37	10	-
Ionia	4	-	3	3	2	44	32	21	11	2	3	-
Iosco	5	1	3	2	-	27	15	2	13	1	1	-
Iron	4	-	2	-	-	14	10	8	2	5	1	-
Isabella	2	-	1	-	2	15	11	5	6	4	1	-
Jackson	18	-	8	14	8	101	61	39	22	17	6	-
Kalamazoo	8	-	6	16	8	144	74	39	35	23	11	-
Kalkaska	-	-	-	-	1	4	5	4	1	1	-	-
Kent	29	1	30	42	23	329	167	110	57	38	33	6

Table 4.16
 Number of Deaths by Cause
 Michigan Residents, 1988

ICD List Number	Cause of Death	Number
I. INFECTIOUS AND PARASITIC DISEASES (001-139)		
3	Other salmonella infections	2
8	Intestinal infections due to other organisms	1
9	Ill-defined intestinal infections	8
11	Pulmonary tuberculosis	36
12	Other respiratory tuberculosis	1
17	Tuberculosis of other organs	2
18	Miliary tuberculosis	3
27	Other zoonotic bacterial diseases	9
31	Diseases due to other mycobacteria	8
33	Whooping cough	1
34	Streptococcal sore throat and scarlatina	1
36	Meningococcal infection	5
38	Septicemia	797
39	Actinomycotic infections	1
40	Other bacterial diseases	8
41	Bacterial infection in conditions classified elsewhere and of unspecified site	4
42	Human Immunodeficiency Virus Infection With Specified Conditions	198
43	Human Immunodeficiency Virus Infection Causing Other Specified Conditions	8
44	Other Human Immunodeficiency Virus Infection	10
46	Slow virus infection of central nervous system	9
47	Meningitis due to enterovirus	1
49	Other non-arthropod-borne viral diseases of central nervous system	5
52	Chickenpox	4
53	Herpes zoster	5
54	Herpes simplex	5
70	Viral hepatitis	32
78	Other diseases due to viruses and Chlamydiae	4
79	Viral infection in conditions classified elsewhere and of unspecified site	10
85	Leishmaniasis	1
90	Congenital syphilis	1
91	Early syphilis, symptomatic	1
112	Candidiasis	40
114	Coccidioidomycosis	1
115	Histoplasmosis	6
116	Blastomycotic infection	1
117	Other mycoses	27
130	Toxoplasmosis	1
135	Sarcoidosis	22
136	Other and unspecified infectious and parasitic diseases	21
137	Late effects of tuberculosis	4
138	Late effects of acute poliomyelitis	4
II. NEOPLASMS (140-239)		
140	Malignant neoplasm of lip	3
141	Malignant neoplasm of tongue	74
142	Malignant neoplasm of major salivary glands	25
143	Malignant neoplasm of gum	2
144	Malignant neoplasm of floor of mouth	16
145	Malignant neoplasm of other and unspecified parts of mouth	36
146	Malignant neoplasm of oropharynx	52

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
147	Malignant neoplasm of nasopharynx	18
148	Malignant neoplasm of hypopharynx	22
149	Malignant neoplasm of other and ill-defined sites within the lip, oral cavity and pharynx	51
150	Malignant neoplasm of oesophagus	362
151	Malignant neoplasm of stomach	500
152	Malignant neoplasm of small intestine, including duodenum	32
153	Malignant neoplasm of colon	1,692
154	Malignant neoplasm of rectum, rectosigmoid junction and anus	290
155	Malignant neoplasm of liver and intrahepatic bile ducts	267
156	Malignant neoplasm of gallbladder and extrahepatic bile ducts	156
157	Malignant neoplasm of pancreas	850
158	Malignant neoplasm of retroperitoneum and peritoneum	17
159	Malignant neoplasm of other and ill-defined sites within the digestive organs and peritoneum	78
160	Malignant neoplasm of nasal cavities, middle ear and accessory sinuses	24
161	Malignant neoplasm of larynx	141
162	Malignant neoplasm of trachea, bronchus and lung	4,914
163	Malignant neoplasm of pleura	16
164	Malignant neoplasm of thymus, heart and mediastinum	25
165	Malignant neoplasm of other and ill-defined sites within the respiratory system and intrathoracic organs	1
170	Malignant neoplasm of bone and articular cartilage	31
171	Malignant neoplasm of connective and other soft tissue	99
172	Malignant melanoma of skin	175
173	Other malignant neoplasm of skin	61
174	Malignant neoplasm of female breast	1,588
175	Malignant neoplasm of male breast	11
179	Malignant neoplasm of uterus, part unspecified	112
180	Malignant neoplasm of cervix uteri	154
181	Malignant neoplasm of placenta	1
182	Malignant neoplasm of body of uterus	124
183	Malignant neoplasm of ovary and other uterine adnexa	487
184	Malignant neoplasm of other and unspecified female genital organs	44
185	Malignant neoplasm of prostate	1,056
186	Malignant neoplasm of testis	17
187	Malignant neoplasm of penis and other male genital organs	10
188	Malignant neoplasm of bladder	365
189	Malignant neoplasm of kidney and other and unspecified urinary organs	339
190	Malignant neoplasm of eye	9
191	Malignant neoplasm of brain	442
192	Malignant neoplasm of other and unspecified parts of nervous system	15
193	Malignant neoplasm of thyroid gland	29
194	Malignant neoplasm of other endocrine glands and related structures	26
195	Malignant neoplasm of other and ill-defined sites	140
199	Malignant neoplasm without specification of site	1,189
200	Lymphosarcoma and reticulosarcoma	87
201	Hodgkin's disease	79
202	Other malignant neoplasm of lymphoid and histiocytic tissue	562
203	Multiple myeloma and immunoproliferative neoplasms	312
204	Lymphoid leukemia	175
205	Myeloid leukemia	250
206	Monocytic leukemia	9
207	Other specified leukemia	8
208	Leukemia of unspecified cell type	220
211	Benign neoplasm of other parts of digestive system	6

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
212	Benign neoplasm of respiratory and intrathoracic organs	2
216	Benign neoplasm of skin	2
220	Benign neoplasm of ovary	1
225	Benign neoplasm of brain and other parts of nervous system	27
227	Benign neoplasm of other endocrine glands and related structures	4
229	Benign neoplasm of other and unspecified sites	2
235	Neoplasm of uncertain behavior of digestive and respiratory systems	4
237	Neoplasm of uncertain behavior of endocrine glands and nervous system	8
238	Neoplasm of uncertain behavior of other and unspecified sites and tissues	37
239	Neoplasm of unspecified nature	61
III. ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES AND IMMUNITY DISORDERS (240-279)		
242	Thyrotoxicosis with or without goitre	1
244	Acquired hypothyroidism	12
246	Other disorders of thyroid	1
250	Diabetes mellitus	1,522
251	Other disorders of pancreatic internal secretion	7
252	Disorders of parathyroid gland	3
253	Disorders of the pituitary gland and its hypothalamic control	4
255	Disorders of adrenal glands	7
259	Other endocrine disorders	5
261	Nutritional marasmus	9
263	Other and unspecified protein-calorie malnutrition	105
265	Thiamine and niacin deficiency states	1
269	Other nutritional deficiencies	4
270	Disorders of amino-acid transport and metabolism	3
271	Disorders of carbohydrate transport and metabolism	3
272	Disorders of lipoid metabolism	20
273	Disorders of plasma protein metabolism	22
274	Gout	2
275	Disorders of mineral metabolism	12
276	Disorders of fluid, electrolyte and acid-base balance	200
277	Other and unspecified disorders of metabolism	56
278	Obesity and other hyperalimentation	48
279	Disorders involving the immune mechanism	19
IV. DISEASES OF BLOOD AND BLOOD-FORMING ORGANS (280-289)		
280	Iron deficiency anemias	2
281	Other deficiency anemias	4
282	Hereditary hemolytic anemias	18
283	Acquired hemolytic anemias	2
284	Aplastic anemia	59
285	Other and unspecified anemias	56
286	Coagulation defects	51
287	Purpura and other hemorrhagic conditions	26
288	Diseases of white blood cells	20
289	Other diseases of blood and blood-forming organs	92
V. MENTAL DISORDERS (290-319)		
290	Senile and presenile organic psychotic conditions	145
291	Alcoholic psychoses	15
292	Drug psychoses	1
294	Other organic psychotic conditions (chronic)	3
295	Schizophrenic psychoses	5

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
298	Other nonorganic psychoses	81
299	Psychoses with origin specific to childhood	1
300	Neurotic disorders	1
303	Alcohol dependence syndrome	142
304	Drug dependence	6
305	Nondependent abuse of drugs	211
306	Physiological malfunction arising from mental factors	1
307	Special symptoms or syndromes not elsewhere classified	2
308	Acute reaction to stress	1
310	Specific nonpsychotic mental disorders following organic brain damage	164
311	Depressive disorder, not elsewhere classified	4
318	Other specified mental retardation	3
319	Unspecified mental retardation	7
VI. DISEASES OF THE NERVOUS SYSTEM AND SENSE ORGANS (320-389)		
320	Bacterial meningitis	11
322	Meningitis of unspecified cause	17
323	Encephalitis, myelitis and encephalomyelitis	3
324	Intracranial and intraspinal abscess	5
325	Phlebitis and thrombophlebitis of intracranial venous sinuses	1
330	Cerebral degenerations usually manifest in childhood	4
331	Other cerebral degenerations	334
332	Parkinson's disease	200
333	Other extrapyramidal disease and abnormal movement disorders	20
334	Spinocerebellar disease	13
335	Anterior horn cell disease	136
336	Other diseases of spinal cord	8
340	Multiple sclerosis	91
341	Other demyelinating diseases of central nervous system	6
342	Hemiplegia	4
343	Infantile cerebral palsy	28
344	Other paralytic syndromes	22
345	Epilepsy	124
348	Other conditions of brain	121
349	Other and unspecified disorders of the nervous system	6
355	Mononeuritis of lower limb	1
356	Hereditary and idiopathic peripheral neuropathy	16
357	Inflammatory and toxic neuropathy	3
358	Myoneural disorders	11
359	Muscular dystrophies and other myopathies	27
376	Disorders of the orbit	1
382	Suppurative and unspecified otitis media	4
VII. DISEASES OF THE CIRCULATORY SYSTEM (390-459)		
390	Rheumatic fever without mention of heart involvement	2
394	Diseases of mitral valve	86
395	Diseases of aortic valve	7
396	Diseases of mitral and aortic valves	32
397	Diseases of other endocardial structures	13
398	Other rheumatic heart disease	51
401	Essential hypertension	156
402	Hypertensive heart disease	649
403	Hypertensive renal disease	151
404	Hypertensive heart and renal disease	118
410	Acute myocardial infarction	9,758

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
411	Other acute and subacute form of ischemic heart disease	39
412	Old myocardial infarction	32
413	Angina pectoris	43
414	Other forms of chronic ischemic heart disease	10,961
415	Acute pulmonary heart disease	311
416	Chronic pulmonary heart disease	89
417	Other diseases of pulmonary circulation	3
420	Acute pericarditis	2
421	Acute and subacute endocarditis	34
422	Acute myocarditis	14
423	Other diseases of pericardium	16
424	Other diseases of endocardium	387
425	Cardiomyopathy	795
426	Conduction disorders	28
427	Cardiac dysrhythmias	1,457
428	Heart failure	1,615
429	Ill-defined descriptions and complications of heart disease	3,676
430	Subarachnoid hemorrhage	255
431	Intracerebral hemorrhage	666
432	Other and unspecified intracranial hemorrhage	119
433	Occlusion and stenosis of precerebral arteries	45
434	Occlusion of cerebral arteries	981
435	Transient cerebral ischemia	13
436	Acute but ill-defined cerebrovascular disease	2,521
437	Other and ill-defined cerebrovascular disease	338
438	Late effects of cerebrovascular disease	299
440	Atherosclerosis	1,187
441	Aortic aneurysm	600
442	Other aneurysm	31
443	Other peripheral vascular disease	116
444	Arterial embolism and thrombosis	61
446	Polyarteritis nodosa and allied conditions	28
447	Other disorders of arteries and arterioles	53
448	Diseases of capillaries	2
451	Phlebitis and thrombophlebitis	53
453	Other venous embolism and thrombosis	16
454	Varicose veins of lower extremities	9
455	Hemorrhoids	1
456	Varicose veins of other sites	11
457	Noninfective disorders of lymphatic channels	2
458	Hypotension	41
459	Other disorders of circulatory system	26
VIII. DISEASES OF THE RESPIRATORY SYSTEM (460-519)		
461	Acute sinusitis	1
464	Acute laryngitis and tracheitis	5
465	Acute upper respiratory infections of multiple or unspecified sites	8
466	Acute bronchitis and bronchiolitis	24
473	Chronic sinusitis	1
475	Peritonsillar abscess	1
478	Other diseases of upper respiratory tract	9
480	Viral pneumonia	30
481	Pneumococcal pneumonia	65
482	Other bacterial pneumonia	84
483	Pneumonia due to other specified organism	10

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
485	Bronchopneumonia, organism unspecified	143
486	Pneumonia, organism unspecified	2,294
487	Influenza	58
490	Bronchitis, not specified as acute or chronic	21
491	Chronic bronchitis	93
492	Emphysema	700
493	Asthma	153
494	Bronchiectasis	26
495	Extrinsic allergic alveolitis	1
496	Chronic airways obstruction, not elsewhere classified	1,905
500	Coalworkers' pneumoconiosis	7
501	Asbestosis	3
502	Pneumoconiosis due to other silica or silicates	4
505	Pneumoconiosis, unspecified	3
507	Pneumonitis due to solids and liquids	246
510	Empyema	16
511	Pleurisy	43
512	Pneumothorax	6
513	Abscess of lung and mediastinum	27
514	Pulmonary congestion and hypostasis	15
515	Postinflammatory pulmonary fibrosis	158
516	Other alveolar and parietoalveolar pneumopathy	47
518	Other diseases of lung	219
519	Other diseases of respiratory system	30
IX. DISEASES OF THE DIGESTIVE SYSTEM (520-579)		
525	Other diseases and conditions of the teeth and supporting structures	1
527	Diseases of the salivary glands	2
528	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue	1
530	Diseases of oesophagus	50
531	Gastric ulcer	83
532	Duodenal ulcer	80
533	Peptic ulcer, site unspecified	90
534	Gastrojejunal ulcer	4
535	Gastritis and duodenitis	33
536	Disorders of function of stomach	5
537	Other disorders of stomach and duodenum	18
540	Acute appendicitis	24
541	Appendicitis, unqualified	2
550	Inguinal hernia	5
551	Other hernia of abdominal cavity, with gangrene	3
552	Other hernia of abdominal cavity with obstruction, without mention of gangrene	12
553	Other hernia of abdominal cavity without mention of obstruction or gangrene	16
555	Regional enteritis	14
556	Idiopathic proctocolitis	12
557	Vascular insufficiency of intestine	230
558	Other noninfective gastroenteritis and colitis	43
560	Intestinal obstruction without mention of hernia	153
562	Diverticula of intestine	89
564	Functional digestive disorders, not elsewhere classified	5
566	Abscess of anal and rectal regions	5
567	Peritonitis	61
568	Other disorders of peritoneum	9
569	Other disorders of intestine	67

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
570	Acute and subacute necrosis of liver	16
571	Chronic liver disease and cirrhosis	1,080
572	Liver abscess and sequelae of chronic liver disease	150
573	Other disorders of liver	44
574	Cholelithiasis	44
575	Other disorders of gallbladder	56
576	Other disorders of biliary tract	42
577	Diseases of pancreas	101
578	Gastrointestinal hemorrhage	204
579	Intestinal malabsorption	6
X. DISEASES OF THE GENITOURINARY SYSTEM (580-629)		
580	Acute glomerulonephritis	4
581	Nephrotic syndrome	9
582	Chronic glomerulonephritis	24
583	Nephritis and nephropathy, not specified as acute or chronic	15
584	Acute renal failure	140
585	Chronic renal failure	227
586	Renal failure, unspecified	429
588	Disorders resulting from impaired renal function	4
590	Infections of kidney	51
591	Hydronephrosis	4
592	Calculus of kidney and ureter	7
593	Other disorders of kidney and ureter	74
595	Cystitis	7
596	Other disorders of bladder	5
598	Urethral stricture	1
599	Other disorders of urethra and urinary tract	411
600	Hyperplasia of prostate	7
601	Inflammatory diseases of prostate	1
602	Other disorders of prostate	3
608	Other disorders of male genital organs	4
611	Other disorders of breast	1
614	Inflammatory disease of ovary, fallopian tube, pelvic cellular tissue and peritoneum	2
615	Inflammatory diseases of uterus, except cervix	2
617	Endometriosis	1
619	Fistulae involving female genital tract	1
620	Noninflammatory disorders of ovary, fallopian tube and broad ligament	1
627	Menopausal and postmenopausal disorders	1
XI. COMPLICATIONS OF PREGNANCY, CHILDBIRTH, AND THE PUERPERIUM (630-676)		
633	Ectopic pregnancy	2
637	Unspecified abortion	1
641	Antepartum hemorrhage, abruptio placentae, and placenta praevia	1
668	Complications of the administration of anaesthetic or other sedation in labor and delivery	1
669	Other complications of labor and delivery, not elsewhere classified	1
671	Venous complications in pregnancy and the puerperium	1
673	Obstetrical pulmonary embolism	2
674	Other and unspecified complications of the puerperium, not elsewhere classified	2

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
XII. DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE (680-709)		
682	Other cellulitis and abscess	24
684	Impetigo	1
685	Pilonidal cyst	2
686	Other local infections of skin and subcutaneous tissue	5
692	Contact dermatitis and other eczema	1
694	Bullous dermatoses	1
695	Erythematous conditions	9
705	Disorders of sweat glands	1
707	Chronic ulcer of skin	101
XIII. DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE (710-739)		
710	Diffuse diseases of connective tissue	82
711	Arthropathy associated with infections	10
714	Rheumatoid arthritis and other inflammatory polyarthropathies	58
715	Osteoarthritis and allied disorders	17
716	Other and unspecified arthropathies	6
718	Other derangement of joint	1
719	Other and unspecified disorder of joint	1
721	Spondylosis and allied disorders	1
722	Intervertebral disc disorders	1
723	Other disorders of cervical region	2
724	Other and unspecified disorders of back	1
727	Other disorders of synovium, tendon and bursa	1
728	Disorders of muscle, ligament and fascia	6
729	Other disorders of soft tissues	13
730	Osteomyelitis, periostitis and other infections involving bone	18
731	Osteitis deformans and osteopathies associated with other disorders classified elsewhere	6
733	Other disorders of bone and cartilage	13
737	Curvature of spine	7
738	Other acquired deformity	1
XIV. CONGENITAL ANOMALIES (740-759)		
740	Anencephalus and similar anomalies	22
741	Spina bifida	5
742	Other congenital anomalies of nervous system	43
743	Congenital anomalies of eye	1
745	Bulbus cordis anomalies and anomalies of cardiac septal closure	33
746	Other congenital anomalies of heart	136
747	Other congenital anomalies of circulatory system	32
748	Congenital anomalies of respiratory system	54
750	Other congenital anomalies of upper alimentary tract	2
751	Other congenital anomalies of digestive system	7
753	Congenital anomalies of urinary system	17
756	Other congenital musculoskeletal anomalies	26
758	Chromosomal anomalies	42
759	Other and unspecified congenital anomalies	35
XV. CERTAIN CONDITIONS ORIGINATING IN THE PERINATAL PERIOD (760-779)		
760	Fetus or newborn affected by maternal conditions which may be unrelated to present pregnancy	3

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
761	Fetus or newborn affected by maternal complications of pregnancy	64
762	Fetus or newborn affected by complications of placenta, cord and membranes	34
763	Fetus or newborn affected by other complications of labor and delivery	1
764	Slow fetal growth and fetal malnutrition	2
765	Disorders relating to short gestation and unspecified low birthweight	179
767	Birth trauma	11
768	Intrauterine hypoxia and birth asphyxia	26
769	Respiratory distress syndrome	138
770	Other respiratory conditions of fetus and newborn	155
771	Infections specific to the perinatal period	36
772	Fetal and neonatal hemorrhage	9
773	Hemolytic disease of fetus or newborn, due to isoimmunization	1
775	Endocrine and metabolic disturbances specific to the fetus and newborn	1
776	Hematological disorders of fetus and newborn	6
777	Perinatal disorders of digestive system	17
778	Conditions involving the integument and temperature regulation of fetus and newborn	13
779	Other and ill-defined conditions originating in the perinatal period	162
XVI. SYMPTOMS, SIGNS AND ILL-DEFINED CONDITIONS (780-799)		
780	General symptoms	7
781	Symptoms involving nervous and musculoskeletal systems	2
782	Symptoms involving skin and other integumentary tissue	1
785	Symptoms involving cardiovascular system	10
786	Symptoms involving respiratory system and other chest symptoms	2
790	Nonspecific findings on examination of blood	1
797	Senility without mention of psychosis	19
798	Sudden death, cause unknown	211
799	Other ill-defined and unknown causes of morbidity and mortality	101
XVII. EXTERNAL CAUSES OF INJURY AND POISONING (E800-E999)		
E805	Hit by rolling stock	10
E806	Other specified railway accident	1
E810	Motor vehicle traffic accident involving collision with train	31
E812	Other motor vehicle traffic accident involving collision with another motor vehicle	843
E813	Motor vehicle traffic accident involving collision with other vehicle	28
E814	Motor vehicle traffic accident involving collision with pedestrian	258
E815	Other motor vehicle traffic accident involving collision on the highway	175
E816	Motor vehicle traffic accident due to loss of control, without collision on the highway	330
E818	Other noncollision motor vehicle traffic accident	30
E819	Motor vehicle traffic accident of unspecified nature	67
E820	Nontraffic accident involving motor-driven snow vehicle	11
E821	Nontraffic accident involving other off-road motor vehicle	6
E822	Other motor vehicle nontraffic accident involving collision with moving object	16
E823	Other motor vehicle nontraffic accident involving collision with stationary object	1
E825	Other motor vehicle nontraffic accident of other and unspecified nature	10
E826	Pedal cycle accident	3
E828	Accident involving animal being ridden	3
E830	Accident to watercraft causing submersion	12
E831	Accident to watercraft causing other injury	1
E832	Other accidental submersion or drowning in water transport accident	10
E838	Other and unspecified water transport accident	5
E841	Accident to powered aircraft, other and unspecified	22

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause Of Death	Number
E842	Accident to unpowered aircraft	1
E848	Accidents involving other vehicles not elsewhere classifiable	2
E850	Accidental poisoning by analgesics, antipyretics, antirheumatics	14
E851	Accidental poisoning by barbiturates	2
E853	Accidental poisoning by tranquilizers	2
E854	Accidental poisoning by other psychotropic agents	3
E855	Accidental poisoning by other drugs acting on central and autonomic nervous systems	20
E858	Accidental poisoning by other drugs	46
E860	Accidental poisoning by alcohol, not elsewhere classified	3
E861	Accidental poisoning by cleansing and polishing agents, disinfectants, paints and varnishes	1
E863	Accidental poisoning by agricultural and horticultural chemical and pharmaceutical preparations other than plant foods and fertilizers	1
E864	Accidental poisoning by corrosives and caustics, not elsewhere classified	1
E866	Accidental poisoning by other and unspecified solid and liquid substances	2
E868	Accidental poisoning by other utility gas and other carbon monoxide	40
E869	Accidental poisoning by other gases and vapors	3
E870	Accidental cut, puncture, perforation or hemorrhage during medical care	3
E876	Other and unspecified misadventures during medical care	3
E878	Surgical operation and other surgical procedures as the cause of abnormal reaction of patient, or of later complication, without mention of misadventure at time of operation	48
E879	Other procedures, without mention of misadventure at the time of procedure, as the cause of abnormal reaction of patient, or of later complication	22
E880	Fall on or from stairs or steps	46
E881	Fall on or from ladders or scaffolding	10
E882	Fall from or out of building or other structure	25
E883	Fall into hole or other opening in surface	4
E884	Other fall from one level to another	18
E885	Fall on same level from slipping, tripping or stumbling	11
E887	Fracture, cause unspecified	105
E888	Other and unspecified fall	154
E890	Conflagration in private dwelling	164
E891	Conflagration in other and unspecified building or structure	2
E892	Conflagration not in building or structure	3
E893	Accident caused by ignition of clothing	4
E894	Ignition of highly inflammable material	1
E897	Accident caused by controlled fire not in building or structure	1
E898	Accident caused by other specified fire and flames	9
E899	Accident caused by unspecified fire	4
E900	Excessive heat	26
E901	Excessive cold	30
E902	High and low air pressure and changes in air pressure	2
E904	Hunger, thirst, exposure, neglect	3
E905	Venomous animals and plants as the cause of poisoning and toxic reactions	2
E906	Other injury caused by animals	4
E907	Lightning	4
E908	Cataclysmic storms, and floods resulting from storms	2
E910	Accidental drowning and submersion	114
E911	Inhalation and ingestion of food causing obstruction of respiratory tract or suffocation	62
E912	Inhalation and ingestion of other object causing obstruction of respiratory tract or suffocation	70
E913	Accidental mechanical suffocation	37
E915	Foreign body accidentally entering other orifice	1

Table 4.16 Number of Deaths by Cause Michigan Residents, 1988 (continued)

ICD List Number	Cause of Death	Number
		32
E916	Struck accidentally by falling object	3
E917	Striking against or struck accidentally by objects or persons	2
E918	Caught accidentally in or between objects	31
E919	Accidents caused by machinery	2
E920	Accidents caused by cutting and piercing instruments or objects	1
E921	Accident caused by explosion of pressure vessel	30
E922	Accident caused by firearm missile	6
E923	Accident caused by explosive material	
E924	Accident caused by hot substance or object, caustic or corrosive material and steam	5
E925	Accident caused by electric current	23
E927	Overexertion and strenuous movements	1
E928	Other and unspecified environmental and accidental causes	69
E929	Late effects of accidental injury	19
E929	Late effects of accidental injury	1
E934	Agents primarily affecting blood constituents	1
E938	Other central nervous system depressants	3
E947	Other and unspecified drugs and medicaments	99
E950	Suicide and selfinflicted poisoning by solid or liquid substances	1
E951	Suicide and selfinflicted poisoning by gases in domestic use	143
E952	Suicide and selfinflicted poisoning by other gases and vapors	182
E953	Suicide and selfinflicted injury by hanging, strangulation and suffocation	11
E954	Suicide and selfinflicted injury by submersion (drowning)	598
E955	Suicide and selfinflicted injury by firearms and explosives	20
E956	Suicide and selfinflicted injury by cutting and piercing instruments	18
E957	Suicide and selfinflicted injuries by jumping from high place	15
E958	Suicide and selfinflicted injury by other and unspecified means	2
E960	Fight, brawl, rape	1
E962	Assault by poisoning	32
E963	Assault by hanging and strangulation	1
E964	Assault by submersion [drowning]	700
E965	Assault by firearms and explosives	176
E966	Assault by cutting and piercing instrument	11
E967	Child battering and other maltreatment	126
E968	Assault by other and unspecified means	1
E969	Late effects of injury purposely inflicted by other person	10
E970	Injury due to legal intervention by firearms	
E980	Poisoning by solid or liquid substances, undetermined whether accidentally or purposely inflicted	61
E982	Poisoning by other gases, undetermined whether accidentally or purposely inflicted	7
E983	Hanging, strangulation or suffocation, undetermined whether accidentally or purposely inflicted	2
E984	Submersion [drowning], undetermined whether accidentally or purposely inflicted	8
E985	Injury by firearms and explosives, undetermined whether accidentally or purposely inflicted	12
E987	Falling from high place, undetermined whether accidentally or purposely inflicted	5
E988	Injury by other and unspecified means, undetermined whether accidentally or purposely inflicted	17
E989	Late effects of injury, undetermined whether accidentally or purposely inflicted	1
E996	Injury due to war operations by nuclear weapons	1

Table 4.17
Population Changes by County
 Michigan, 1978 and 1988

Area	Population Estimate July 1, 1978	Population Estimate July 1, 1988	Net Change	Percent Change	Natural Increase	Estimated Net Migration
Michigan	9,202,029	9,239,811	37,782	0.4	625,173	-587,391
Alcona	9,475	10,631	1,156	12.2	-215	1,371
Alger	9,396	8,742	-654	-7.0	236	-890
Allegan	78,765	90,249	11,484	14.6	7,261	4,223
Alpena	32,046	31,471	-575	-1.8	1,628	-2,203
Antrim	16,078	17,660	1,582	9.8	580	1,002
Arenac	13,998	15,816	1,818	13.0	572	1,246
Baraga	8,625	8,253	-372	-4.3	162	-534
Barry	44,179	49,649	5,470	12.4	3,332	2,138
Bay	122,058	115,518	-6,540	-5.4	7,677	-14,217
Benzie	10,847	11,597	750	6.9	364	386
Berrien	173,421	166,558	-6,863	-4.0	10,786	-17,649
Branch	40,358	40,721	363	0.9	2,646	-2,283
Calhoun	143,471	139,199	-4,272	-3.0	7,855	-12,127
Cass	48,353	49,508	1,155	2.4	2,567	-1,412
Charlevoix	19,291	21,246	1,955	10.1	1,320	635
Cheboygan	20,061	21,435	1,374	6.8	905	469
Chippewa	31,091	30,129	-962	-3.1	1,054	-2,016
Clare	22,878	26,357	3,479	15.2	761	2,718
Clinton	55,605	58,006	2,401	4.3	5,207	-2,806
Crawford	9,134	10,790	1,656	18.1	696	960
Delta	39,198	38,382	-816	-2.1	1,910	-2,726
Dickinson	25,717	26,184	467	1.8	660	-193
Eaton	85,254	94,026	8,772	10.3	6,766	2,006
Emmet	22,564	24,763	2,199	9.7	1,348	851
Genesee	449,603	430,749	-18,854	-4.2	36,798	-55,652
Gladwin	18,714	22,795	4,081	21.8	795	3,286
Gogebic	20,546	18,159	-2,387	-11.6	-602	-1,785
Gd Traverse	51,310	63,300	11,990	23.4	4,691	7,299
Gratiot	40,193	39,472	-721	-1.8	2,066	-2,787
Hillsdale	41,539	43,346	1,807	4.4	2,632	-825
Houghton	38,304	35,769	-2,535	-6.6	518	-3,053
Huron	36,689	36,618	-71	-0.2	1,539	-1,610
Ingham	269,094	276,338	7,244	2.7	27,690	-20,446
Ionia	50,720	56,208	5,488	10.8	4,716	772
Iosco	28,816	30,437	1,621	5.6	2,791	-1,170
Iron	14,046	13,527	-519	-3.7	-394	-125
Isabella	53,886	54,014	128	0.2	3,927	-3,799
Jackson	151,505	149,457	-2,048	-1.4	8,760	-10,808
Kalamazoo	209,046	217,906	8,860	4.2	17,011	-8,151
Kalkaska	9,403	12,563	3,160	33.6	1,098	2,062

Table 4.17 (continued)
 Population Changes by County
 Michigan, 1978 and 1988

Area	Population Estimate July 1, 1978	Population Estimate July 1, 1988	Net Change	Percent Change	Natural Increase	Estimated Net Migration
Kent	431,770	484,626	52,856	12.2	49,510	3,346
Keweenaw	2,010	2,019	9	0.4	-121	130
Lake	7,563	8,953	1,390	18.4	-68	1,458
Lapeer	66,536	74,528	7,992	12.0	5,976	2,016
Leelanau	13,540	15,545	2,005	14.8	806	1,199
Lenawee	89,942	90,969	1,027	1.1	6,116	-5,089
Livingston	90,786	113,461	22,675	25.0	8,314	14,361
Luce	6,967	5,848	-1,119	-16.1	151	-1,270
Mackinac	10,488	10,563	75	0.7	235	-160
Macomb	680,971	706,872	25,901	3.8	43,865	-17,964
Manistee	22,986	22,377	-609	-2.6	194	-803
Marquette	75,014	70,040	-4,974	-6.6	7,278	-12,252
Mason	25,350	26,315	965	3.8	1,048	-83
Mecosta	35,664	38,297	2,633	7.4	2,039	594
Menominee	26,249	25,886	-363	-1.4	718	-1,081
Midland	71,904	75,166	3,262	4.5	6,714	-3,452
Missaukee	9,427	11,568	2,141	22.7	908	1,233
Monroe	132,455	136,446	3,991	3.0	9,614	-5,623
Montcalm	46,265	53,522	7,257	15.7	3,406	3,851
Montmorency	7,430	8,416	986	13.3	-29	1,015
Muskegon	157,250	161,316	4,066	2.6	11,825	-7,759
Newaygo	34,033	39,488	5,455	16.0	2,495	2,960
Oakland	997,236	1,052,475	55,239	5.5	68,167	-12,928
Oceana	21,924	23,400	1,476	6.7	1,664	-188
Ogemaw	15,641	18,743	3,102	19.8	523	2,579
Ontonagon	10,587	9,055	-1,532	-14.5	-21	-1,511
Osceola	18,755	21,054	2,299	12.3	1,213	1,086
Oscoda	6,473	7,428	955	14.8	163	792
Otsego	14,221	16,854	2,633	18.5	1,177	1,456
Ottawa	150,009	180,586	30,577	20.4	17,916	12,661
Presque Isle	14,407	14,202	-205	-1.4	428	-633
Roscommon	15,656	20,590	4,934	31.5	-208	5,142
Saginaw	227,112	215,474	-11,638	-5.1	18,157	-29,795
St. Clair	137,298	145,787	8,489	6.2	8,281	208
St. Joseph	54,443	59,979	5,536	10.2	4,176	1,360
Sanilac	40,298	41,354	1,056	2.6	1,907	-851
Schoolcraft	8,926	8,260	-666	-7.5	153	-819
Shiawassee	70,427	70,896	469	0.7	5,687	-5,218
Tuscola	55,752	56,642	890	1.6	3,918	-3,028
Van Buren	65,152	69,439	4,287	6.6	4,536	-249
Washtenaw	259,770	267,822	8,052	3.1	24,578	-16,526
Wayne	2,383,783	2,122,827	-260,956	-10.9	120,566	-381,522
Wexford	24,282	27,175	2,893	11.9	1,503	1,390

Table 4.18
Population by Age, Race and Sex
Michigan Residents, 1988

Age in Years	All Races			White			Black			All Other		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Under 1	139,587	70,874	68,713	111,974	56,968	55,006	24,446	12,255	12,191	3,167	1,651	1,516
1-4	548,276	280,402	267,874	449,761	230,560	219,201	87,873	44,408	43,465	10,642	5,434	5,208
5-9	674,962	345,612	329,350	554,333	284,673	269,660	108,866	55,013	53,853	11,763	5,926	5,837
10-14	691,024	354,039	336,985	565,294	290,704	274,590	114,553	57,679	56,874	11,177	5,656	5,521
15-19	725,828	370,132	355,696	598,686	306,569	292,117	116,933	58,369	58,564	10,209	5,194	5,015
20-24	758,886	380,646	378,240	636,104	320,957	315,147	113,358	54,937	58,421	9,424	4,752	4,672
25-29	786,265	389,592	396,673	667,214	334,165	333,049	109,040	50,534	58,506	10,011	4,893	5,118
30-34	769,740	379,833	389,907	656,741	328,569	328,172	101,524	45,859	55,665	11,475	5,405	6,070
35-39	702,956	345,317	357,639	604,157	300,966	303,191	87,385	38,974	48,411	11,414	5,377	6,037
40-44	601,601	294,419	307,182	522,407	258,699	263,708	69,861	31,148	38,713	9,333	4,572	4,761
45-49	500,214	243,785	256,429	438,205	215,715	222,490	55,304	24,708	30,596	6,705	3,362	3,343
50-54	439,288	212,748	226,540	386,514	189,111	197,403	48,075	21,309	26,766	4,699	2,328	2,371
55-59	420,992	202,272	218,720	372,016	180,218	191,798	45,492	20,385	25,107	3,484	1,669	1,815
60-64	398,492	187,812	210,680	354,170	167,710	186,460	41,681	18,888	22,793	2,641	1,214	1,427
65-69	351,207	159,345	191,862	313,996	142,833	171,163	35,165	15,604	19,561	2,046	908	1,138
70-74	281,261	120,491	160,770	252,624	108,374	144,250	27,065	11,430	15,635	1,572	687	885
75-79	203,188	80,587	122,601	183,531	72,680	110,851	18,560	7,444	11,116	1,097	463	634
80-84	129,178	46,112	83,066	117,448	41,667	75,781	11,032	4,171	6,861	698	274	424
85+	116,866	35,169	81,697	106,569	31,754	74,815	9,723	3,274	6,449	574	141	433
Total	9,239,811	4,499,187	4,740,624	7,891,744	3,862,892	4,028,852	1,225,936	576,389	649,547	122,131	59,906	62,225

Source: The estimate of the total state population was provided by the Department of Management and Budget, Office of Revenue and Tax Analysis. The breakdown of the total population by age, race and sex was prepared by the Department of Public Health, Office of the State Registrar and Center for Health Statistics. See Technical Notes.

Table 4.19
Abridged Life Table
Michigan Residents, 1988

Age	$nx(1)^1$	$lx(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$Tx(5)^1$
0-1	0.01105	100,000	1,105	99,012	7,452,047
1-5	0.00173	98,895	171	395,198	7,353,035
5-10	0.00132	98,724	130	493,264	6,957,837
10-15	0.00148	98,594	145	492,676	6,464,573
15-20	0.00465	98,449	457	491,176	5,971,897
20-25	0.00512	97,992	501	488,729	5,480,721
25-30	0.00577	97,491	562	486,094	4,991,992
30-35	0.00742	96,929	718	482,929	4,505,898
35-40	0.00988	96,210	950	478,778	4,022,969
40-45	0.01270	95,260	1,209	473,448	3,544,190
45-50	0.01876	94,051	1,764	466,133	3,070,743
50-55	0.02807	92,287	2,590	455,459	2,604,609
55-60	0.04643	89,697	4,164	438,903	2,149,150
60-65	0.07691	85,532	6,578	412,225	1,710,247
65-70	0.11405	78,954	9,004	373,306	1,298,021
70-75	0.16565	69,951	11,587	321,770	924,715
75-80	0.23523	58,364	13,729	258,309	602,945
80-85	0.34701	44,635	15,489	184,332	344,636
85+	1.00000	29,146	29,146	160,305	160,305

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.20
Abridged Life Table for Males
Michigan Residents, 1988

Age	$nxq(1)^1$	$lx(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$Tx(5)^1$	$ex(6)^1$
0-1	0.01180	100,000	1,180	98,950	7,133,700	71.3
1-5	0.00196	98,820	193	394,850	7,034,750	71.2
5-10	0.00149	98,627	147	492,733	6,639,901	67.3
10-15	0.00178	98,481	175	492,072	6,147,167	62.4
15-20	0.00673	98,305	661	489,992	5,655,095	57.5
20-25	0.00752	97,645	734	486,426	5,165,103	52.9
25-30	0.00858	96,911	831	482,530	4,678,677	48.3
30-35	0.01020	96,080	979	478,045	4,196,147	43.7
35-40	0.01338	95,101	1,272	472,447	3,718,102	39.1
40-45	0.01675	93,829	1,571	465,426	3,245,655	34.6
45-50	0.02480	92,257	2,287	455,907	2,780,229	30.1
50-55	0.03558	89,970	3,201	442,414	2,324,323	25.8
55-60	0.05767	86,769	5,003	422,348	1,881,909	21.7
60-65	0.09842	81,766	8,047	389,900	1,459,560	17.9
65-70	0.14516	73,719	10,701	342,990	1,069,660	14.5
70-75	0.21495	63,019	13,545	282,062	726,670	11.5
75-80	0.29702	49,473	14,694	210,843	444,609	9.0
80-85	0.41870	34,779	14,562	136,723	233,766	6.7
85+	1.00000	20,217	20,217	97,043	97,043	4.8

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.21
Abridged Life Table for Females
Michigan Residents, 1988

Age	$nxq(1)^1$	$lx(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$Tx(5)^1$	$ex(6)^1$
0-1	0.01028	100,000	1,028	99,078	7,762,524	77.6
1-5	0.00150	98,972	148	395,559	7,663,447	77.4
5-10	0.00114	98,825	112	493,814	7,267,888	73.5
10-15	0.00116	98,712	114	493,303	6,774,074	68.6
15-20	0.00248	98,598	244	492,412	6,280,771	63.7
20-25	0.00270	98,354	265	491,120	5,788,359	58.9
25-30	0.00300	98,089	294	489,753	5,297,239	54.0
30-35	0.00470	97,795	459	487,899	4,807,487	49.2
35-40	0.00649	97,336	631	485,185	4,319,588	44.4
40-45	0.00879	96,705	850	481,529	3,834,403	39.7
45-50	0.01299	95,855	1,245	476,401	3,352,873	35.0
50-55	0.02097	94,610	1,984	468,527	2,876,472	30.4
55-60	0.03594	92,627	3,328	455,466	2,407,946	26.0
60-65	0.05734	89,298	5,120	434,531	1,952,479	21.9
65-70	0.08743	84,178	7,359	403,457	1,517,948	18.0
70-75	0.12687	76,819	9,746	360,880	1,114,491	14.5
75-80	0.19197	67,073	12,876	304,577	753,611	11.2
80-85	0.30393	54,197	16,472	230,228	449,034	8.3
85+	1.00000	37,725	37,725	218,806	218,806	5.8

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.22
Abridged Life Table for Whites
Michigan Residents, 1988

Age	$q_x(1)^1$	$l_x(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$T_x(5)^1$	$ex(6)^1$
0-1	0.00850	100,000	850	99,253	7,560,285	75.6
1-5	0.00161	99,150	159	396,236	7,461,031	75.3
5-10	0.00118	98,990	116	494,632	7,064,795	71.4
10-15	0.00131	98,874	129	494,103	6,570,162	66.5
15-20	0.00388	98,745	383	492,827	6,076,059	61.5
20-25	0.00421	98,362	414	490,792	5,583,232	56.8
25-30	0.00469	97,948	459	488,628	5,092,440	52.0
30-35	0.00589	97,489	574	486,064	4,603,813	47.2
35-40	0.00729	96,916	706	482,896	4,117,749	42.5
40-45	0.01007	96,210	968	478,799	3,634,853	37.8
45-50	0.01598	95,242	1,521	472,689	3,156,055	33.1
50-55	0.02478	93,721	2,322	463,292	2,683,366	28.6
55-60	0.04252	91,399	3,886	448,106	2,220,074	24.3
60-65	0.07195	87,513	6,296	422,839	1,771,968	20.2
65-70	0.10788	81,217	8,761	385,314	1,349,129	16.6
70-75	0.16204	72,455	11,740	334,033	963,815	13.3
75-80	0.23172	60,715	14,068	269,327	629,782	10.4
80-85	0.34640	46,647	16,158	192,768	360,455	7.7
85+	1.00000	30,489	30,489	167,687	167,687	5.5

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.23
Abridged Life Table for White Males
Michigan Residents, 1988

Age	$q_x(1)^1$	$l_x(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$T_x(5)^1$	$ex(6)^1$
0-1	0.00923	100,000	923	99,193	7,257,287	72.6
1-5	0.00182	99,077	180	395,884	7,158,094	72.2
5-10	0.00120	98,896	118	494,157	6,762,210	68.4
10-15	0.00150	98,778	148	493,609	6,268,053	63.5
15-20	0.00544	98,631	536	491,909	5,774,444	58.5
20-25	0.00620	98,095	608	488,983	5,282,535	53.9
25-30	0.00694	97,487	676	485,776	4,793,552	49.2
30-35	0.00790	96,811	765	482,197	4,307,776	44.5
35-40	0.00979	96,046	940	477,988	3,825,579	39.8
40-45	0.01349	95,106	1,282	472,535	3,347,591	35.2
45-50	0.02082	93,824	1,953	464,569	2,875,056	30.6
50-55	0.03146	91,870	2,889	452,704	2,410,486	26.2
55-60	0.05307	88,981	4,722	434,128	1,957,782	22.0
60-65	0.09285	84,259	7,823	402,955	1,523,655	18.1
65-70	0.13827	76,436	10,568	357,021	1,120,699	14.7
70-75	0.21084	65,867	13,887	295,606	763,678	11.6
75-80	0.29442	51,980	15,304	221,962	468,073	9.0
80-85	0.42038	36,677	15,418	144,070	246,111	6.7
85+	1.00000	21,259	21,259	102,041	102,041	4.8

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.24
Abridged Life Table for White Females
 Michigan Residents, 1988

Age	$nx(1)^1$	$lx(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$Tx(5)^1$	$ex(6)^1$
0-1	0.00775	100,000	775	99,317	7,853,781	78.5
1-5	0.00139	99,225	138	396,603	7,754,464	78.2
5-10	0.00115	99,088	114	495,126	7,357,861	74.3
10-15	0.00112	98,974	110	494,618	6,862,735	69.3
15-20	0.00225	98,864	221	493,789	6,368,117	64.4
20-25	0.00218	98,643	214	492,682	5,874,328	59.6
25-30	0.00243	98,428	239	491,579	5,381,647	54.7
30-35	0.00387	98,189	379	490,046	4,890,068	49.8
35-40	0.00479	97,810	468	487,936	4,400,022	45.0
40-45	0.00670	97,342	651	485,208	3,912,086	40.2
45-50	0.01125	96,690	1,088	480,961	3,426,878	35.4
50-55	0.01834	95,603	1,753	474,039	2,945,917	30.8
55-60	0.03252	93,849	3,052	462,251	2,471,877	26.3
60-65	0.05277	90,798	4,791	442,840	2,009,627	22.1
65-70	0.08178	86,007	7,033	413,485	1,566,786	18.2
70-75	0.12359	78,973	9,760	371,711	1,153,301	14.6
75-80	0.18790	69,213	13,005	315,061	781,590	11.3
80-85	0.30228	56,208	16,991	239,066	466,529	8.3
85+	1.00000	39,218	39,218	227,463	227,463	5.8

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.25
Abridged Life Table for Blacks
 Michigan Residents, 1988

Age	$nx(1)^1$	$lx(2)^1$	$ndx(3)^1$	$nLx(4)^1$	$Tx(5)^1$	$ex(6)^1$
0-1	0.02336	100,000	2,336	97,846	6,747,700	67.5
1-5	0.00237	97,664	231	390,176	6,649,854	68.1
5-10	0.00221	97,433	215	486,573	6,259,678	64.2
10-15	0.00232	97,218	225	485,655	5,773,104	59.4
15-20	0.00848	96,993	822	483,072	5,287,449	54.5
20-25	0.01036	96,171	996	478,440	4,804,378	50.0
25-30	0.01245	95,175	1,185	473,052	4,325,938	45.5
30-35	0.01774	93,990	1,667	466,084	3,852,886	41.0
35-40	0.02851	92,323	2,632	455,313	3,386,802	36.7
40-45	0.03346	89,691	3,000	441,167	2,931,488	32.7
45-50	0.04209	86,691	3,648	424,651	2,490,322	28.7
50-55	0.05452	83,043	4,527	404,435	2,065,670	24.9
55-60	0.07947	78,515	6,239	377,840	1,661,236	21.2
60-65	0.11980	72,276	8,658	340,683	1,283,396	17.8
65-70	0.16948	63,618	10,781	291,562	942,713	14.8
70-75	0.20243	52,837	10,696	237,602	651,151	12.3
75-80	0.27368	42,141	11,533	181,972	413,550	9.8
80-85	0.36480	30,608	11,166	124,645	231,578	7.6
85+	1.00000	19,442	19,442	106,933	106,933	5.5

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.26
Abridged Life Table for Black Males
 Michigan Residents, 1988

Age	$nq_x(1)^1$	$l_x(2)^1$	$ndx(3)^1$	$nL_x(4)^1$	$T_x(5)^1$	$ex(6)^1$
0-1	0.02448	100,000	2,448	97,744	6,306,770	63.1
1-5	0.00270	97,552	263	389,726	6,209,026	63.6
5-10	0.00318	97,288	309	485,592	5,819,300	59.8
10-15	0.00330	96,979	319	484,305	5,333,708	55.0
15-20	0.01346	96,660	1,300	480,291	4,849,403	50.2
20-25	0.01545	95,360	1,473	473,229	4,369,112	45.8
25-30	0.01961	93,887	1,841	465,045	3,895,883	41.5
30-35	0.02714	92,046	2,497	454,388	3,430,839	37.3
35-40	0.04211	89,549	3,771	438,609	2,976,451	33.2
40-45	0.04553	85,778	3,905	419,389	2,537,841	29.6
45-50	0.06146	81,873	5,031	397,120	2,118,452	25.9
50-55	0.07181	76,841	5,518	370,842	1,721,332	22.4
55-60	0.09956	71,323	7,100	339,719	1,350,490	18.9
60-65	0.14963	64,223	9,609	297,989	1,010,771	15.7
65-70	0.20894	54,614	11,410	244,871	712,782	13.1
70-75	0.25909	43,203	11,193	187,836	467,911	10.8
75-80	0.32701	32,010	10,467	133,403	280,074	8.8
80-85	0.41297	21,543	8,896	84,705	146,672	6.8
85+	1.00000	12,646	12,646	61,966	61,966	4.9

¹ Definitions of life table values are contained in the Technical Notes.

Table 4.27
Abridged Life Table for Black Females
 Michigan Residents, 1988

Age	$nq_x(1)^1$	$l_x(2)^1$	$ndx(3)^1$	$nL_x(4)^1$	$T_x(5)^1$	$ex(6)^1$
0-1	0.02224	100,000	2,224	97,951	7,178,508	71.8
1-5	0.00203	97,776	198	390,629	7,080,558	72.4
5-10	0.00121	97,578	118	487,568	6,689,928	68.6
10-15	0.00132	97,461	128	487,028	6,202,360	63.6
15-20	0.00350	97,332	340	485,895	5,715,332	58.7
20-25	0.00556	96,992	538	483,668	5,229,436	53.9
25-30	0.00623	96,454	600	480,853	4,745,769	49.2
30-35	0.00993	95,853	952	477,107	4,264,916	44.5
35-40	0.01743	94,902	1,653	470,635	3,787,809	39.9
40-45	0.02363	93,248	2,203	460,885	3,317,174	35.6
45-50	0.02616	91,045	2,381	449,561	2,856,289	31.4
50-55	0.04053	88,664	3,593	434,954	2,406,728	27.1
55-60	0.06284	85,071	5,346	412,809	1,971,774	23.2
60-65	0.09433	79,725	7,520	380,768	1,558,965	19.6
65-70	0.13671	72,205	9,871	336,839	1,178,196	16.3
70-75	0.15848	62,334	9,878	287,495	841,357	13.5
75-80	0.23573	52,456	12,365	232,096	553,862	10.6
80-85	0.33374	40,091	13,380	166,842	321,766	8.0
85+	1.00000	26,711	26,711	154,923	154,923	5.8

¹ Definitions of life table values are contained in the Technical Notes.

Figure 4.3



STATE OF MICHIGAN DEPARTMENT OF PUBLIC HEALTH

LF _____ CF _____

STATE FILE NUMBER _____

1116391

CERTIFICATE OF LIVE BIRTH

CHILD	1. CHILD - NAME (FIRST) (MIDDLE) (LAST)	
	2. SEX (THIS BIRTH - SINGLE, TWIN, TRIPLET, ETC. (SPECIFY) 3a.)	IF NOT SINGLE - BORN 1ST 2ND, 3RD, ETC. (SPECIFY) 3b.
	DATE OF BIRTH 4a. (MO) (DAY) (YEAR) 4b. HOUR	
PLACE	5a. HOSPITAL NAME - (IF NOT HOSPITAL GIVE STREET AND NUMBER)	
	5b. CITY, VILLAGE, OR TOWNSHIP OF BIRTH	
	5c. COUNTY OF BIRTH	
CERTIFICATION	I CERTIFY THAT THE ABOVE NAMED CHILD WAS BORN ALIVE AT THE PLACE AND TIME AND ON THE DATE STATED ABOVE	
	6a. SIGNATURE: _____ DATE: _____	
	CERTIFIER NAME AND TITLE (PRINT OR TYPE) _____	
	MAILING ADDRESS (ST. NO., CITY OR VILLAGE, STATE, ZIP) _____	
	REGISTRAR'S SIGNATURE _____	
	DATE RECEIVED BY LOCAL REGISTRAR - (MO, DAY, YEAR) _____	
MOTHER	8a. MOTHER - MAIDEN NAME (FIRST) (MIDDLE) (LAST)	
	8b. SOCIAL SECURITY NUMBER	
	8c. AGE (AT TIME OF THIS BIRTH)	
	8d. STATE OF BIRTH - NAME COUNTRY IF NOT USA	
FATHER	9a. FATHER - NAME (FIRST) (MIDDLE) (LAST)	
	9b. SOCIAL SECURITY NUMBER	
	9c. AGE (AT TIME OF THIS BIRTH)	
	9d. STATE OF BIRTH - NAME COUNTRY IF NOT USA	
	I CERTIFY THAT THE PERSONAL INFORMATION PROVIDED ON THIS CERTIFICATE IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF	
	10a. SIGNATURE (PARENT OR OTHER INFORMANT) _____ DATE: _____	
	10b. RELATION TO CHILD _____	

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1116391

CONFIDENTIAL INFORMATION FOR PUBLIC HEALTH USE ONLY

CHILD	11. BIRTHWEIGHT _____ grams	12. ESTIMATED WEEKS GESTATION _____	13. APGAR SCORE 1 MIN _____ 5 MIN _____	14. HAVE EYES OF CHILD BEEN TREATED WITH AN APPROVED PROPHYLAXIS? 1. <input type="checkbox"/> YES 2. <input type="checkbox"/> NO 3. <input type="checkbox"/> UNKNOWN	
MOTHER	15. APPARENT CONGENITAL MALFORMATIONS OR ANOMALIES OF CHILD (DESCRIBE) _____				
	16. RACE 1. <input type="checkbox"/> WHITE 2. <input type="checkbox"/> BLACK 3. <input type="checkbox"/> AM INDIAN 4. <input type="checkbox"/> OTHER (SPECIFY) _____				
	17. EDUCATION (SPECIFY ONLY HIGHEST GRADE COMPLETED; CHECK ONLY ONE BOX) ELEMENTARY OR SECONDARY COLLEGE 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5+ <input type="checkbox"/>				
FATHER	18. WAS MOTHER'S BLOOD TESTED FOR SYPHILIS DURING PREGNANCY? 1. <input type="checkbox"/> YES 2. <input type="checkbox"/> NO 3. <input type="checkbox"/> UNKNOWN				
	19. RACE 1. <input type="checkbox"/> WHITE 2. <input type="checkbox"/> BLACK 3. <input type="checkbox"/> AM INDIAN 4. <input type="checkbox"/> OTHER (SPECIFY) _____				
	20. EDUCATION (SPECIFY ONLY HIGHEST GRADE COMPLETED; CHECK ONLY ONE BOX) ELEMENTARY OR SECONDARY COLLEGE 0 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/> 12 <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5+ <input type="checkbox"/>				
PREGNANCY HISTORY	21. PRIOR DELIVERIES		22. THIS PREGNANCY		
	LIVE BIRTHS (Do not include this Child) 21a. None 21b. _____ 21c. _____ 21d. _____		DATE LAST NORMAL MENSTRUATION 23. MO DAY YEAR		
	OTHER TERMINATIONS (Spontaneous and induced) 21e. Before 20 weeks 21f. After 20 weeks		MONTH OF PREGNANCY PRENATAL CARE BEGAN 24. _____		
	DATE OF LAST LIVE BIRTH (Month, Year) 22a. _____		TOTAL PRENATAL VISITS 25. _____		
	DATE OF LAST OTHER TERMINATION (Month, Year) 22b. _____		ATTENDANT AT BIRTH 1. <input type="checkbox"/> MD. 2. <input type="checkbox"/> D.O. 3. <input type="checkbox"/> NURSE 4. <input type="checkbox"/> MIDWIFE 5. <input type="checkbox"/> CERTIFIED NURSE-MIDWIFE 6. <input type="checkbox"/> OTHER (SPECIFY) _____		
	26. <input type="checkbox"/> NONE		27. <input type="checkbox"/> NONE		
	28. <input type="checkbox"/> NONE		29. <input type="checkbox"/> NONE		

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FAILURE TO PROVIDE THE REQUIRED INFORMATION IS A MISDEMEANOR PUNISHABLE BY IMPRISONMENT OF NOT MORE THAN 1 YEAR OR A FINE OF NOT MORE THAN \$1,000.00 OR BOTH.

Figure 4.4

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
REPORT OF FETAL DEATH
 (TYPE OR PRINT IN INK)

REPORT NUMBER _____

FETUS	DATE OF DELIVERY		HOUR	SEX OF FETUS	THIS DELIVERY	IF NOT SINGLE -	FETUS DIED BEFORE LABOR	WEIGHT OF FETUS	PHYSICIAN'S	
	(MONTH)	(DAY)	YEAR	1 MALE 2 FEMALE 3 INDETERMINABLE	SINGLE, TWIN, ETC. (SPECIFY)	111 112 113 114 115 116 117 118 119 120	1 FETUS DIED BEFORE LABOR 2 FETUS DIED DURING LABOR 3 FETUS DIED AFTER LABOR	GRAMS	ESTIMATE OF GESTATION WEEKS	
CAUSE OF FETAL DEATH	PART I									
	FETAL OR MATERNAL CONDITION DIRECTLY CAUSING FETAL DEATH									
	DUE TO OR AS A CONSEQUENCE OF: (SPECIFY FETAL OR MATERNAL)									
	FETAL AND/OR MATERNAL CONDITIONS, IF ANY, GIVING RISE TO THE IMMEDIATE CAUSE IN 1a, STATING THE UNDERLYING CAUSE LAST.									
PART II OTHER SIGNIFICANT CONDITIONS OF FETUS OR MOTHER, CONDITIONS CONTRIBUTING TO FETAL DEATH, BUT NOT RELATED TO CAUSE GIVEN IN PART I										
MOTHER	AGE (AT TIME OF DELIVERY)		RESIDENCE - STATE	IF OUTSIDE USA ENTER COUNTRY	RACE	EDUCATION - HIGHEST GRADE COMPLETED	CHECK ONLY ONE BOX	11a	11b	
	(MONTH)	(DAY)	YEAR	1 WHITE 2 BLACK 3 AM INDIAN 4 OTHER (SPECIFY)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	
	11c									
FATHER	AGE (AT TIME OF DELIVERY)		RESIDENCE - STATE	IF OUTSIDE USA ENTER COUNTRY	RACE	EDUCATION - HIGHEST GRADE COMPLETED	CHECK ONLY ONE BOX	11a	11b	
	(MONTH)	(DAY)	YEAR	1 WHITE 2 BLACK 3 AM INDIAN 4 OTHER (SPECIFY)	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	
	11c									
MEDICAL AND PREGNANCY HISTORY INFORMATION	DATE LAST NORMAL MENSTRUATION BEGAN		MONTH OF PREGNANCY PROGRAM BEGAN	TOTAL PREGNANCY VISITS	PRIOR PREGNANCIES					
	(MONTH)	(DAY)	YEAR	1 2 3 4 5 6 7 8 9 10 11 12	1 2 3 4 5 6 7 8 9 10 11 12	LIVE BIRTHS		OTHER TERMINATIONS		
	19									
	20									
PLACE	21									
	22									
	23									
NAME OF PERSON COMPLETING REPORT (TYPE OR PRINT)			CITY, VILLAGE OR TOWNSHIP OF DELIVERY			COUNTY OF DELIVERY			24	
25			DATE REPORT COMPLETED			DATE REPORT RECEIVED BY DEPARTMENT OF PUBLIC HEALTH			26	
25			26			27			28	

SAMPLE COPY

AUTHORITY: Act 368, PA 1978.

Failure to provide the required information is a misdemeanor punishable by imprisonment of not more than 1 year or a fine of not more than \$1,000.00 or both.

8-35 1/84

INSTRUCTIONS

Michigan Public Act 368 of 1978 requires the reporting of the death of a fetus which has completed 20 weeks of gestation or weighs at least 400 grams to the state registrar within 5 days after delivery. Responsibility for filing fetal death reports lies with the following: 1) the institution where the fetus is delivered; 2) the attending physician if delivered outside an institution; 3) the medical examiner, when investigation by the medical examiner is required.

As these reports are necessary in the development of important statistical health measures for the state, including fetal and perinatal mortality, and the analysis of various variables associated to fetal death outcomes, it is important that each report be as accurate and complete as is possible.

DO NOT REPORT THE NAME OF THE BIOLOGICAL PARENTS, OR OTHER INFORMATION WHICH WOULD MAKE IT POSSIBLE TO IDENTIFY EITHER PARENT.

Figure 4.5

LF _____

CF _____

1048458



STATE OF MICHIGAN DEPARTMENT OF PUBLIC HEALTH

STATE FILE NUMBER

CERTIFICATE OF DEATH

DECEDENT NAME FIRST MIDDLE LAST		SEX	DATE OF DEATH (Mo., Day, Yr.)
1. RACE - 10 0, 10 1, 10 2, 10 3, 10 4, 10 5, 10 6, 10 7, 10 8, 10 9, 10 10, 10 11, 10 12, 10 13, 10 14, 10 15, 10 16, 10 17, 10 18, 10 19, 10 20, 10 21, 10 22, 10 23, 10 24, 10 25, 10 26, 10 27, 10 28, 10 29, 10 30, 10 31, 10 32, 10 33, 10 34, 10 35, 10 36, 10 37, 10 38, 10 39, 10 40, 10 41, 10 42, 10 43, 10 44, 10 45, 10 46, 10 47, 10 48, 10 49, 10 50, 10 51, 10 52, 10 53, 10 54, 10 55, 10 56, 10 57, 10 58, 10 59, 10 60, 10 61, 10 62, 10 63, 10 64, 10 65, 10 66, 10 67, 10 68, 10 69, 10 70, 10 71, 10 72, 10 73, 10 74, 10 75, 10 76, 10 77, 10 78, 10 79, 10 80, 10 81, 10 82, 10 83, 10 84, 10 85, 10 86, 10 87, 10 88, 10 89, 10 90, 10 91, 10 92, 10 93, 10 94, 10 95, 10 96, 10 97, 10 98, 10 99, 10 100		2. AGE - Last birthday (Yrs.)	3. DATE OF BIRTH (Mo., Day, Yr.)
4. UNDER 1 YEAR		5. UNDER 1 DAY	
6. DATE OF BIRTH (Mo., Day, Yr.)		7. COUNTY OF DEATH	
8. LOCATION OF DEATH (Check one and specify)		9. HOSPITAL OR OTHER INSTITUTION - Name of inst or center, year built and number	
10. STATE OF BIRTH (10 inst or U.S.A. named country)		11. SURVIVING SPOUSE (If wife, give maiden name)	
12. SOCIAL SECURITY NUMBER		13. USUAL OCCUPATION (Give kind of work done during most of working life, even if retired)	
14. CURRENT RESIDENCE - STATE		15. STREET AND NUMBER	
16. FATHER - NAME FIRST MIDDLE LAST		17. MOTHER - MAIDEN NAME FIRST MIDDLE LAST	
18. INFORMANT		19. MAILING ADDRESS	
20. IMMEDIATE CAUSE		21. PART I	
22. DUE TO, OR AS A CONSEQUENCE OF		23. DUE TO, OR AS A CONSEQUENCE OF	
24. PART II OTHER SIGNIFICANT CONDITIONS		25. AUTOPSY (Specify Yes; WAS CASE REFERRED TO MEDICAL EXAMINER? (Specify Yes or No)	
26. PLACE OF DEATH (Specify nursing home, rest home, institution) (Specify)		27. IF HOSP OR INST. indicate OOL (Specify Yes; HOSPITAL) (Specify)	
28. To the best of your knowledge, death occurred at the time, date and place and due to the causes stated		29. On the basis of examination and investigation, at the stated death occurred at the time, date and place and due to the causes stated	
30. CERTIFYING PHYSICIAN (Signature and Title)		31. MEDICAL EXAMINER (Signature and Title)	
32. DATE SIGNED (Mo., Day, Yr.)		33. DATE SIGNED (Mo., Day, Yr.)	
34. NAME OF ATTENDING PHYSICIAN IF OTHER THAN CERTIFIER (Type or Print)		35. PRONOUNCED DEAD (Mo., Day, Yr.)	
36. NAME AND ADDRESS OF CERTIFIER (Physician or Medical Examiner) (Type or Print)		37. PRONOUNCED DEAD (Hour)	
38. ACC. SUICIDE FROM NATURAL OR PENDING INQUIRY - Specify		39. DATE OF INJURY (Mo., Day, Yr.)	
40. INJURY AT WORK (Specify Yes or No)		41. PLACE OF INJURY - as home, farm, street, factory, office, business, etc. (Specify)	
42. BURIAL, CREMATION, REMOVAL, OTHER		43. CEMETERY OR CREMATORY - NAME	
44. DATE (Mo., Day, Yr.)		45. ADDRESS OF FACILITY	
46. FUNERAL SERVICE LICENSEE (Signature)		47. REGISTRAR (Signature)	
48. DATE RECEIVED BY REGISTRAR (Mo., Day, Yr.)		49. DATE RECEIVED BY REGISTRAR (Mo., Day, Yr.)	

SAMPLE COPY

Section 2843 of Act 368 Public Acts of 1978, requires that the attending physician, or in the absence of an attending physician, a medical examiner shall fill out and sign the medical certificate of death within 48 hours after death.

The funeral director is responsible for completing all other portions of the certificate and obtaining a burial or removal permit prior to disposing of the body or removing from the registration district where the death occurred.

This document must be typewritten (except signatures) or completed in black indelible ink. Alterations to the document must be accomplished using a lift off process. Damaged or folded documents are not acceptable.

Failure to provide the required information is a misdemeanor punishable by imprisonment of not more than 1 year or a fine of not more than \$1,000.00 or both.

B-36a 5/83

Figure 4.6

Marriage License

State of Michigan

To any person legally authorized to solemnize marriage in the State of Michigan,

Greeting:

Marriage must be solemnized within 33 days of date of Application for License in the State of Michigan between

Full name of male _____ and _____ Maiden name of female, if different _____ Age at last birthday _____ Date of birth _____ Residence No. _____ Street _____ City _____ State _____ Zip Code _____ Birthplace—city and state _____ Number of times previously married _____ Father's full name _____ Mother's maiden name _____	Full name of female _____ Maiden name of female, if different _____ Age at last birthday _____ Date of birth _____ Residence No. _____ Street _____ City _____ State _____ Zip Code _____ Birthplace—city and state _____ Number of times previously married _____ Father's full name _____ Mother's maiden name _____
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An affidavit has been filed in _____ County, Michigan, which appears that said statements are true. This marriage license authorizes the marriage of the parties named above within the State of Michigan by any person authorized to perform a marriage ceremony under the laws of the State of Michigan.

In witness whereof, I have signed and sealed these presents,

this _____ day of _____ 19 _____

County Clerk _____ Deputy County Clerk _____

Date of Application _____ Date _____

Certificate of Marriage

Between Mr. _____ and M _____

I hereby certify that, in accordance with the above license, the persons herein mentioned were joined in marriage by me, at _____ County of _____ MICHIGAN, on the _____ day of _____ A. D. 19 _____ in the presence of _____ and _____ of _____ Residence—city and state _____ and _____ Full name _____ Residence—city and state _____ as witnesses. _____ Full name _____ Signature of magistrate or clergy _____ Official title _____ Post office address _____

THIS ORIGINAL must be returned, WITHIN TEN DAYS AFTER THE MARRIAGE, to the COUNTY CLERK, who issued the same, under severe penalty. This provision must be complied with to insure a PROPER LEGAL RECORD of the marriage. THIS DUPLICATE must be delivered to one of the parties joined in marriage.

0473971

*Except for signatures, spaces left blank must be completed by typewriter or printed letterly.

By authority of Act No. 568 of the Public Acts of 1978. This space reserved for blanking.

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ORIGINAL*

No. _____ is _____
LICENSE AND CERTIFICATE OF MARRIAGE

and _____

CLERK'S OFFICE _____

County of _____

Received for record the _____ day of _____

_____ A. D. 19 _____ and recorded _____

in liber. _____ of marriage, on page _____

Clerk _____

*THIS ORIGINAL must be returned WITHIN TEN DAYS AFTER THE MARRIAGE, to the County Clerk who issued the same, under severe penalty. This provision must be complied with to insure a PROPER LEGAL RECORD of the marriage. THIS DUPLICATE must be delivered to one of the parties joined in marriage.

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Figure 4.7

0315216

RECORD OF
DIVORCE OR ANNULMENT

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

STATE FILE NO.
DOCKET NO.

COUNTY

HUSBAND-NAME		FIRST	MIDDLE	LAST
1. USUAL RESIDENCE-STREET ADDRESS		LOCALITY: CHECK ONE AND SPECIFY 2b.		INSIDE CITY LIMITS OF: INSIDE VILLAGE LIMITS OF: TWP. OF:
2A. COUNTY	STATE	BIRTHPLACE (STATE OR FOREIGN COUNTRY)		DATE OF BIRTH (MO., DAY, YR.)
2C. COUNTY	STATE	BIRTHPLACE (STATE OR FOREIGN COUNTRY)		DATE OF BIRTH (MO., DAY, YR.)
WIFE-NAME		FIRST	MIDDLE	LAST
3A. USUAL RESIDENCE-STREET ADDRESS		LOCALITY: CHECK ONE AND SPECIFY 3b.		INSIDE CITY LIMITS OF: INSIDE VILLAGE LIMITS OF: TWP. OF:
3A. COUNTY	STATE	BIRTHPLACE (STATE OR FOREIGN COUNTRY)		DATE OF BIRTH (MO., DAY, YR.)
3C. COUNTY	STATE	BIRTHPLACE (STATE OR FOREIGN COUNTRY)		DATE OF BIRTH (MO., DAY, YR.)
PLACE OF THIS MARRIAGE-CITY		COUNTY	STATE	DATE OF THIS MARRIAGE (MO., DAY, YR.)
DATE COUPLE SEPARATED (MO., DAY, YR.)		NUMBER OF CHILDREN EVER BORN ALIVE OF THIS MARRIAGE (SPECIFY)		PETITIONER-HUSBAND, WIFE, BOTH, OTHER (SPECIFY)
11a. ATTORNEY FOR PETITIONER-NAME (TYPE OR PRINT)		STREET OR R.F.D. NO.		CITY OR VILLAGE STATE ZIP
13a. I CERTIFY THAT THE MARRIAGE OF THE ABOVE NAMED PERSONS WAS DISSOLVED ON:		MONTH	DAY	YEAR
14a. COUNTY OF DECREE		14b. TYPE OF DECREE-DIVORCE, DISSOLUTION OR ANNULMENT (SPECIFY)		14c. DATE OF ENTRY (MO., DAY, YEAR.)
14d. SIGNATURE OF CERTIFYING OFFICIAL		14e. TITLE OF OFFICIAL		

SAMPLE COPY

By authority of Act 368 Public Acts of 1978.
Failure to provide the required information is a misdemeanor punishable by imprisonment of not more than 1 year or a fine of not more than \$1000.00 or both.

INFORMATION FOR STATISTICAL PURPOSES ONLY

HUSBAND	NUMBER OF THIS MARRIAGE	IF PREVIOUSLY MARRIED HOW MANY ENDED BY		EDUCATION - SPECIFY HIGHEST GRADE COMPLETED																	
	FIRST, SECOND, ETC. (SPECIFY)	DEATH	DIVORCE OR ANNULMENT (SPECIFY IF NONE)	ELEMENTARY OR SECONDARY					COLLEGE												
15		16		0	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5+
18		19		0	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5+