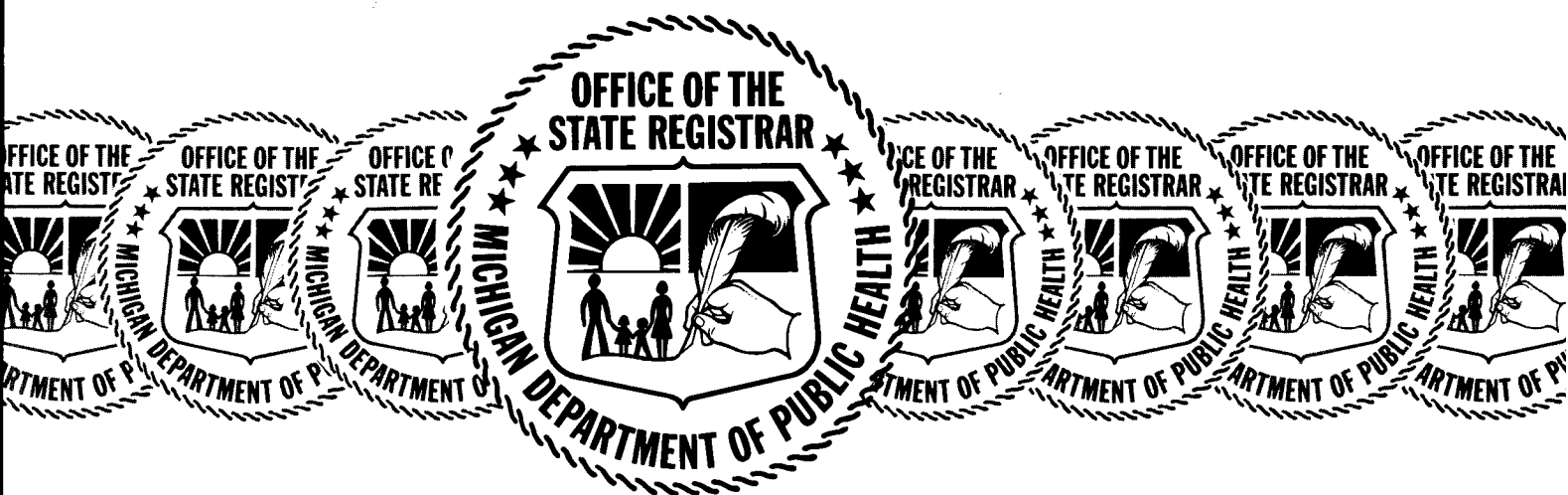


MICHIGAN DEPARTMENT  
OF PUBLIC HEALTH

*Michigan*  
**HEALTH  
STATISTICS**



*1987*

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# **MICHIGAN HEALTH STATISTICS**

**1987**

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Office of the State Registrar and Center for Health Statistics

Michigan Department of Public Health  
Lansing, Michigan      August 1989

**Michigan Department of Public Health**

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## INTRODUCTION

The 1987 edition of Michigan Health Statistics is a statistical summary of vital events for calendar year 1987. 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 1987, 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, 1988, and all in-state certificates and records received prior to March 15, 1988. Records from a few Michigan counties and institutions which were filed after March 15, 1988 were also included. Although a few additional records for the calendar year 1987 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 ac-

cording 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.

$e_x$  = 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  $\times 1,000$ .

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

**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  $\times 100,000$ .

**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  $\times 1,000$ .

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

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

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

**CRUDE BIRTH RATE** - Number of resident live births divided by total resident population  $\times 1,000$ .

**CRUDE DEATH RATE** - Number of resident deaths divided by total resident population  $\times 1,000$ .

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

**FERTILITY RATE** - Number of resident live births divided by total resident female population ages 15-44)  $\times 1,000$ .

**FETAL DEATH RATE** - Number of resident fetal deaths divided by total resident live births and resident fetal deaths  $\times 1,000$ .

**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 1,000.

**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 1987.

## 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  $ndx$  and  $nqx$ . An iteration procedure is also used for  $nLx$  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 1987 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 1970-1987 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 1987 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, 1987

TOTAL RESIDENT BIRTHS	141,290
TOTAL RESIDENT LIVE BIRTHS	140,466
RESIDENT LIVE BIRTHS PER DAY	385
TOTAL RESIDENT FETAL DEATHS	824
RESIDENT FETAL DEATHS PER DAY	2
CRUDE BIRTH RATE	15.3
FERTILITY RATE	64.3
FETAL DEATH RATIO	5.9
FIRST ORDER BIRTHS (PERCENT OF TOTAL LIVE BIRTHS)	40.6
MEDIAN BIRTH WEIGHT IN GRAMS (LIVE BIRTHS)	3,400
MEDIAN BIRTH WEIGHT IN GRAMS (FETAL DEATHS)	1,020
LOW WEIGHT LIVE BIRTHS	10,095
LOW WEIGHT BIRTH RATIO	71.9
MEDIAN AGE OF MOTHER (LIVE BIRTHS)	26
MEDIAN AGE OF MOTHER (FETAL DEATHS)	26
LIVE BIRTHS WITH CONGENITAL ANOMALIES	791
CONGENITAL ANOMALIES PER 10,000 LIVE BIRTHS	56.3
LIVE BIRTHS WITH NO PRENATAL CARE	1,303
NO PRENATAL CARE RATIO	9.3
HOME BIRTHS	742
LIVE BORN SETS OF TWINS	1,536
LIVE BORN SETS OF TRIPLETS	27
LIVE BORN MULTIPLE BIRTHS OF FOUR OR MORE	2
MALE LIVE BIRTHS PER 100 FEMALE LIVE BIRTHS	104.4



# NATALITY

Between 1900 and 1987, the number of total births (live births and fetal deaths) has varied considerably. 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 increased to 141,290 in 1987 (Table 1.1).

## 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 1987.

Table 1.1  
Total Births<sup>1</sup>  
Michigan Residents  
Selected Years, 1900 - 1987

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

<sup>1</sup> Live births plus fetal deaths.

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 percent to 131,378, the lowest total in 31 years. In 1977, however, live births increased by 5.4 percent, the largest



FIGURE 1.1  
LIVE BIRTHS, MICHIGAN RESIDENTS, 1900-1987

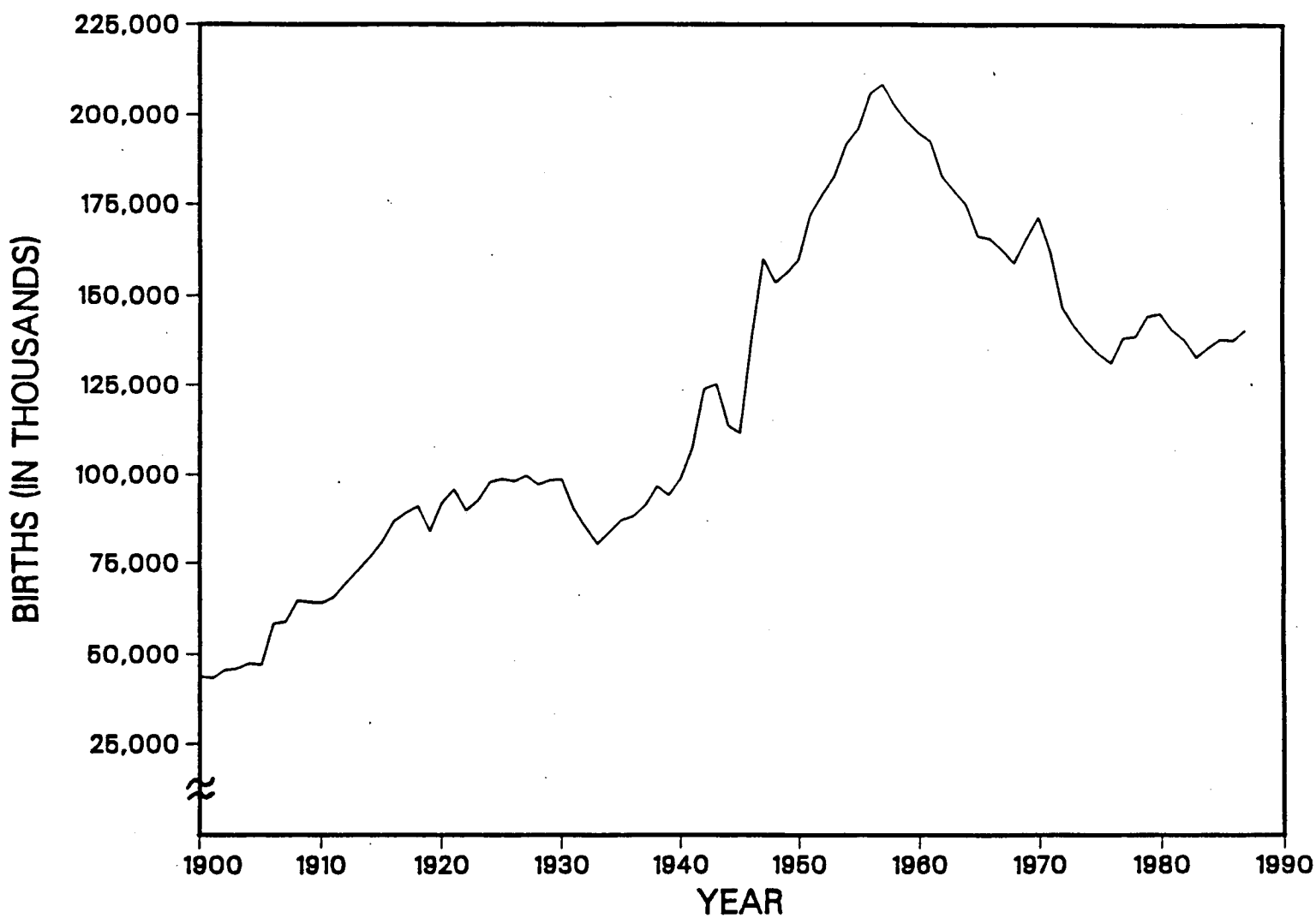


Table 1.2  
Live Births and Crude Birth Rates  
Michigan and United States Residents  
Selected Years, 1900 - 1987

UNITED STATES		YEAR	MICHIGAN	
LIVE BIRTHS	RATE		LIVE BIRTHS	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
3,829,000Pr.	15.7	1987	140,466	15.3

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 births declined by 8.4 percent, reaching 133,026 in 1983. By 1987 the number of live births increased 5.6 percent to 140,466.

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 eleven years from 1977 through 1987. For 1987 the provisional figure was 3,829,000 an increase (1.9 percent) from the number born in 1986.

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 1956. 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 1987 the rate was 15.3.

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

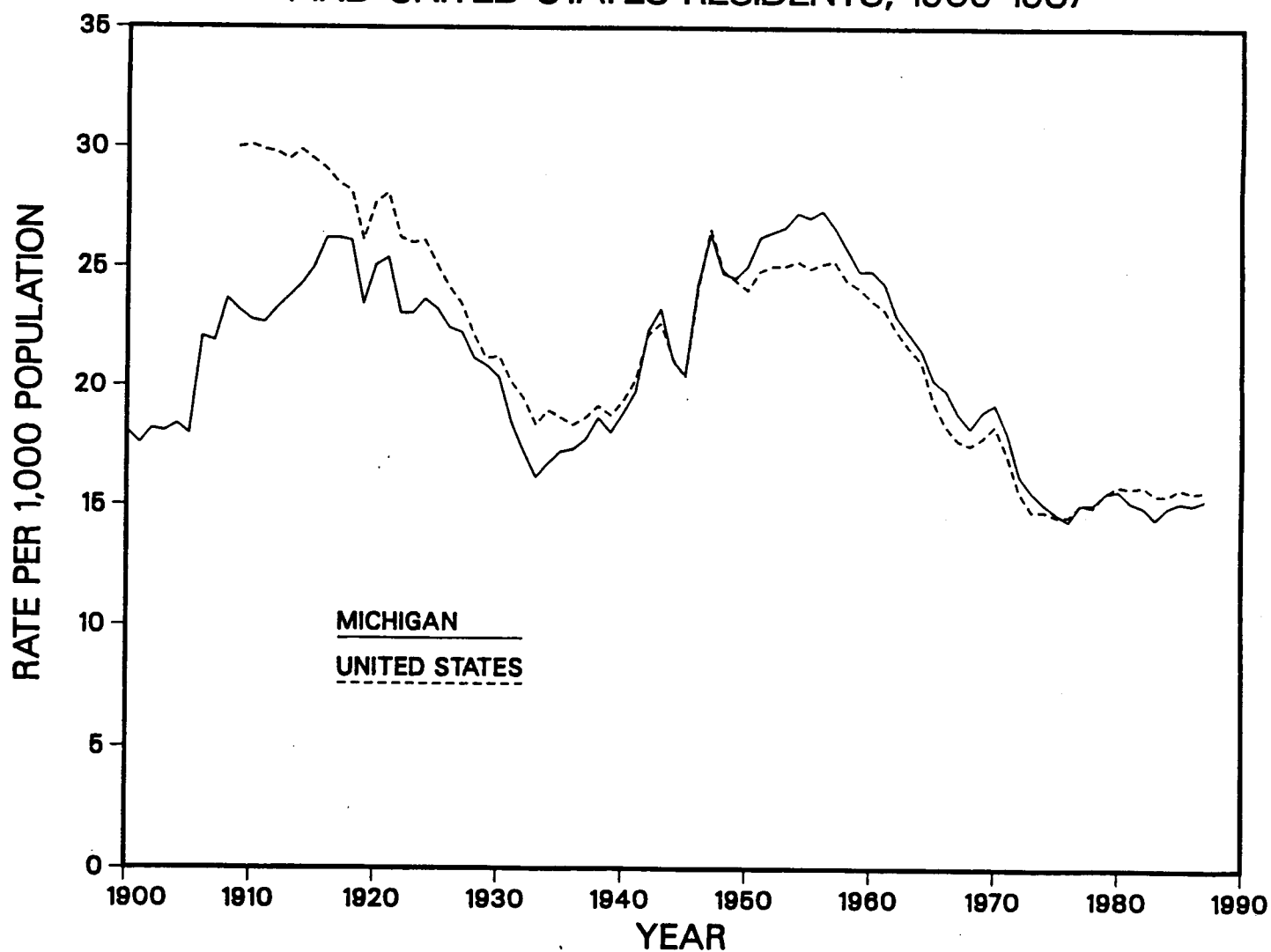
lowest was 14.6, occurring in both 1975 and 1976. United States live birth rates were above those observed in Michigan without exception from 1909 to 1941. Between 1942 and 1947, national rates were above those for the state twice. National birth rates were below Michigan rates from 1949 through 1975. For ten of the past eleven years, the rates for the nation were equal to or above those observed in Michigan. The 1987 provisional rate for the United States was 15.7 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 38.6 percent, while the fertility rate in 1987 was 47.8 percent below the 1960 rate. For the United States over this same period the crude birth rate declined 33.8 percent and the fertility rate fell by 44.0 percent. The difference in these two measures occurs because the

FIGURE 1.2  
LIVE BIRTH RATES, MICHIGAN RESIDENTS, 1900-1987  
AND UNITED STATES<sup>1</sup> RESIDENTS, 1909-1987



1-United States Rates prior to 1909 are not available.

Table 1.3  
Fertility Rates  
Michigan and United States Residents  
Selected Years, 1900 - 1987

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
66.1Pr.	1987	64.3

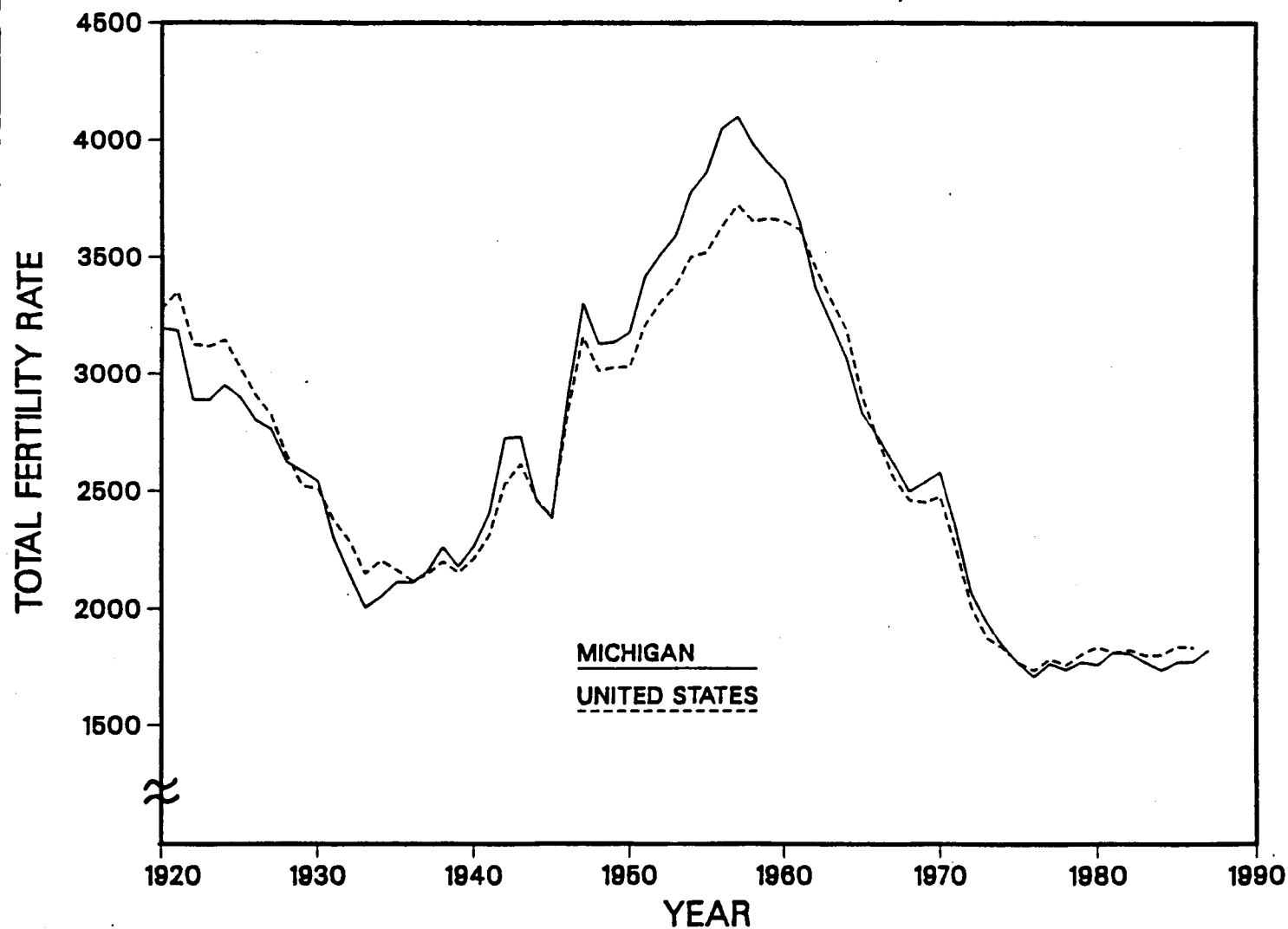
proportion of the population in the childbearing ages has increased over this 27 year period. In Michigan this proportion has increased from 20.3 percent to 23.7 percent.

Figure 1.3 displays the changes in the total fertility rate between 1920 and 1987 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 1,709.5 in 1976. The rates for the following eleven years were higher, fluctuating between a high of 1,826.0 in 1987 and a low of 1,738.0 in 1984. The rate was 1,836.0 in 1986 for the United States. The national rates were higher than the Michigan rates each year between 1975 and 1986, except 1981.

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 do all children survive to adulthood. If the total fertility rate falls below 2,000 for a long period, a natural decrease in population will 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 1987, there were 929,209 persons added to the population of Michigan through the excess of live births over deaths.

FIGURE 1.3  
TOTAL FERTILITY RATES,<sup>1</sup> MICHIGAN RESIDENTS, 1920-1987  
AND UNITED STATES RESIDENTS, 1920-1986



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

## RACIAL COMPOSITION

The racial composition of live births in Michigan changed over the period 1970 through 1987 (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 1985, this percentage held between 81.3 and 82.5. In 1987, the percentage dropped to a new low of 79.9 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 18.3 percent of all live births in 1987. 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 1987.

Table 1.4  
Live Births by Infant's Race or National Origin  
Michigan Residents, 1970 - 1987<sup>1</sup>

YEAR	TOTAL ALL RACES	WHITE <sup>2</sup>	BLACK	AMER- ICAN INDIAN	ASIAN OR PACIFIC ISLANDER <sup>2,3</sup>	OTHER <sup>4</sup>	UN- KNOWN
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

<sup>1</sup> 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.

<sup>2</sup> 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.

<sup>3</sup> Includes Chinese, Japanese, Hawaiian, Filipino, and other Asian or Pacific Islander.

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

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 respectively since 1970. The numbers fluctuated between 1984 and 1987 for both white and black infants.

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.

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

Table 1.5  
Crude Birth Rates and  
Fertility Rates by Race  
Michigan Residents, 1970 - 1987

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
-22.3	-26.4	Percent Change 1970 - 1987	-30.5	-35.9

increased to 71.7 percent. In 1974, the percent dropped sharply to 57.4, and by 1982 it had fallen to 20.7 percent. By 1987 the crude birth rate for black persons was 46.2 percent higher than the rate 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 1987 the crude birth rate for white persons declined by 4.7 percent, while the crude birth rate for black persons increased by 4.0 percent. The crude birth rate for white persons in 1987 was 22.3 percent below that observed in 1970 while the rate for the black group was 26.4 percent below the rate for 1970.

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 decrease. The fertility rate for black persons was 42.7 percent above the rate for white persons in 1970 and 31.5 percent higher in 1987. Since 1970 the fertility rate for black persons has declined 35.9 percent compared with a 30.5 percent drop for white persons.

## AGE OF MOTHER

In 1987 40.2 percent of all live births were to women less than 25 years of age. Only 0.7 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 27 years.

Approximately 56.4 percent of the black infants were born to women aged 24 or less compared to 36.8 percent of the white infants and 30.3 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 (Table 1.6).

The total number of live births increased by 1.5 percent between 1977 and 1987 (Table 1.7) while the number of women of child bearing age (15 to 44 years of age) increased by 3.9 percent.

The largest relative decrease in the number of live births occurred to women under age 20. There was a 25.1 percent decrease in the number of births to these women while there was a 22.7 percent decrease in the number of women under age 20. The age group 20-24 experienced a 21.0 percent decline in births while they decreased 11.6 percent in numbers. For these two age groups the percent decrease in the number of births was higher than the percent decrease in the number of women.

The number of live births to women 25-29 was 8.5 percent higher in 1987 than in 1977, while there was a 60.7 and 92.4 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 23.5 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 between age 25 and 39 than the percent increase in the numbers of births.

Table 1.7 also provides the age distribution of the childbearing population in 1977 and 1987. The largest relative increase in population occurred in the age group 35-39, the age group with the greatest increase in live births between 1977 and 1987. The only groups to experience a population decline were those under 25 years of age.

## AGE-SPECIFIC LIVE BIRTH RATES

As displayed in Table 1.8, a reduction in the age-specific live birth rates for Michigan females under 25 and over 39 years of age has

Table 1.6

**Live Births and Percent Distribution by Age of Mother and Race of Child**  
Michigan Residents, 1987.

AGE OF MOTHER	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Under 15 Years	329	0.2	100	0.1	225	0.9	2	0.1	2	2.3
15 - 19 Years	16,911	12.0	10,514	9.4	6,200	24.1	188	7.6	9	10.2
20 - 24 Years	39,314	28.0	30,645	27.3	8,083	31.4	562	22.6	24	27.3
25 - 29 Years	47,052	33.5	39,908	35.6	6,268	24.4	851	34.3	25	28.4
30 - 34 Years	27,795	19.8	23,638	21.1	3,520	13.7	618	24.9	19	21.6
35 - 39 Years	8,038	5.7	6,573	5.9	1,234	4.8	224	9.0	7	8.0
40 or More Years	1,015	0.7	779	0.7	197	0.8	37	1.5	2	2.3
Not Stated	12	0.0	10	0.0	2	0.0	-	-	-	-
Total	140,466	100.0	112,167	100.0	25,729	100.0	2,482	100.0	88	100.0
Median Age at Last Birthday	26		26		23		27		27	

Table 1.7  
Live Births and Population of Women by Age  
Michigan Residents, 1977 and 1987

AGE GROUP	LIVE BIRTHS			POPULATION ESTIMATES		
	1977	1987	PERCENT CHANGE	1977	1987	PERCENT CHANGE
Under 20 Years <sup>1</sup>	23,011	17,240	-25.1	467,083	360,829	-22.7
20 - 24 Years	49,740	39,314	-21.0	435,052	384,429	-11.6
25 - 29 Years	43,346	47,052	+8.5	384,576	401,865	+4.5
30 - 34 Years	17,293	27,795	+60.7	327,181	388,785	+18.8
35 - 39 Years	4,178	8,038	+92.4	256,617	351,296	+36.9
40 and Over <sup>2</sup>	822	1,015	+23.5	233,075	297,449	+27.6
All Ages <sup>3</sup>	138,416	140,466	+1.5	2,103,584	2,184,653	+3.9

<sup>1</sup> Population shown is for females 15 - 19.

<sup>2</sup> Population shown is for females 40 - 44.

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

occurred since 1977. The greatest relative decrease in rates between 1977 and 1987 was for women age 20 to 24 years of age. The live birth rates for women 30-34 and 35-39 years old in 1987 were 35.2 and 40.5 percent above the rates for these age groups in 1977.

Figure 1.4 displays age-specific live birth rates for the period 1970-1987. Live birth rates in all age groups dropped between 1970 and 1976. For women under 20 years of age the rate continued to decline throughout the years 1976-1980. The rate fluctuated between 1980

and 1987 reaching a new low of 44.7 in 1984. The rate was 47.8 in 1987.

The live birth rates for women between 20 and 29 years of age declined between 1970 and 1976. The rates for women between 20 and 24 were similar to the rates for women 25 to 29 between 1976 and 1980. The rates for women in the age groups 20-24 increased in 1981 then declined 17.3 percent to a low of 101.6 live births per 1,000 women in 1986. In 1987, the rate increased to 102.3.

Table 1.8  
Age Specific Live Birth Rates by Race  
Michigan Residents, 1977 and 1987

AGE GROUP	RACE <sup>1</sup>										
	TOTAL			WHITE			BLACK			ALL OTHER <sup>1</sup>	
	1977	1987	PERCENT CHANGE IN RATE	1977	1987	PERCENT CHANGE IN RATE	1977	1987	PERCENT CHANGE IN RATE	1977	PERCENT CHANGE IN RATE
Under 20 <sup>2</sup> Years	49.3	47.8	-3.0	40.2	35.8	-10.9	109.2	107.6	-1.5	22.3	+73.5
	114.3	102.3	-10.5	110.6	95.6	-13.6	141.6	136.4	-3.7	50.8	+138.6
	112.7	117.1	+3.9	115.3	118.4	+2.7	100.5	105.3	+4.8	76.2	+111.9
30 - 34 Years	52.9	71.5	+35.2	52.7	72.4	+37.4	53.8	62.9	+16.9	54.3	+80.5
35 - 39 Years	16.3	22.9	+40.5	15.4	22.1	+43.5	22.1	25.9	+17.2	24.3	+53.5
40 or Over <sup>3</sup>	3.5	3.4	-2.9	3.2	3.0	-6.3	6.9	5.3	-7.0	5.1	+62.7
Total <sup>4</sup>	65.8	64.3	-2.3	63.0	61.2	-2.9	87.5	80.5	-8.0	42.6	+84.3

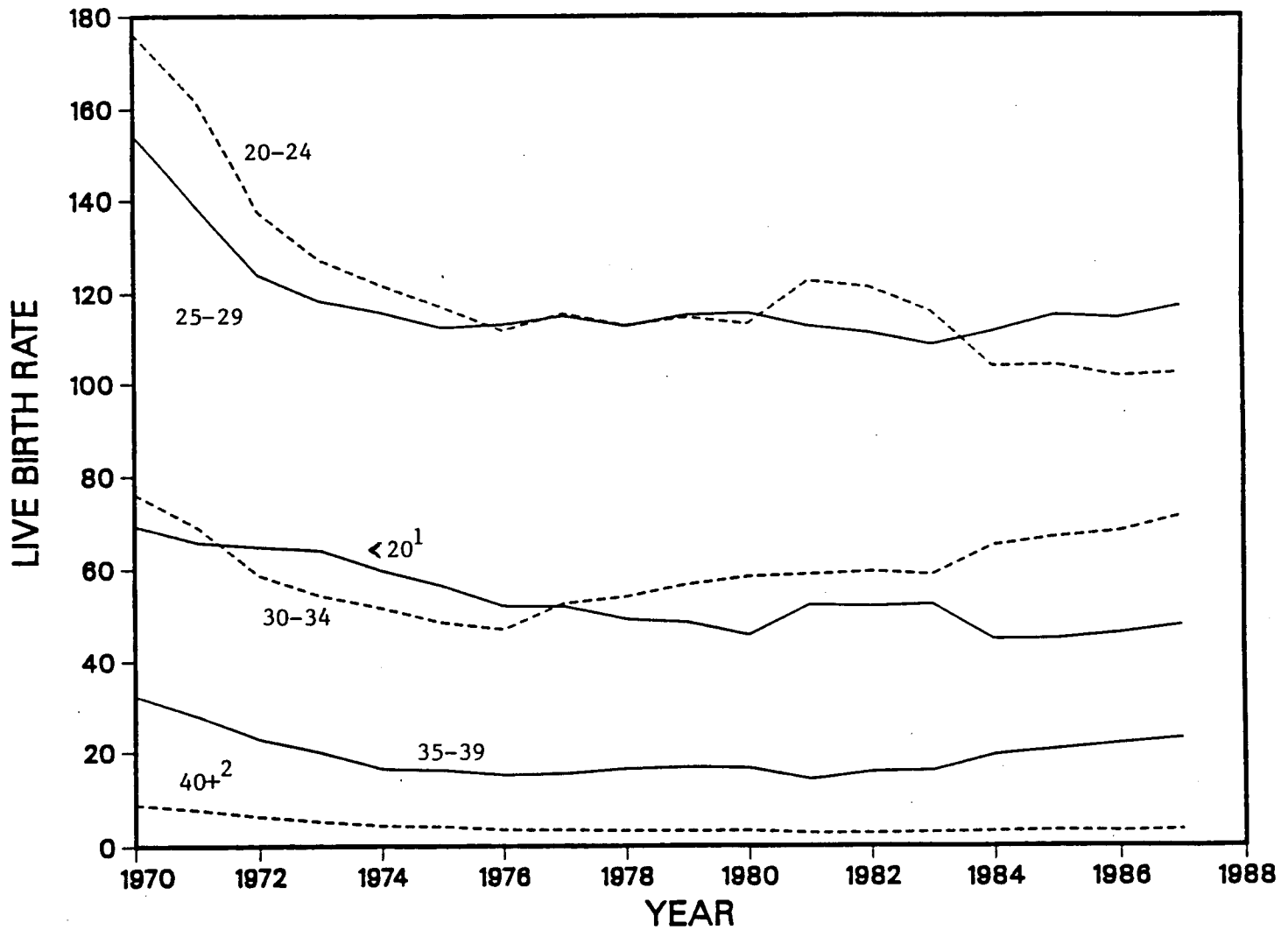
<sup>1</sup> Data on race not stated are included only in the total columns.

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

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

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

FIGURE 1.4  
AGE-SPECIFIC LIVE BIRTH RATES,  
MICHIGAN RESIDENTS, 1970-1987



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

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

The rates for women 25-29 declined between 1970 and 1976 then generally increase through 1980. The rates fluctuated between 1980 and 1987. The 1987 rate of 117.1 was 14.5 percent higher than the 1987 rate for women 20-24 years of age.

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 1984 through 1987 the live birth rate of women in the 25-29 year age group was above that of women aged 20-24 (Table 4.4).

For women in the age groups 30-34 and 35-39 live birth rates decreased between 1970 and 1976 then increased by 52.5 and 52.7 percent, respectively by 1987.

Table 1.8 displays age-specific live birth rates for white and black women and women of all other races for the years 1977 and 1987. 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 14.7 and 12.4 percent, respectively, in 1977 and 1987. In 1987 the rate for white women between 30 and 34 years also exceeded that for their black counterparts by 15.1 percent.

In 1977 the live birth rates for all other women under 30 years of age were generally lower than the rates for white and black women of the same ages. For women 30 and above, however, live birth rates for all other women were higher than those for black and white women, except for black women ages 40 and over who had the highest rate. In 1987 the rates for all other women 25 years of age or over were higher than the rates for white and black women.

The live birth rate for black women age 15 to 44 (87.5) was 38.9 percent higher than the rate for white women (63.0) in 1977. By 1987

the difference between the rates was slightly less. The rate for black women was 31.5 percent higher than the rate for white women. During the ten years the rate for black females declined by 8.0 percent while the rate for white females declined by 2.9 percent.

The rates for females below age 25 declined less for black females than for white females. Correspondingly the rates increased less for black females between 30 and 39 years of age than their white counterparts. For ages 25 through 29 years the rates increased more, and for ages 40 and over the rates decreased more, for black females than 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 40.6 percent in 1987.

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 1980 and 1983. By 1987 the number of first births increased by 5.0 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 1977 and 1987. The distributions of births by birth order were similar in 1977 and 1987. Of the births where birth order was known, first- and second-order live births comprised 73.0 per-

FIGURE 15  
FIRST BIRTHS AS A PERCENTAGE OF ALL LIVE BIRTHS,  
MICHIGAN RESIDENTS, 1960-1987 AND UNITED STATES  
RESIDENTS, 1960-1986

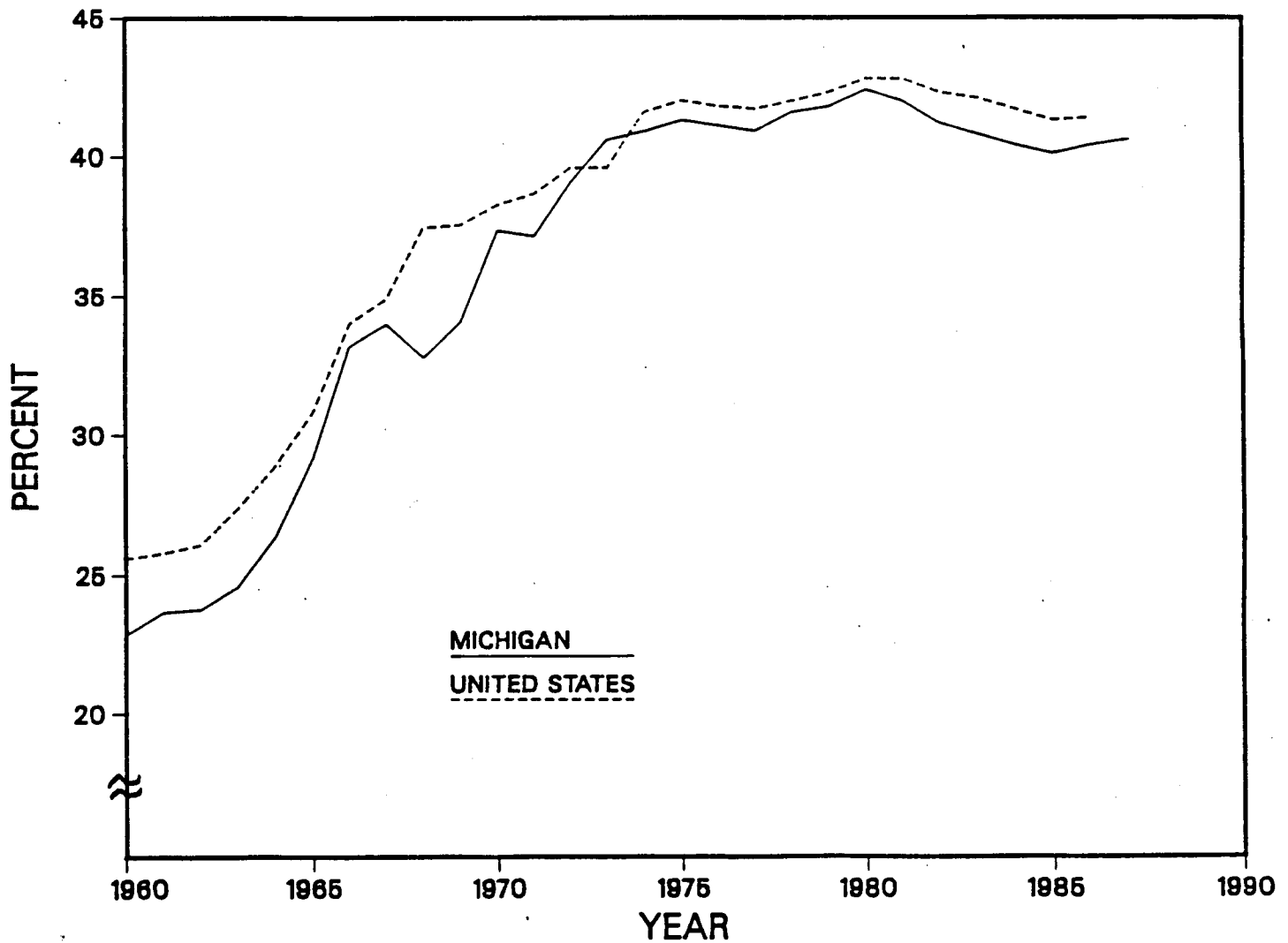


Table 1.9  
First Births, Michigan and United States Residents  
Selected Years, 1960 - 1987

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
—	—	1987	56,971	40.6

cent of all live births in 1977 and 73.5 percent in 1987. On the other hand, 9.9 percent of all live births in 1977 were fourth or higher order live births. In 1987 the figure was 9.5 percent. The greatest relative decline occurred in fifth or higher order live births. These constituted 4.1 percent of all live births in 1977 compared to 3.5 percent in 1987.

The distribution of births for women under 25 years of age were about the same in 1977 and 1987. For women under age 20 about 78 to 80 percent of the births were first-order births, about 17 percent were second-order births and about 3 percent were third- or higher-order births. For women 20 to 24 years of age the corresponding percentages of first-order births were 46.3 and 49.1 percent in 1977



Table 1.10  
Live Births by Live Birth Order and Age of Mother  
Michigan Residents, 1977

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	17,921	23,052	12,575	3,008	60	6	56,622	22
Second Birth	3,994	18,230	16,231	5,822	75	3	44,355	25
Third Birth	565	5,957	9,344	5,580	110	2	21,558	27
Fourth Birth	56	1,399	3,169	3,274	108	1	8,007	29
Fifth Birth or Greater	11	348	1,430	3,433	456	-	5,678	33
Not Stated	464	754	597	354	13	14	2,196	24
All Birth Orders	23,011	49,740	43,346	21,471	822	26	138,416	25

Table 1.11  
Live Births by Live Birth Order and Age of Mother  
Michigan Residents, 1987

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	13,734	19,295	16,081	7,733	124	4	56,971	23
Second Birth	2,913	13,463	17,484	12,280	195	2	46,337	26
Third Birth	484	4,846	8,912	8,703	206	3	23,154	28
Fourth Birth	57	1,179	3,027	3,998	167	-	8,428	29
Fifth Birth or Greater	15	370	1,344	2,908	313	-	4,950	32
Not Stated	37	161	204	211	10	3	626	27
All Birth Orders	17,240	39,314	47,052	35,833	1,015	12	140,466	26

and 1987, respectively, the percentages of second-order births were 36.7 and 34.2 percent while 15.7 and 16.3 percent were third- or higher-order births.

The percent of first order births increased for women 25 years or over between 1977 and 1987. In 1977 29.0 percent of the births to women 25-29 years of age were first order births. By 1987 the percent of first order births had risen to 34.2 percent. For women 30 to 39 years of age the percent of first-order births rose from 14.0 percent in 1977 to 21.6 percent in 1987. For births to women 40 or over the percentages were 7.3 and 12.2 percent respectively in 1977 and 1987.

The percent of second order births born to women 25-29 years of age were about the same in 1977 and 1987 at 37.4 and 37.2 percent. The percent of these births born to women over 29 years of age increased from 27.1 percent to 34.3 percent for women age 30-39 and from 9.1 to 19.2 percent for women over 40 years of age.

Between 1977 and 1987 the percent of third- or higher-order births decreased for women 25-29 years of age from 32.2 percent to 28.2 percent. The largest change occurred for women ages 40 and over with a decrease from 82.0 percent to 67.6 percent. The decrease for women 30 to 39 years of age was from 57.2 to 43.6 percent.

The median age of mothers having their first child increased from 22 to 23 between 1977 and 1987. For mothers having their second child, the median age also increased from 25 to 26. The median ages for mothers increased for all birth orders between 1977 and 1987, except fourth order births, which remained the same, and fifth order births or greater, which decreased from 33 to 32.

First births to women 25 years of age or older comprised 27.6 percent of all first births

in 1977 and 42.0 percent in 1987. Similarly, second order births to women 25 years or older increased from 49.9 percent of all second order births in 1977 to 64.7 percent in 1987. This change in mother's age at birth was reflective of the emergence of the 25-29 year age group as the group with the highest age-specific birth rate (Table 1.8).

## INTERPREGNANCY TIME PERIOD

The distributions of live births by interpregnancy time period were similar in 1977 and 1987. 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 28.2 and 31.2 percent of the births were to women with deliveries occurring one to two years after the most recent prior 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 1987 (22.3 percent) than in 1977 (25.2 percent). In both years about 18 or 19 percent of the births were to women delivering five or more years after the termination of their most recent prior pregnancy.

In 1987 women having live births whose most recent prior termination was a fetal death had a median time span of 2 years between their previous termination 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 (39.6) was much larger than that for women with prior live births (28.2). The greatest relative difference was associated with time spans of less than one year. A spacing of less than one year was observed for 9.4 percent of all women reporting their most recent prior pregnancy as a fetal death. This compares to

Table 1.12  
**Live Births to Women Reporting Prior Pregnancy Terminations<sup>1</sup>**  
**by Time Span Between Last and Current Termination**  
Michigan Residents, 1977 and 1987<sup>2</sup>

TIME SPAN IN YEARS	1977		1987	
	NUMBER	PERCENT	NUMBER	PERCENT
Total	85,239	100.0	93,682	100.0
Less Than One	2,605	3.1	3,405	3.6
1 < 2	24,000	28.2	29,200	31.2
2 < 3	20,929	24.6	22,983	24.5
3 < 5	21,445	25.2	20,909	22.3
5 or More	16,260	19.1	17,185	18.3
Median Time Span	2 Years 8 Months		2 Years 6 Months	

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

<sup>2</sup> 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 1.13  
**Live Births to Women Reporting Prior Pregnancy Terminations<sup>1</sup>**  
**by Time Span Between Last and Current Termination and**  
**by Whether Prior Termination Resulted in a Live Birth or a Fetal Death<sup>2</sup>**  
Michigan Residents, 1987<sup>3</sup>

TIME SPAN IN YEARS	TOTAL		PRIOR FETAL DEATH		PRIOR LIVE BIRTH	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total	93,682	100.0	24,257	100.0	69,425	100.0
Less Than One	3,405	3.6	2,270	9.4	1,135	1.6
1 < 2	29,200	31.2	9,596	39.6	19,604	28.2
2 < 3	22,983	24.5	4,249	17.5	18,734	27.0
3 < 5	20,909	22.3	3,853	15.9	17,056	24.6
5 or More	17,185	18.3	4,289	17.7	12,896	18.6
Median Time Span	2 Years 6 Months		2 Years 0 Months		2 Years 8 Months	

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

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

<sup>3</sup> 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.

1.6 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 1987 41.3 percent of all women having live births initiated care during the second month. The median number of prenatal visits was 12, and 61.9 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 14. 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 80.0 percent in 1987. This percent steadily increased between 1970, when the figure was 69.0, and 1985 when it peaked at 81.0 (Figure 1.6). In 1986 the proportion slipped to 79.8 percent and then rose again to 80.0 in 1987.

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 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 two years to 93.1 in 1987.

The proportion of births to women receiving early prenatal care varied considerably by

race of infant and age of mother (Table 1.15). In 1987, 82.7 percent of white infants compared to 68.4 percent of the black infants were born to mothers who began their prenatal care in the first trimester. Over 85.6 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 as maternal age increased or decreased from 30-34 years of age, falling to 80.2 percent for women 40 years or over and 28.0 percent for women under 15 years. About six in ten (58.4 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.

The time 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 (83.0 percent) and lowest for fifth or higher order births (65.9 percent). Conversely, the proportion of births to women who began care during the third trimester, or received no care, was lowest (2.6 percent) for second order live births. This figure increased with the number of previous live births. Among fifth order live births 8.4 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 78.0 percent in 1987 compared to 70.2 percent in 1980. This statistic varied considerably by race. While mothers of 79.4 percent of white infants had at least ten prenatal visits, the percentages were only 72.4 and 74.0 for black and all other infants, respectively (Table 1.17). The median number of prenatal visits was 12 for mothers of children of all races. The mean number of prenatal visits was 11.8 for mothers of white infants, 4.4 percent higher than the

FIGURE 1.6  
PERCENT OF WOMEN HAVING LIVE BIRTHS WHO RECEIVED  
CARE PRIOR TO THE 4TH MONTH AND 6TH MONTH  
OF PREGNANCY, MICHIGAN RESIDENTS, 1970-1987

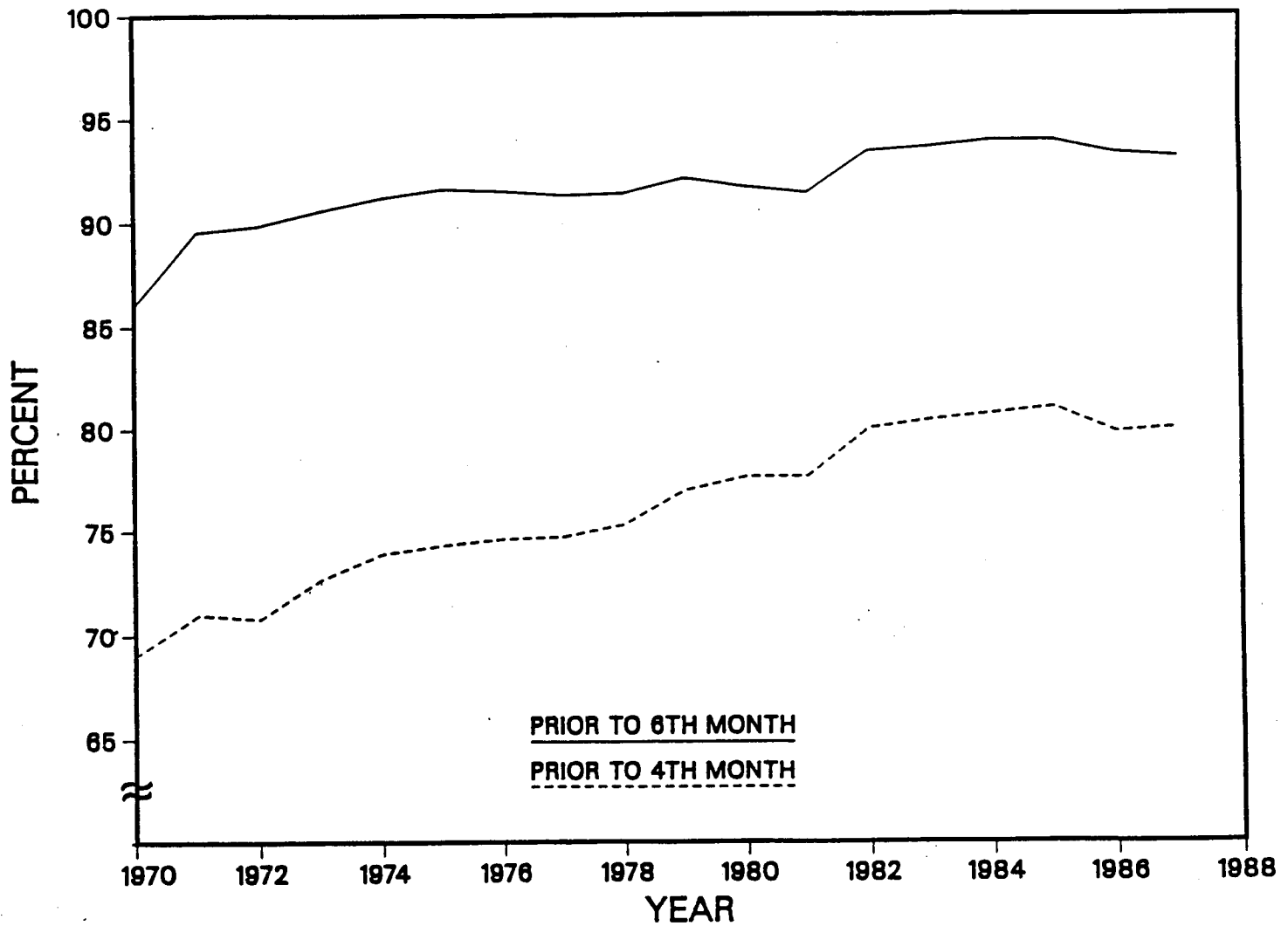


Table 1.14  
Live Births by Month Prenatal Care Began and Number of Prenatal Visits  
Michigan Residents, 1987

MONTH CARE BEGAN	NUMBER OF VISITS								
	TOTAL	NONE	1 - 4	5 - 9	10 - 14	15 - 19	20 OR MORE	UNK- KNOWN	MEDIAN NUMBER OF VISITS
Total	140,466	1,303	3,245	23,325	86,995	18,335	4,199	3,064	12
First	22,390	-	130	1,276	12,729	6,785	1,253	217	14
Second	58,044	-	325	5,192	41,907	8,082	1,788	770	12
Third	31,880	-	332	5,769	21,869	2,512	791	607	12
Fourth	12,125	-	340	4,048	6,653	634	248	202	10
Fifth	6,350	-	404	3,097	2,458	200	70	121	9
Sixth	3,568	-	396	2,058	959	84	26	45	8
Seventh	2,131	-	516	1,341	222	22	8	22	6
Eighth	1,017	-	515	409	72	6	3	12	4
Ninth	260	-	192	35	17	2	2	12	3
No Care	1,303	1,303	-	-	-	-	-	-	-
Unknown	1,398	-	95	100	109	28	10	1,056	8

mean of 11.3 visits for mothers of black infants. The mean number of visits for mothers of infants of all other races was the same as the mean for mothers of black infants.

In 1987, 1,303 resident live births, or 9.3 of every 1,000, occurred with the mother having had no prenatal care. 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 11.8 in 1971. In 1986 1,195 resident live births 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 4.9 times as large for black infants than for white infants

in 1987 (Table 1.18). The ratio was 6.6 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

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, 1987

AGE OF MOTHER	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	PERCENT <sup>1</sup>	NUMBER	PERCENT <sup>1</sup>	NUMBER	PERCENT <sup>1</sup>	NUMBER	PERCENT <sup>1</sup>	NUMBER	PERCENT <sup>1</sup>
Under 15 Years	92	28.0	26	26.0	64	28.4	1	*	1	*
15 - 19 Years	9,870	58.4	6,390	60.8	3,383	54.6	92	48.9	5	*
20 - 24 Years	29,695	75.5	23,720	77.4	5,558	68.8	403	71.7	14	58.3
25 - 29 Years	40,462	86.0	34,984	87.7	4,765	76.0	701	82.4	12	48.0
30 - 34 Years	24,497	88.1	21,265	90.0	2,719	77.2	501	81.1	12	63.2
35 - 39 Years	6,878	85.6	5,740	87.3	959	77.7	178	79.5	1	*
40 or More Years	814	80.2	637	81.8	149	75.6	28	75.7	-	-
Not Stated	6	50.0	6	60.0	-	-	-	-	-	-
Total	112,314	80.0	92,768	82.7	17,597	68.4	1,904	76.7	45	51.1

<sup>1</sup> 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, 1987

MONTH OF PREGNANCY CARE BEGAN	LIVE BIRTH ORDER						
	TOTAL	FIRST	SECOND	THIRD	FOURTH	FIFTH OR GREATER	NOT STATED
1st Month	22,390	9,193	7,983	3,455	1,137	566	56
2nd Month	58,044	23,543	20,212	9,476	3,061	1,534	218
3rd Month	31,880	12,616	10,282	5,580	2,095	1,164	143
4th Month	12,125	4,900	3,624	2,079	854	612	56
5th Month	6,350	2,783	1,711	1,018	464	348	26
6th Month	3,568	1,542	946	575	278	212	15
7th Month	2,131	921	578	335	156	130	11
8th Month	1,017	428	255	166	87	74	7
9th Month	260	101	64	40	26	26	3
No Care	1,303	436	300	195	167	187	18
Not Stated	1,398	508	382	235	103	97	73
Total	140,466	56,971	46,337	23,154	8,428	4,950	626
Percentage Beginning Care in First Trimester	80.0	79.6	83.0	79.9	74.7	65.9	66.6
Percentage Without Care During First Six Months	3.4	3.3	2.6	3.2	5.2	8.4	6.2

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 73.1 percent of the live births (Table 1.19). The proportion of live births to mothers of white infants who received adequate care (75.7 percent) was higher than the corresponding proportion for mothers of black (61.8) and all other infants (69.0 percent). Inadequate care was received by the mothers of 6.1 percent of all live births. The propor-



Table 1.17

**Live Births and Percent Distribution by Number of the Mother's Prenatal Visits and Race of Child**  
Michigan Residents, 1987

NUMBER OF PRENATAL VISITS	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
None	1,303	0.9	610	0.5	682	2.7	10	0.4	1	1.1
1 - 4	3,245	2.3	1,964	1.8	1,194	4.6	84	3.4	3	3.4
5 - 9	23,325	16.6	18,101	16.1	4,716	18.3	499	20.1	9	10.2
10 - 14	86,995	61.9	71,408	63.7	14,068	54.7	1,487	59.9	32	36.4
15 - 19	18,335	13.1	14,150	12.6	3,893	15.1	283	11.4	9	10.2
20 or Over	4,199	3.0	3,459	3.1	671	2.6	66	2.7	3	3.4
Not Stated	3,064	2.2	2,475	2.2	505	2.0	53	2.1	31	35.2
Total	140,466	100.0	112,167	100.0	25,729	100.0	2,482	100.0	88	100.0
Median Number of Visits	12		12		12		12		12	
Mean Number of Visits	11.7		11.8		11.3		11.3		11.9	

Table 1.18  
Live Births with No Prenatal Care by Age of Mother and Race of Child  
Michigan Residents, 1987

AGE OF MOTHER	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	RATIO <sup>1</sup>	NUMBER	RATIO <sup>1</sup>	NUMBER	RATIO <sup>1</sup>	NUMBER	RATIO <sup>1</sup>	NUMBER	RATIO <sup>1</sup>
Under 15 Years	20	60.8	9	90.0	11	48.9	-	-	-	-
15 - 19 Years	354	20.9	172	16.4	179	28.9	3	*	-	-
20 - 24 Years	417	10.6	202	6.6	215	26.6	-	-	-	-
25 - 29 Years	272	5.8	118	3.0	151	24.1	2	*	1	*
30 - 39 Years	227	6.3	103	3.4	120	25.2	4	*	-	-
40 or More Years	12	11.8	6	7.7	5	*	1	*	-	-
Not Stated	1	*	-	-	1	*	-	-	-	-
Total	1,303	9.3	610	5.4	682	26.5	10	4.0	1	*
Median Age at Last Birthday	23		22		23		26		28	

<sup>1</sup> Ratio per 1,000 live births. Ratio denominator obtained from Table 1.6.

Table 1.19

**Number and Percent of Live Births by Level of Prenatal Care and Race of Child**  
Michigan Residents, 1987

LEVEL OF PRENATAL CARE (KESSNER INDEX <sup>1</sup> )	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Adequate	102,617	73.1	84,954	75.7	15,908	61.8	1,713	69.0	42	47.7
Intermediate	26,422	18.8	19,186	17.1	6,692	26.0	534	21.5	10	11.4
Inadequate	8,614	6.1	5,820	5.2	2,611	10.1	177	7.1	6	6.8
Unknown	2,813	2.0	2,207	2.0	518	2.0	58	2.3	30	34.1
Total	140,466	100.0	112,167	100.0	25,729	100.0	2,482	100.0	88	100.0

<sup>1</sup> 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.)

tions of live births to mothers who received inadequate care were 5.2 percent for white infants, 10.1 percent for black infants and 7.1 percent for all other infants.

Although the mothers of 80.0 percent of all live births received prenatal care during the first trimester, only 73.1 received adequate care as defined by the Kessner Index. Mothers of 8.4 percent of white infants began prenatal care during the first trimester but failed to receive an adequate number of prenatal visits during the pregnancy. The percentages for black and all other infants were 9.6 and 10.0, respectively (Tables 1.15 and 1.19).

Overall, this means that for 8.6 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. Considered as a proportion of the live births to mothers who did not receive adequate care, 27.7 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.

## BIRTH WEIGHT

The mean weight for all live births was 3,351 grams or approximately 7 pounds 6 ounces. The median weight was 3,400 grams or about 7 pounds 8 ounces (Table 1.20). For black infants the mean (3,076.6 grams) and median (3,147 grams) birth weights were much lower than the mean and median birth

Table 1.20  
Live Births by Birth Weight and Race  
Michigan Residents, 1987

WEIGHT AT BIRTH	RACE				
	TOTAL	WHITE	BLACK	ALL OTHER	NOT STATED
500 Grams or Less	329	151	173	5	-
501 - 1,000 Grams	734	376	342	15	1
1,001 - 1,500 Grams	955	554	389	12	-
1,501 - 2,000 Grams	1,931	1,198	699	30	4
2,001 - 2,499 <sup>1</sup> Grams	6,146	3,920	2,104	121	1
2,500 - 3,000 Grams	22,028	15,384	6,164	466	14
3,001 - 3,500 Grams	50,169	39,588	9,583	958	40
3,501 - 4,000 Grams	42,026	36,359	4,995	648	24
4,001 - 4,500 Grams	13,374	12,125	1,061	186	2
4,501 Grams or More	2,734	2,489	206	38	1
Not Stated	40	23	13	3	1
Total	140,466	112,167	25,729	2,482	88
Mean Weight in Grams	3,350.8	3,415.0	3,076.6	3,293.0	3,237.4
Median Weight in Grams	3,400.0	3,440.0	3,147.0	3,317.0	3,289.0

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

weights for white infants (3,415.0 and 3,440 grams, respectively). For all other infants, the median and mean birth weights were 123 and 122 grams less than the median and mean for white infant but were 170 and 216.4 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 1987, 71.9 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 (109.4) was the group of mothers under 15 years of age. This ratio was lower for each succeeding age group through age group 25-29 (64.4) then increased for the older age groups to 83.7 per 1,000 live births for mothers 40 years or over (Table 1.21).

The low birth weight ratio for black infants was 144.1 compared with 55.3 for white infants and 73.7 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 associated with mothers under 15 years of age (100.0) was two times that of mothers in the 25-29 year age group (49.4). For black infants the differential between the age groups with

the highest and lowest ratios was about 1.5 times.

The ages of mothers associated with the lowest low birth weight ratio were 25-29 for white infants (49.4) and under 15 years of age (115.6) 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, but lower than the ratios for black infants. The ratios increased for white infants born to mothers of increasing and decreasing age around 25-29 years. For black infants, the ratios generally increase with maternal age. However, 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 6.8 times that of the group with the lowest ratio. The low birth weight ratio was highest when the mother had no prenatal care at 323.9. The ratio declined as the number of prenatal visits increased through 10-14 visits, where the ratio was 47.5. The low birth weight ratio was 75.0 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 the frequency of prenatal visits (Table 1.22). The low birth weight ratio for black infants varied from a high of 413.5 where the mother had no care to a low of 99.9 where the mother had 20 or more visits. The ratio for white infants varied from a high of 226.2 where the mother had no care to a low of 34.9 where the mother had 10 to 14 prenatal visits.

Table 1.21  
**Low Weight<sup>1</sup> Live Births and Low Birth Weight Ratios by Age of Mother and Race of Child**  
Michigan Residents, 1987

AGE OF MOTHER	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>
Under 15 Years	36	109.4	10	100.0	26	115.6	-	-	-	-
15 - 19 Years	1,665	98.5	820	78.0	826	133.2	18	95.7	1	*
20 - 24 Years	2,901	73.8	1,784	58.2	1,080	133.6	36	64.1	1	*
25 - 29 Years	3,032	64.4	1,972	49.4	991	158.1	68	79.9	1	*
30 - 39 Years	2,374	66.3	1,564	51.8	748	157.3	59	70.1	3	*
40 or More Years	85	83.7	48	61.6	35	177.7	2	*	-	-
Not Stated	2	*	1	*	1	*	-	-	-	-
Total	10,095	71.9	6,199	55.3	3,707	144.1	183	73.7	6	68.2
Median Age at Last Birthday	25		26		24		27		28	

<sup>1</sup> Less than 2,500 grams.

<sup>2</sup> Ratio denominators obtained from Table 1.6.

Table 1.22  
Low Weight<sup>1</sup> Live Births and Low Birth Weight Ratios by Number of Prenatal Visits and Race of Child  
Michigan Residents, 1987

NUMBER OF PRENATAL VISITS	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>
None	422	323.9	138	226.2	282	413.5	2	*	-	-
1 - 4	867	267.2	434	221.0	420	351.8	13	154.8	-	-
5 - 9	3,015	129.3	2,137	118.1	815	172.8	60	120.2	3	*
10 - 14	4,130	47.5	2,492	34.9	1,568	111.5	69	46.4	1	*
15 - 19	984	53.7	520	36.7	437	112.3	27	95.4	-	-
20 or Over	315	75.0	243	70.3	67	99.9	5	*	-	-
Not Stated	362	118.1	235	94.9	118	233.7	7	132.1	2	*
Total	10,095	71.9	6,199	55.3	3,707	144.1	183	73.7	6	68.2
Median Number of Visits	10		10		10		10		7	
Mean Number of Visits	9.8		10.0		9.5		10.4		8.3	

<sup>1</sup> Less than 2500 grams.

<sup>2</sup> Ratio denominators obtained from Table 1.17.

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 3.2 times the ratio for white infants. Overall, the low birth weight ratio for black infants was 2.6 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 18.4 percent of the white infants were to mothers who had less than 10 prenatal visits, the corresponding figure for black infants was 25.6 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 9.8, 16.2 percent less than the mean of 11.7 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 white infants born to mothers with inadequate care than to mothers with adequate prenatal care. For black infants the low birth weight ratio was 1.9 times higher when the mother received inadequate care rather than adequate 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 women who receive inadequate and intermediate care were 1.3 and 1.2 times higher than the ratio for women who received adequate care.

At birth 14.4 percent of the black infants weighed less than 2,500 grams. Of black infants born to women with adequate care, a lower percentage (12.4) 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 2.6 and 1.8 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 or intermediate care, but higher for women receiving inadequate care. For all other infants born to women with inadequate care, the low birth weight ratio was 7.1 percent lower than the corresponding ratio for white infants.

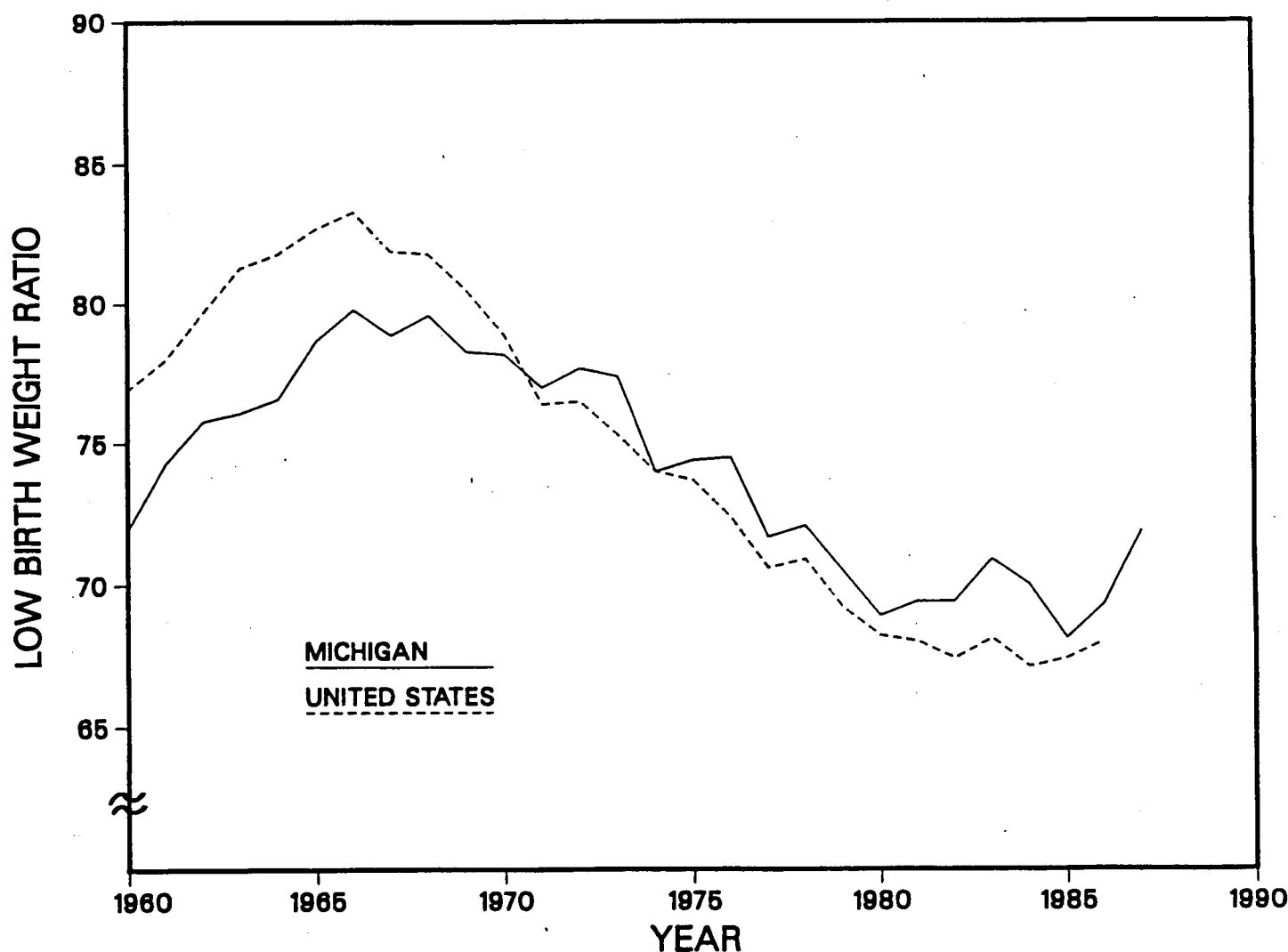
Figure 1.7 displays the low birth weight ratio for Michigan and the United States over the last twenty-eight years. In 1960 this ratio was 72.0 for Michigan. Between 1960 and 1966 the ratio increased, reaching a high for the 28 year period in 1966 (79.8). Since that time the ratio has generally declined. The ratio for 1985 was 68.1, the lowest rate since 1960. It rose to 71.9 in 1987. The pattern for the United States has been similar. The ratio increased from 76.9 in 1960 to 83.3 in 1966, and has since declined. In 1986 the low birth weight ratio for the nation was 68.0. The ratio for the United States was above that for Michigan each year from 1960 through 1970. Since then the ratio for the nation has been the same or lower than that of Michigan.

## SEX OF INFANT

In 1987 51.1 percent of the infants born to Michigan residents were male. The proportion of males to females varies by race. The



FIGURE 1.7  
 LOW BIRTH WEIGHT<sup>1</sup> RATIOS, MICHIGAN RESIDENTS, 1960-1987  
 AND UNITED STATES RESIDENTS, 1960-1986



<sup>1</sup>Prior to 1984, low birth weight was defined as 2500 grams or less. Starting with data year 1984, low birth weight is defined as less than 2500 grams in order to conform to national standards.

Table 1.23  
Low Weight<sup>1</sup> Live Births and Low Birth Weight Ratios by Level of Prenatal Care and Race of Child  
Michigan Residents, 1987

LEVEL OF PRENATAL CARE (KESSNER INDEX <sup>2</sup> )	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	RATIO <sup>3</sup>	NUMBER	RATIO <sup>3</sup>	NUMBER	RATIO <sup>3</sup>	NUMBER	RATIO <sup>3</sup>	NUMBER	RATIO <sup>3</sup>
Adequate	6,107	59.5	4,016	47.3	1,972	124.0	116	67.7	3	*
Intermediate	2,448	92.7	1,399	72.9	1,003	149.9	45	84.3	1	*
Inadequate	1,185	137.6	566	97.3	603	230.9	16	90.4	-	-
Unknown	355	126.2	218	98.8	129	249.0	6	103.4	2	*
Total	10,095	71.9	6,199	55.3	3,707	144.1	183	73.7	6	68.2

<sup>1</sup> Less than 2500 grams.

<sup>2</sup> 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).

<sup>3</sup> Ratio denominators obtained from Table 1.19.

numbers of males per 1,000 females were 1,047 for white infants, 1,034 for black infants, 987 for American Indians, and 1,027 for infants of all other races (Table 1.24). For all races the low birth weight ratio for females was higher than for males. The ratio of 77.3 for females of all races was 15.9 percent above the corresponding ratio of 66.7 for males.

## MOTHER'S EDUCATION

Educational attainment of women having live births in 1987 varied with their age (Table 1.25). Of all Michigan resident live births in 1987, 19.2 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 6.9 for mothers aged 30-34. This percentage increased to 7.9 for mothers aged 35-39 and to 14.2 for mothers 40 years or older. Conversely, age of mother varied with the level of education. The median age of the mother was 21 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) generally decreased with increasing maternal age. Within maternal age categories the ratio increased with educational attainment. The first birth ratio for mothers with 4 or more years of college was 44.0 compared to 41.5 for mothers with 8 or fewer years of 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 24.6 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 (42.3). This high overall ratio reflects the fact that a relatively large proportion 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 791 of the 140,466 resident live births in 1987 (Table 1.27). This translates to a rate of 56.3 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.

The most frequently reported category was ICD 755, other congenital anomalies of limbs (excluding those classified to 754), with 166 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 increased to 294, or 37.2 percent of all the 791 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

Table 1.24  
Live Births, Low Weight Live Births and Low Birth Weight Ratios by Sex and Race  
Michigan Residents, 1987

RACE	LIVE BIRTHS				LOW WEIGHT LIVE BIRTHS			LOW BIRTH WEIGHT RATIOS		
	TOTAL <sup>1</sup>	MALE	FEMALE	MALES PER 1,000 FEMALES	TOTAL <sup>1</sup>	MALE	FEMALE	TOTAL <sup>1</sup>	MALE	FEMALE
Total	140,466	71,733	68,730	1,044	10,095	4,783	5,310	71.9	66.7	77.3
White	112,167	57,357	54,808	1,047	6,199	2,909	3,288	55.3	50.7	60.0
Black	25,729	13,082	12,646	1,034	3,707	1,784	1,923	144.1	136.4	152.1
American Indian	777	386	391	987	62	28	34	79.8	72.5	87.0
Other	1,705	864	841	1,027	121	61	60	71.0	70.6	71.3
Unknown	88	44	44	1,000	6	1	5	68.2	*	*

<sup>1</sup> Records with sex not stated are included only in total columns.

Table 1.25  
**Live Births by Age and Education of Mother**  
Michigan Residents, 1987

AGE OF MOTHER	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 Years	17,240	1,276	9,803	5,479	613	3	66	35.4
20 - 24 Years	39,314	658	7,768	21,071	8,422	1,287	108	78.3
25 - 29 Years	47,052	501	4,249	21,329	12,912	7,945	116	89.7
30 - 34 Years	27,795	300	1,606	10,129	7,734	7,953	73	92.9
35 - 39 Years	8,038	167	466	2,454	2,032	2,888	31	91.7
40 or More Years	1,015	65	79	334	231	300	6	85.2
Not Stated	12	-	2	1	2	3	4	50.0
Total	140,466	2,967	23,973	60,797	31,946	20,379	404	80.5
Median Age at Last Birthday	26	21	21	25	27	30	26	000

Table 1.26  
First Birth Ratios<sup>1</sup> by Age and Education of Mother  
Michigan Residents, 1987

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	79.7	77.9	77.0	83.8	90.2	*
20 - 24 Years	49.1	24.6	24.8	50.8	64.3	81.1
25 - 29 Years	34.2	8.2	12.2	28.3	37.8	57.6
30 - 34 Years	22.8	7.3	7.5	18.2	22.2	32.9
35 or More Years	16.9	4.7	5.9	13.7	16.2	23.0
Total	40.6	41.5	42.3	38.8	40.5	44.0

<sup>1</sup> 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.

experienced by mothers 15-19 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 except 30-34 years of age. The overall rate for white infants was 58.5 compared to 46.3 for black infants.

Figure 1.8 displays the rate of reported congenital anomalies for Michigan resident live births over the period 1960-1987. 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 44.1 percent. The rate of 56.3 for 1987 was the lowest reported congenital anomalies rate during the 28 year period.

## COMPLICATIONS

The numbers of deliveries with specific types of complications reported in 1987 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

Table 1.27  
**Congenital Anomalies<sup>1</sup> Reported by Type of Anomaly**  
Michigan Residents, 1987

TYPE OF ANOMALY	ICD <sup>3</sup> NUMBER	NUMBER OF CONDI- TIONS <sup>4</sup>	RATE PER 10,000 LIVE BIRTHS
Other congenital anomalies of limbs . . . . .	755	166	11.8
Cleft palate and cleft lip . . . . .	749	93	6.6
Congenital anomalies of genital organs . . . . .	752	83	5.9
Certain congenital musculoskeletal deformities . . . . .	754	81	5.8
Congenital anomalies of the integument . . . . .	757	63	4.5
Other congenital musculoskeletal anomalies . . . . .	756	47	3.3
Other congenital anomalies of the heart . . . . .	746	45	3.2
Chromosomal anomalies . . . . .	758	44	3.1
Other congenital anomalies of nervous system . . . . .	742	41	2.9
Other and unspecified congenital anomalies . . . . .	759	35	2.5
Spina bifida . . . . .	741	29	2.1
Other congenital anomalies of upper alimentary tract . . . . .	750	29	2.1
Congenital anomalies of ear, face, and neck . . . . .	744	28	2.0
Congenital anomalies of urinary system . . . . .	753	27	1.9
Other congenital anomalies of digestive system . . . . .	751	26	1.9
Other congenital anomalies of circulatory system . . . . .	747	25	1.8
Congenital anomalies of respiratory system . . . . .	748	13	0.9
Bulbus cordis anomalies and anomalies of cardiac septal closure . . . . .	745	13	0.9
Congenital anomalies of eye . . . . .	743	12	0.9
Anencephalus and similar anomalies . . . . .	740	6	0.4
<b>At Least One Anomaly<sup>2</sup> . . . . .</b>		<b>791</b>	<b>56.3</b>

<sup>1</sup> Indicates anomalies apparent soon after a live birth.

<sup>2</sup> Does not equal the sum of anomalies specified because of multiple anomaly occurrences.

<sup>3</sup> Ninth Revision International Classification of Diseases, WHO.

<sup>4</sup> 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 Rates<sup>1</sup>  
by Age of Mother and Race of Child  
Michigan Residents, 1987

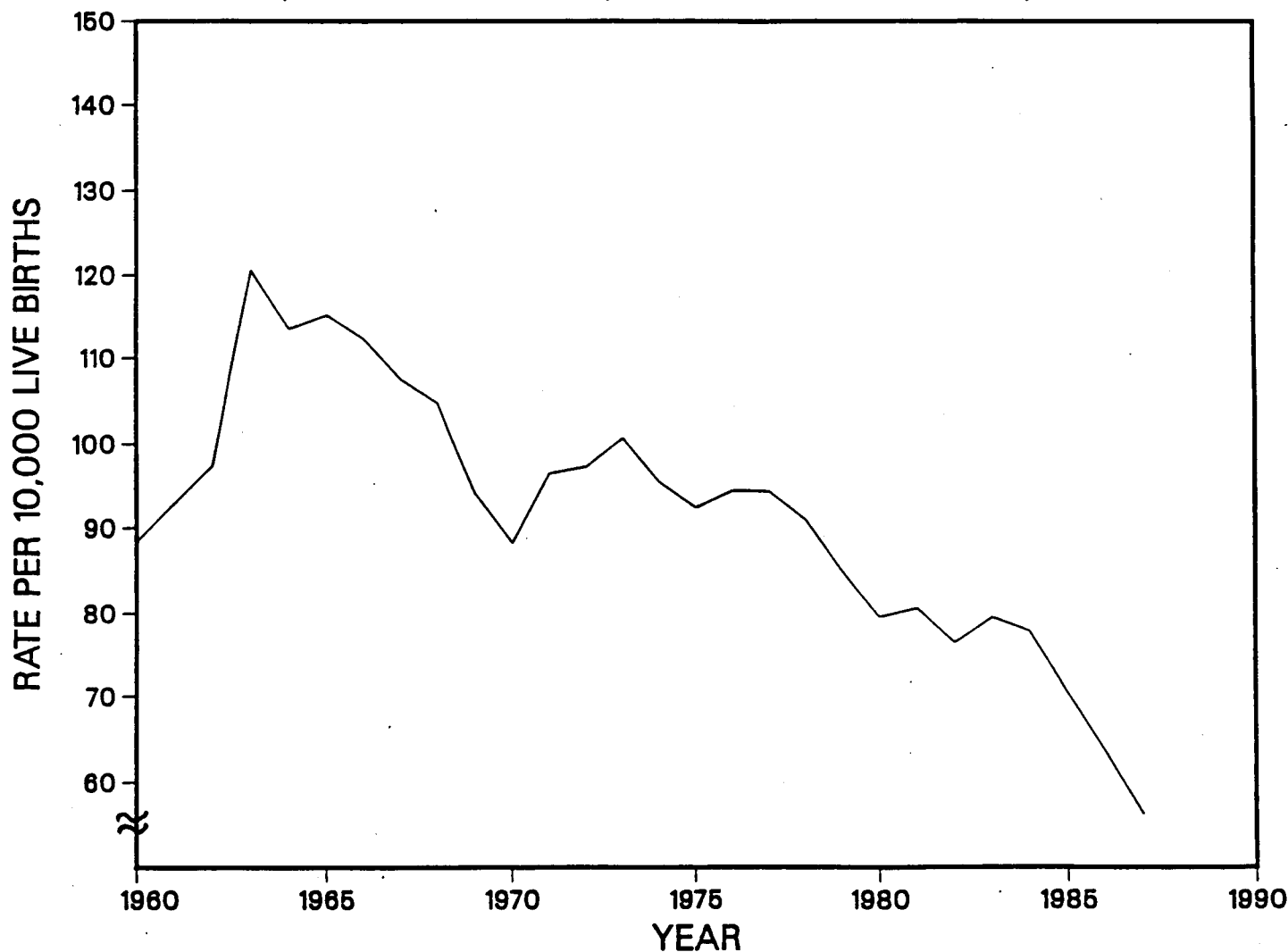
AGE OF MOTHER	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>
Under 15 Years	3	*	1	*	2	*	-	-	-	-
15 - 19 Years	83	49.1	66	62.8	15	24.2	2	*	-	-
20 - 24 Years	228	58.0	183	59.7	41	50.7	4	*	-	-
25 - 29 Years	249	52.9	218	54.6	28	44.7	3	*	-	-
30 - 34 Years	166	59.7	137	58.0	23	65.3	6	97.1	-	-
35 - 39 Years	51	63.4	43	65.4	7	56.7	1	*	-	-
40 or More Years	11	108.4	8	102.7	3	*	-	-	-	-
Total	791	56.3	656	58.5	119	46.3	16	64.5	-	-
Median Age at Last Birthday	26		26		25		27		000	

<sup>1</sup> Number of live births with congenital anomalies reported per 10,000 live births.

<sup>2</sup> Rate denominator obtained from Table 1.6.



FIGURE 1.8  
INCIDENCE OF CONGENITAL ANOMALIES REPORTED  
PER 10,000 LIVE BIRTHS, MICHIGAN RESIDENTS, 1960-1987



"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 43,242. 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 10,162 deliveries (723.4 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 7332 (522.0 per 10,000 live births). This latter figure was more comparable 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.

Among the most commonly reported maternal conditions not directly related to the pregnancy were chronic hypertensive disease, diabetes mellitus, and previous Cesarean sec-

tions, which were reported 1,893, 1,558 and 2,673 times, respectively, in 1987. Toxemia of pregnancy was reported for 1,917 deliveries (136.5 per 10,000). The most common form was pre-eclampsia of pregnancy, which was reported 100.5 times per 10,000 deliveries.

Various forms of difficult labor were reported in 6.6 percent of all live births. There were 1,290 deliveries complicated by conditions of the placenta and fetal membranes, and 3,862 by conditions of the umbilical cord. Premature rupture of membranes was reported for 3,169 deliveries. There were 22,151 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 1,577.0 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 increased with mother's age for mothers over 29 years of age. For mothers less than 30 years of age, mothers under 15 had the highest rate of complications (31.3 percent). Mothers 15-19 years of age had the lowest rate overall (29.4 percent), and mothers 40 years or more had the highest overall rate (39.1 percent). The 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 14.3 percent higher than the rate for white infants (34.3 compared to 30.0).

Table 1.29  
Live Births with Specific Types of Complications Reported  
Michigan Residents, 1987

TYPE OF COMPLICATION	NUMBER OF DELIVERIES <sup>1</sup>	RATE PER 10,000 LIVE BIRTHS
Concurrent Illnesses or Conditions Affecting this Pregnancy . . .	10,162	723.4
Chronic Circulatory and Genitourinary Diseases in Mother . . .	2,755	196.1
Chronic rheumatic heart disease . . . . .	77	5.5
Chronic hypertensive disease . . . . .	1,893	134.8
Other chronic diseases and congenital anomalies of heart and circulatory system . . . . .	214	15.2
Chronic diseases of genitourinary system . . . . .	612	43.6
Other Maternal Conditions . . . . .	7,850	558.9
Syphilis . . . . .	12	0.9
Gonorrhea and other VD, excluding syphilis . . . . .	639	45.5
Diabetes mellitus . . . . .	1,558	110.9
Influenza . . . . .	17	1.2
Rubella . . . . .	11	0.8
Injury . . . . .	56	4.0
Prior operations (excluding previous cesarean section) . . . . .	114	8.1
Previous cesarean section . . . . .	2,673	190.3
Narcotic or drug user . . . . .	610	43.4
Obesity . . . . .	228	16.2
Hepatitis . . . . .	46	3.3
Anemia . . . . .	289	20.6
Pneumonia . . . . .	36	2.6
Bronchitis . . . . .	45	3.2
Emphysema . . . . .	1	*
Epilepsy . . . . .	80	5.7
Asthma . . . . .	333	23.7
Alcohol Abuse . . . . .	114	8.1
Overdose of Aspirin . . . . .	-	-
All other maternal conditions . . . . .	1,454	103.5
Unknown type of maternal condition . . . . .	41	2.9
Toxemia of Pregnancy . . . . .	1,917	136.5
Hypertensive disease arising during pregnancy . . . . .	31	2.2
Pre-eclampsia of pregnancy . . . . .	1,411	100.5
Eclampsia of pregnancy . . . . .	20	1.4
Hyperemesis gravidarum . . . . .	136	9.7
Toxemia superimposed on pre-existing hypertensive cardiovascular disease . . . . .	109	7.8
Other and unspecified toxemia of pregnancy . . . . .	373	26.6

Table 1.29 (continued)  
**Live Births with Specific Types of Complications Reported**  
Michigan Residents, 1987

TYPE OF COMPLICATION	NUMBER OF DELIVERIES <sup>1</sup>	RATE PER 10,000 LIVE BIRTHS
Maternal Ante- and Intrapartum Infection . . . . .	728	51.8
Infections of genital tract . . . . .	87	6.2
Pyelitis and pyelonephritis . . . . .	39	2.8
Other infections of urinary tract . . . . .	251	17.9
Infections of amniotic fluid . . . . .	192	13.7
Other infections . . . . .	179	12.7
Difficult Labor With Disproportion or Abnormality of Organs and Tissues of the Pelvis . . . . .	3,789	269.7
Difficult Labor With Malposition of Fetus . . . . .	3,778	269.0
Breech presentation . . . . .	2,639	187.9
Transverse presentation . . . . .	195	13.9
Brow presentation . . . . .	23	1.6
Face presentation . . . . .	64	4.6
Compound or shoulder presentation . . . . .	69	4.9
Other specified presentation . . . . .	283	20.1
Unspecified presentation . . . . .	535	38.1
Difficult Labor With Abnormality of Forces of Labor . . . . .	816	58.1
Primary uterine inertia . . . . .	168	12.0
Secondary uterine inertia . . . . .	120	8.5
Prolonged second stage . . . . .	153	10.9
Precipitate birth . . . . .	314	22.4
Other and unspecified abnormality of forces of labor . . . . .	72	5.1
Other and Unspecified Difficult Labor . . . . .	949	67.6
Laceration of Pelvic Organs . . . . .	513	36.5
Conditions of Placenta and Fetal Membranes . . . . .	1,290	91.8
Placenta previa - partial . . . . .	359	25.6
Placenta previa - complete . . . . .	26	1.9
Premature separation of placenta - partial . . . . .	628	44.7
Premature separation of placenta - complete . . . . .	-	-
Placental insufficiency . . . . .	50	3.6

Table 1.29 (continued)  
**Live Births with Specific Types of Complications Reported**  
Michigan Residents, 1987

TYPE OF COMPLICATION	NUMBER OF DELIVERIES <sup>1</sup>	RATE PER 10,000 LIVE BIRTHS
Delivery complicated by retained placenta . . . . .	222	15.8
Other and unspecified abnormalities of placenta and fetal membranes . . . . .	43	3.1
Conditions of Umbilical Cord . . . . .	3,862	274.9
Other Complications of Pregnancy and Childbirth . . . . .	12,294	875.2
Incompetent cervix . . . . .	172	12.2
Premature rupture of membranes . . . . .	3,169	225.6
Hydramnios . . . . .	124	8.8
Ectopic pregnancy . . . . .	-	-
Abortion - any type . . . . .	32	2.3
Destructive operation on live fetus to facilitate birth . . . . .	3	*
Multiple pregnancy . . . . .	1,521	108.3
Hemorrhage or threatened abortion . . . . .	899	64.0
RH incompatibility . . . . .	260	18.5
Anemia of pregnancy . . . . .	268	19.1
All other complications of pregnancy and childbirth . . . . .	6,650	473.4
Unknown type of complication of pregnancy and childbirth . . . . .	44	3.1
Obstetrical Operations . . . . .	24,017	1,709.8
Antepartum obstetrical procedures . . . . .	33	2.3
Operations inducing labor or assisting delivery . . . . .	1,830	130.3
Cesarean section . . . . .	22,151	1,577.0
Operations after delivery or abortion . . . . .	1,252	89.1
At Least One Complication . . . . .	43,242	3,078.5

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

Table 1.30  
Live Births with Complications Reported and Complication Rates<sup>1</sup> by Age of Mother and Race of Child  
Michigan Residents, 1987

AGE OF MOTHER	RACE OF CHILD									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>	NUMBER	RATIO <sup>2</sup>
Under 15 Years	103	31.3	26	26.0	75	33.3	1	*	1	*
15 - 19 Years	4,968	29.4	3,070	29.2	1,839	29.7	58	30.9	1	*
20 - 24 Years	11,862	30.2	9,115	29.7	2,589	32.0	157	27.9	1	*
25 - 29 Years	14,169	30.1	11,622	29.1	2,302	36.7	240	28.2	5	*
30 - 34 Years	8,963	32.2	7,372	31.2	1,377	39.1	209	33.8	5	*
35 - 39 Years	2,774	34.5	2,152	32.7	544	44.1	78	34.8	-	-
40 or More Years	397	39.1	294	37.7	87	44.2	16	43.2	-	-
Not Stated	6	50.0	5	*	1	*	-	-	-	-
Total	43,242	30.8	33,656	30.0	8,814	34.3	759	30.6	13	14.8
Median Age at Last Birthday	26		26		24		28		27	

<sup>1</sup> Number of live births with complications reported per 100 live births.

<sup>2</sup> Rate denominators obtained from Table 1.6.

## 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 1987 1,989 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 1.4 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 three border states and Canada comprise 89.4 percent of all resident live births that occurred out of state. Live births to Michigan residents occurred in 41 of the 50 states and in Canada in 1987.

The number of nonresident live births that occurred in Michigan in 1987 was 458. 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 67.0 percent of these events, as shown in Table 1.31. There were live births in Michigan to residents of 34 states, the Virgin Islands and at least 4 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  
1987

GEOGRAPHIC AREA	LIVE BIRTHS TO RESIDENTS OCCURRING OUTSIDE MICHIGAN		LIVE BIRTHS TO NONRESIDENTS OCCURRING IN MICHIGAN	
	NUMBER	PERCENT	NUMBER	PERCENT
Total . . . . .	1,989	100.0	458	100.0
Florida . . . . .	10	0.5	25	5.5
Illinois . . . . .	28	1.4	18	3.9
Indiana . . . . .	529	26.6	93	20.3
Ohio . . . . .	888	44.6	35	7.6
Texas . . . . .	13	0.7	35	7.6
Wisconsin . . . . .	334	16.8	160	34.9
Canada . . . . .	27	1.4	19	4.1
Other Areas . . . . .	160	8.0	73	15.9

## PLACE OF BIRTH

In 1987, 99.3 percent of the 138,935 infants born in Michigan were delivered in hospitals. There were 742 infants born at home, and 209 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 in both 1986 and 1987.

Table 1.32  
Live Births by Place of Delivery  
Michigan Occurrences, 1975 - 1987

YEAR	PLACE OF DELIVERY						
	TOTAL	HOSPITAL <sup>1</sup>		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

<sup>1</sup> Does not include births in hospitals without a maternity ward.



## ATTENDANT AT BIRTH

Data in Table 1.33 reveal that 98.5 percent of the live births which occurred in Michigan during 1987 were attended by a physician, either an M.D. or D.O. There were 198 live births attended by the mother's husband, while nurses delivered 120 infants. Midwives and nurse-midwives delivered 1,395 infants.

During 1987 there were 107 infants born to unattended women.

Of the 742 infants born in the mother's home, only 7.5 percent were attended by a physician while 21.6 percent were attended by the husband and 45.4 by midwives and nurse-midwives.

Table 1.33  
Live Births by Place of Delivery and Type of Attendant  
Michigan Occurrences, 1987

ATTENDANT	PLACE OF DELIVERY							
	TOTAL		HOSPITAL <sup>1</sup>		HOME		OTHER AND UNKNOWN	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total	138,935	100.0	137,984	100.0	742	100.0	209	100.0
Physician, M.D.	117,876	84.8	117,761	85.3	42	5.7	73	34.9
Physician, D.O.	19,005	13.7	18,964	13.7	13	1.8	28	13.4
Husband	198	0.1	13	0.0	160	21.6	25	12.0
Nurse	120	0.1	115	0.1	4	0.5	1	0.5
Midwife	340	0.2	14	0.0	317	42.7	9	4.3
Physician's Asst.	1	0.0	-	-	1	0.1	-	-
Nurse-Midwife <sup>2</sup>	1,055	0.8	1,033	0.7	20	2.7	2	1.0
Other	177	0.1	29	0.0	98	13.2	50	23.9
Unattended	107	0.1	4	0.0	83	11.2	20	9.6
Unknown	56	0.0	51	0.0	4	0.5	1	0.5

<sup>1</sup> Does not include births in hospitals without a maternity ward.

<sup>2</sup> 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 1987 the number had decreased to 824 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 established repeatedly, as the fetal death ratio continued to decline. The ratio in 1987 was 5.9, 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

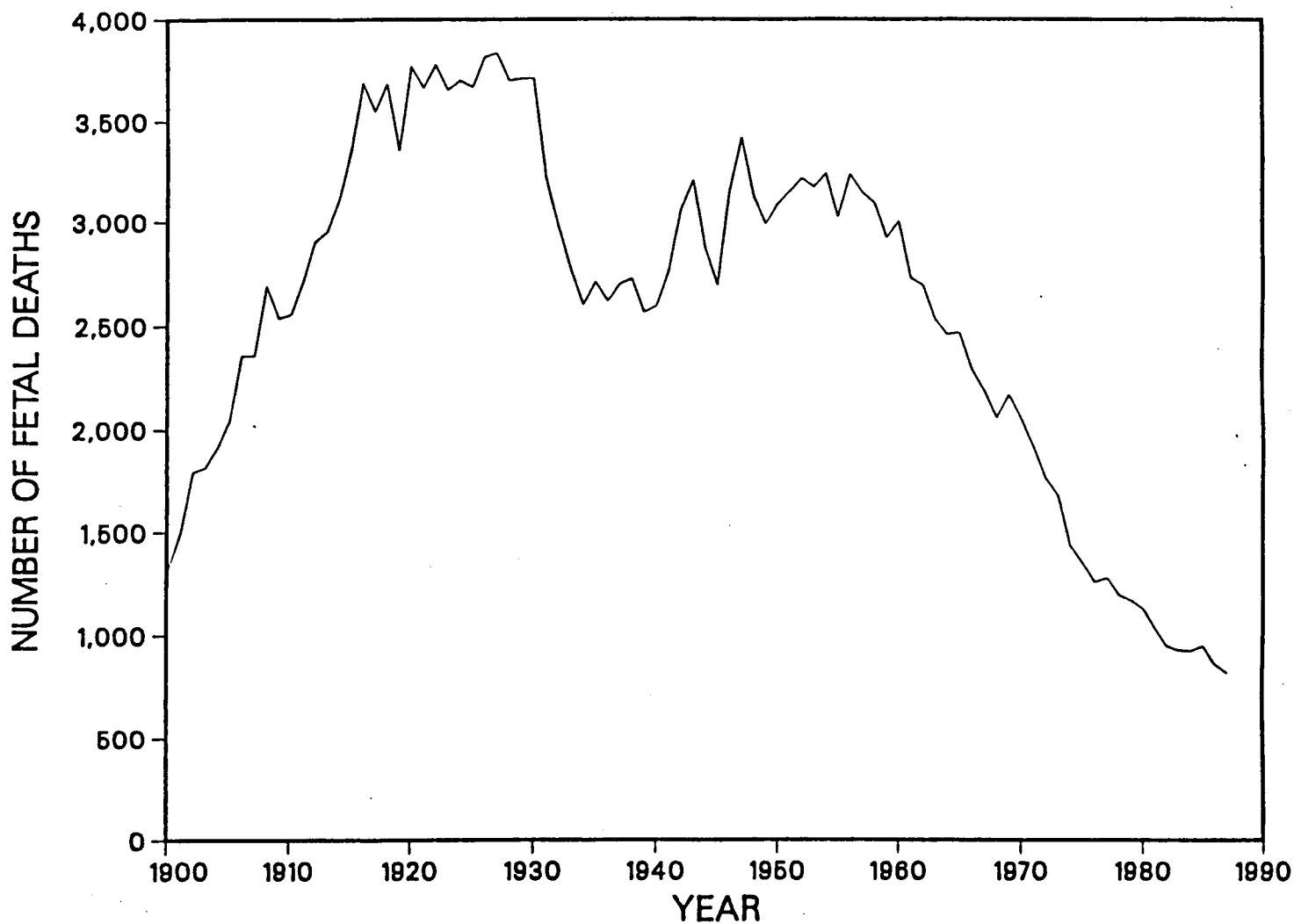
of the 65 years for which national data are available. The last time the United States ratio was below the Michigan ratio was in 1950. In 1986, the Michigan ratio of 6.3 was 18.2 percent below the national ratio of 7.7. It should be noted that fetal deaths in Michigan are comprised of infants born dead who had passed through 20 weeks gestation or weighed 400 grams or more. This definition is different from that of most states.

## CAUSES OF FETAL DEATH

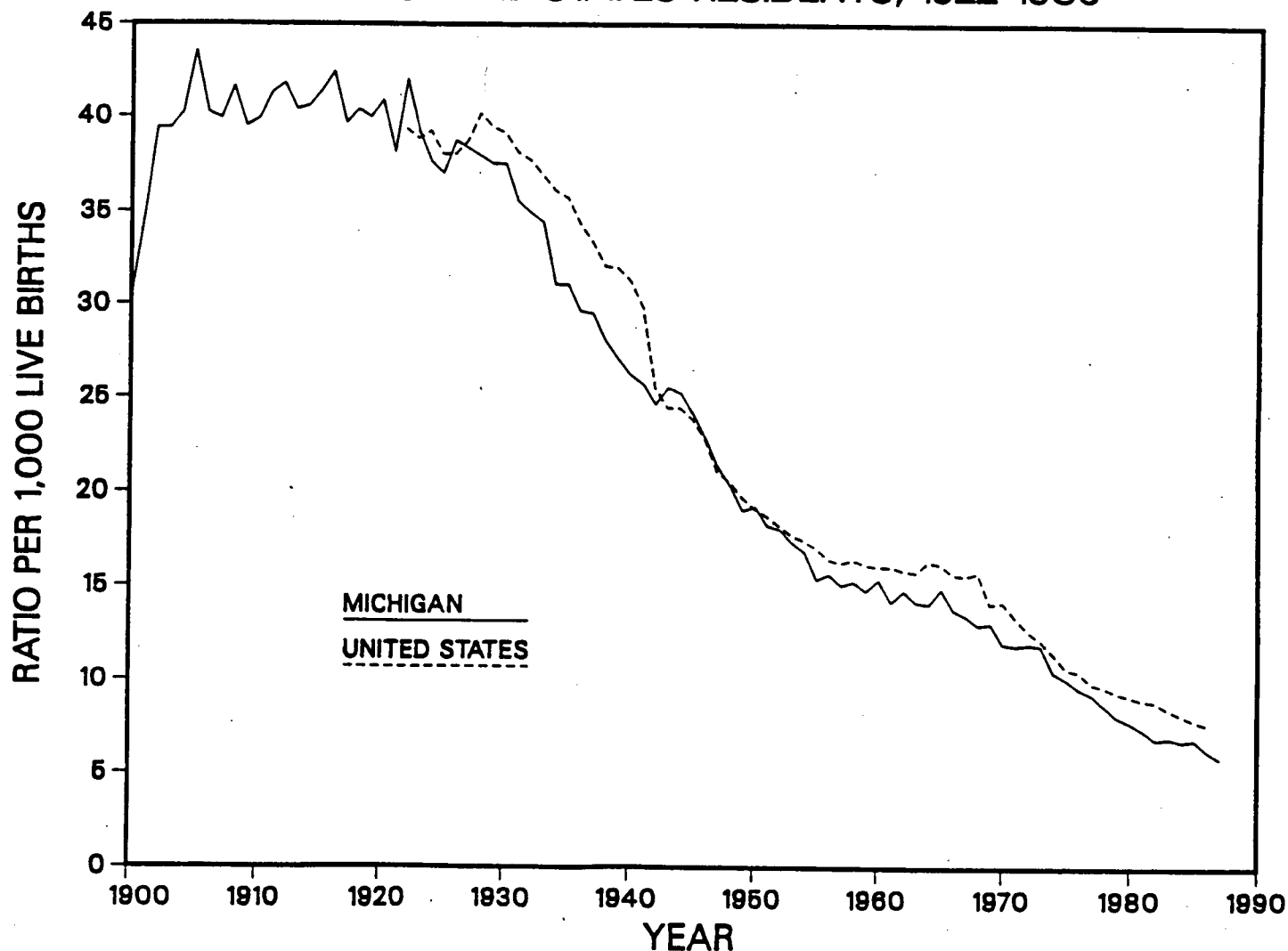
A classification of fetal deaths by underlying cause of death is contained in Table 1.35. This classification is based on the 9th Revision of the International Classification of Diseases which was introduced in 1979. Since major changes were made between the 8th and 9th revisions of the ICD in the section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

In 1987, 283 of the total 824 deaths were assigned to the category of "other and ill-defined conditions originating in the perinatal period". Nearly half (46.4 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),

FIGURE 1.9  
FETAL DEATHS, MICHIGAN RESIDENTS, 1900-1987



**FIGURE 1.10**  
**FETAL DEATH RATIOS, MICHIGAN RESIDENTS, 1900-1987,**  
**AND UNITED STATES RESIDENTS, 1922-1986**



<sup>1</sup>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) 1942-1968 - fetal deaths with gestational age 20 weeks or more or not stated
- 3) 1969-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 - 1987

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 <sup>1</sup>	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

<sup>1</sup> Data for 1922.

Table 1.35  
Fetal Deaths and Fetal Death Ratios by Underlying Cause of Death  
Michigan Residents, 1987

ICD. No. <sup>1</sup>	CAUSE OF DEATH	FREQUENCY	RATIO <sup>2</sup>
740	Anencephalus and similar anomalies . . . . .	11	7.8
741	Spina bifida . . . . .	4	2.8
742	Other congenital anomalies of nervous system . . . . .	5	3.6
746	Other congenital anomalies of heart . . . . .	9	6.4
747	Other congenital anomalies of circulatory system . . . . .	3	2.1
753	Congenital anomalies of urinary system . . . . .	2	1.4
756	Other congenital musculoskeletal anomalies . . . . .	4	2.8
758	Chromosomal anomalies . . . . .	9	6.4
759	Other and unspecified congenital anomalies . . . . .	23	16.4
740 - 759	All Congenital Anomalies Combined . . . . .	70	49.8
760	Fetus or newborn affected by maternal conditions which may be unrelated to present pregnancy . . . . .	35	24.9
761	Fetus or newborn affected by maternal complications of pregnancy . . . . .	90	64.1
762	Fetus or newborn affected by complications of placenta, cord, and membranes . . . . .	251	178.7
763	Fetus or newborn affected by other complications of labor and delivery . . . . .	6	4.3
764	Slow fetal growth and fetal malnutrition . . . . .	2	1.4
765	Disorders relating to short gestation and unspecified low birthweight . . . . .	35	24.9
766	Disorders relating to long gestation and high birthweight . . . . .	3	2.1
768	Intrauterine hypoxia and birth asphyxia . . . . .	29	20.6
770	Other respiratory conditions of fetus and newborn . . . . .	3	2.1
772	Fetal and neonatal hemorrhage . . . . .	3	2.1
773	Hemolytic disease of fetus or newborn, due to isoimmunization . . . . .	4	2.8
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 . . . . .	5	3.6
779	Other and ill-defined conditions originating in the perinatal period . . . . .	283	201.5
740 - 779	All Causes . . . . .	824	586.6

<sup>1</sup> Ninth Revision of the International Classification of Diseases, WHO.

<sup>2</sup> Ratios per 100,000 resident live births.

which was listed as the cause of 90 fetal deaths. This includes such complications as premature rupture of membranes, multiple pregnancy, and incompetent cervix. An additional 35 fetal deaths were caused by maternal conditions which may be unrelated to the pregnancy. There were 70 fetal deaths caused by congenital anomalies in 1987.

### **AGE OF MOTHER AND RACE OF FETUS**

The overall fetal death rate per 1,000 total births (live births plus fetal deaths) was 5.8 in 1987. 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 20-24 and 25-29 age groups displayed the lowest rates. Progressively older and younger age groups displayed increasingly higher rates. The rate for women 15-19 (8.0) was 66.7 percent higher than the rate for women 20-24 years of age (4.8). The highest rate was experienced by women under 15, for whom the rate (17.9) was 3.7 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 1987 the fetal death rate for white fetuses was 5.2. The rate for mothers of fetuses of races other than white and black was the same as the rate for mothers of white fetuses, while the fetal death rate for mothers of black fetuses was 67.3 percent higher at 8.7. Rates for black fetuses were higher than for white fetuses in all age intervals with sufficient events to calculate rates. The differentials ranged from 15.8 percent higher for women aged 15 through 19 to 87.5 percent higher for women aged 25 through 29.

### **INTERPREGNANCY TIME PERIOD FOR FETAL DEATHS**

For those women whose pregnancy terminated with a fetal death in 1987, a total of 443 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 1987 to women who reported the date of a prior termination. Minimum risk was associated with spacings of between 3 and 5 years (3.6 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 44.4 percent above the rate of the risk with spacing between 3 and 5 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 (13.3) was three times the rate with spacing between 1 and 2 years and 3.7 times the rate with spacing between 3 and 5 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 3 months, which was three months shorter than the median time period of 2 years and 6 months for women having live births in 1987.

As with live births (Table 1.13), the outcome of the immediate prior termination has a strong influence on the interval between pregnancies (Table 1.38). For women whose prior termination was a fetal death, the median

Table 1.36  
Fetal Deaths, Live Births, Total Births and Fetal Death Rates  
by Age of Mother and Race of Fetus  
Michigan Residents, 1987

AGE OF MOTHER AND RACE OF FETUS	FETAL DEATHS	LIVE BIRTHS	TOTAL BIRTHS	RATE PER 1,000 TOTAL BIRTHS
Under 15 Years . . . . .	6	329	335	17.9
White . . . . .	2	100	102	*
Black . . . . .	4	225	229	*
All Other Races . . . . .	-	2	2	-
Not Stated . . . . .	-	2	2	-
15 - 19 Years . . . . .	136	16,911	17,047	8.0
White . . . . .	80	10,514	10,594	7.6
Black . . . . .	55	6,200	6,255	8.8
All Other Races . . . . .	-	188	188	-
Not Stated . . . . .	1	9	10	*
20 - 24 Years . . . . .	190	39,314	39,504	4.8
White . . . . .	129	30,645	30,774	4.2
Black . . . . .	57	8,083	8,140	7.0
All Other Races . . . . .	4	562	566	*
Not Stated . . . . .	-	24	24	-
25 - 29 Years . . . . .	254	47,052	47,306	5.4
White . . . . .	194	39,908	40,102	4.8
Black . . . . .	57	6,268	6,325	9.0
All Other Races . . . . .	3	851	854	*
Not Stated . . . . .	-	25	25	-
30 - 39 Years . . . . .	215	35,833	36,048	6.0
White . . . . .	166	30,211	30,377	5.5
Black . . . . .	42	4,754	4,796	8.8
All Other Races . . . . .	5	842	847	*
Not Stated . . . . .	2	26	28	*
40 or Over . . . . .	11	1,015	1,026	10.7
White . . . . .	9	779	788	11.4
Black . . . . .	1	197	198	*
All Other Races . . . . .	1	37	38	*
Not Stated . . . . .	-	2	2	-
Not Stated . . . . .	12	12	24	500.0
White . . . . .	1	10	11	*
Black . . . . .	9	2	11	818.2
All Other Races . . . . .	-	-	-	-
Not Stated . . . . .	2	-	2	-
Total . . . . .	824	140,466	141,290	5.8
White . . . . .	581	112,167	112,748	5.2
Black . . . . .	225	25,729	25,954	8.7
All Other Races . . . . .	13	2,482	2,495	5.2
Not Stated . . . . .	5	88	93	*



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 Terminations<sup>1</sup>  
1987<sup>2</sup>

TIME SPAN IN YEARS	FETAL DEATHS	LIVE BIRTHS	TOTAL BIRTHS	RATE PER 1,000 TOTAL BIRTHS
Total	443	93,682	94,125	4.7
Less Than One	46	3,405	3,451	13.3
1 < 2	133	29,200	29,333	4.5
2 < 3	100	22,983	23,083	4.3
3 < 5	75	20,909	20,984	3.6
5 or More	89	17,185	17,274	5.2

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

<sup>2</sup> 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 Deaths<sup>1</sup> to Women Reporting Prior Pregnancy Terminations<sup>2</sup>  
by Time Span Between Last and Current Termination and  
by Whether Prior Termination Resulted in a Live Birth or a Fetal Death  
Michigan Residents, 1987<sup>3</sup>

TIME SPAN IN YEARS	TOTAL		PRIOR FETAL DEATH <sup>4</sup>		PRIOR LIVE BIRTH	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Total	443	100.0	143	100.0	300	100.0
Less than One	46	10.4	31	21.7	15	5.0
1 < 2	133	30.0	51	35.7	82	27.3
2 < 3	100	22.6	26	18.2	74	24.7
3 < 5	75	16.9	14	9.8	61	20.3
5 or More	89	20.1	21	14.7	68	22.7
Median Time Span	2 Years 3 Months		1 Year 7 Months		2 Years 7 Months	

<sup>1</sup> Deaths of fetuses of twenty or more weeks gestation or weighing 400 grams or more.

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

<sup>3</sup> 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.

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

interpregnancy time span was 1 year and 7 months. For 300 women whose prior termination was a live birth, the median interpregnancy time span was 2 years and 7 months.

## PRENATAL CARE - FETAL DEATHS

Of the 824 fetal deaths reported for 1987, 84 or 10.2 percent of the reports indicated that the mother had no prenatal visits. The comparable percent for live births was 0.9. The percent of mothers with fewer than ten prenatal visits was 63.7 for fetal deaths and 19.8 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 5.1 and 4.4 visits respectively. Note, however, that the number of prenatal visits was not stated on 7.4 percent of the reports for white fetuses, 25.8 percent of the reports for black fetuses and 30.8 percent of the reports for fetuses of all other races.

The fetal death rate varied with the number of prenatal visits (Table 1.40). The rate was 60.6 for mothers with no care, 49.5 for mothers with 1-4 visits, and 11.5 for those with 5-9 visits. The fetal death rate was low for mothers with 10-14 visits (1.7) and 15-19 visits (1.6) and increased to 2.4 for mothers with 20 or more visits.

For those cases where the number of prenatal visits was reported and where rates could be calculated, black fetuses had similar or lower fetal death rates (Table 1.40). 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 (25.8 versus 7.4). In this category, the death rate

for black fetuses was 6.0 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 13.0 percent of the fetal death reports compared with 2.2 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 1987, 34.0 percent of the reported fetal deaths occurred before 28 weeks of gestational age, and 59.0 percent occurred before 36 weeks. Incomplete reporting of gestational age occurred on 14.0 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 in 1987 that were to women who reported receiving care prior to the fourth month of pregnancy was 62.7 with 73.2 percent receiving care prior to the sixth month.

From 1970 through 1973 there were increases in the percentage of fetal deaths in which the mother received care prior to the fourth and sixth month. These percentages declined between 1973 and 1976, and generally increased between 1976 and 1983 (Figure 1.11). Both percentages declined between 1983 and 1986 and increased in 1987. 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 and increased to 80.0 in 1987. 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 93.1 in 1987 (Figure 1.6).

The relationship between the fetal death rates and numbers and the Kessner Index are

Table 1.39  
Fetal Deaths and Percent Distribution by Number of the Mother's Prenatal Visits and Race of Fetus  
Michigan Residents, 1987

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	84	10.2	39	6.7	42	18.7	1	7.7	2	40.0
1 - 4	169	20.5	126	21.7	38	16.9	5	38.5	-	-
5 - 9	272	33.0	210	36.1	60	26.7	2	15.4	-	-
10 - 14	152	18.6	132	22.7	19	8.4	-	-	1	20.0
15 - 19	30	3.6	24	4.1	5	2.2	1	7.7	-	-
20 or Over	10	1.2	7	1.2	3	1.3	-	-	-	-
Not Stated	107	13.0	43	7.4	58	25.8	4	30.8	2	40.0
Total	824	100.0	581	100.0	225	100.0	13	100.0	5	100.0
Median Number of Visits	6		6		5		4		0	
Mean Number of Visits	6.6		7.1		5.1		4.4		3.3	

Table 1.40  
Fetal Deaths, Total Births and Fetal Death Rates by Number of Prenatal Visits and Race<sup>1</sup>  
Michigan Residents, 1987

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	824	141,290	5.8	581	112,748	5.2	225	25,954	8.7	13	2,495	5.2
None	84	1,387	60.6	39	649	60.1	42	724	58.0	1	11	*
1 - 4	169	3,414	49.5	126	2,090	60.3	38	1,232	30.8	5	89	*
5 - 9	272	23,597	11.5	210	18,311	11.5	60	4,776	12.6	2	501	*
10 - 14	152	87,147	1.7	132	71,540	1.8	19	14,087	1.3	-	1,487	-
15 - 19	30	18,365	1.6	24	14,174	1.7	5	3,898	*	1	284	*
20 or Over	10	4,209	2.4	7	3,466	2.0	3	674	*	-	66	-
Not Stated	107	3,171	33.7	43	2,518	17.1	58	563	103.0	4	57	*

<sup>1</sup> Race not stated included in total columns only.

Table 1.41  
Fetal Deaths  
by Gestational Age and Number of Prenatal Visits  
Michigan Residents, 1987

GESTATIONAL AGE IN COMPLETED WEEKS	NUMBER	PERCENT	MEDIAN NUMBER OF VISITS
Under 20	29	3.5	3
20 - 23	153	18.6	4
24 - 27	98	11.9	5
28 - 31	85	10.3	6
32 - 35	121	14.7	7
36 - 39	142	17.2	10
40 - 43	70	8.5	12
44 or More	11	1.3	11
Unknown	115	14.0	0
Total	824	100.0	6

Table 1.42  
Fetal Deaths by Month Prenatal Care Began and Number of Prenatal Visits  
Michigan Residents, 1987

MONTH CARE BEGAN	NUMBER OF VISITS							
	TOTAL	NONE	1 - 4	5 - 9	10 - 14	15 - 19	20 OR OVER	UN- KNOWN
Total	824	84	169	272	152	30	10	107
First	109	-	15	53	25	6	3	7
Second	278	-	56	124	69	18	5	6
Third	130	-	38	46	38	4	1	3
Fourth	64	-	25	24	12	1	-	2
Fifth	22	-	6	10	5	-	1	-
Sixth	20	-	15	2	1	1	-	1
Seventh	9	-	3	4	2	-	-	-
Eighth	9	-	6	3	-	-	-	-
Ninth	-	-	-	-	-	-	-	-
No Care	84	84	-	-	-	-	-	-
Unknown	99	-	5	6	-	-	-	88

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 3.8 per 1,000 total births (fetal deaths and live births)

born to women receiving adequate prenatal care. The rate increased to 6.6 and 20.2 for births to women receiving intermediate and inadequate levels of care respectively.

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, 1970-1987

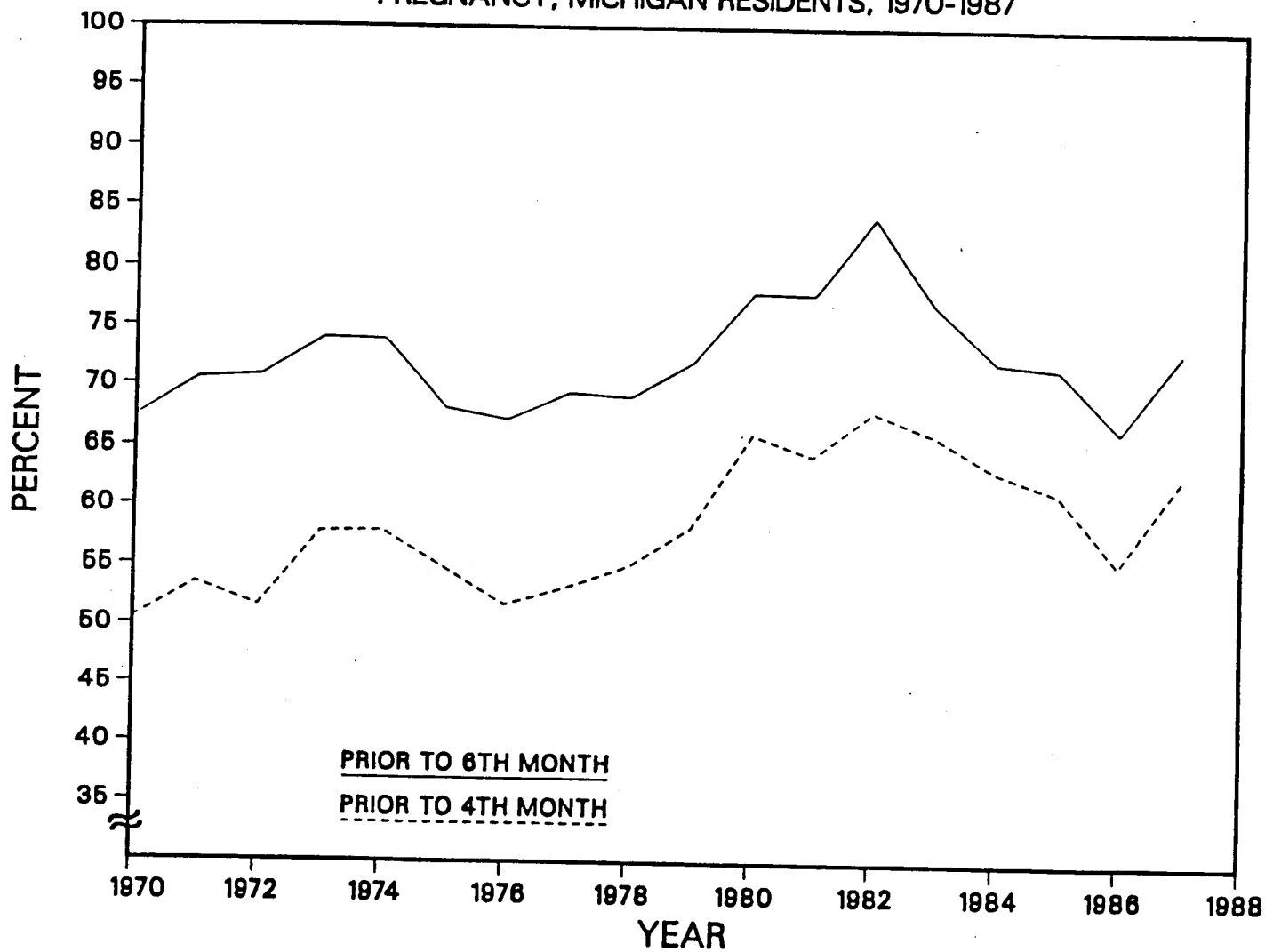


Table 1.43  
Fetal Deaths, Total Births and Fetal Death Rates by Level of Prenatal Care and Race<sup>1</sup>  
Michigan Residents, 1987

LEVEL OF CARE (KESSNER INDEX <sup>2</sup> )	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
Total	824	141,290	5.8	581	112,748	5.2	225	25,954	8.7	13	2,495	5.2
Adequate	392	103,009	3.8	318	85,272	3.7	68	15,976	4.3	6	1,719	3.5
Intermediate	175	26,597	6.6	129	19,315	6.7	44	6,736	6.5	1	535	*
Inadequate	178	8,792	20.2	94	5,914	15.9	74	2,685	27.6	6	183	32.8
Unknown	79	2,892	27.3	40	2,247	17.8	39	557	70.0	-	58	-

<sup>1</sup> Race not stated included in total columns only.

<sup>2</sup> 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, 1987

LEVEL OF PRENATAL CARE (KESSNER INDEX <sup>1</sup> )	RACE OF FETUS									
	TOTAL		WHITE		BLACK		ALL OTHER		NOT STATED	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
Adequate	392	47.6	318	54.7	68	30.2	6	46.2	-	-
Intermediate	175	21.2	129	22.2	44	19.6	1	7.7	1	20.0
Inadequate	178	21.6	94	16.2	74	32.9	6	46.2	4	80.0
Unknown	79	9.6	40	6.9	39	17.3	-	-	-	-
Total	824	100.0	581	100.0	225	100.0	13	100.0	5	100.0

<sup>1</sup> 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 fetal death rate was 16.2 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 3.1 percent less than for white fetuses. The fetal death rate was again higher for black births than for white births for women receiving inadequate levels of care (73.6 percent).

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 total births born to women receiving adequate care in 1987 was 72.9 percent while 47.6 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 7.2. The comparable percent among fetal deaths was 77.1. 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 75.7. The comparable percent for twin deliveries was 94.6.

The fetal weight distribution is strongly associated with gestational age (Table 1.46). The median fetal weight for all fetal deaths was 1,020 grams compared to a median birthweight of 3,400 grams for live births. For deaths of fetuses of 32-35 weeks of age, the median was 1,530 grams, while for the normal gestational age range of 36-39 weeks the median weight was only 2,551 grams.

Table 1.45  
Fetal Deaths by Fetal Weight and Plurality<sup>1</sup>  
Michigan Residents, 1987

WEIGHT	FETAL DEATHS	CUM. PERCENT	SINGLE DELIVERY	TWIN DELIVERY	TRIPLET DELIVERY	QUAD-RUPLET DELIVERY
500 Grams or Less	212	25.7	188	23	-	-
501-1,000 Grams	185	48.2	167	18	-	-
1,001-1,500 Grams	80	57.9	75	5	-	-
1,501-2,000 Grams	76	67.1	71	5	-	-
2,001-2,499 Grams	82	77.1	80	2	-	-
2,500-3,000 Grams	66	85.1	64	2	-	-
3,001-3,500 Grams	63	92.7	62	1	-	-
3,501-4,000 Grams	27	96.0	27	-	-	-
4,001-4,500 Grams	13	97.6	13	-	-	-
4,501 Grams or More	4	98.1	4	-	-	-
Not Stated	16	100.0	16	-	-	-
Total	824	100.0	767	56	-	-

<sup>1</sup> Plurality unknown included in fetal deaths column only.

Table 1.46  
Fetal Deaths by Fetal Weight and Gestational Age  
Michigan Residents, 1987

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	477	27	145	94	70	57	14	3	3	64
1501 - 2499	158	1	1	2	10	51	54	9	3	27
2500 or Over	173	-	2	1	2	12	74	56	5	21
Unknown	16	1	5	1	3	1	-	2	-	3
Total	824	29	153	98	85	121	142	70	11	115
Median <sup>1</sup>	1020	425	439	525	907	1530	2551	3175	2494	1050

<sup>1</sup> Excluding unknown fetal weight.



# MORTALITY

## SECTION II



### MORTALITY: AN OVERVIEW, 1987

RESIDENT DEATHS	79,795
CRUDE DEATH RATE	8.7
INFANT DEATHS	1,538
INFANT DEATH RATE	10.9
NEONATAL DEATHS	1,029
NEONATAL DEATH RATE	7.3
PERINATAL DEATHS	1,701
PERINATAL DEATH RATES	12.4
MATERNAL DEATHS	8
MATERNAL DEATH RATES	0.1
DEATHS FROM HEART DISEASE PER DAY	84
DEATHS FROM CANCER PER DAY	48
DEATHS FROM STROKE PER DAY	15
DEATHS FROM ACCIDENTS PER DAY	9
MEDIAN AGE AT DEATH	73 Years
MEDIAN AGE AT DEATH FOR MALES	70 Years
MEDIAN AGE AT DEATH FOR FEMALES	77 Years



## MORTALITY

In 1987 there were 79,795 deaths recorded for Michigan residents, 382 less than in the previous year. The crude death rate per 1,000 population was 8.7 in 1987, compared to a rate of 8.8 observed in 1986 (Table 2.1). The age-adjusted death rate decreased in 1987 being 1.9 percent less than the age-adjusted rate for 1986. 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 1987 the number of deaths occurring to Michigan residents increased from 32,453 to 79,795. 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 1987, the increase is due to an increasing population. The crude death rate decreased from 13.4 (per 1,000

Table 2.1  
Number of Deaths and Crude Death Rates  
Michigan and United States Residents, 1970 - 1987

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
2,127,000Pr.	8.7Pr.	1987	79,795	8.7



population) in 1900 to 8.7 in 1987. 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 1970-1987 is presented in Table 2.1. Between 1970 and 1985, the Michigan rates had consistently been below or equal to the United States rates. In 1986, the Michigan rate of 8.8 was above the United States rate of 8.7. In 1987, however, the Michigan rate of 8.7 was the same as the provisional United States rate. 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 1987 the number of Michigan resident deaths increased by 4.6 percent and the crude death rate increased by 1.2 percent. The age-adjusted death rates displayed the opposite pattern by dropping 22.5 percent (Table 2.6). Over the period 1970-1987 the age-adjusted death rates for the nation declined by a greater amount, 24.9 percent. For this same period, the age-adjusted rates for Michigan were higher than national rates sixteen out of eighteen years. Between 1970 and 1983 the rates were similar, based upon the revised data in Table 2.6. By 1987 the age-adjusted rate for Michigan was 3.8 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 (58.1 percent compared to 27.2 percent). Conversely, women were over three times as likely to be widows at the time of death as men were to be widowers (56.0 percent compared to 17.8 percent). Among males, 14.8 percent had never been married, while the corresponding figure for females was 9.3 percent. Men were also more likely to be divorced (9.0 percent compared to 7.4 percent).

Table 2.3 presents data on the number of deaths by race for the period 1970-1987. The number of deaths of white persons increased by 0.8 percent over these years while deaths of black persons increased by 33.0 percent. Reported deaths of American Indians remained fairly constant. In 1987 deaths of white persons numbered 67,831 and accounted for 85.0 percent of all deaths, while deaths of black persons constituted 14.6 percent of the state total.

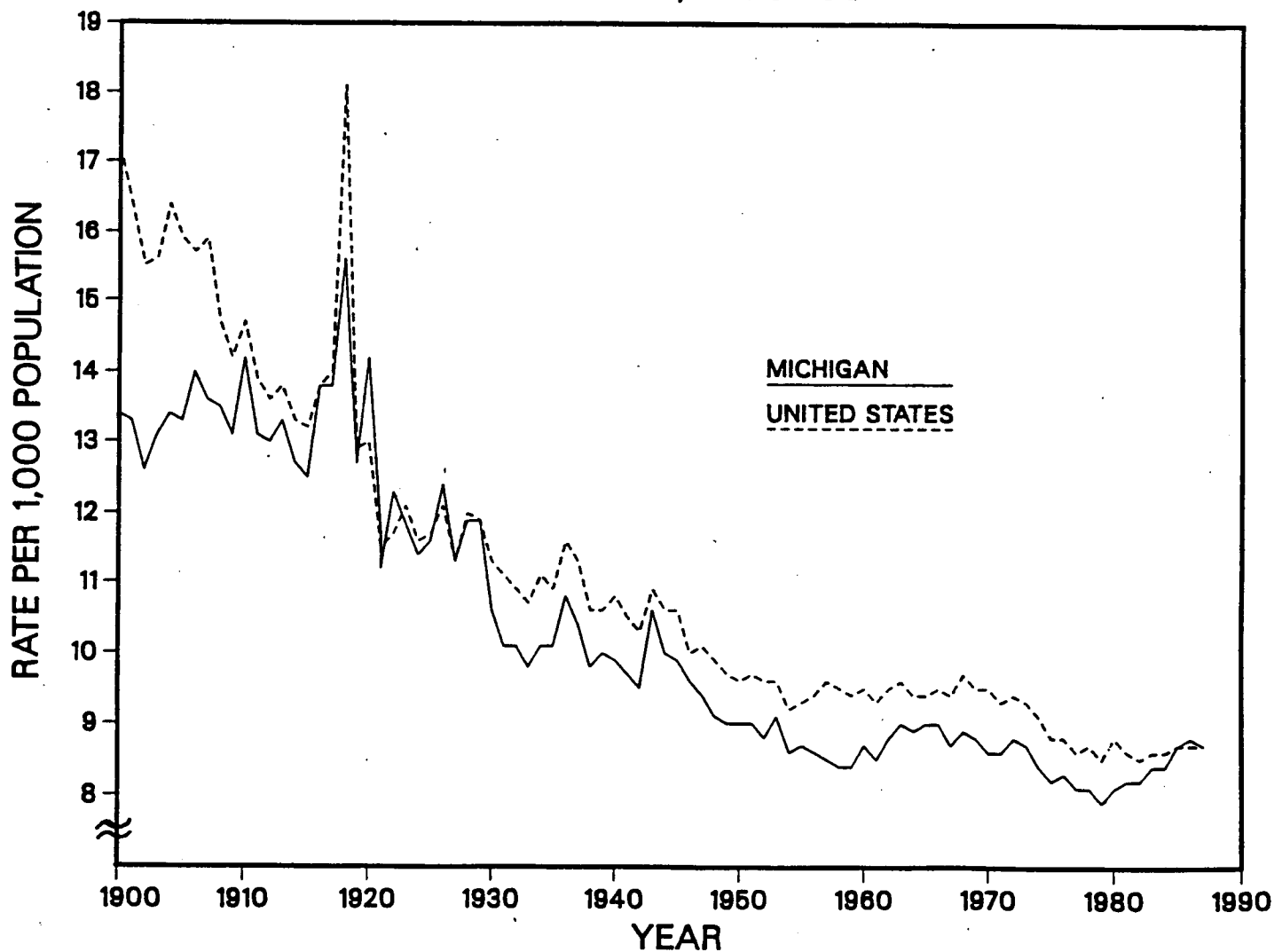
It should be noted that data on race are derived from the death certificates filed by funeral directors. Data from sources where race is self-enumerated, when matched with death data, indicate that there are larger numbers of American Indians and persons of other races dying than are reported as members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

Michigan resident deaths in 1987 are tabulated by age, race, and sex in Table 2.4. Of the 79,795 Michigan resident deaths that occurred in 1987, 41,562 (52.1 percent) occurred to males and 38,228 occurred to females (5 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

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<sup>1</sup> 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).

FIGURE 2.1  
CRUDE DEATH RATES, MICHIGAN AND UNITED STATES<sup>1</sup>  
RESIDENTS, 1900-1987



<sup>1</sup>United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

Table 2.2  
Deaths by Age, Sex and Marital Status  
Michigan Residents, 1987.

AGE IN YEARS	MALES						FEMALES					
	TOTAL	NEVER MARRIED	DIVORCED	WIDOWER	MARRIED¹	UN- KNOWN	TOTAL	NEVER MARRIED	DIVORCED	WIDOW	MARRIED¹	UN- KNOWN
Under 15	1,249	1,249	-	-	-	-	950	950	-	-	-	-
15 - 24	1,174	1,091	7	1	72	3	392	333	9	1	47	2
25 - 34	1,529	842	187	11	489	-	663	275	105	14	268	1
35 - 44	1,819	429	463	24	894	9	950	165	235	34	515	1
45 - 54	2,631	316	604	68	1,632	11	1,727	119	350	172	1,086	-
55 - 64	6,653	584	944	463	4,638	24	4,320	216	600	1,027	2,472	5
65 - 74	10,728	680	899	1,457	7,663	29	7,897	389	665	3,620	3,219	4
75 - 84	10,395	620	478	2,731	6,539	27	10,819	547	547	7,494	2,217	14
85 +	5,380	323	171	2,663	2,208	15	10,508	563	306	9,055	575	9
Unknown	4	1	-	-	-	3	2	-	-	-	-	2
All Ages	41,562	6,135	3,753	7,418	24,135	121	38,228	3,557	2,817	21,417	10,399	38

<sup>1</sup> Includes legally separated.

Table 2.3  
Number of Deaths by Race<sup>1</sup>  
Michigan Residents, 1970 - 1987

YEAR	ALL RACES	WHITE	BLACK	AMERICAN INDIAN	OTHER <sup>2</sup>
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

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

<sup>2</sup> 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.

females. The median age at death was 74 years for white persons, 65 years for black persons and 66 years for persons of other races.

In 1987, 24,061 or 30.2 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 than for white persons or persons of other races. For deaths of white persons 32.6 percent of the males and 20.7 percent of the females died before age 65. For deaths of black persons, 55.0 percent of the males and

41.9 percent of the females died before age 65. For persons of races other than black or white, the percentage of the males (47.5) 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 (47.2) was greater than the percentages of both black and white females.

Since about eighty-nine 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, 75.9 percent of white males born in 1987 would survive to age 65. The percentages are 85.2, 53.8 and 72.5, respectively, for white females, black males and black females.

Unadjusted, age-specific, and age-adjusted death rates by race and sex are presented in Table 2.5. The unadjusted rate for males of 928.1 was 14.6 percent above that for females, while the age-adjusted rate for males was 66.6 percent higher than the age-adjusted rate for females. The population with the lowest unadjusted death rate was black females (769.2) and the highest unadjusted rate was experienced by black males (1,142.0).

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.

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 3.9 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 1.8 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 2.9 times that for females.

A comparison by race of 1987 age-specific death rates for males is graphically presented in Figure 2.3. Rates for white and black males were 3.2 and 6.6 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 23.2 percent,

while the corresponding increase for black males was 59.2 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 4.3 times that of white males. Beyond age 84, the rates for white males were higher.

The overall death rate of 1,142.0 per 100,000 for black males was 26.1 percent higher than the rate for white males (905.9). 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 2.4 to 4.3 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 75.9 percent higher than that for white males.

Rates for black females were higher than those for white females at all ages prior to 85 years (Figure 2.4). For women from 25 through 44 years, the rates for black females were 3.2 times the rates for white females. The death rate for all ages was 825.6 for white females and 769.2 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 57.6 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.

Table 2.4  
Number of Deaths by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	1,538	860	675	953	523	430	567	324	240	17	12	5
1 - 4	316	175	141	245	138	107	69	36	33	2	1	1
5 - 9	162	98	64	119	78	41	42	19	23	-	-	-
10 - 14	186	116	70	134	88	46	47	27	20	5	1	4
15 - 19	741	544	197	518	351	167	218	189	29	3	2	1
20 - 24	825	630	195	557	424	133	260	201	59	7	5	2
25 - 29	1,014	723	291	696	504	192	314	218	96	3	-	3
30 - 34	1,178	806	372	726	496	230	440	304	136	8	3	5
35 - 39	1,332	930	402	819	569	250	511	359	152	2	2	-
40 - 44	1,437	889	548	985	599	386	441	281	160	9	7	2
45 - 49	1,811	1,085	726	1,371	825	546	423	251	172	15	8	7
50 - 54	2,547	1,546	1,001	1,988	1,213	775	535	318	217	20	12	8
55 - 59	4,317	2,613	1,704	3,530	2,142	1,388	764	458	306	17	8	9
60 - 64	6,657	4,040	2,616	5,526	3,377	2,148	1,100	645	455	26	15	11
65 - 69	8,564	5,022	3,541	7,292	4,267	3,024	1,238	737	501	29	13	16
70 - 74	10,062	5,706	4,356	8,818	5,007	3,811	1,209	682	527	27	13	14
75 - 79	10,778	5,509	5,269	9,546	4,879	4,667	1,191	604	587	37	25	12
80 - 84	10,436	4,886	5,550	9,393	4,382	5,011	1,010	484	526	24	14	10
85 - 89	8,398	3,173	5,225	7,656	2,861	4,795	720	299	421	17	10	7
90 +	7,490	2,207	5,283	6,957	2,034	4,923	514	162	352	14	8	6
Not Stated	6	4	2	2	1	1	1	1	-	1	1	-
All Ages	79,795	41,562	38,228	67,831	34,758	33,071	11,614	6,599	5,012	283	160	123
Median Age At Last Birthday	73	70	77	74	71	78	65	62	69	66	67	66

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

Table 2.5  
Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	867.3	928.1	809.7	864.9	905.9	825.6	944.5	1142.0	769.2
Under 1 Year	1097.5	1206.9	983.7	841.4	904.2	775.6	2392.8	2740.9	2042.0
1 - 14 Years	34.6	39.6	29.4	31.8	37.8	25.4	50.0	51.4	48.5
15 - 24 Years	104.1	154.7	52.6	86.1	122.4	48.8	204.8	340.8	74.0
25 - 34 Years	140.3	198.0	83.9	107.3	150.8	63.7	356.4	542.6	200.9
35 - 44 Years	217.6	291.6	146.4	164.4	214.5	115.0	619.4	932.7	366.7
45 - 54 Years	476.2	591.7	367.0	419.1	518.3	323.6	940.1	1252.4	688.5
55 - 64 Years	1330.7	1694.6	1000.0	1242.1	1581.4	930.4	2094.7	2728.0	1567.1
65 - 74 Years	2971.8	3879.8	2254.9	2874.9	3746.1	2185.3	3918.3	5220.0	2913.9
75 - 84 Years	6551.8	8471.7	5380.3	6466.1	8382.1	5305.2	7594.9	9518.8	6342.9
85 Years and Over	14406.3	16439.7	13547.8	14527.5	16564.2	13679.6	13477.3	15195.3	12622.5
Age-Adjusted Rate <sup>2</sup>	556.4	713.6	428.4	516.1	658.8	400.9	866.4	1159.1	632.0

<sup>1</sup> 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.

<sup>2</sup> 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.

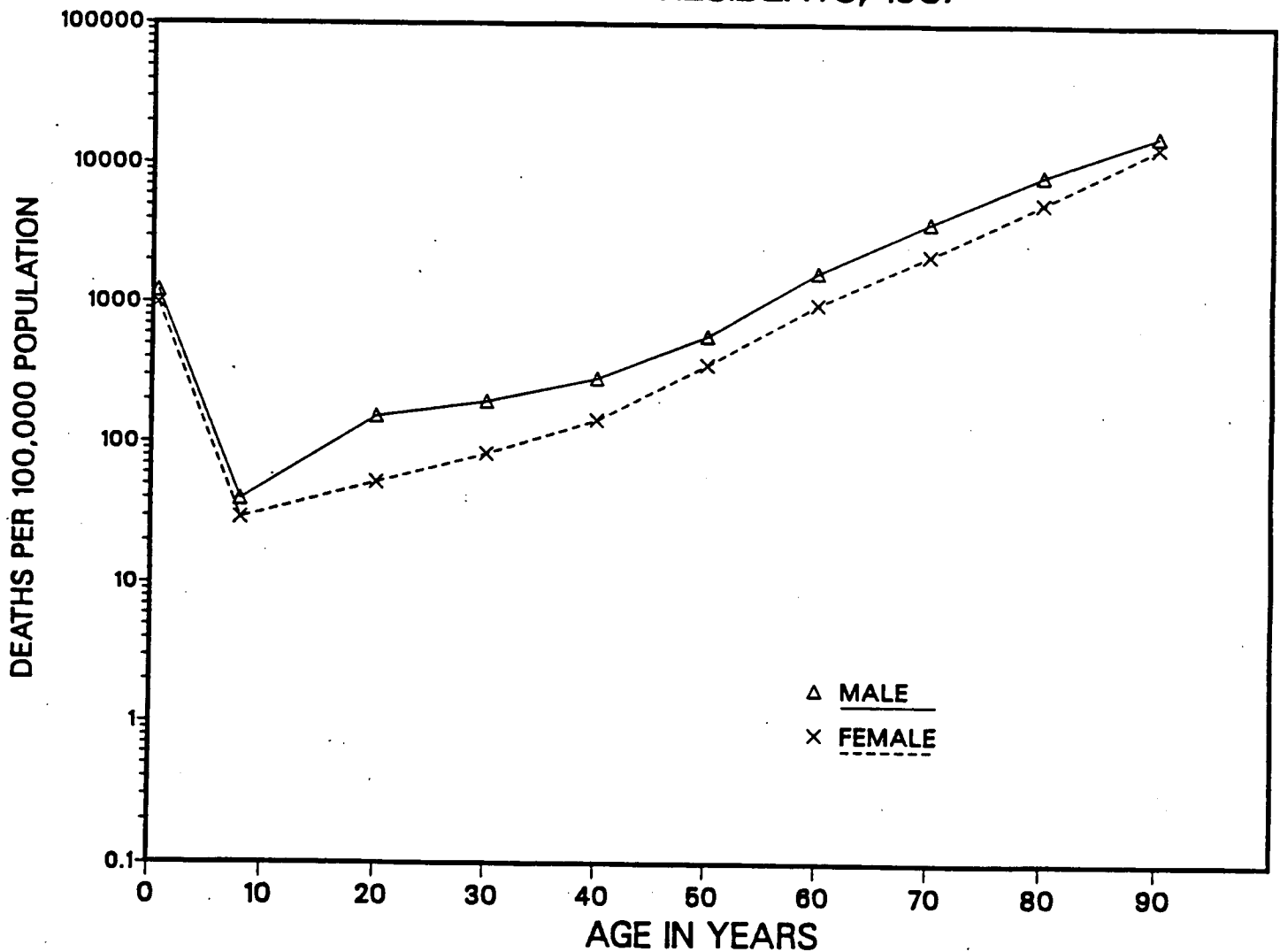
Note: Population estimates by race used to compute the rates in this table are from a revised series of population estimates based on a modified race distribution for 1980. The race distribution was modified to be consistent with the racial categories from the 1970 Census and the categories used by state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

Michigan age-adjusted death rates for other than white persons were considerably higher than comparable rates for white persons throughout the period 1970-1987 (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 50.5 percent (in 1987).

Declines have occurred since 1970 both in Michigan and the United States in age-adjusted death rates in each race-sex group. Michigan's age-adjusted rate for the population as a whole declined by 22.5 percent between 1970 and 1987 while the estimated decline for the United States was 24.9 percent.

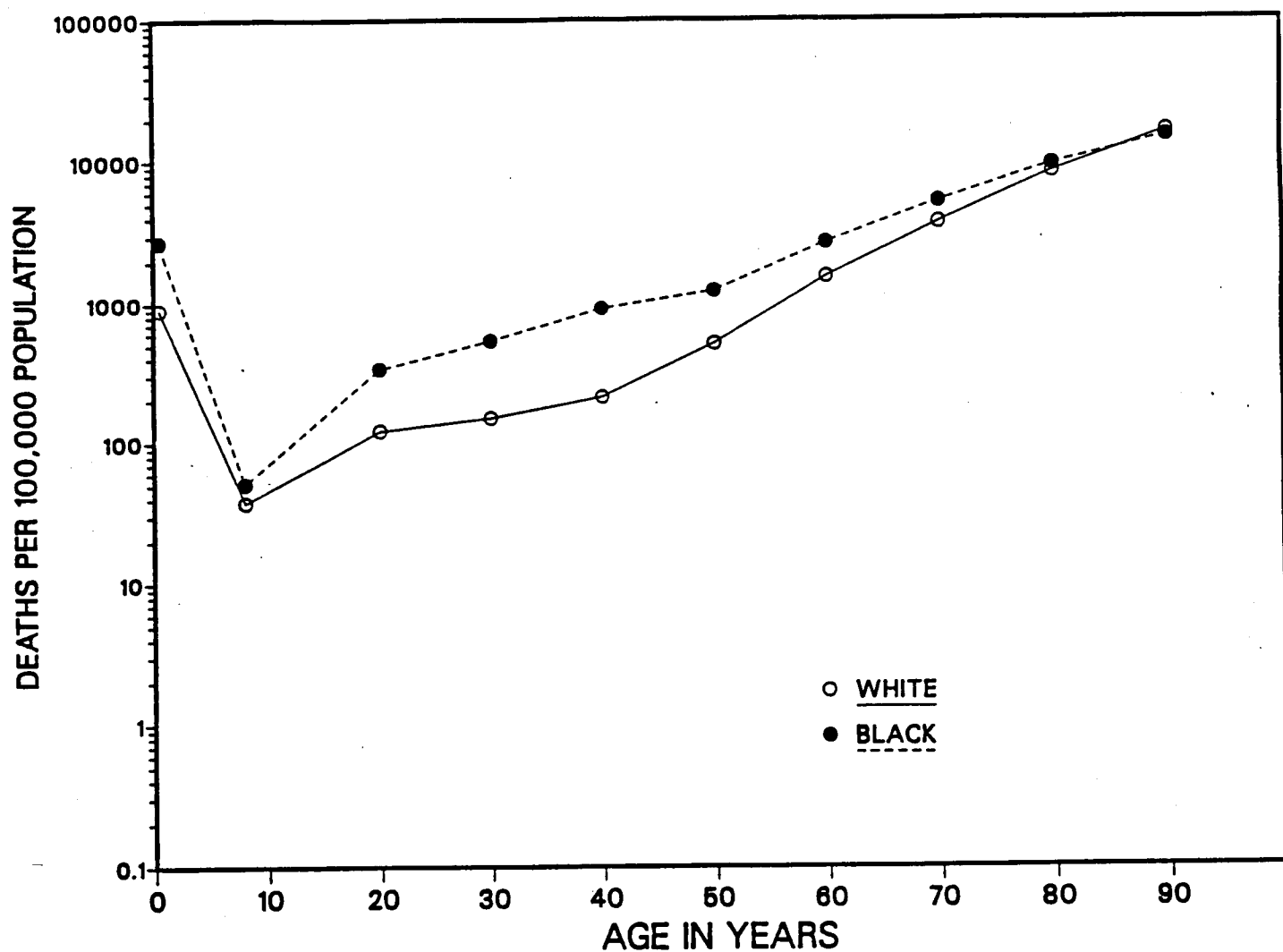
FIGURE 2.2  
AGE-SPECIFIC DEATH RATES<sup>1</sup> BY SEX,  
MICHIGAN RESIDENTS, 1987



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

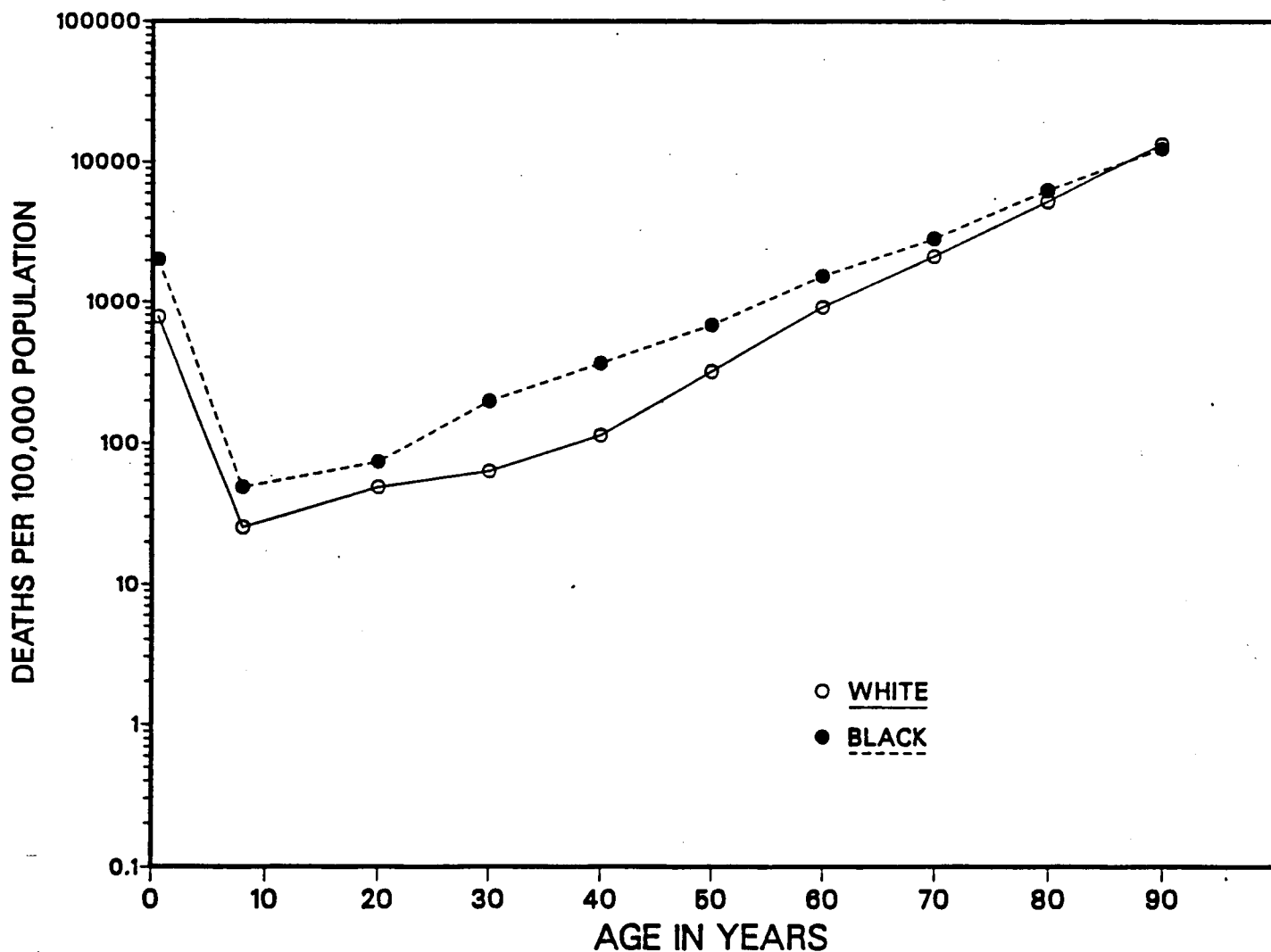


FIGURE 2.3  
AGE-SPECIFIC DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENT MALES, 1987



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

FIGURE 2.4  
AGE-SPECIFIC DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENT FEMALES, 1987



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

Table 2.6  
Age - Adjusted Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987

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	1201.7	744.8
	1971	707.9	922.9	524.0	672.5	881.2	495.7	969.6	1226.9	739.3
	1972	711.1	928.2	526.4	677.2	888.0	499.4	954.7	1220.4	719.6
	1973	694.3	906.3	513.7	658.4	862.6	486.0	949.5	1223.6	709.2
	1974	660.7	865.1	488.0	628.4	824.6	464.2	885.2	1153.2	651.4
	1975	640.2	840.3	472.4	610.1	800.5	452.0	846.1	1122.0	607.8
	1976	636.1	838.5	469.1	607.2	801.4	448.5	835.0	1100.7	608.1
	1977	614.4	814.8	449.4	587.3	781.6	428.8	802.2	1049.4	592.9
	1978	606.3	797.8	449.8	578.7	765.7	426.8	798.9	1025.7	608.9
	1979	585.4	775.6	431.4	557.9	742.5	409.7	773.0	1007.6	577.6
	1980	588.0	773.9	438.7	557.1	735.5	414.9	797.3	1045.8	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	1024.5	582.0
	1985	570.0	747.3	427.6	534.9	701.2	402.8	801.0	1063.7	587.9
	1986	566.9	734.8	431.0	529.2	685.4	404.0	815.2	1076.8	603.9
	1987	556.4	713.6	428.4	516.1	658.8	400.9	822.4	1094.8	603.5
U.S.	1970	714.3	931.6	532.5	679.6	893.4	501.7	983.4	1231.4	770.8
	1971	697.6	913.3	519.1	663.7	876.0	489.1	959.5	1206.7	749.8
	1972	698.0	918.0	516.6	664.0	879.3	487.6	958.6	1223.1	737.1
	1973	687.3	905.9	508.1	654.0	868.5	479.3	942.2	1199.5	728.1
	1974	659.5	870.9	487.0	629.0	836.1	461.0	889.6	1142.4	680.5
	1975	630.4	837.2	462.5	602.2	804.3	439.0	840.6	1090.1	634.5
	1976	618.5	820.9	455.0	591.3	789.3	432.5	818.5	1063.4	618.3
	1977	602.1	801.3	441.8	575.7	770.6	419.6	796.7	1036.1	601.8
	1978	595.0	791.4	437.4	569.5	761.1	416.4	780.0	1021.0	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	1015.1	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 <sup>3</sup>	536.2	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

For the other than white population, the relative decline in Michigan was less than it was for the United States through the year 1986, the last year for which national data were available. For Michigan other than white persons, male age-adjusted rates declined 10.4 percent and female rates declined 18.9 percent between 1970 and 1986. The United States rates for these groups declined by 26.4 and 32.0 percent, respectively, during this period. The Michigan rates for white males and females declined 22.9 and 20.9 percent, respectively. The United States rates for these groups dropped 23.9 and 22.7 percent, respectively, during the same period.

During the period 1970 through 1986, the age-adjusted mortality rates for Michigan white females have been consistently greater than the rates for their national counterparts. For ten of the seventeen 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 fifteen of the seventeen years of the period.

Between 1970 and 1987, the minimum age-adjusted death rates were achieved in 1987 for Michigan white males and in 1986, the latest available year, for the United States white males and females. However, for the United States, other than white males and females had their lowest rates in 1984, while in Michigan white females and other than white males and females achieved their lowest rates in 1982. Between 1986 and 1987 rates for Michigan white females and males dropped. The rate for other than white females showed a slight decrease between the two years. The rate for other than white males rose to its highest level since 1976.

## LEADING CAUSES OF DEATH

Deaths due to the 10 leading causes accounted for 83.9 percent of all deaths in 1987. Diseases of the heart were the leading cause of death with 38.2 percent of all deaths due to heart diseases. Another 22.1 percent of the deaths were due to cancer. Together these two causes of death were responsible for 60.3 percent of all Michigan resident deaths.

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.

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 1987 are shown in Table 2.7, and the percentage of total deaths resulting from each of these causes is illustrated in Figure 2.5. The ranking of the 10 leading causes for 1987 was different than the

FIGURE 2.5  
LEADING CAUSES OF DEATH, MICHIGAN RESIDENTS, 1987

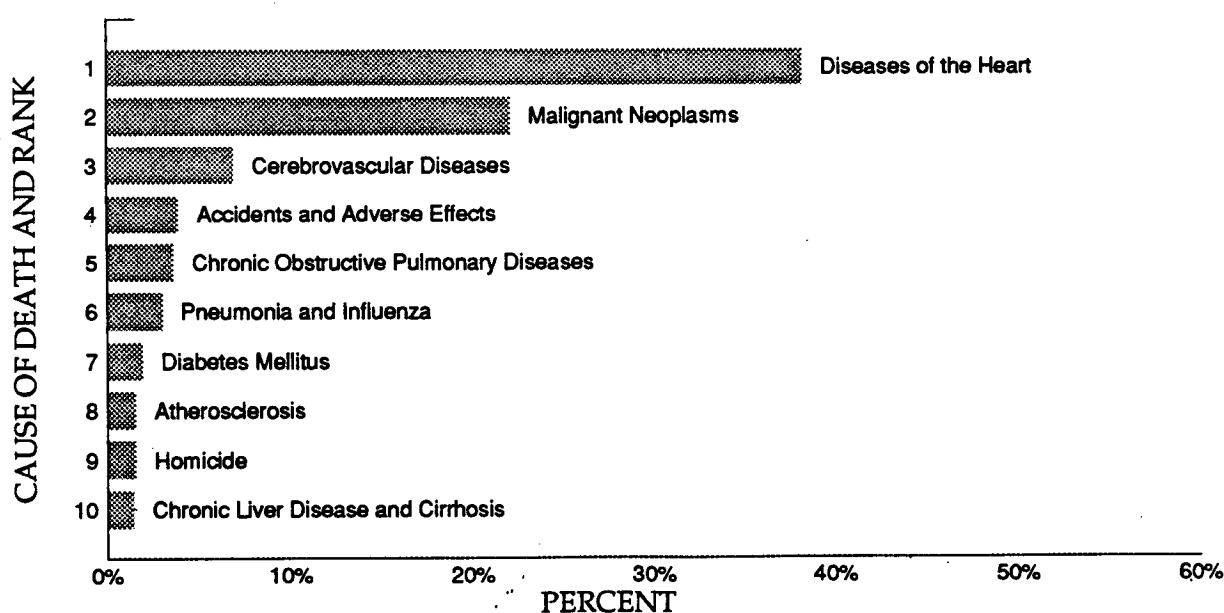


Table 2.7  
**Leading Causes of Death and Cause - Specific Rates**  
Michigan and United States Residents, 1987

RANK	CAUSE OF DEATH	NUMBER OF DEATHS		RATE	
		MICHIGAN	U.S. <sup>1</sup>	MICHIGAN	U.S. <sup>1</sup>
1	Diseases of the Heart	30,521	762,820	331.8	313.4
2	Malignant Neoplasms	17,669	477,190	192.1	196.1
3	Cerebrovascular Diseases	5,481	149,220	59.6	61.3
4	Accidents and Adverse Effects	3,143	94,840	34.2	39.0
5	Chronic Obstructive Pulmonary Diseases and Allied Conditions	2,868	78,270	31.2	32.2
6	Pneumonia and Influenza	2,377	70,120	25.8	28.8
7	Diabetes Mellitus	1,479	37,900	16.1	15.6
8	Atherosclerosis	1,168	23,200	12.7	9.5
9	Homicide	1,168	20,580	12.7	8.5
10	Chronic Liver Disease and Cirrhosis	1,099	26,050	11.9	10.7
Sub Total		66,973	1,740,190	728.0	818.1
All Other Causes		12,822	386,810	139.4	181.9
Total		79,795	2,127,000	867.3	874.0

<sup>1</sup> United States data are estimates based on a 10 percent sample of deaths.

rankings for the last eight years. Homicide was listed among the 10 leading causes of death for the first time since 1978 when it was the 10th leading cause of death. In 1987, homicide was tied with atherosclerosis for 8th leading cause, but was officially 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 1987.

Suicide did not rank among the 10 leading causes of death in 1987. In recent years it had generally ranked as the 10th leading cause of death.

Crude death rates in Michigan were higher in 1987 than in 1986 for three of the ten leading causes. The rates were higher in 1987 for malignant neoplasms, cerebrovascular disease and homicide. The rates were lower for

diseases of the heart, accidents and adverse effects, chronic obstructive pulmonary diseases and allied conditions, pneumonia and influenza, diabetes mellitus, atherosclerosis, and chronic liver disease and cirrhosis.

Through the 7th leading cause of death, the order of the leading causes of death for Michigan and the United States were similar for 1987 (Table 2.7). For the United States, suicide was the 8th leading cause of death with 30,980 attributed deaths and a rate of 12.7. Homicide was not nationally ranked among the 10 leading causes of death. 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, homicide 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 pur-

poses 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 dropped out of the 10 leading causes of death for the first time since 1963. The number of deaths due to suicide in 1987 was 1,084, eighty-four fewer than the number of homicide deaths.

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 and influenza, with pneumonia and influenza ranking 5th in 19 of the 29 years. For the past eleven years pneumonia and influenza 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 1987. Homicide, the 9th leading cause of death in 1987, was first ranked among the ten leading causes in 1972 when it ranked 9th. The 10th leading cause of death in 1987, 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, 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 two categories. Malignant neoplasms, accidents and homicides have the next most widespread significance, being present respectively in 27, 25 and 20 of the 32 age-sex-race groupings.

The variation in leading causes of death by age is most evident among deaths to infants under one year. This category has little similarity to any other age group. 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.

Homicide was one of the top five leading causes of death for all age groups under 50 years of age among both black males and females and was the leading cause for black males and females 15 to 34 years of age.

Homicide was the fourth or fifth leading cause of death for white males 1-34 years of

age. Among white females homicide was the second leading cause of death for ages 15-24 years and the fourth, fifth or sixth leading cause of death for ages 1-14 and 25-34 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 35-49 among white males. Accidents were one of the top leading causes of death among black males under 65 years of age and the leading cause for ages 1 to 14 years. Suicide was the third leading cause among black males age 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 or fifth leading cause of death for white female infants under 1 year of age. Suicide was the third or fourth leading cause for ages 15 to 49 years. For black females accidents were one of the top five causes for all age groups under 35 years of age and the leading cause for ages 1-14 years. Suicide was the fourth or 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.



Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987

TOTAL POPULATION <sup>1</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
All Ages	1. Diseases of the Heart	30,521	331.8
	2. Malignant Neoplasms	17,669	192.1
	3. Cerebrovascular Diseases	5,481	59.6
	4. Accidents	3,143	34.2
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	2,868	31.2
	All Causes	79,795	867.3
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	807	575.8
	2. Congenital Anomalies	270	192.7
	3. Diseases of the Heart	38	27.1
	4. Accidents	28	20.0
	5. Pneumonia and Influenza	22	15.7
	All Causes	1,538	1,097.5
1 - 4 Years	1. Accidents	120	21.9
	2. Congenital Anomalies	43	7.8
	3. Malignant Neoplasms	27	4.9
	4. Homicide	19	3.5
	5. Diseases of the Heart	13	2.4
	All Causes	316	57.6
5 - 14 Years	1. Accidents	162	11.8
	2. Malignant Neoplasms	48	3.5
	3. Homicide	26	1.9
	4. Congenital Anomalies	18	1.3
	5-6. Diseases of the Heart - Pneumonia and Influenza	10	0.7
	All Causes	348	25.4
15 - 24 Years	1. Accidents	645	42.9
	2. Homicide	370	24.6
	3. Suicide	206	13.7
	4. Malignant Neoplasms	84	5.6
	5. Diseases of the Heart	36	2.4
	All Causes	1,566	104.1
25 - 34 Years	1. Accidents	559	35.8
	2. Homicide	368	23.5
	3. Suicide	240	15.4
	4. Malignant Neoplasms	199	12.7
	5. Diseases of the Heart	166	10.6
	All Causes	2,192	140.3

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

TOTAL POPULATION <sup>1</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
35 - 49 Years	1. Malignant Neoplasms	1,125	64.1
	2. Diseases of the Heart	1,015	57.8
	3. Accidents	482	27.5
	4. Suicide	264	15.0
	5. Chronic Liver Disease and Cirrhosis	230	13.1
	All Causes	4,580	260.9
50 - 64 Years	1. Malignant Neoplasms	4,851	385.9
	2. Diseases of the Heart	4,644	369.4
	3. Cerebrovascular Diseases	581	46.2
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	424	33.7
	5. Chronic Liver Disease and Cirrhosis	420	33.4
	All Causes	13,521	1,075.6
65 and Over	1. Diseases of the Heart	24,599	2,318.7
	2. Malignant Neoplasms	11,332	1,068.2
	3. Cerebrovascular Diseases	4,665	439.7
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	2,342	220.8
	5. Pneumonia and Influenza	2,046	192.9
	All Causes	55,728	5,253.0

<sup>1</sup> Subtotals by sex and race do not add to the grand total as the race was not stated on records for 45 males and 22 females. In addition, the sex was not stated on 2 records for white and 3 other than white persons. Age groups do not add to respective totals because records with age not stated are included only in the total.

<sup>2</sup> 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.

<sup>3</sup> Rate per 100,000 population.

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

WHITE MALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
All Ages	1. Diseases of the Heart	13,527	352.1
	2. Malignant Neoplasms	8,105	211.0
	3. Cerebrovascular Diseases	1,836	47.8
	4. Accidents	1,804	47.0
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	1,532	39.9
	All Causes	34,758	904.8
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	243	419.3
	2. Congenital Anomalies	107	184.6
	3. Diseases of the Heart	17	29.3
	4. Accidents	10	17.3
	5. Pneumonia and Influenza	8	13.8
	All Causes	523	902.5
1 - 4 Years	1. Accidents	57	24.6
	2. Congenital Anomalies	22	9.5
	3. Malignant Neoplasms	13	5.6
	4. Homicide	7	3.0
	5. Meningitis	3	1.3
	All Causes	138	59.7
5 - 14 Years	1. Accidents	85	14.8
	2. Malignant Neoplasms	29	5.0
	3. Congenital Anomalies	10	1.7
	4. Diseases of the Heart	5	0.9
	5. Homicide	4	0.7
	All Causes	166	28.8
15 - 24 Years	1. Accidents	417	65.7
	2. Suicide	158	24.9
	3. Malignant Neoplasms	47	7.4
	4. Homicide	40	6.3
	5. Diseases of the Heart	16	2.5
	All Causes	775	122.1
25 - 34 Years	1. Accidents	383	57.6
	2. Suicide	162	24.4
	3. Malignant Neoplasms	77	11.6
	4-5. Diseases of the Heart - Homicide	68	10.2
	All Causes	1,000	150.3

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

WHITE MALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
35 - 49 Years	1. Diseases of the Heart	574	76.2
	2. Malignant Neoplasms	401	53.2
	3. Accidents	287	38.1
	4. Suicide	165	21.9
	5. Chronic Liver Disease and Cirrhosis	85	11.3
	All Causes	1,993	264.5
50 - 64 Years	1. Diseases of the Heart	2,675	499.8
	2. Malignant Neoplasms	2,190	409.2
	3. Chronic Liver Disease and Cirrhosis	225	42.0
	4. Cerebrovascular Diseases	223	41.7
	5. Accidents	202	37.7
	All Causes	6,732	1,257.7
65 and Over	1. Diseases of the Heart	10,170	2,621.7
	2. Malignant Neoplasms	5,345	1,377.9
	3. Cerebrovascular Diseases	1,554	400.6
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	1,299	334.9
	5. Pneumonia and Influenza	845	217.8
	All Causes	23,430	6,040.1

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
 Michigan Residents, 1987 (continued)

BLACK MALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
All Ages	1. Diseases of the Heart	1,933	334.1
	2. Malignant Neoplasms	1,287	222.4
	3. Homicide	662	114.4
	4. Cerebrovascular Diseases	350	60.5
	5. Accidents	290	50.1
	All Causes	6,599	1,140.5
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	212	1,782.4
	2. Congenital Anomalies	30	252.2
	3. Homicide	6	50.4
	4. Diseases of the Heart	5	42.0
	5. Accidents	4	33.6
	All Causes	324	2,724.1
1 - 4 Years	1. Accidents	16	36.0
	2-3. Homicide - Congenital Anomalies	4	9.0
	4-10. Certain Conditions Originating in the Perinatal Period - Malignant Neoplasms - Benign Neoplasms - Diseases of the Heart - Cerebrovascular Diseases - Pneumonia and Influenza - Chronic Obstructive Pulmonary Diseases and Allied Conditions	1	2.3
	All Causes	36	81.0
5 - 14 Years	1. Accidents	15	13.0
	2. Homicide	12	10.4
	3. Malignant Neoplasms	5	4.3
	4. Congenital Anomalies	3	2.6
	5-6. Suicide - Chronic Obstructive Pulmonary Diseases and Allied Conditions	2	1.7
	All Causes	46	39.9
15 - 24 Years	1. Homicide	254	222.0
	2. Accidents	53	46.3
	3. Suicide	24	21.0
	4. Diseases of the Heart	6	5.2
	5-6. Malignant Neoplasms - Congenital Anomalies	5	4.4
	All Causes	390	340.8
25 - 34 Years	1. Homicide	215	223.1
	2. Accidents	50	51.9
	3. Diseases of the Heart	43	44.6
	4. Suicide	30	31.1
	5. HTLV-III/LAV Infection (AIDS)	23	23.9
	All Causes	522	541.6

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
 Michigan Residents, 1987 (continued)

BLACK MALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
35 - 49 Years	1. Diseases of the Heart	193	208.1
	2. Homicide	115	124.0
	3. Chronic Liver Disease and Cirrhosis	88	94.9
	4. Malignant Neoplasms	81	87.3
	5. Accidents	64	69.0
	All Causes	891	960.8
50 - 64 Years	1. Diseases of the Heart	517	835.2
	2. Malignant Neoplasms	419	676.9
	3. Cerebrovascular Diseases	85	137.3
	4. Chronic Liver Disease and Cirrhosis	58	93.7
	5. Accidents	41	66.2
	All Causes	1,421	2,295.7
65 and Over	1. Diseases of the Heart	1,168	2,801.0
	2. Malignant Neoplasms	770	1,846.6
	3. Cerebrovascular Diseases	215	515.6
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	118	283.0
	5. Pneumonia and Influenza	94	225.4
	All Causes	2,968	7,117.7

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

WHITE FEMALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
All Ages	1. Diseases of the Heart	13,189	329.0
	2. Malignant Neoplasms	7,217	180.1
	3. Cerebrovascular Diseases	2,874	71.7
	4. Pneumonia and Influenza	1,106	27.6
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	1,078	26.9
	All Causes	33,071	825.1
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	195	351.7
	2. Congenital Anomalies	96	173.2
	3. Pneumonia and Influenza	9	16.2
	4-5. Diseases of the Heart - Accidents	8	14.4
	All Causes	430	775.6
1 - 4 Years	1. Accidents	41	18.7
	2. Congenital Anomalies	13	5.9
	3. Malignant Neoplasms	11	5.0
	4. Diseases of the Heart	5	2.3
	5-6. Pneumonia and Influenza - Homicide	4	1.8
	All Causes	107	48.8
5 - 14 Years	1. Accidents	43	7.9
	2. Malignant Neoplasms	11	2.0
	3. Congenital Anomalies	4	0.7
	4-5. Diseases of the Heart - Homicide	3	0.6
	All Causes	87	16.0
15 - 24 Years	1. Accidents	158	25.6
	2. Homicide	31	5.0
	3. Malignant Neoplasms	28	4.5
	4. Suicide	18	2.9
	5. Diseases of the Heart	8	1.3
	All Causes	300	48.6
25 - 34 Years	1. Accidents	100	15.1
	2. Malignant Neoplasms	93	14.0
	3. Suicide	40	6.0
	4. Homicide	33	5.0
	5. Diseases of the Heart	29	4.4
	All Causes	422	63.6

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

WHITE FEMALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
35 - 49 Years	1. Malignant Neoplasms	519	67.6
	2. Diseases of the Heart	153	19.9
	3. Accidents	99	12.9
	4. Suicide	65	8.5
	5. Cerebrovascular Diseases	61	7.9
	All Causes	1,182	153.9
50 - 64 Years	1. Malignant Neoplasms	1,896	330.2
	2. Diseases of the Heart	1,131	196.9
	3. Cerebrovascular Diseases	197	34.3
	4. Chronic Obstructive Pulmonary Diseases and Allied Conditions	176	30.6
	5. Diabetes Mellitus	103	17.9
	All Causes	4,311	750.7
65 and Over	1. Diseases of the Heart	11,852	2,091.7
	2. Malignant Neoplasms	4,659	822.3
	3. Cerebrovascular Diseases	2,596	458.2
	4. Pneumonia and Influenza	1,008	177.9
	5. Chronic Obstructive Pulmonary Diseases and Allied Conditions	873	154.1
	All Causes	26,231	4,629.5



Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

BLACK FEMALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
All Ages	1. Diseases of the Heart	1,777	272.5
	2. Malignant Neoplasms	996	152.8
	3. Cerebrovascular Diseases	405	62.1
	4. Homicide	160	24.5
	5. Certain Conditions Originating in the Perinatal Period	149	22.9
	All Causes	5,012	768.7
Under 1 Year	1. Certain Conditions Originating in the Perinatal Period	148	1,254.0
	2. Congenital Anomalies	30	254.2
	3. Diseases of the Heart	8	67.8
	4. Accidents	6	50.8
	5. Homicide	4	33.9
	All Causes	240	2,033.6
1 - 4 Years	1. Accidents	6	13.9
	2. Diseases of the Heart	5	11.6
	3-4. Congenital Anomalies - Homicide	4	9.2
	5-10. Malignant Neoplasms - Cerebrovascular Diseases - Pneumonia and Influenza - Chronic Obstructive Pulmonary Diseases and Allied Conditions - Certain Conditions Originating in the Perinatal Period - Septicimia	1	2.3
	All Causes	33	76.3
5 - 14 Years	1. Accidents	17	15.0
	2. Homicide	7	6.2
	3. Malignant Neoplasms	3	2.6
	4-5. Anemia - Diseases of the Heart	2	1.8
	All Causes	43	38.0
15 - 24 Years	1. Homicide	43	36.1
	2. Accidents	11	9.2
	3. Diseases of the Heart	6	5.0
	4-5. Malignant Neoplasms - Suicide	4	3.4
	All Causes	88	74.0
25 - 34 Years	1. Homicide	49	42.4
	2. Diseases of the Heart	26	22.5
	3. Accidents	22	19.1
	4. Malignant Neoplasms	20	17.3
	5. Chronic Liver Disease and Chirrhosis	14	12.1
	All Causes	232	200.9

Table 2.8  
**Leading Causes of Death and Cause-Specific Rates by Age, Sex and Race**  
Michigan Residents, 1987 (continued)

BLACK FEMALES <sup>2</sup>			
AGE	RANK AND CAUSE OF DEATH	NUMBER	RATE <sup>3</sup>
35 - 49 Years	1. Malignant Neoplasms	119	103.7
	2. Diseases of the Heart	93	81.0
	3. Chronic Liver Disease and Cirrhosis	37	32.2
	4. Homicide	35	30.5
	5. Cerebrovascular Diseases	31	27.0
	All Causes	484	421.7
50 - 64 Years	1. Malignant Neoplasms	332	440.2
	2. Diseases of the Heart	293	388.5
	3. Cerebrovascular Diseases	74	98.1
	4. Chronic Liver Disease and Cirrhosis	29	38.4
	5. Diabetes Mellitus	27	35.8
	All Causes	978	1,296.6
65 and Over	1. Diseases of the Heart	1,344	2,279.3
	2. Malignant Neoplasms	517	876.8
	3. Cerebrovascular Diseases	288	488.4
	4. Diabetes Mellitus	95	161.1
	5. Pneumonia and Influenza	87	147.5
	All Causes	2,914	4,941.8

## DISEASES OF THE HEART

The leading cause of death, heart disease, caused the death of 30,521 Michigan residents in 1987. That was more than the number of deaths from the next four largest categories combined. There were 749 less deaths from heart disease in 1987 than in 1986. The crude rate of 331.8 deaths per 100,000 population from this cause in 1987 is 3.0 percent lower than the rate of 342.0 in 1986.

The median age of persons who died from heart disease was 77 years, compared to a median of 73 years for deaths from all causes. Of the 30,521 deaths due to diseases of the heart, 50.8 percent were to males. The median age at death for males was 73 years compared to 81 years for females. The median age of 73 years for white males exceeded that for black males by 5 years, but was one year less than the median for males of other races. The median age at death for white females was 81 years, 5 years above that for black females and 11 years above that for females of other races (Table 2.9).

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 51 persons below 5 years of age or about 2.8 percent of all deaths in this age group. In contrast, 50.0 percent of all deaths in the age group 85 and over were attributed to this cause in 1987. The heart disease death rate was 7,204.9 per 100,000 persons over 84 years of age in 1987.

Examination of Table 2.10 reveals that the heart disease death rate for males was greater than that for females (346.4 compared to 317.9 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 higher than female rates for all age groups except persons 1 to 14 years of age where the rate for females was twice as high as the male rate. The greatest relative differentials occurred from age 35 through 64 with rates for males ranging from 2.4 to 3.4 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 7700.8 for males was 10.1 percent above that for females (6995.6). The age-adjusted death rate for males was 1.8 times that for female.

A comparison of 1987 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 352.3 compared to 334.1 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 1987 was 28.3 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 ages below 85 with the relative differentials steadily decreasing with advancing age. Beyond age 84 the rate for white females exceeded that for black females by 1.5 percent.

Although the rate for white females of all ages (329.1) was greater than the comparable rate for black females (272.7), this relationship is reversed when the differing age distributions of the two populations are considered.

Table 2.9  
Deaths Due to Diseases of the Heart by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	38	22	16	25	17	8	13	5	8	-	-	-
1 - 4	13	3	10	7	2	5	6	1	5	-	-	-
5 - 9	4	3	1	3	3	-	1	-	1	-	-	-
10 - 14	6	2	4	5	2	3	1	-	1	-	-	-
15 - 19	19	11	8	14	9	5	5	2	3	-	-	-
20 - 24	17	11	6	10	7	3	7	4	3	-	-	-
25 - 29	55	35	20	35	24	11	20	11	9	-	-	-
30 - 34	111	76	35	62	44	18	49	32	17	-	-	-
35 - 39	201	159	42	121	98	23	80	61	19	-	-	-
40 - 44	316	238	78	229	178	51	85	58	27	2	2	-
45 - 49	498	372	126	377	298	79	121	74	47	-	-	-
50 - 54	813	593	220	651	490	161	156	98	58	5	4	1
55 - 59	1,463	1,041	422	1,193	866	327	261	170	91	8	4	4
60 - 64	2,368	1,575	793	1,962	1,319	643	393	249	144	11	5	6
65 - 69	3,245	1,993	1,252	2,769	1,715	1,054	463	272	191	12	5	7
70 - 74	4,054	2,375	1,679	3,583	2,113	1,470	462	257	205	8	5	3
75 - 79	4,572	2,309	2,263	4,050	2,070	1,980	504	228	276	17	11	6
80 - 84	4,779	2,174	2,605	4,312	1,960	2,352	457	209	248	8	4	4
85 - 89	4,037	1,422	2,615	3,683	1,296	2,387	347	123	224	5	2	3
90 +	3,912	1,100	2,812	3,625	1,016	2,609	279	79	200	8	5	3
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	30,521	15,514	15,007	26,716	13,527	13,189	3,710	1,933	1,777	84	47	37
Median Age At Last Birthday	77	73	81	77	73	81	72	68	76	73	74	70

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

Table 2.10  
Heart Disease Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	331.8	346.4	317.9	340.5	352.3	329.1	301.6	334.1	272.7
Under 1 Year	27.1	30.8	23.3	22.0	29.3	14.4	54.9	42.0	67.8
1 - 14 Years	1.2	0.8	1.6	1.0	0.9	1.0	2.5	*	4.5
15 - 24 Years	2.4	2.9	1.9	1.9	2.5	1.3	5.1	5.2	5.0
25 - 34 Years	10.6	14.4	7.0	7.3	10.2	4.4	32.6	44.6	22.5
35 - 44 Years	40.6	63.6	18.5	31.9	50.6	13.4	107.3	173.4	54.1
45 - 54 Years	143.2	217.0	73.5	128.2	200.3	58.7	271.5	377.9	185.8
55 - 64 Years	464.5	666.2	281.2	432.8	626.1	255.1	733.8	1034.4	483.3
65 - 74 Years	1164.6	1579.7	836.8	1133.1	1545.5	806.7	1480.0	1943.3	1122.5
75 - 84 Years	2888.0	3653.5	2420.9	2853.8	3645.9	2374.0	3318.0	3823.3	2989.2
85 Years and Over	7204.9	7700.8	6995.6	7260.8	7815.8	7029.7	6825.9	6629.5	6923.6
Age-Adjusted Rate <sup>2</sup>	188.7	252.1	137.6	180.5	242.9	130.1	261.2	339.0	199.9

<sup>1</sup> 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.

<sup>2</sup> 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.

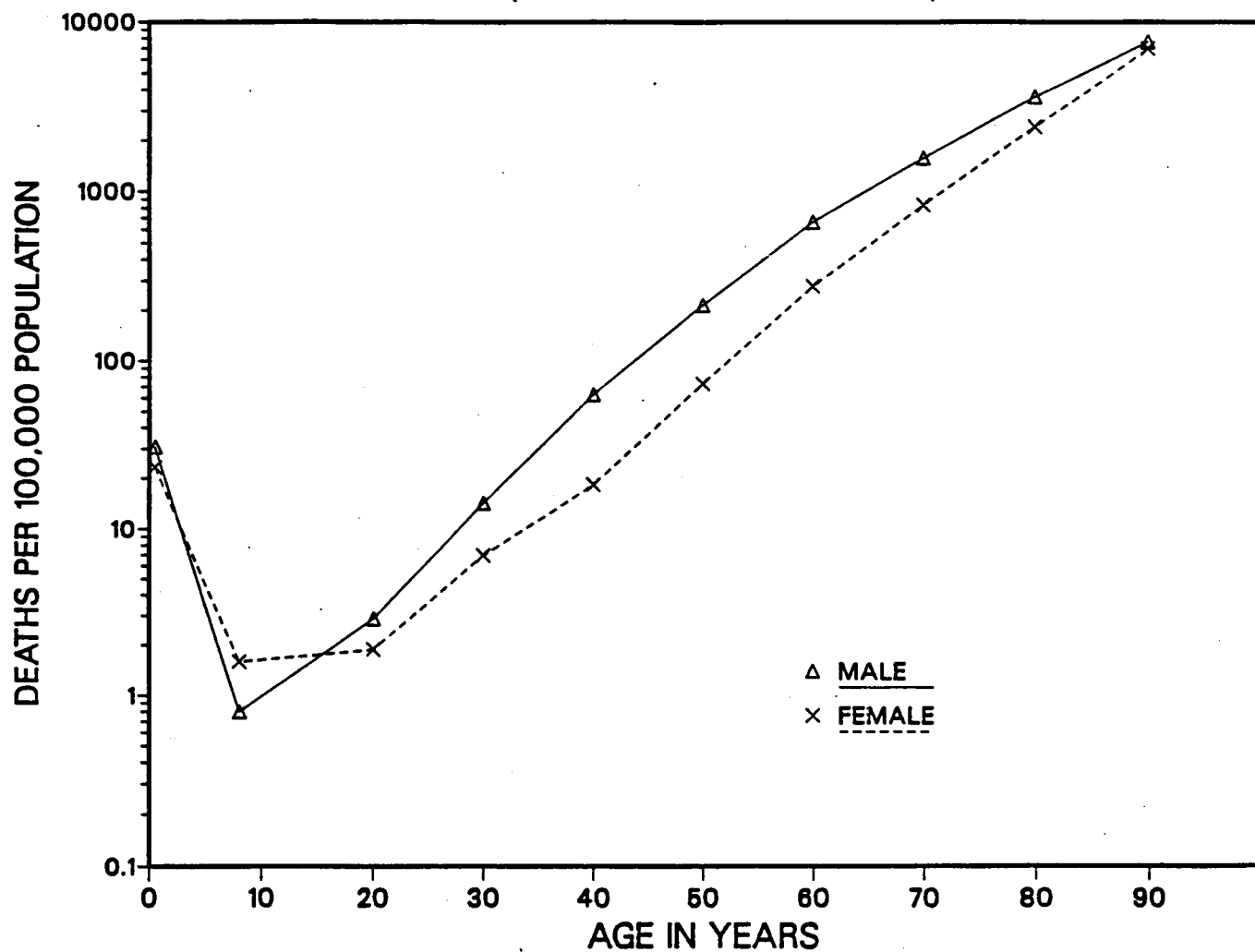
The age-adjusted rate for black females was 53.7 percent higher than that for white females.

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 rate of 342.0 for 1986 was 0.3 percent below the peak rate observed in 1965.

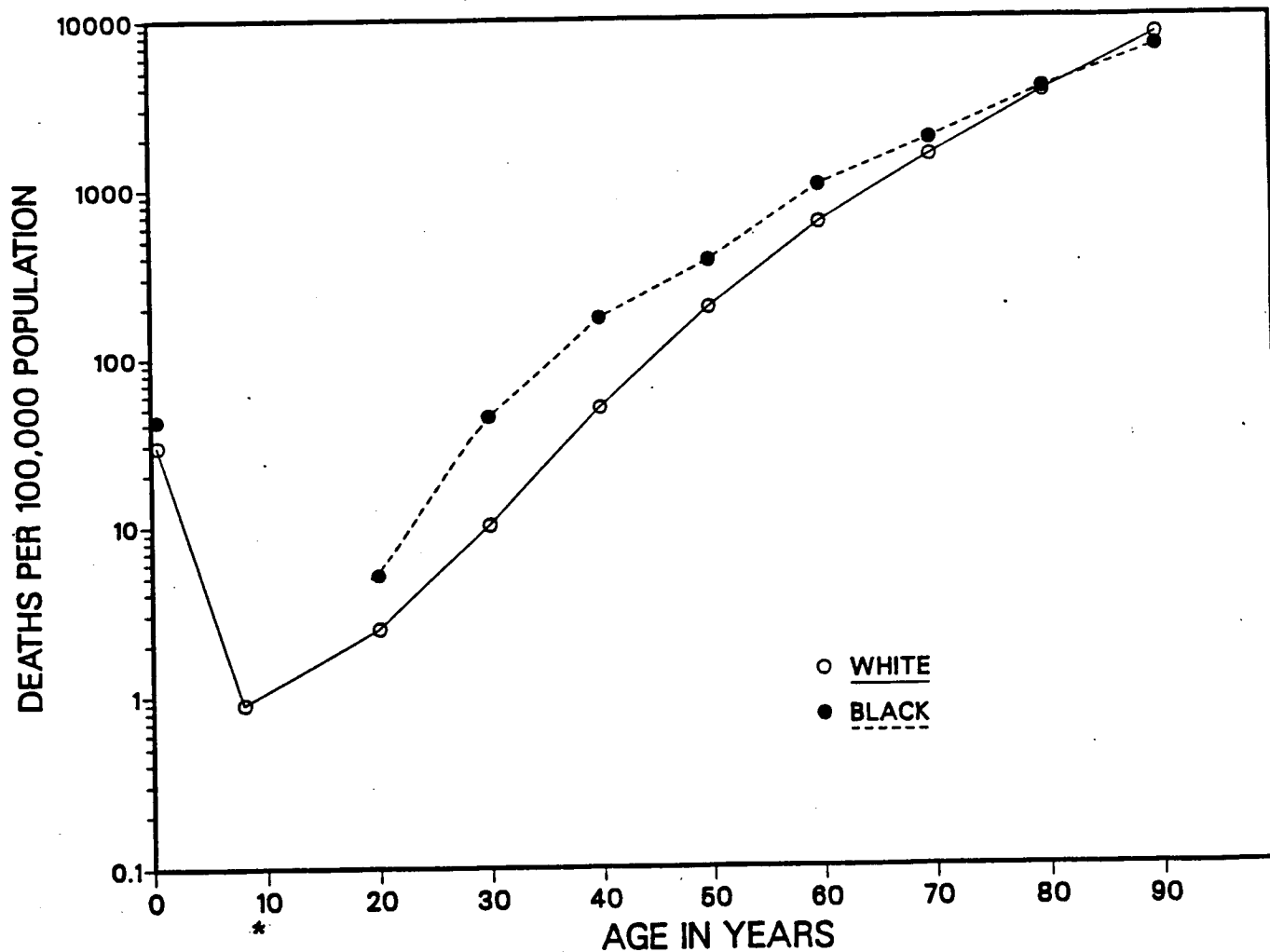
The heart disease death rate for Michigan was consistently close to the national rate until 1947. From 1947 through 1981 the crude rate for Michigan was below that of the nation but

FIGURE 2.6  
AGE-SPECIFIC HEART DISEASE DEATH RATES<sup>1</sup>  
BY SEX, MICHIGAN RESIDENTS, 1987



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

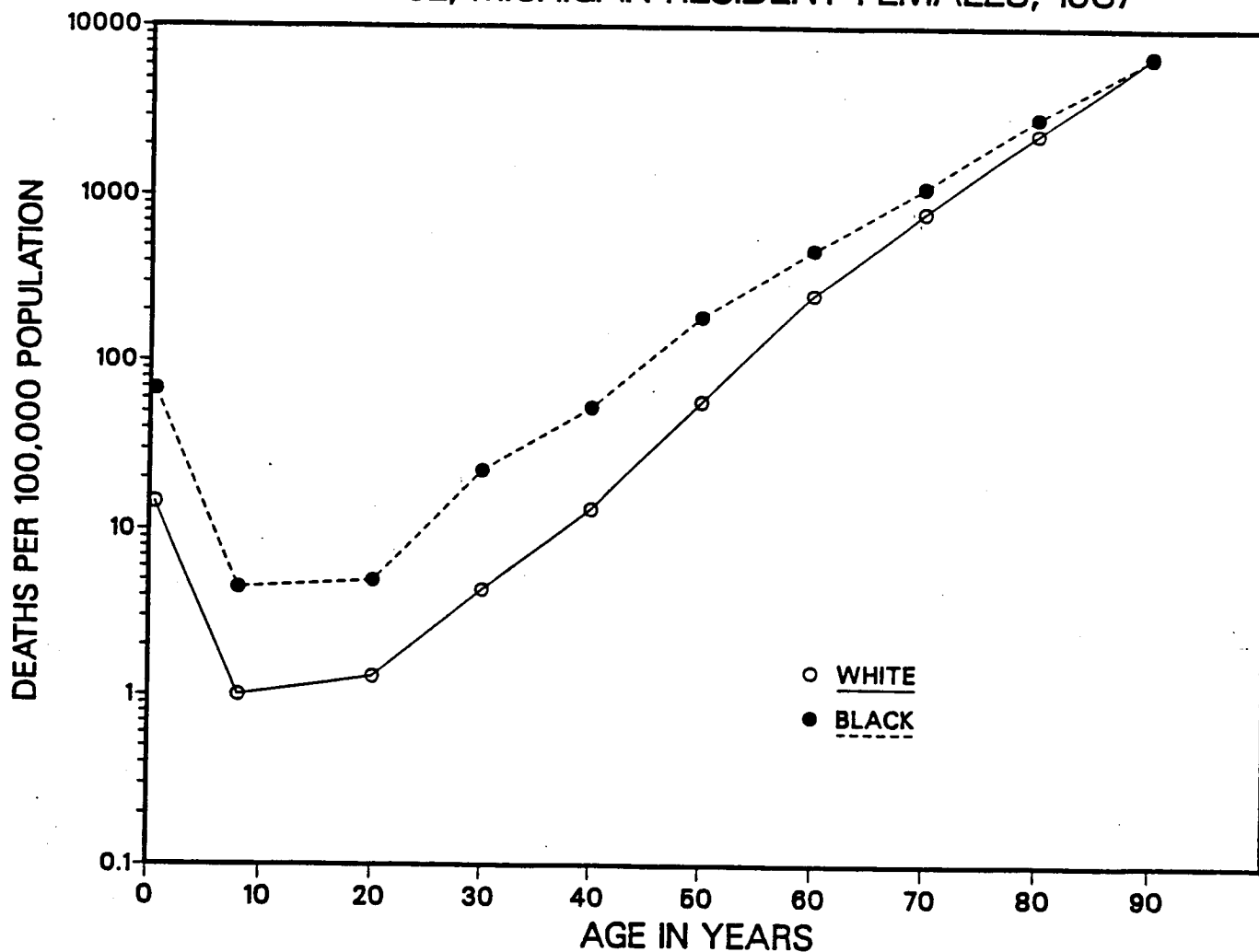
FIGURE 2.7  
AGE-SPECIFIC HEART DISEASE DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENT MALES, 1987



<sup>1</sup> 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.

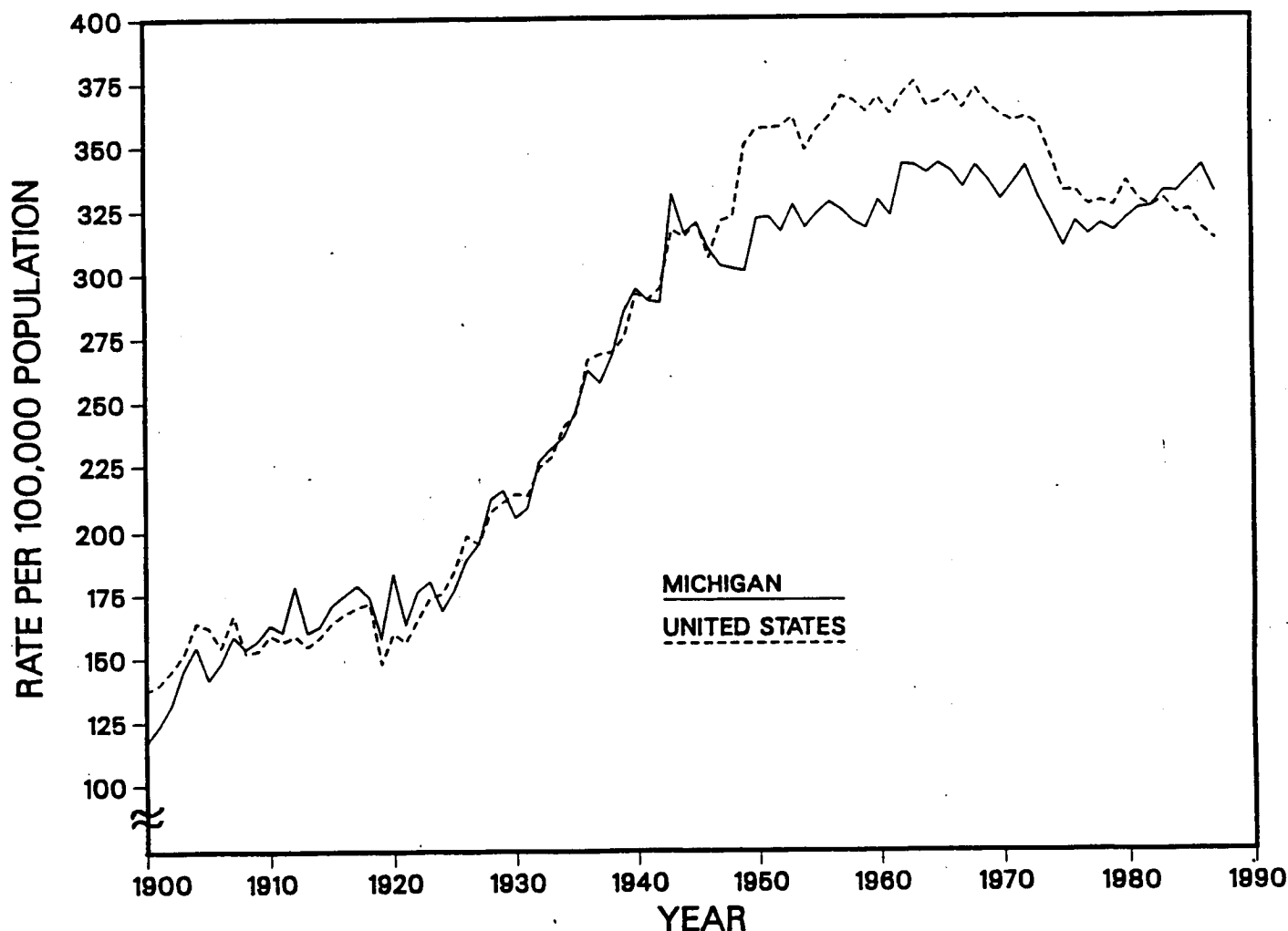
FIGURE 2.8  
AGE-SPECIFIC HEART DISEASE DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENT FEMALES, 1987



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



FIGURE 2.9  
HEART DISEASE DEATH RATES, MICHIGAN AND  
UNITED STATES RESIDENTS, 1900-1987<sup>1</sup>



<sup>1</sup> National rates are from death registration states for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>2</sup> 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.

by a progressively lesser degree in later years. From 1982 through 1987 rates for Michigan were above the national rates with the 1987 Michigan rate of 331.8, 5.9 percent above the national provisional rate of 313.4.

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 1987 except 1980. The age-adjusted rate for Michigan declined by 27.5 percent between 1970 and 1987 whereas the age-adjusted rate for the nation declined by 33.0 percent (see Technical Notes). Since 1970, the age-adjusted rate for Michigan has been consistently above that for the nation with the 1987 Michigan rate 11.1 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 1987 the Michigan age-adjusted heart disease death rate for other than white females exceeded the rate for white females by 47.3 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 1987 the rate for other than white males was 33.0 percent higher than

the rate for white males. Nationally the rates were highest 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 1986.

The most prevalent type of heart disease death was old myocardial infarction and other forms of chronic ischemic heart disease (10,790 deaths in 1987) (Table 2.12). The second most frequent was acute myocardial infarction, commonly referred to as a "coronary". In 1987 there were 10,285 deaths attributed to this cause. Together, these causes accounted for 69.1 percent of all Michigan resident deaths from heart disease. Of the remaining 9,446 heart disease deaths, 79.5 percent were attributed to all other and ill-defined forms of heart disease (5,969 deaths) and heart failure (1,542 deaths).

The probabilities of eventually dying from heart disease, based on Michigan resident death data from 1985, 1986 and 1987 were 0.401 for males and 0.429 for females at 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 0.471 for males and 0.517 for females. At all ages the probability of death eventually being caused by heart disease was greater for females. These differentials by sex were smallest from ages 35 to 49. 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 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

Table 2.11  
Age-Adjusted Heart Disease Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987

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
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 <sup>3</sup>	169.9	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

Table 2.12  
Deaths Due to Diseases of the Heart by Specific Cause  
Michigan Residents, 1987

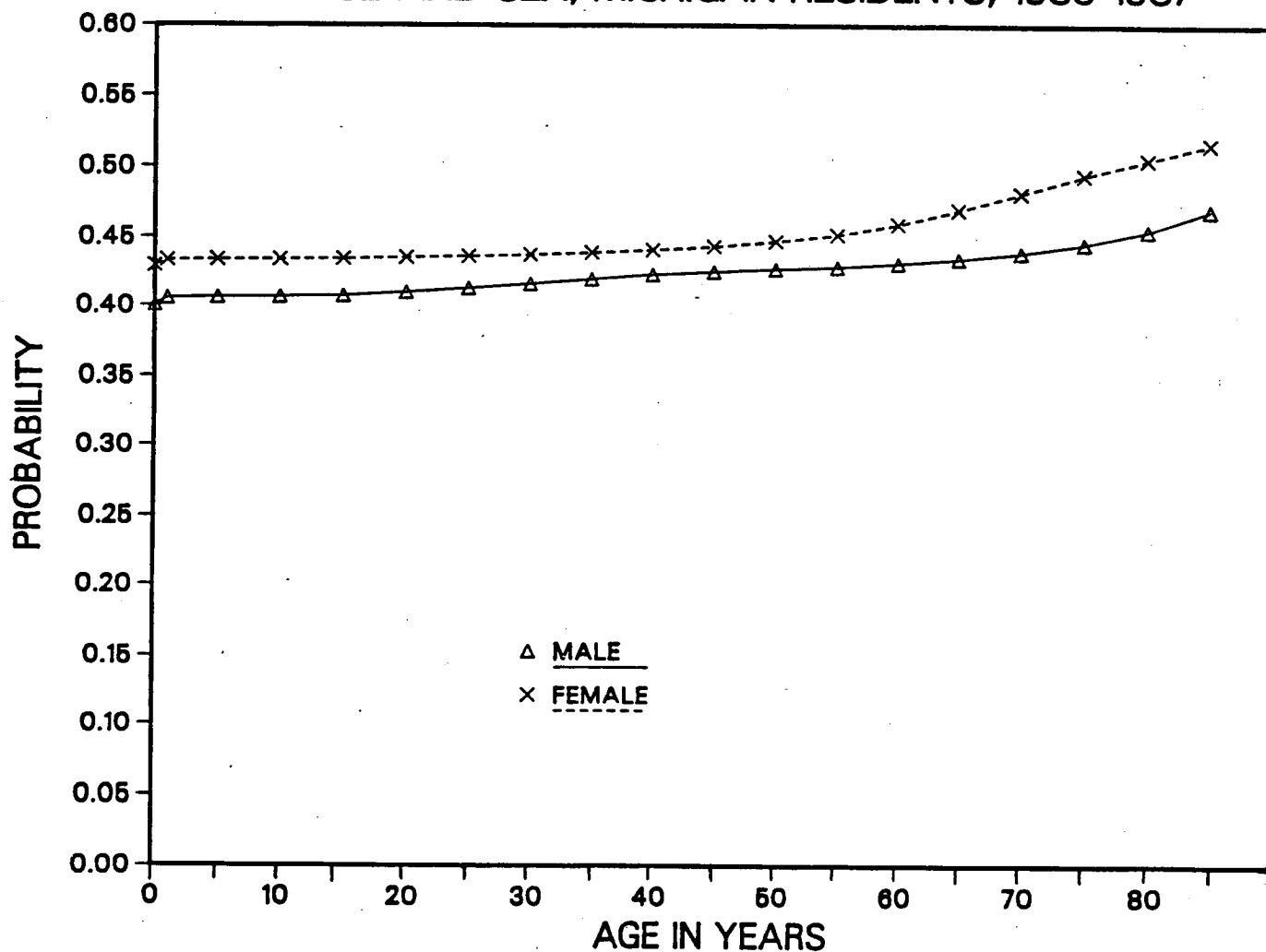
282 LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
139	Old Myocardial Infarction and Other Forms of Chronic Ischemic Heart Disease	10,790	35.4
136	Acute Myocardial Infarction	10,285	33.7
148	All Other and Ill - Defined Forms of Heart Disease	5,969	19.6
146	Heart Failure	1,542	5.1
133	Hypertensive Heart Disease	649	2.1
140	Diseases of Pulmonary Circulation	360	1.2
144	Aortic Valve Disorders	210	0.7
128	Diseases of Mitral Valve	118	0.4
135	Hypertensive Heart and Renal Disease	97	0.3
145	All Other Diseases of Endocardium	88	0.3
131	All Other Chronic Rheumatic Heart Disease	83	0.3
137	Other Acute and Subacute Forms of Ischemic Heart Disease	64	0.2
143	Mitral Valve Disorders	63	0.2
147	Myocarditis, Unspecified and Myocardial Degeneration	45	0.1
138	Angina Pectoris	44	0.1
130	Diseases of Mitral and Aortic Valves	39	0.1
141	Acute and Subacute Endocarditis	33	0.1
142	Acute Pericarditis, Acute Myocarditis, and Other Diseases of Pericardium	32	0.1
129	Diseases of Aortic Valve	6	0.0
127	Acute Rheumatic Fever	4	0.0
TOTAL		30,521	100.0

<sup>1</sup> 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.

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.

FIGURE 2.10  
PROBABILITY OF EVENTUALLY DYING FROM HEART DISEASE  
BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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.

## CANCER

Of 79,795 Michigan resident deaths in 1987, 17,669 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 57.9 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 17,669 cancer deaths in 1987 occurring to Michigan residents, 53.3 percent were to males. The median age at death was 69 years for white males and females. The median ages at death for black persons who died of cancer were 67 years for males and 65 years for females. The median age at death for persons of all other races was 71 years for males and 68 years for females.

Cancer death rates by age, race and sex are presented in Table 2.14. The cancer death rate across all ages in 1987 was higher for males (210.4) than for females (174.7). 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 35 through 54 years of age. For those ages with sufficient data to calculate rates, rates for males were higher than those of females below age 15 and age 55 and above. After 54 years of age the relative differential increased, from 34.9 percent in the 55-64 year age group to 94.0 percent in the age group 85 years and over. The age-adjusted cancer death rate for males was 42.3 percent above that for females.

Cancer death rates for white and black males recorded in Table 2.14 are graphically displayed in Figure 2.12. For those ages with sufficient data to calculate rates, black males had rates lower than white males for ages under 35 years. Rates for black males exceeded those for white males at ages above 34 years. The largest relative differential occurred in the age group 45-54 years, where the rate for black males exceeded by 101.3 percent the rate for white males. The crude death rate for black males (222.6) was above the corresponding rates for white (211.1) males. The age-adjusted cancer death rate for black males was 46.4 percent above the rate for white males.

Except for females 85 years and over, 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 23.6 percent higher than the rates 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 51.6 percent. The crude rate for white females was 17.9 percent higher than the crude rate for black females. The age-adjusted rate for black females, however, was 25.4 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). In 1987, the crude cancer death rate increased, following a decrease in 1986 that was the first decrease in cancer rates since 1974. The 1987 rate of 192.1 was 1.4 percent higher than the

Table 2.13  
Deaths Due to Cancer by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	3	3	-	3	3	-	-	-	-	-	-	-
1 - 4	27	15	12	24	13	11	2	1	1	1	1	-
5 - 9	24	16	8	20	13	7	4	3	1	-	-	-
10 - 14	24	18	6	20	16	4	4	2	2	-	-	-
15 - 19	35	23	12	33	21	12	2	2	-	-	-	-
20 - 24	49	29	20	42	26	16	7	3	4	-	-	-
25 - 29	74	37	37	64	33	31	9	4	5	1	-	1
30 - 34	125	46	79	106	44	62	17	2	15	2	-	2
35 - 39	206	89	117	165	72	93	41	17	24	-	-	-
40 - 44	343	147	196	283	123	160	58	23	35	2	1	1
45 - 49	576	248	328	472	206	266	101	41	60	3	1	2
50 - 54	908	444	464	741	353	388	162	89	73	4	2	2
55 - 59	1,583	830	753	1,337	697	640	242	132	110	4	1	3
60 - 64	2,360	1,342	1,018	2,008	1,140	868	347	198	149	4	4	-
65 - 69	2,774	1,584	1,189	2,413	1,357	1,055	352	225	127	9	2	7
70 - 74	2,799	1,576	1,223	2,456	1,375	1,081	334	197	137	7	4	3
75 - 79	2,439	1,319	1,120	2,155	1,162	993	277	154	123	7	3	4
80 - 84	1,783	963	820	1,589	846	743	183	111	72	6	3	3
85 - 89	1,015	471	544	916	409	507	96	59	37	2	2	-
90 +	522	221	301	476	196	280	45	24	21	1	1	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	17,669	9,421	8,247	15,323	8,105	7,217	2,283	1,287	996	53	25	28
Median Age At Last Birthday	69	69	69	69	69	69	67	67	65	68	71	68

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

Table 2.14  
Cancer Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	192.1	210.4	174.7	195.3	211.1	180.2	185.6	222.6	152.8
Under 1 Year	*	*	*	*	*	*	*	*	*
1 - 14 Years	3.9	5.0	2.8	4.1	5.2	2.9	3.2	3.8	*
15 - 24 Years	5.6	6.9	4.3	6.0	7.4	4.5	3.9	4.4	*
25 - 34 Years	12.7	10.7	14.7	12.8	11.6	14.0	12.3	6.2	17.3
35 - 44 Years	43.1	37.8	48.2	40.8	35.8	45.7	64.4	58.3	69.3
45 - 54 Years	162.1	155.6	168.3	151.3	141.9	160.2	257.8	285.6	235.4
55 - 64 Years	478.1	553.1	409.9	458.5	525.7	396.8	660.8	814.7	532.7
65 - 74 Years	889.2	1142.8	688.9	868.6	1102.7	683.4	1097.6	1550.2	748.3
75 - 84 Years	1303.9	1859.8	964.8	1279.2	1818.9	952.2	1586.6	2318.5	1110.3
85 Years and Over	1393.1	2113.0	1089.2	1382.6	2044.3	1107.1	1548.4	2756.8	947.1
Age-Adjusted Rate <sup>2</sup>	136.9	165.4	116.2	132.3	158.7	113.4	180.6	232.4	142.2

<sup>1</sup> 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.

<sup>2</sup> 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.

1986 rate. The lowest observed rate for Michigan was 59.3 in 1902.

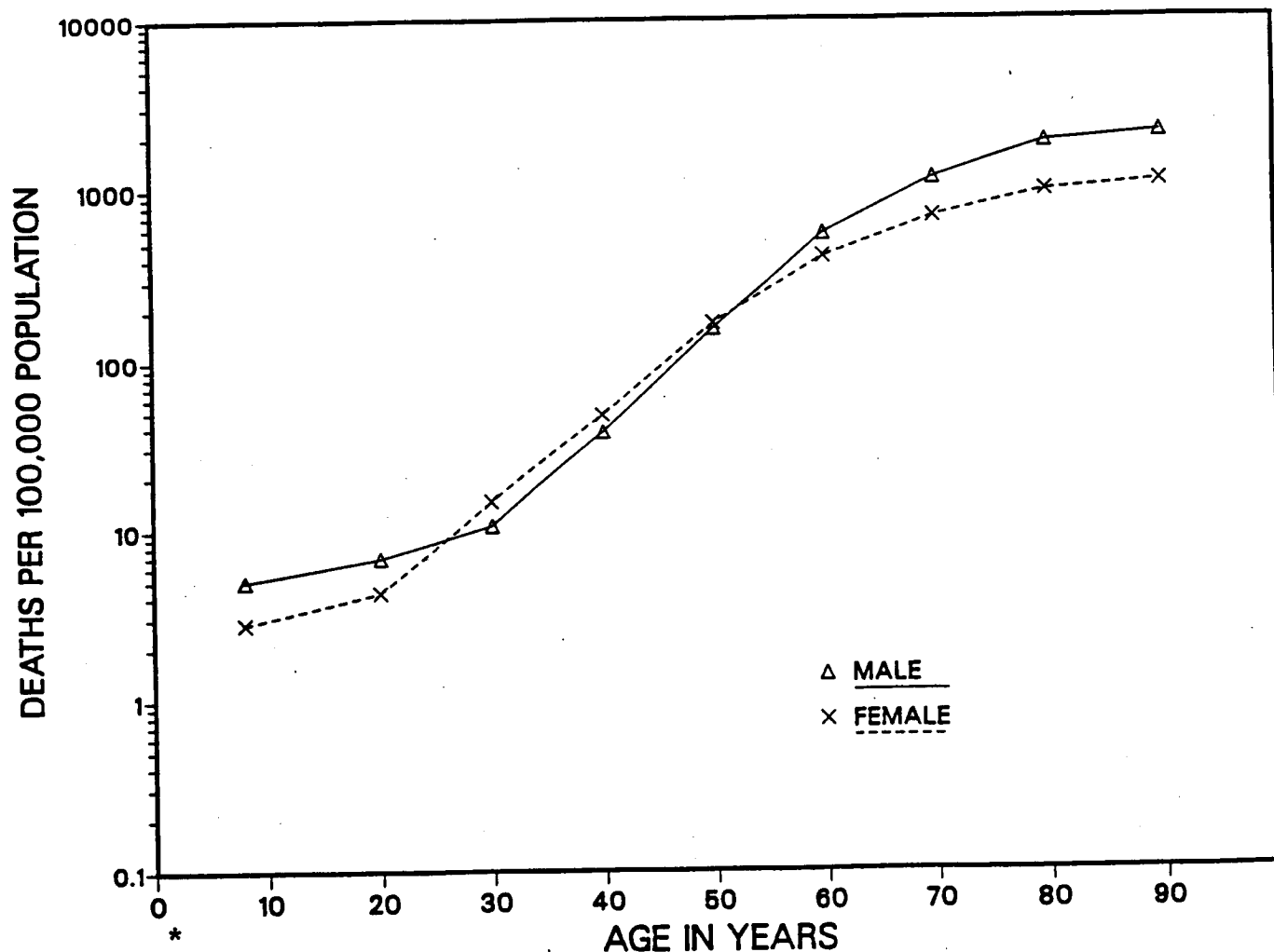
Michigan's cancer death rate was less than the national rate from 1900 through 1915. During the period 1916 through 1947 Michigan's rate was generally close to the national rate. Since 1948, the state rate has been consistently less than the national cancer death rate. The national provisional cancer

death rate in 1987 was 196.1, 2.1 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 1987, Michigan age-



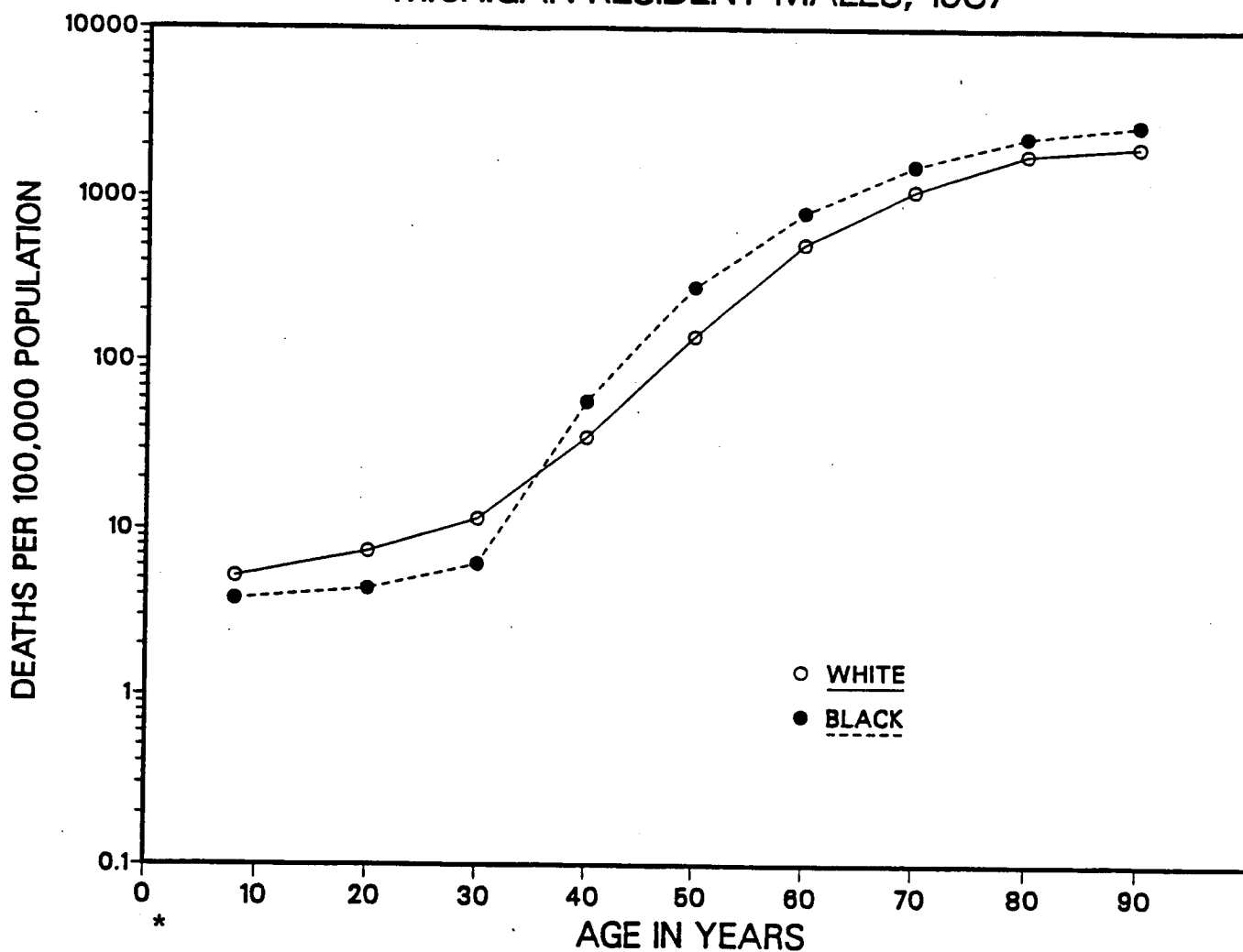
FIGURE 2.11  
AGE-SPECIFIC CANCER DEATH RATES<sup>1</sup> BY SEX,  
MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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.

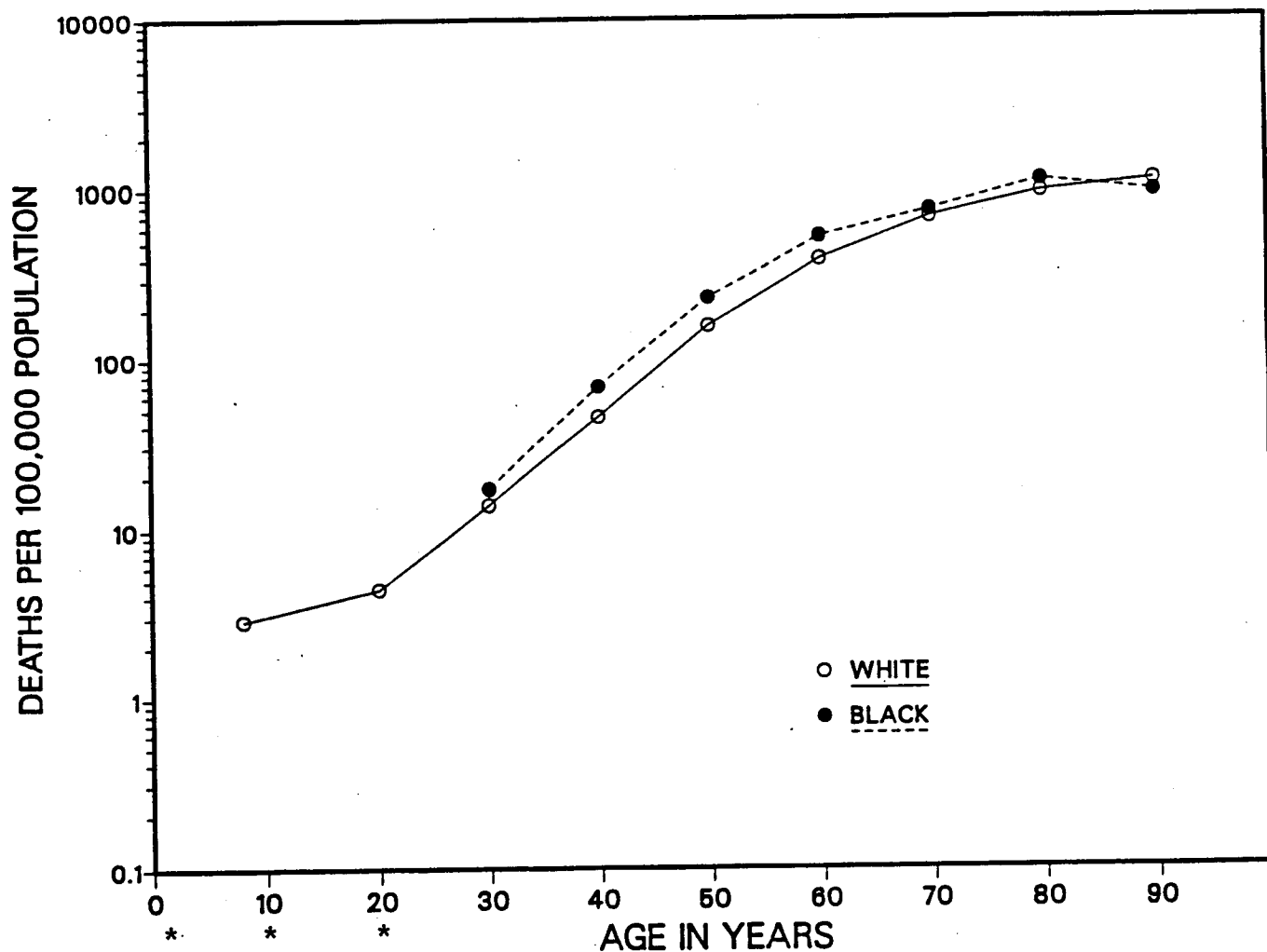
FIGURE 2.12  
AGE-SPECIFIC CANCER DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENT MALES, 1987



<sup>1</sup> 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.

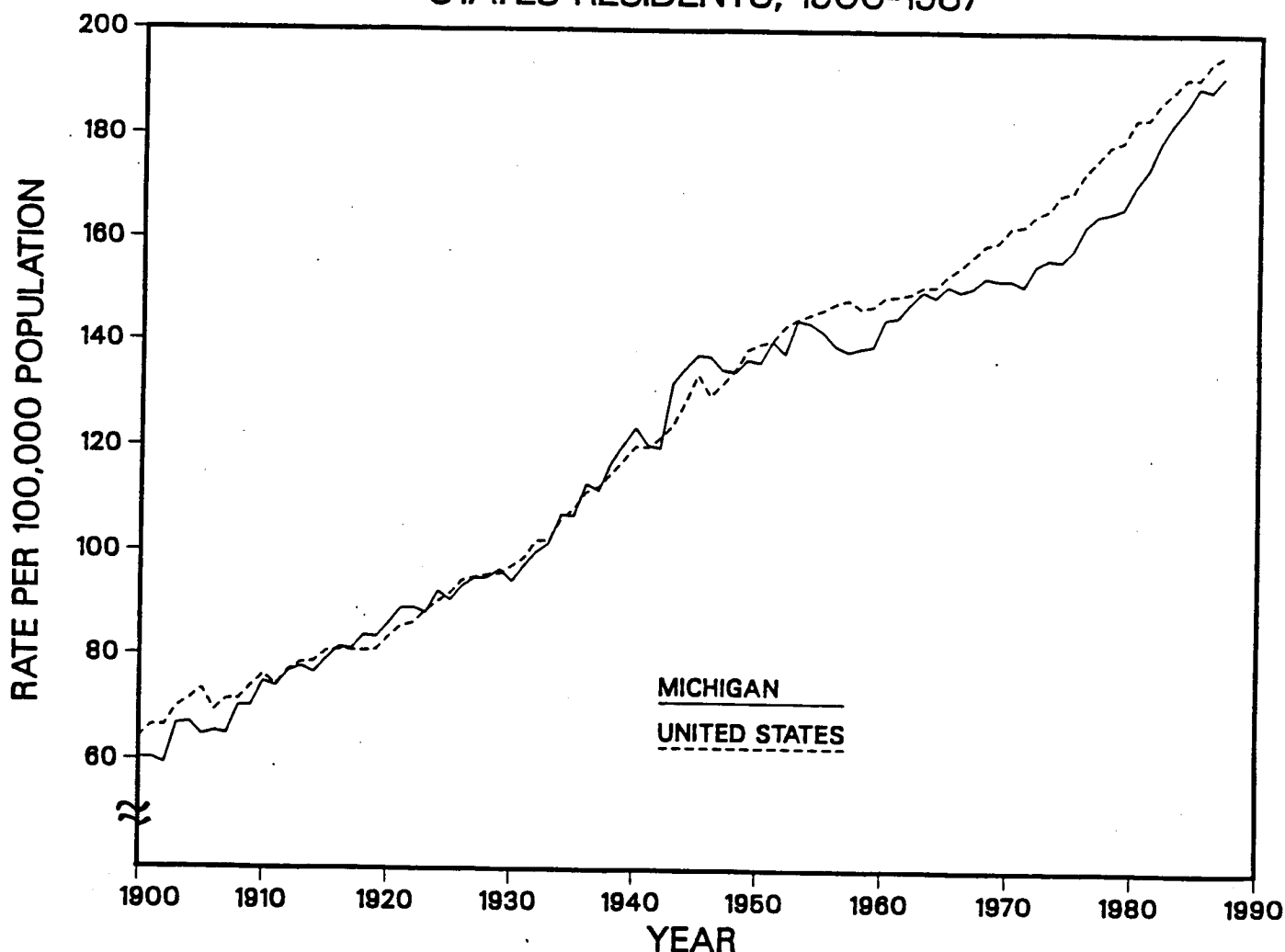
FIGURE 2.13  
AGE-SPECIFIC CANCER DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENT FEMALES, 1987



<sup>1</sup>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  
STATES<sup>1</sup> RESIDENTS, 1900-1987<sup>2</sup>



<sup>1</sup> National rates are from Death Registration States for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>2</sup> 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.

Table 2.15  
Age - Adjusted Cancer Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987

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
U.S.	1970	129.9	157.4	108.8	127.8	154.3	107.6	148.3	185.3	117.6
	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 <sup>3</sup>	133.1	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

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 1.9 percent between 1983 and 1987. The United States rates remained stable from 1970 through 1979 and rose 2.1 percent between 1979 and 1985. In the last two years the United States rates have decreased (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 females. Nationally and in Michigan the 1970 through 1987 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 essentially stable.

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

Malignant neoplasms of the trachea, bronchus, and lung were the underlying cause of 4,836 deaths, 27.4 percent of all cancer deaths. Cancer of female breast was the second leading cause of cancer mortality (1,573 deaths). The third most frequent category of cancer mortality was cancer of other and unspecified parts of the colon (1,487). The total number of deaths attributed to colon cancer was 1,608. Malignant neoplasms of the prostate and the pancreas caused 1,079 and 829 deaths, respectively. There were 24 other categories which had at least 100 deaths in 1987.

Based upon 1985 through 1987 death data, the probability of death due to cancer is 0.223 for males and 0.191 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 0.235 by age 54 then declines to 0.133 at age 85 and above. Probabilities for females display little change from birth to age 49, then diminish to 0.082 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.

Table 2.16  
Deaths Due to Malignant Neoplasms by Site Affected  
Michigan Residents, 1987

282 LIST <sup>1</sup> NUMBER	CAUSES OF DEATH	NUMBER OF DEATHS	PERCENT
57	Malignant Neoplasms of Trachea, Bronchus, and Lung	4,836	27.4
63	Malignant Neoplasms of Female Breast	1,573	8.9
48	Malignant Neoplasms of Other and Unspecified Colon	1,487	8.4
78	Malignant Neoplasms of All Other and Unspecified Sites	1,263	7.1
69	Malignant Neoplasms of Prostate	1,079	6.1
54	Malignant Neoplasms of Pancreas	829	4.7
81	Other Malignant Neoplasms of Lymphoid and Histiocytic Tissue	561	3.2
42	Malignant Neoplasms of Stomach	502	2.8
67	Malignant Neoplasms of Ovary and Other Uterine Adnexa	482	2.7
75	Malignant Neoplasms of Brain	463	2.6
73	Malignant Neoplasms of Kidney and Other and Unspecified Urinary Organs	391	2.2
72	Malignant Neoplasms of Bladder	379	2.1
41	Malignant Neoplasms of Esophagus	334	1.9
49	Malignant Neoplasms of Rectum, Rectosigmoid Junction, and Anus	305	1.7
82	Multiple Myeloma and Immunoproliferative Neoplasms	298	1.7
84	Myeloid Leukemia	269	1.5
66	Malignant Neoplasms of Other Parts of Uterus	245	1.4
86	Other and Unspecified Leukemia	185	1.0
83	Lymphoid Leukemia	179	1.0
61	Melanoma of Skin	175	1.0
53	Malignant Neoplasms of Gallbladder and Extrahepatic Bile Ducts	150	0.8
65	Malignant Neoplasms of Cervix Uteri	148	0.8
56	Malignant Neoplasms of Larynx	138	0.8
39	Malignant Neoplasms of Pharynx	121	0.7
60	Malignant Neoplasms of Connective and Other Soft Tissue	120	0.7
50	Malignant Neoplasms of Liver, Primary	116	0.7
52	Malignant Neoplasms of Liver not Specified as Primary or Secondary	115	0.7
55	Malignant Neoplasms of Retroperitoneum, Peritoneum, and Other and Ill-Defined Sites Within the Digestive Organs and Peritoneum	107	0.6
79	Lymphosarcoma and Reticulosarcoma	104	0.6
40	Malignant Neoplasms of Other and Ill-Defined Sites Within Lip, Oral Cavity, and Pharynx	87	0.5

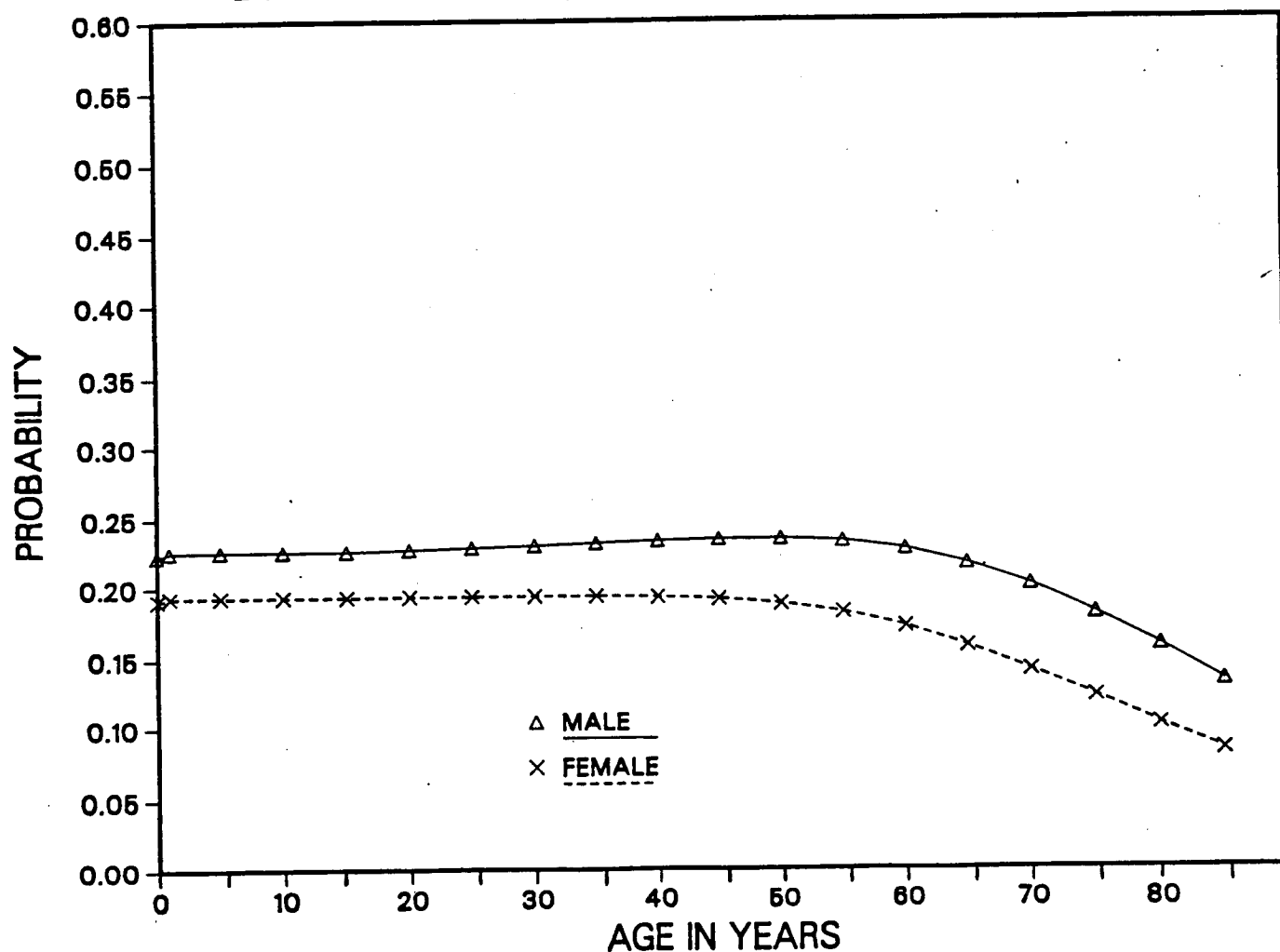
Table 2.16  
Deaths Due to Malignant Neoplasms by Site Affected  
Michigan Residents, 1987 (continued)

282 LIST <sup>1</sup> NUMBER	CAUSES OF DEATH	NUMBER OF DEATHS	PERCENT
80	Hodgkin's Disease	80	0.5
62	Other Malignant Neoplasms of Skin	60	0.3
77	Malignant Neoplasms of Thyroid Gland and Other Endocrine Glands and Related Structures	59	0.3
47	Malignant Neoplasms of Cecum, Appendix, and Ascending Colon	58	0.3
38	Malignant Neoplasms of Tongue	52	0.3
46	Malignant Neoplasms of Sigmoid Colon	49	0.3
51	Malignant Neoplasms of Intrahepatic Bile Ducts	42	0.2
58	Malignant Neoplasms of All Other and Ill-Defined Sites Within the Respiratory System and Intrathoracic Organs	42	0.2
59	Malignant Neoplasms of Bone and Articular Cartilage	36	0.2
43	Malignant Neoplasms of Small Intestine, Including Duodenum	34	0.2
68	Malignant Neoplasms of Other and Unspecified Female Genital Organs	34	0.2
70	Malignant Neoplasms of Testis	20	0.1
85	Monocytic Leukemia	14	0.1
74	Malignant Neoplasms of Eye	11	0.1
64	Malignant Neoplasms of Male Breast	10	0.1
45	Malignant Neoplasms of Descending Colon	8	0.0
71	Malignant Neoplasms of Penis and Other Male Genital Organs	8	0.0
44	Malignant Neoplasms of Hepatic and Splenic Flexures and Transverse Colon	6	0.0
76	Malignant Neoplasms of Other and Unspecified Parts of Nervous System	4	0.0
37	Malignant Neoplasms of Lip	1	0.0
TOTAL		17,669	100.0

<sup>1</sup> 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 2.15  
PROBABILITY OF EVENTUALLY DYING FROM CANCER  
BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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 5,481 in 1987 or 6.9 percent of the 79,795 total Michigan resident deaths. This is 60 more stroke deaths than were observed in 1986. Of the total in 1987, 59.9 percent were to females.

The median age at death from stroke was 79 years (Table 2.17). The median age for females was 81 years, 5 years higher than that for males. Deaths for white persons due to cerebrovascular disease displayed median ages several years higher than those for black persons. The median age was 69 years for black males, 77 years for white males and 81 years for males of other races. The median was 74 years for black females and 73 years for females of other races. This was 8 years and 9 years less, respectively, than that for white females (82 years).

The cerebrovascular disease death rate was 59.6 in 1987. The rate for females (69.6) was greater than the rate for males (49.0). 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 from age 45 through 84, 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 12.8 percent higher than the age-adjusted rate for females.

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 age 85 with sufficient events to calculate rates. 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 15.5 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 74.8 percent higher than that for white females, while for black males the age-adjusted rate was 103.3 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 were very similar over the next eight years, whereupon the Michigan rate slipped below the national rate and has remained so since.

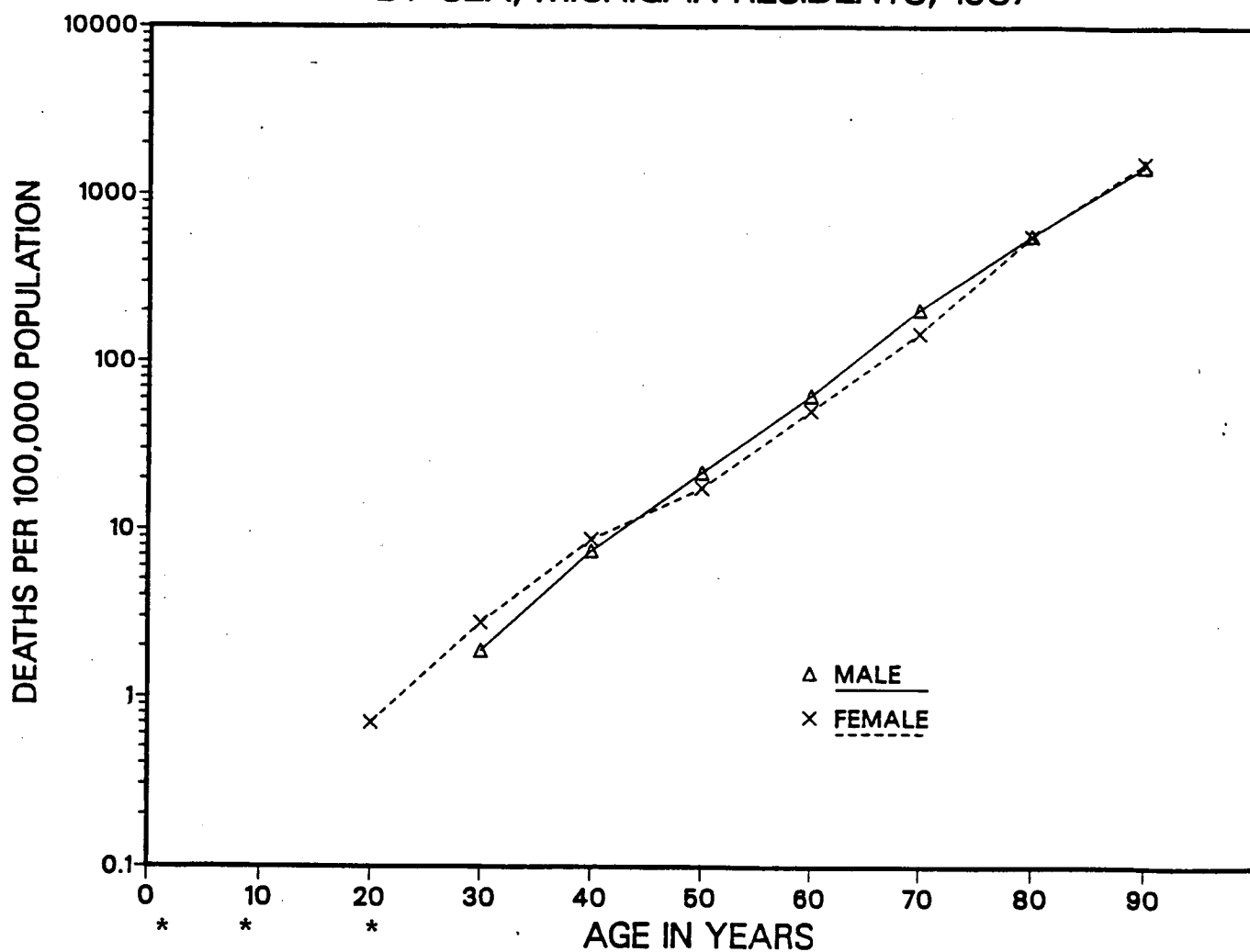
The 6th revision to ICD cause of death coding was adopted in the year 1949 nationally and in 1950 in Michigan. This revision resulted in a lack of direct comparability between cerebrovascular disease death rates prior to these dates and those after adoption. Since the significant change in coding procedures,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

Table 2.17  
Deaths Due to Cerebrovascular Disease by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	4	2	2	3	1	2	1	1	-	-	-	-
1 - 4	4	3	1	2	2	-	2	1	1	-	-	-
5 - 9	1	-	1	1	-	1	-	-	-	-	-	-
10 - 14	2	1	1	1	1	-	1	-	1	-	-	-
15 - 19	3	-	3	3	-	3	-	-	-	-	-	-
20 - 24	5	3	2	3	2	1	2	1	1	-	-	-
25 - 29	14	6	8	10	3	7	4	3	1	-	-	-
30 - 34	23	9	14	10	4	6	13	5	8	-	-	-
35 - 39	43	21	22	25	10	15	18	11	7	-	-	-
40 - 44	61	26	35	36	13	23	25	13	12	-	-	-
45 - 49	75	38	37	46	23	23	27	15	12	2	-	2
50 - 54	107	60	47	74	39	35	33	21	12	-	-	-
55 - 59	176	95	81	124	64	60	52	31	21	-	-	-
60 - 64	298	155	143	222	120	102	74	33	41	2	2	-
65 - 69	484	255	229	389	207	182	94	47	47	1	1	-
70 - 74	617	321	296	514	266	248	101	55	46	2	-	2
75 - 79	865	361	504	773	320	453	91	40	51	1	1	-
80 - 84	1,004	353	651	897	313	584	104	37	67	3	3	-
85 - 89	901	299	602	828	273	555	70	24	46	3	2	1
90 +	794	188	606	749	175	574	43	12	31	2	1	1
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	5,481	2,196	3,285	4,710	1,836	2,874	755	350	405	16	10	6
Median Age At Last Birthday	79	76	81	80	77	82	72	69	74	80	81	73

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

FIGURE 2.16  
AGE-SPECIFIC CEREBROVASCULAR DISEASE DEATH RATES<sup>1</sup>  
BY SEX, MICHIGAN RESIDENTS, 1987



<sup>1</sup>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.

Table 2.18  
Cerebrovascular Disease Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	59.6	49.0	69.6	60.0	47.8	71.7	61.4	60.5	62.1
Under 1 Year	*	*	*	*	*	*	*	*	*
1 - 14 Years	0.4	*	*	*	*	*	*	*	*
15 - 24 Years	0.5	*	0.7	0.5	*	*	*	*	*
25 - 34 Years	2.4	1.9	2.8	1.5	1.1	2.0	8.0	8.3	7.8
35 - 44 Years	8.2	7.5	8.8	5.6	4.2	6.9	28.0	35.0	22.3
45 - 54 Years	19.9	22.0	17.8	15.0	15.7	14.2	58.8	79.1	42.5
55 - 64 Years	57.5	63.7	51.8	47.4	52.7	42.6	141.4	158.0	127.5
65 - 74 Years	175.7	208.3	149.9	161.0	190.9	137.4	312.0	374.7	263.6
75 - 84 Years	577.2	581.9	574.4	569.8	572.5	568.2	672.6	673.7	671.9
85 Years and Over	1536.3	1487.0	1557.2	1566.4	1513.8	1588.3	1232.1	1181.5	1257.3
Age-Adjusted Rate <sup>2</sup>	31.4	33.5	29.7	28.7	30.3	27.4	54.0	61.6	47.9

<sup>1</sup> 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.

<sup>2</sup> 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.

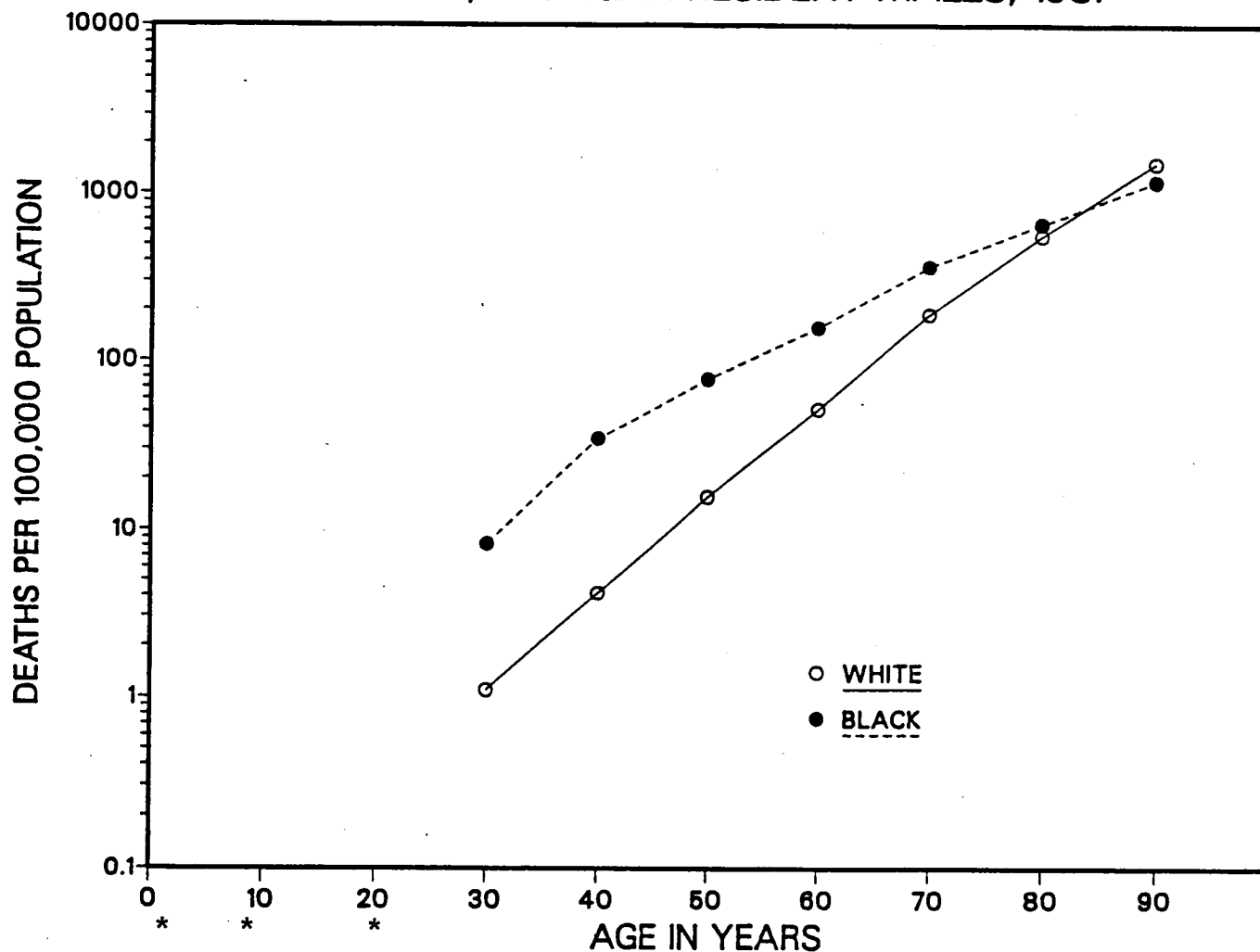
in Michigan has ranged from a high of 102.8 in 1953 to a low of 59.3 in 1986.

Recent cerebrovascular disease death rates over the last twenty years have shown a clear downward tendency both nationally and in Michigan. The 1987 rate for Michigan was

20.0 percent below the rate of 1977. In 1987 the Michigan rate was 2.8 percent below the United States provisional rate of 61.3.

Age-adjusted rates for cerebrovascular disease deaths by race and sex are presented in Table 2.19. Michigan rates have declined by

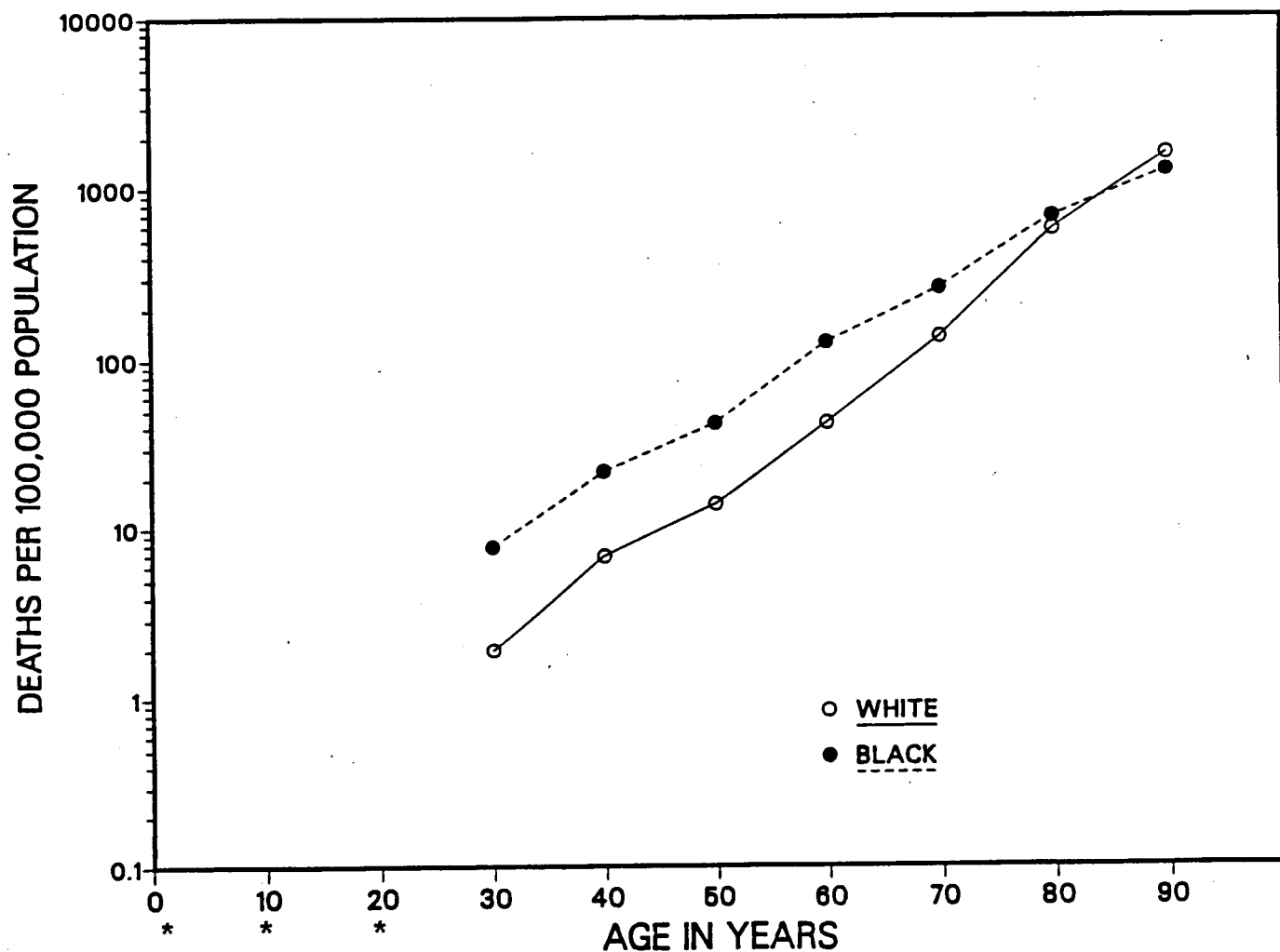
FIGURE 2.17  
AGE-SPECIFIC CEREBROVASCULAR DISEASE DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENT MALES, 1987



<sup>1</sup>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.

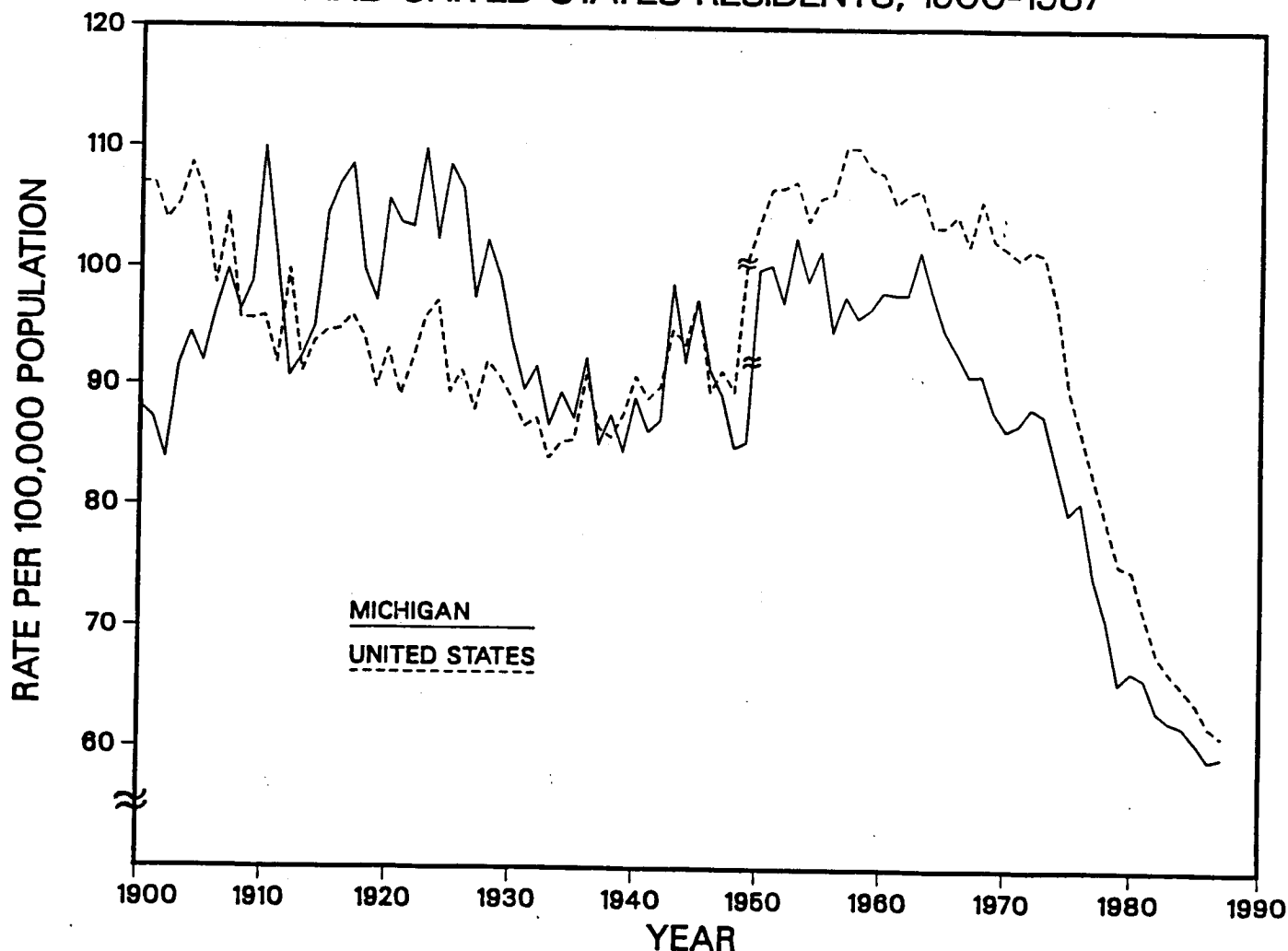
FIGURE 2.18  
AGE-SPECIFIC CEREBROVASCULAR DISEASE DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENT FEMALES, 1987



<sup>1</sup>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 STATES<sup>1</sup> RESIDENTS, 1900-1987<sup>2</sup>



<sup>1</sup> National rates are from Death Registration States for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>2</sup> 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.



51.5 and 50.5 percent since 1970 for white and other than white females, respectively, by 55.4 percent for white males and by 38.5 percent for other than white males. Rates for other than white persons, however, remained substantially above rates for white persons throughout the period.

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). In 1987, the Michigan age-adjusted rate for cerebrovascular disease deaths was 4.3 percent above the national provisional rate.

Acute but ill-defined cerebrovascular disease was most frequently given as the type of cerebrovascular disease causing death (2,538 deaths). Second in frequency was cerebral

thrombosis and unspecified occlusion of cerebral arteries which caused 1,025 deaths in 1987 (Table 2.20). These two cause of death categories comprised 65.0 percent of all stroke deaths. Intracerebral and other intracranial hemorrhage caused 813 deaths while other and late effects of cerebrovascular diseases caused 737 stroke deaths.

Based upon the mortality experience of 1985 through 1987, at birth a Michigan male faces a 0.058 chance of dying from cerebrovascular disease while the probability for a female at birth is 0.094. 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 males start a slightly accelerated rise, reaching 0.084 at ages 85 and above. Data for females reveal a similar tendency. The peak probability for females is 0.120 at age 85.

Table 2.19  
Age - Adjusted Cerebrovascular Disease Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987

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
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 <sup>3</sup>	30.1	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

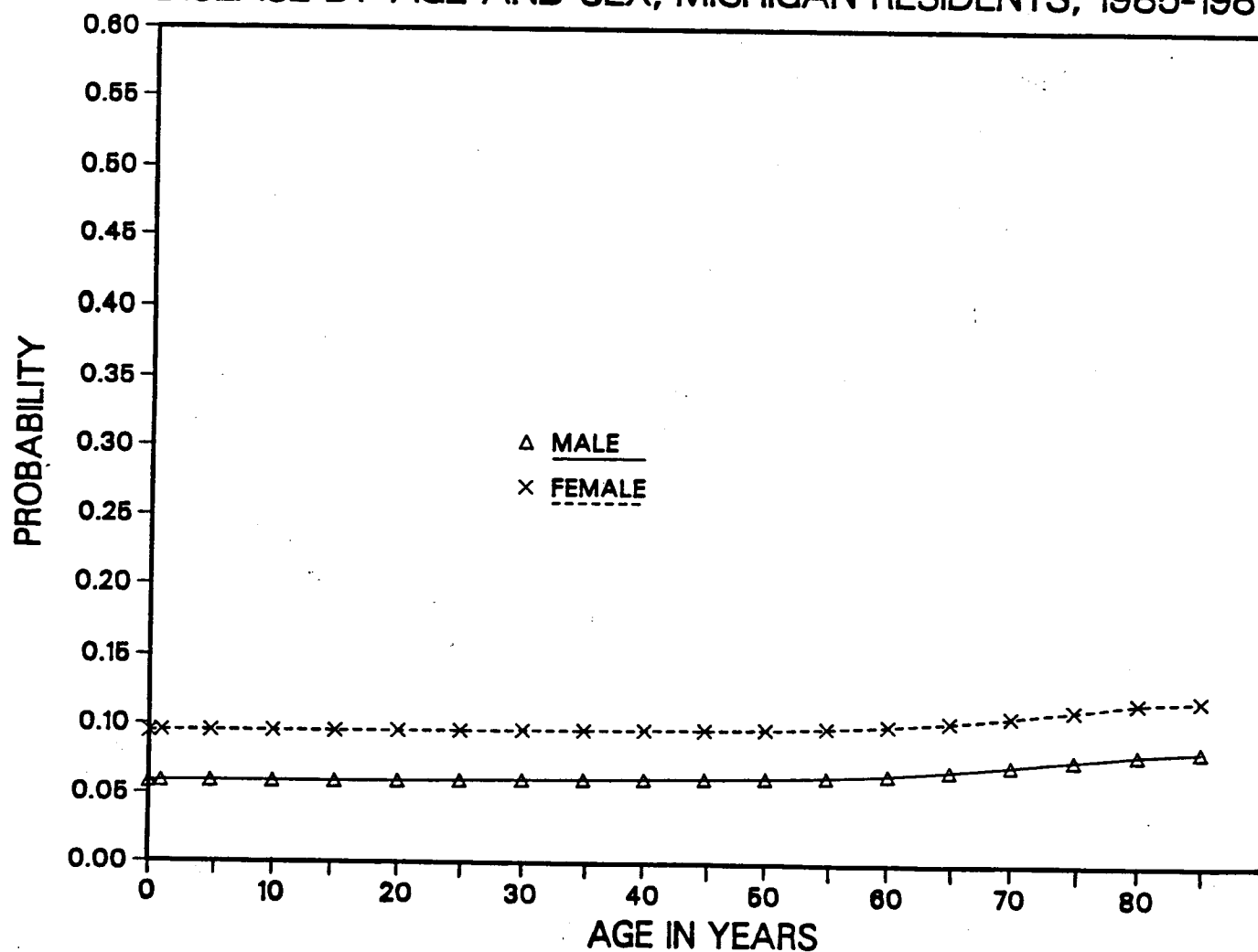
<sup>3</sup> Provisional data.

Table 2.20  
Deaths Due to Cerebrovascular Disease by Specific Cause  
Michigan Residents, 1987

282 LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
154	Acute but Ill - Defined Cerebrovascular Disease	2,538	46.3
152	Cerebral Thrombosis and Unspecified Occlusion of Cerebral Arteries	1,025	18.7
150	Intracerebral and Other Intracranial Hemorrhage	813	14.8
155	Other and Late Effects of Cerebrovascular Diseases	737	13.4
149	Subarachnoid Hemorrhage	278	5.1
151	Occlusion and Stenosis of Precerebral Arteries	60	1.1
153	Cerebral Embolism	30	0.5
TOTAL		5,481	100.0

<sup>1</sup> 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 2.20  
PROBABILITY OF EVENTUALLY DYING FROM CEREBROVASCULAR  
DISEASE BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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 1987, 3.9 percent were attributed to accidents. The total of 3,143 accidental deaths was 59 less than in 1986. In 1987 67.2 percent of the total accidental deaths were to males.

The median age at death among accident victims was 36 years (Table 2.21). The median age among males was 34, 11 years lower than the 45 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 33 years compared to 35 years for black males and 47 years for males of other races. For white females who died from accidents the median of 47 years was 8 years higher than that for their black counterparts and 6 years lower than that for their counterparts of other races.

Accidental deaths among white males were especially concentrated in the 15-39 year old age ranges. These five age groups accounted for 52.2 percent of accidental deaths for white males compared to 46.2 percent for black males and less than 37 percent for all other race-sex categories.

The crude death rate from accidents for males was 2.2 times that for females. Age-specific accident death rates for males were greater than those for females in age groups 1 year of age and above. 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 3.6 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 2.5 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 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. For those age groups with sufficient data to calculate rates, rates for black males were higher than those for white males in the 1-14 year old age group and for those age groups between 35 and 84 years of age. Both the crude and age-adjusted accident death rates for black males were somewhat higher than those for white males.

The rates for black females were higher than those for white females in the 1-14 age group and between 25 and 74 years of age. At 75 years of age and above 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 (Table 2.22).

Michigan's accident death rate in 1900 was 71.9. The highest rate observed in this century was 103.1 in 1936. In eight of the last 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 34.2 in 1987 was 6.2 percent higher

Table 2.21  
Deaths Due to Accidents by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	28	14	14	18	10	8	10	4	6	-	-	-
1 - 4	120	73	47	98	57	41	22	16	6	-	-	-
5 - 9	79	47	32	61	41	20	18	6	12	-	-	-
10 - 14	83	54	29	67	44	23	14	9	5	2	1	1
15 - 19	335	230	105	295	196	99	38	33	5	2	1	1
20 - 24	310	244	66	280	221	59	26	20	6	4	3	1
25 - 29	320	249	71	282	223	59	38	26	12	-	-	-
30 - 34	239	186	53	201	160	41	34	24	10	3	1	2
35 - 39	216	173	43	172	142	30	44	31	13	-	-	-
40 - 44	130	88	42	102	67	35	26	19	7	1	1	-
45 - 49	136	95	41	112	78	34	21	14	7	3	3	-
50 - 54	112	80	32	80	59	21	28	20	8	4	1	3
55 - 59	108	72	36	92	62	30	15	9	6	1	1	-
60 - 64	138	93	44	119	81	37	18	12	6	1	-	1
65 - 69	135	82	53	113	67	46	21	14	7	1	1	-
70 - 74	146	87	59	128	77	51	17	10	7	1	-	1
75 - 79	143	73	70	128	64	64	14	8	6	1	1	-
80 - 84	145	80	65	133	74	59	11	6	5	1	-	1
85 - 89	122	53	69	106	46	60	15	6	9	1	1	-
90 +	96	37	59	92	34	58	4	3	1	-	-	-
Not Stated	2	2	-	1	1	-	-	-	-	1	1	-
All Ages	3,143	2,112	1,030	2,680	1,804	875	434	290	144	27	16	11
Median Age At Last Birthday	36	34	45	35	33	47	37	35	39	47	47	53

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

Table 2.22  
Accident Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	34.2	47.2	21.8	34.2	47.0	21.8	35.3	50.1	22.1
Under 1 Year	20.0	19.6	20.4	15.9	17.3	14.4	42.2	*	50.8
1 - 14 Years	14.7	17.7	11.5	14.4	17.6	11.0	17.1	19.4	14.7
15 - 24 Years	42.9	62.5	22.9	45.9	65.7	25.6	27.4	46.3	9.2
25 - 34 Years	35.8	56.3	15.7	36.4	57.7	15.1	34.0	51.9	19.1
35 - 44 Years	27.2	41.8	13.1	25.0	38.5	11.8	45.5	72.9	23.5
45 - 54 Years	27.1	39.4	15.5	23.9	34.8	13.5	48.0	74.7	26.5
55 - 64 Years	29.8	42.3	18.5	28.9	41.2	17.6	37.0	51.8	24.7
65 - 74 Years	44.8	61.1	32.0	43.0	58.1	31.0	60.8	88.2	39.7
75 - 84 Years	88.9	124.7	67.1	89.1	124.8	67.4	86.2	122.5	62.6
85 Years and Over	199.4	280.9	165.0	197.7	273.7	166.0	207.2	295.4	163.3
Age-Adjusted Rate <sup>2</sup>	31.0	44.7	18.0	30.7	44.2	17.7	35.1	52.2	20.8

<sup>1</sup> 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.

<sup>2</sup> 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.

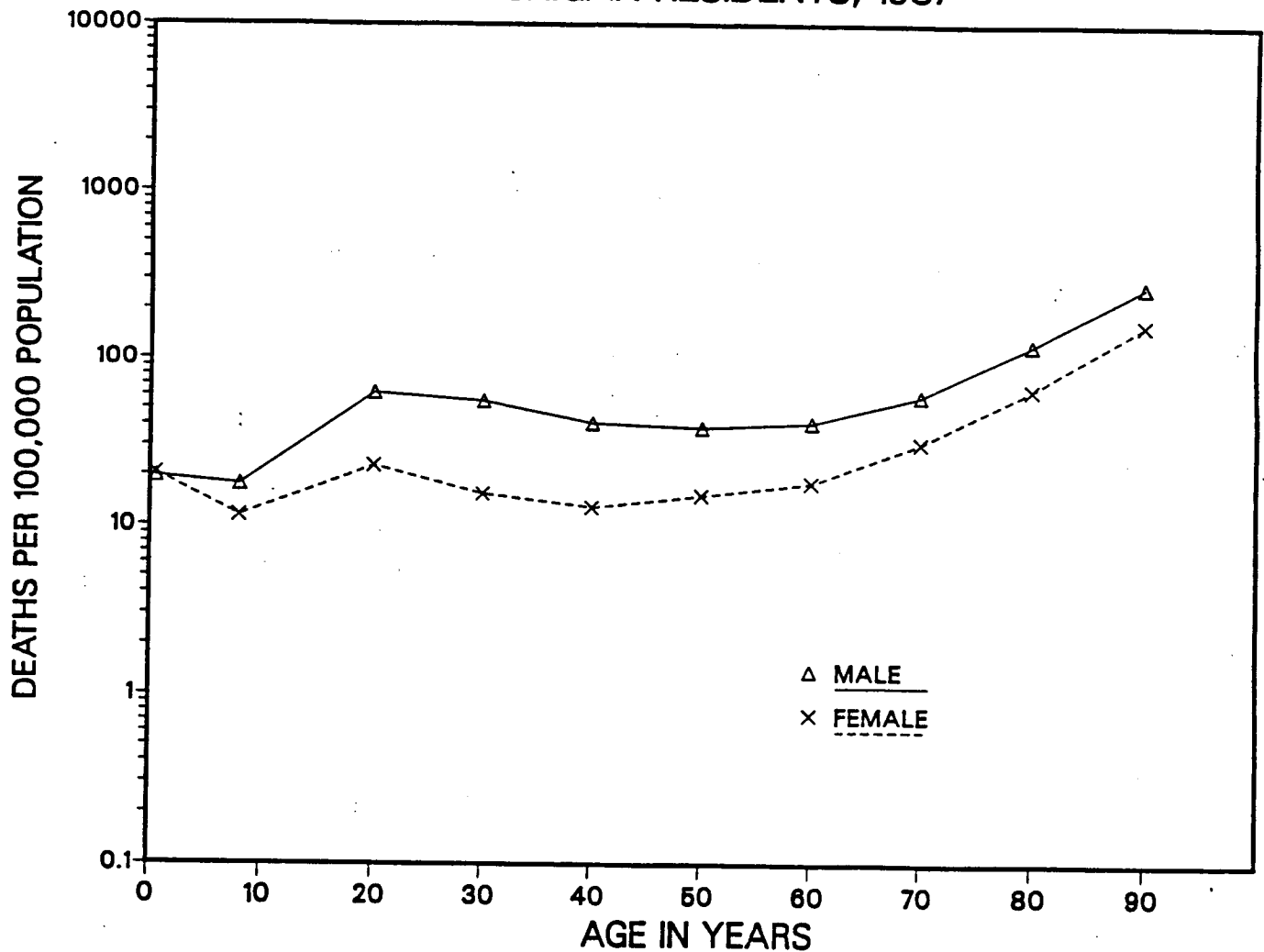
than that of 1983 and was 2.3 percent less than the 1986 rate of 35.0.

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 1987 was 12.3 percent below the provisional rate of 39.0 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 7.0 percent

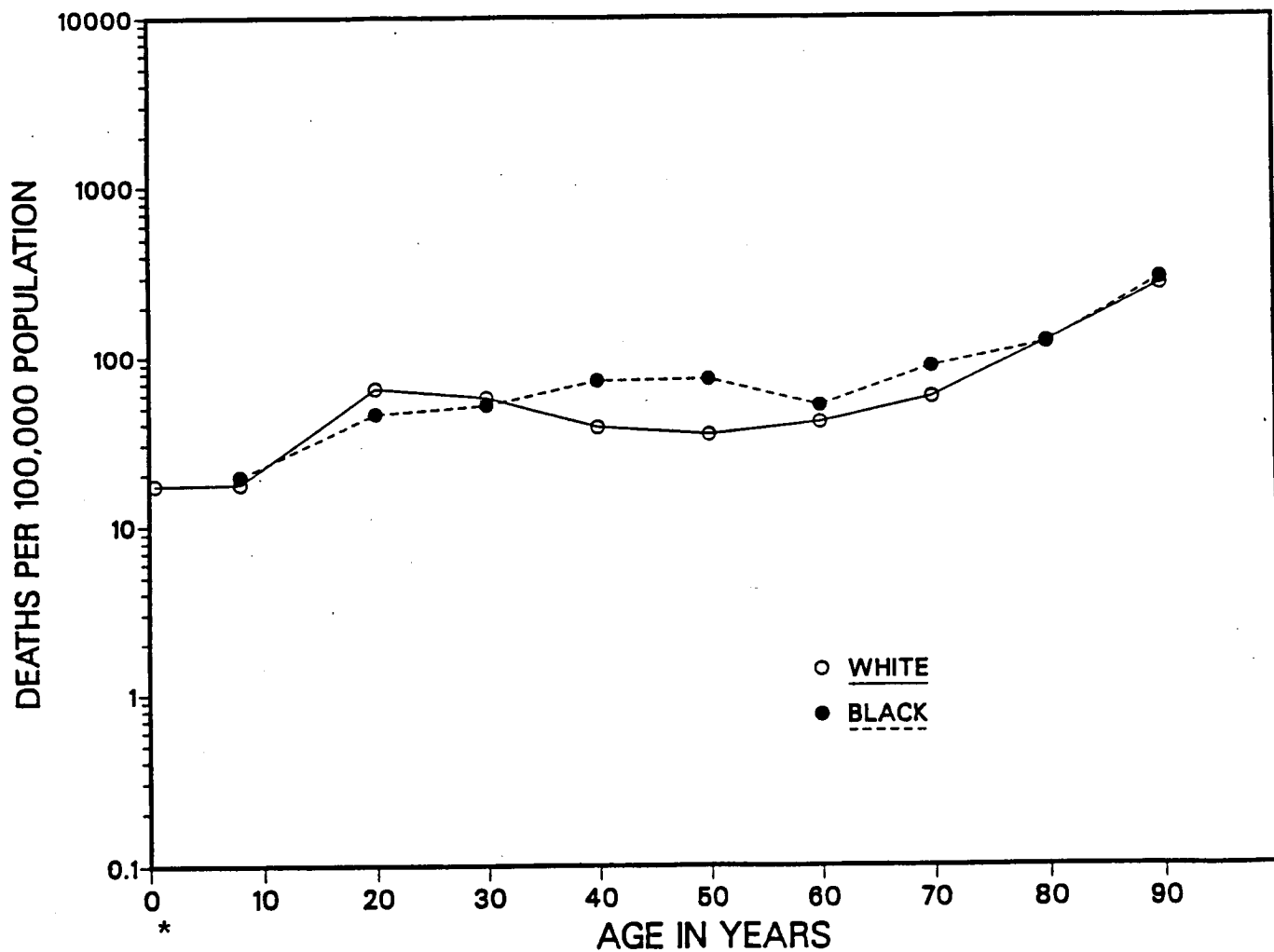
FIGURE 2.21  
AGE-SPECIFIC ACCIDENT DEATH RATES<sup>1</sup> BY SEX,  
MICHIGAN RESIDENTS, 1987



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



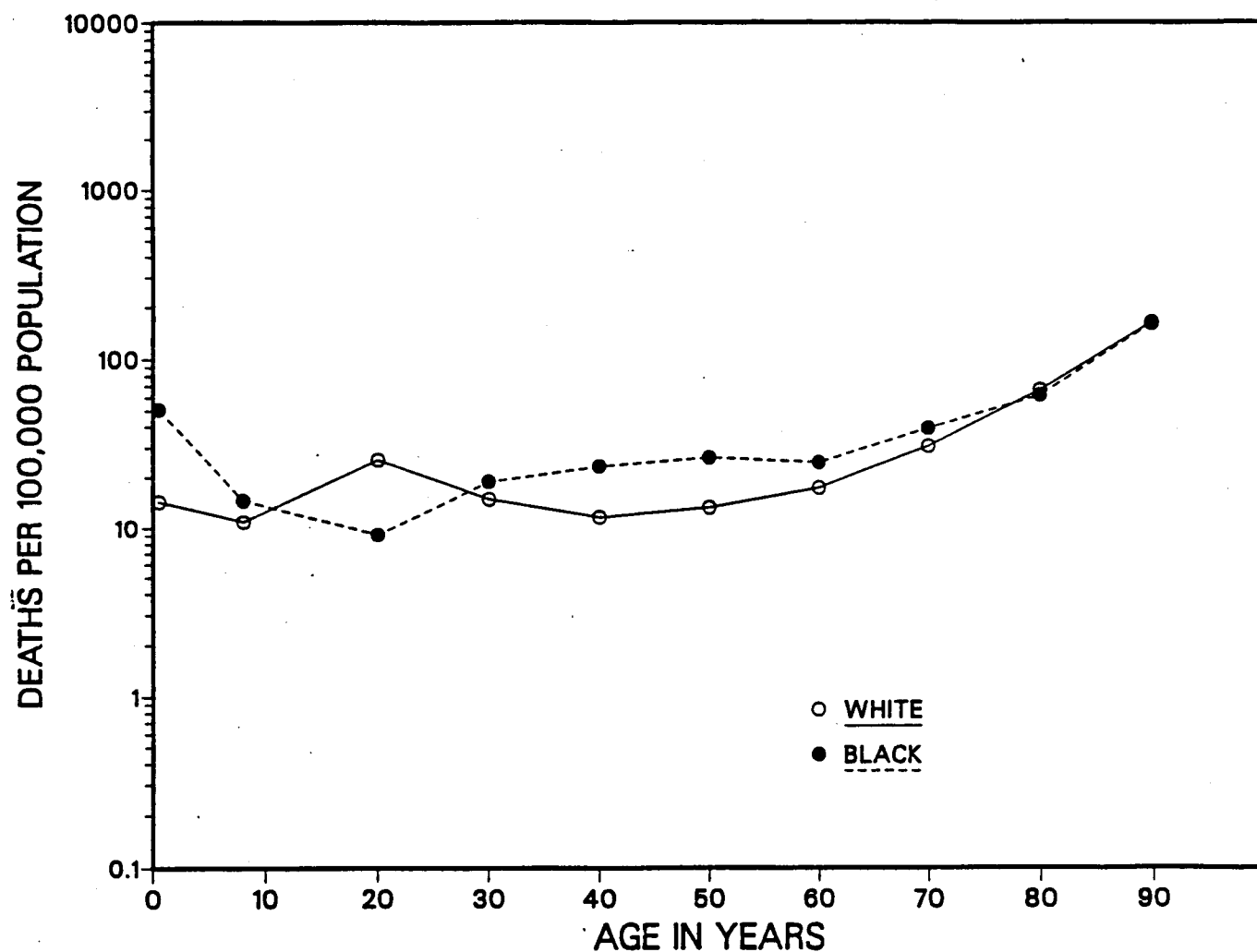
FIGURE 2.22  
AGE-SPECIFIC ACCIDENT DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENT MALES, 1987



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

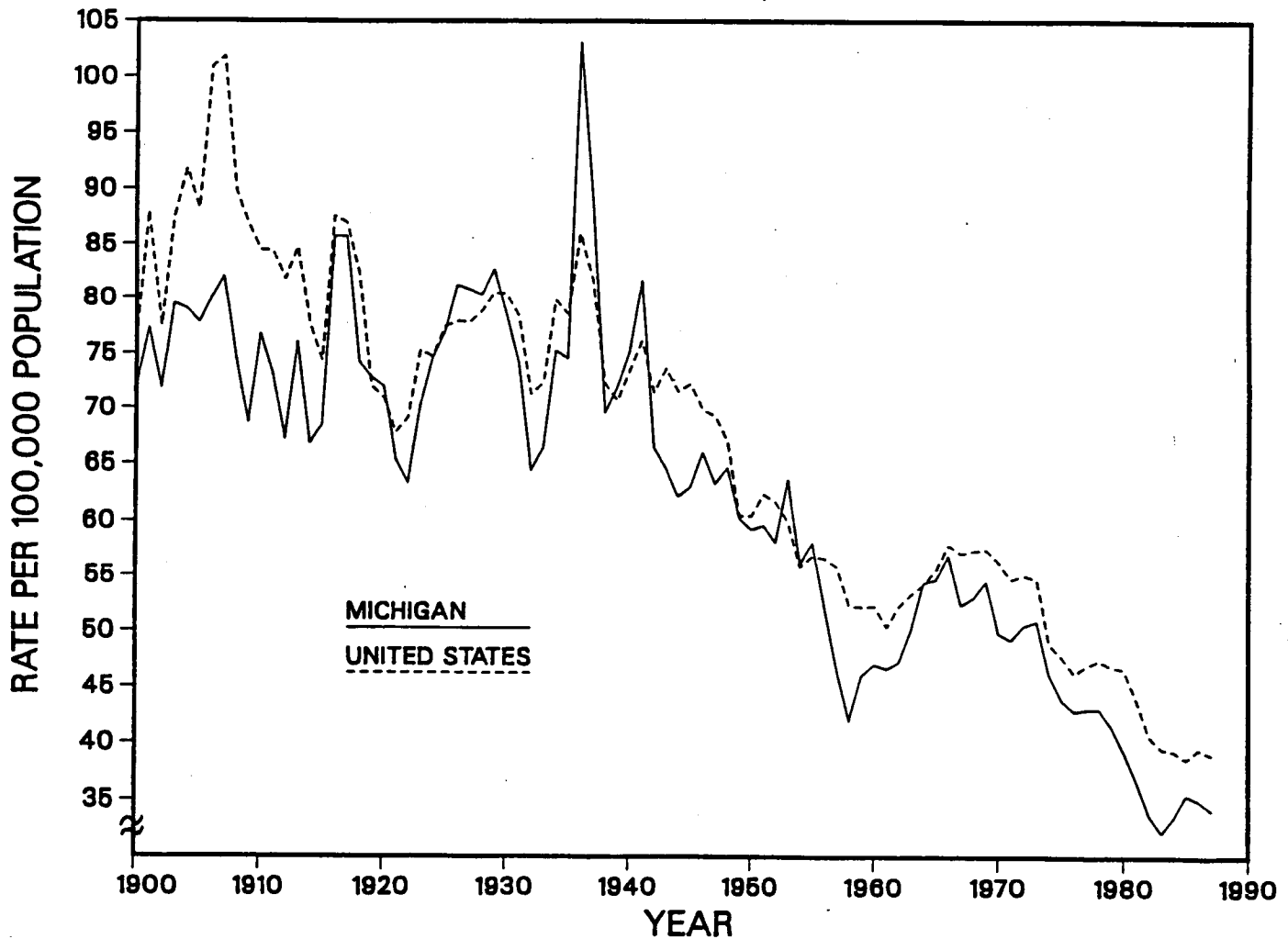
\*Rate is considered statistically unreliable.

FIGURE 2.23  
AGE-SPECIFIC ACCIDENT DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENT FEMALES, 1987



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

FIGURE 2.24  
ACCIDENT DEATH RATES, MICHIGAN AND UNITED  
STATES<sup>1</sup> RESIDENTS, 1900-1987<sup>2</sup>



<sup>1</sup> National rates are from Death Registration States for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>2</sup> 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 Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987

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
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 <sup>3</sup>	34.6	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

between 1983 and 1985. In 1987 the Michigan rate was 3.4 percent below the 1985 rate. Between 1970 and 1987 the national age-adjusted rate declined by 35.6 percent (see Technical Notes). Michigan's rate was 10.4 percent below the national provisional rate in 1987.

The age-adjusted rates by race and sex declined for each population subgroup between 1970 and 1987. Other than white female rates have been generally below or about the same as those for white females since 1970, fluctuating from about 16.9 percent above to 20.3 percent below the white female rates. 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 1987. 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 21.9 percent above in 1986, the last year for which such data were available. The rates for other than white females were 29.0 percent higher in 1970 and 10.9 percent higher in 1986 than the white female rates.

Motor vehicle accidents involving collision with another motor vehicle was the largest single cause of accidental death in 1987, resulting in 791 deaths (Table 2.24). Deaths from all types of motor vehicle accidents accounted for 1,725 deaths in 1987. Accidental falls of all types resulted in 347 deaths. Accidents caused by fires and flames, accidental poisonings, choking and food or other objects and accidental drownings caused 169, 142, 142 and 135 deaths, respectively. Medical misadventures, air and space transport accidents and water transport accidents each accounted for 97, 50 and 35 deaths in 1987,

respectively. Accidents caused by handguns and other firearms resulted in the deaths of 33 Michigan residents. (Table 2.24).

Deaths from motor vehicle accidents accounted for 54.9 percent of all accidental deaths in 1987. After age 14, the proportion of motor vehicle accident deaths decreased by age group, from 79.5 percent for persons 15-24 years of age to a low of 29.5 percent of accident deaths for persons 65 years of age or over (Table 2.25).

Among children under 15 years the most frequent causes of accidental death were motor vehicle accidents, drownings and fire, resulting in 148, 48 and 43 deaths, respectively, in 1987. Motor vehicle accidents were the leading causes 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. Accidental falls, which caused 11.0 percent of all accidental deaths, were the leading cause of the accidental deaths (31.0 percent) among persons 65 years of age or older.

Table 2.26 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 1,725 persons killed in motor vehicle accidents in 1987, 774 (44.9 percent) were driving motor vehicles other than motorcycles at the time of the fatal accident. There were 354 deaths of passengers in motor vehicles other than motorcycles, while 243 pedestrians were killed in motor vehicle accidents. Motorcycle accidents resulted in the deaths of 97 motorcyclists and 5 motorcycle passengers. It should be noted that for 210 deaths (12.2 percent of the total) the type of involvement of the deceased in the accident was not stated.

Table 2.24  
Deaths Due to Accidents by Type of Accident  
Michigan Residents, 1987

282 LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
236	Motor Vehicle Accidents Involving Collision with Another Motor Vehicle	791	25.2
239	Motor Vehicle Accidents Not Involving Collision on Highway	335	10.7
252	Fracture, Cause Unspecified, and Other and Unspecified Falls	244	7.8
237	Motor Vehicle Accidents Involving Collision with Pedestrian	234	7.4
238	Motor Vehicle Accidents Involving Collision with Other Vehicle or Object	222	7.1
262	All Other Accidents, and Late Effects of Accidental Injury	221	7.0
253	Accidents Caused by Fires and Flames	169	5.4
256	Inhalation and Ingestion of Food or Other Object Causing Obstruction of Respiratory Tract or Suffocation	142	4.5
255	Accidental Drowning and Submersion	135	4.3
250	Fall From One Level to Another	97	3.1
249	Misadventures During Medical Care, Abnormal Reactions, and Late Complications	97	3.1
246	Accidental Poisoning by Drugs, Medicaments, and Biologicals	86	2.7
240	Motor Vehicle Traffic Accidents of Unspecified Nature	77	2.4
244	Air and Space Transport Accidents	50	1.6
248	Accidental Poisoning by Gases and Vapors	44	1.4
241	Motor Vehicle Nontraffic Accidents	43	1.4
243	Water Transport Accidents	35	1.1
258	Accidents Caused by All Other and Unspecified Firearms	33	1.0
235	Motor Vehicle Accidents Involving Collision with Train	23	0.7
261	Accidents Caused by Electric Current	16	0.5
247	Accidental Poisoning by Other Solid or Liquid Substances	12	0.4
234	Railway Accidents	9	0.3
259	Accidents Caused by Explosive Material	6	0.2
251	Fall on Same Level	6	0.2
263	Drugs, Medicaments, and Biological Substances Causing Adverse Effects in Therapeutic Use	5	0.2
242	Other Road Vehicle Accidents	5	0.2
260	Accidents Caused by Hot Substance or Object, Caustic or Corrosive Material, Steam, and Exposure to Radiation	4	0.1
254	Lightning	2	0.1
257	Accidents Caused by Handguns	-	-
245	Vehicle Accidents Not Elsewhere Classifiable	-	-
TOTAL		3,143	100.0

<sup>1</sup> 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 2.25  
Deaths Due to Accidents by Age at Death and Type of Accident  
Michigan Residents, 1987

TYPE OF ACCIDENT	AGE AT DEATH IN YEARS					
	TOTAL	<15	15 - 24	25 - 44	45 - 64	65 +
Total	3,143	310	645	905	494	787
Motor Vehicle Accidents	1,725	148	513	594	236	232
Accidental Falls	347	8	9	35	51	244
Accidents Caused by Fire and Flames	169	43	16	38	29	43
Accidental Drownings	135	48	28	34	16	9
Accidental Poisonings	142	2	20	73	27	20
Choking on Food or Other Object	142	16	3	19	28	76
Accidents Caused by Handguns and Other Firearms	33	5	12	10	4	2
Air and Space Transport Accidents	50	1	5	25	17	2
Misadventures During Medical Care, Abnormal Reactions, and Late Complications	97	1	-	6	24	66
Water Transport Accidents	35	-	5	16	7	7
All Other Accidents	268	38	34	55	55	86

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 (40.5 percent) or pedestrians (32.4 percent). Well over two-thirds of the persons 15-24 years of age who died in motor vehicle accidents in 1987 were either drivers (44.1 percent) or passengers (28.8 percent) of motor vehicles other than motorcycles. Among persons 25-44 years and 45-64 years of age 53.2 percent and 50.8 percent, respectively, were driving motor vehicles other than motorcycles at the time of the accident. Pedestrians accounted for 19.4 percent of all motor vehicle accident deaths

among persons 65 years of age and over, compared to 14.1 percent for persons of all ages.

Of the total 3,143 accidental deaths, 1,711 or 54.4 percent of the accidents occurred on streets and highways (Table 2.27). The second most common place of occurrence was the home with 563 deaths (17.9 percent). There were 84 deaths attributed to accidents at places for recreation and sport, 62 at industrial places or premises, 42 in resident institutions, 35 in public buildings and 25 on farms. Note that the place of injury was not specified for 14.2 percent of the accidental deaths.

Table 2.26  
Deaths From Motor Vehicle Accidents by Person Injured and Age at Death  
Michigan Residents, 1987

PERSON INJURED	AGE AT DEATH IN YEARS					
	TOTAL	<15	15 - 24	25 - 44	45 - 64	65 +
Total	1,725	148	513	594	236	232
Driver of Motor Vehicle Other Than Motorcycle	774	4	226	316	120	108
Passenger in Motor Vehicle Other Than Motorcycle	354	60	148	73	31	40
Motorcyclist	97	2	32	55	7	1
Passenger on Motorcycle	5	-	3	1	1	-
Pedal Cyclist	42	19	11	6	3	3
Pedestrian	243	48	31	74	45	45
Other Unspecified Person	2	-	-	2	-	-
Unspecified Person	208	15	62	67	29	35

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 1985 through 1987 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

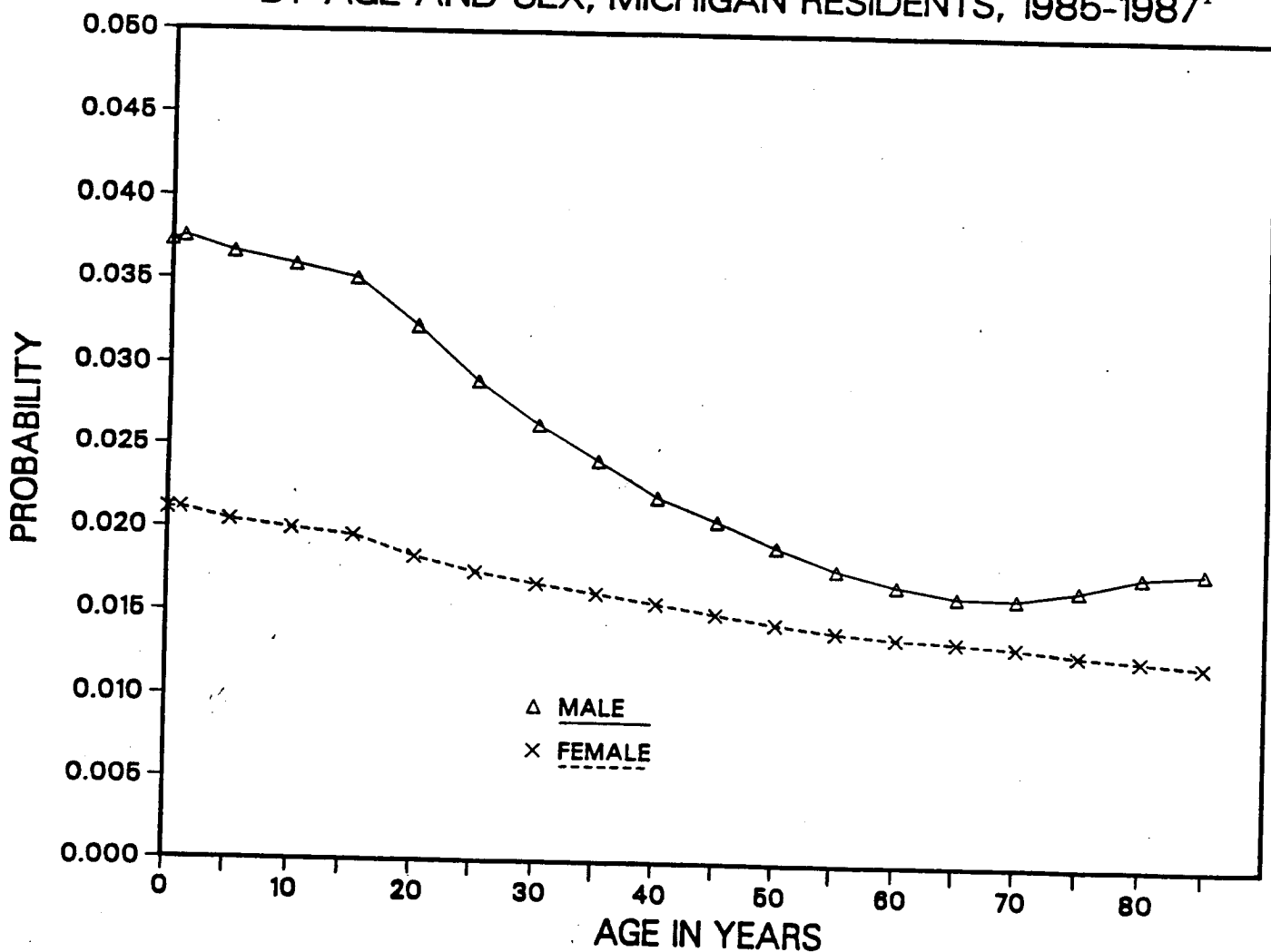
childhood and the teenage years, fall rapidly between ages 15 and 54, and thereafter decline more slowly until the lowest probability of 0.016 is reached at age 65-69. For females the probabilities decline more moderately and steadily. Probabilities for males remain much higher than for females until about age 50 and slightly higher after that age.



Table 2.27  
Deaths Due to Accidents by Place of Injury  
Michigan Residents, 1987

PLACE	NUMBER OF DEATHS
Street and Highway	1,711
Home	563
Place for Recreation and Sport	84
Industrial Place and Premises	62
Resident Institution	42
Public Building	35
Farm	25
Mine and Quarry	7
Other Specified Places	168
Place Not Specified	446
Total	3,143

FIGURE 2.25  
 PROBABILITY OF EVENTUALLY DYING FROM ACCIDENTAL CAUSES  
 BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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 1987 was chronic obstructive pulmonary diseases and allied conditions. This group of diseases caused 2,868 Michigan resident deaths. Of these deaths, 1,704 (59.4 percent) were to males (Table 2.28).

The median age at death of persons who died from these respiratory diseases was 75 years. The median age of females who died from chronic obstructive pulmonary diseases and allied conditions was one year lower than that for males (74 years compared to 75 years). The median age for white persons (75 years) was three years higher than that for black persons (72 years) and three years lower than the median age for persons of other races (78 years).

The crude death rate for chronic obstructive pulmonary diseases and allied conditions was 31.2 per 100,000 population. The crude death rate for males was 1.5 times that for females (Table 2.29).

Age-specific rates for males and females from Table 2.29 are graphically presented in Figure 2.26. The strong association between chronic obstructive pulmonary diseases and allied conditions and increasing 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 except ages 45-54 years. 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 3.2 times that for females. The age-adjusted

death rate for this group of diseases was 1.9 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 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 9.8 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 1970-1987 for deaths from this group of respiratory diseases. The age-adjusted death rates for males rose 6.8 percent over the period, while for females the rate in 1987 was 2.5 times higher than in 1970. The increase in age-adjusted rates for females was higher for white females (2.6 times) than for other than white females (1.6 times) between 1970 and 1987.

The age-adjusted death rate for the total population of Michigan from chronic obstructive pulmonary diseases and allied conditions was 1.1 percent greater than the United States provisional rate in 1987 (see Technical Notes).

Of the 2,868 Michigan resident deaths due to chronic obstructive pulmonary diseases and allied conditions, 1,878 (65.5 percent) were classified as chronic airways obstruction, not elsewhere classified. There were 681 deaths in 1987 due to emphysema, 166 due to asthma, and 125 due to bronchitis (Table 2.31).

Table 2.28  
Deaths Due to Chronic Obstructive Pulmonary Diseases and Allied Conditions by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

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	1	-	1	2	1	1	-	-	-
1 - 4	2	1	1	-	-	-	2	1	1	-	-	-
5 - 9	-	-	-	-	-	-	-	-	-	-	-	-
10 - 14	5	4	1	2	2	-	3	2	1	-	-	-
15 - 19	12	9	3	9	7	2	3	2	1	-	-	-
20 - 24	5	3	2	2	2	-	2	1	1	-	-	-
25 - 29	6	2	4	3	1	2	3	1	2	-	-	-
30 - 34	11	7	4	4	3	1	7	4	3	-	-	-
35 - 39	15	9	6	10	7	3	5	2	3	-	-	-
40 - 44	17	10	7	12	7	5	5	3	2	-	-	-
45 - 49	26	8	18	23	8	15	2	-	2	1	-	1
50 - 54	43	21	22	36	19	17	7	2	5	-	-	-
55 - 59	129	59	70	115	54	61	14	5	9	-	-	-
60 - 64	252	145	107	221	123	98	29	21	8	2	1	1
65 - 69	370	219	151	345	198	147	24	20	4	-	-	-
70 - 74	538	324	214	496	298	198	41	25	16	1	1	-
75 - 79	574	357	217	530	323	207	41	31	10	3	3	-
80 - 84	456	293	163	430	275	155	25	17	8	1	1	-
85 - 89	257	156	101	230	133	97	25	21	4	2	2	-
90 +	147	76	71	141	72	69	6	4	2	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	2,868	1,704	1,164	2,610	1,532	1,078	246	163	83	10	8	2
Median Age At Last Birthday	75	75	74	75	75	74	72	72	66	78	78	61

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

Table 2.29  
Death Rates Deaths Due to Chronic Obstructive Pulmonary Diseases  
and Allied Conditions by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	31.2	38.0	24.7	33.3	39.9	26.9	20.0	28.2	12.7
Under 1 Year	*	*	*	*	*	*	*	*	*
1 - 14 Years	0.4	0.5	*	*	*	*	1.6	*	*
15 - 24 Years	1.1	1.6	0.7	1.0	1.4	*	2.1	*	*
25 - 34 Years	1.1	1.2	1.0	0.5	*	*	4.7	5.2	4.3
35 - 44 Years	2.5	3.0	2.0	2.0	2.6	1.4	6.5	7.3	5.9
45 - 54 Years	7.5	6.5	8.5	7.4	6.9	7.8	8.8	*	12.4
55 - 64 Years	46.2	52.0	41.0	46.0	50.7	41.8	48.2	64.2	35.0
65 - 74 Years	144.9	196.4	104.2	150.2	200.6	110.2	104.0	165.3	56.7
75 - 84 Years	318.1	529.7	189.0	327.6	540.9	198.3	227.6	419.9	102.5
85 Years and Over	366.2	708.4	221.7	368.5	692.7	233.5	338.0	820.5	98.0
Age-Adjusted Rate <sup>2</sup>	18.9	26.6	13.9	19.1	26.6	14.1	17.4	26.1	11.3

<sup>1</sup> 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.

<sup>2</sup> 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.

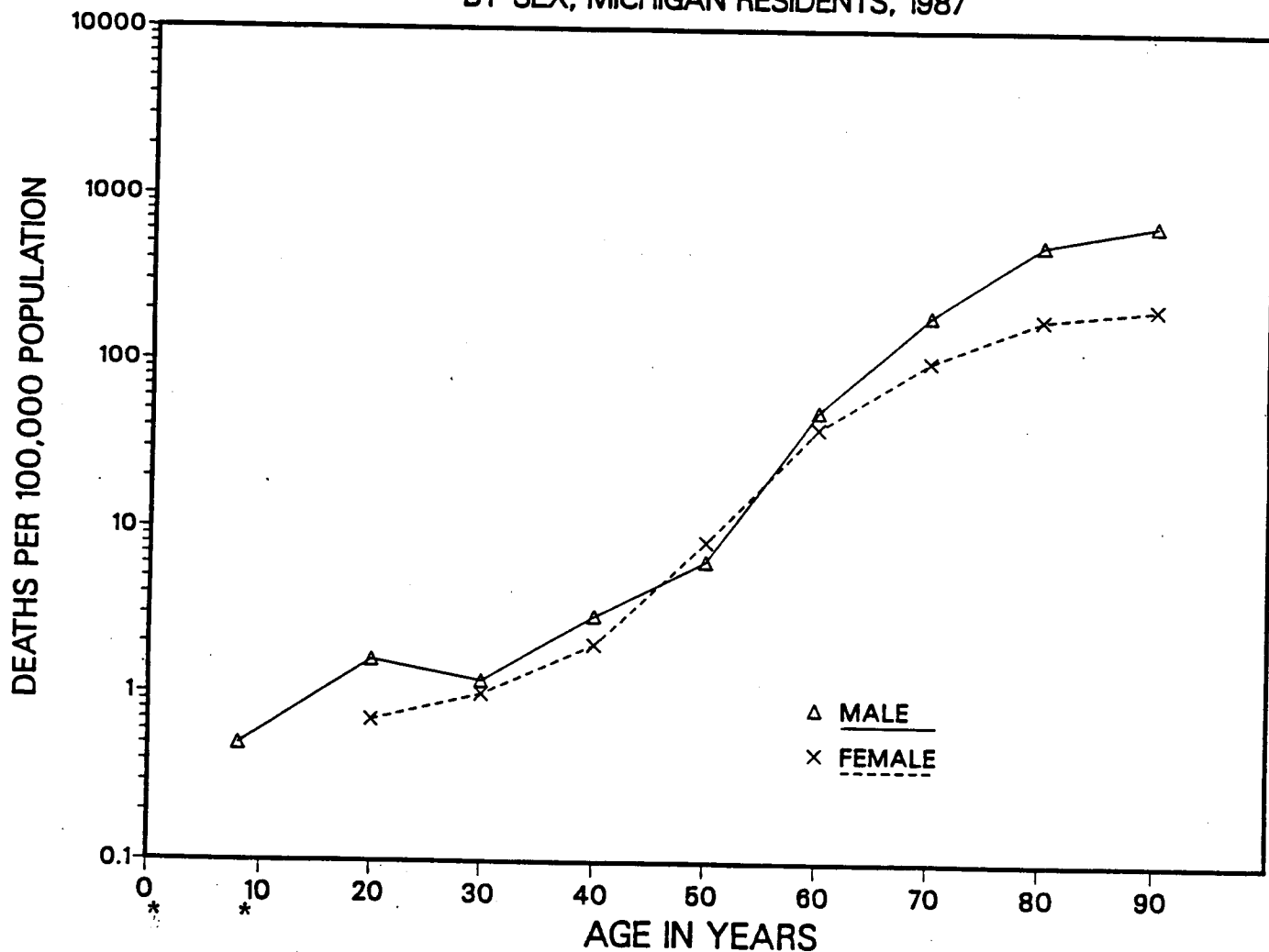
\* Rate is considered statistically unreliable.

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.

Based on mortality data from 1985-1987, the probability of eventual death due to chronic obstructive pulmonary diseases and allied conditions is 0.045 for males and 0.027 for females at birth. The probability for males increases steadily to a peak of 0.055 at ages

70-74 and then declines in the last few age groups to 0.044. 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.

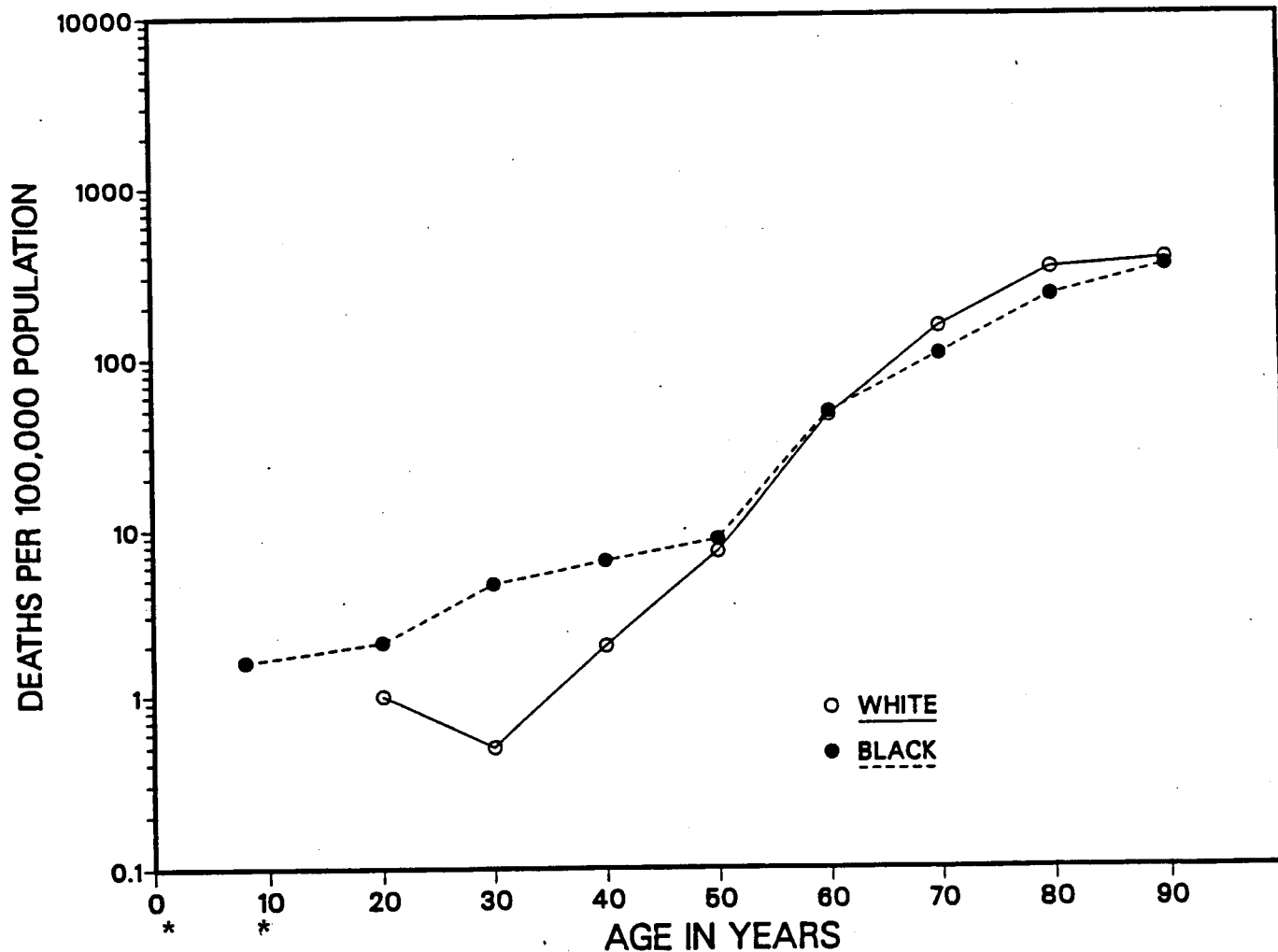
FIGURE 2.26  
AGE-SPECIFIC DEATH RATES<sup>1</sup> FOR DEATHS DUE TO CHRONIC  
OBSTRUCTIVE PULMONARY DISEASES AND ALLIED CONDITIONS,  
BY SEX, MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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 RATES<sup>1</sup> FOR DEATHS DUE TO CHRONIC  
OBSTRUCTIVE PULMONARY DISEASES AND ALLIED CONDITIONS,  
BY RACE, MICHIGAN RESIDENTS, 1987



<sup>1</sup>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.

Table 2.30  
**Age - Adjusted Death Rates<sup>1</sup> for Deaths Due to Chronic Obstructive Pulmonary  
Diseases and Allied Conditions<sup>2</sup> by Race and Sex**  
Michigan<sup>3</sup> Residents, 1970 - 1987 and United States Residents, 1979 - 1987

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
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 <sup>4</sup>	18.7	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

<sup>2</sup> 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.

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

<sup>4</sup> Provisional data.

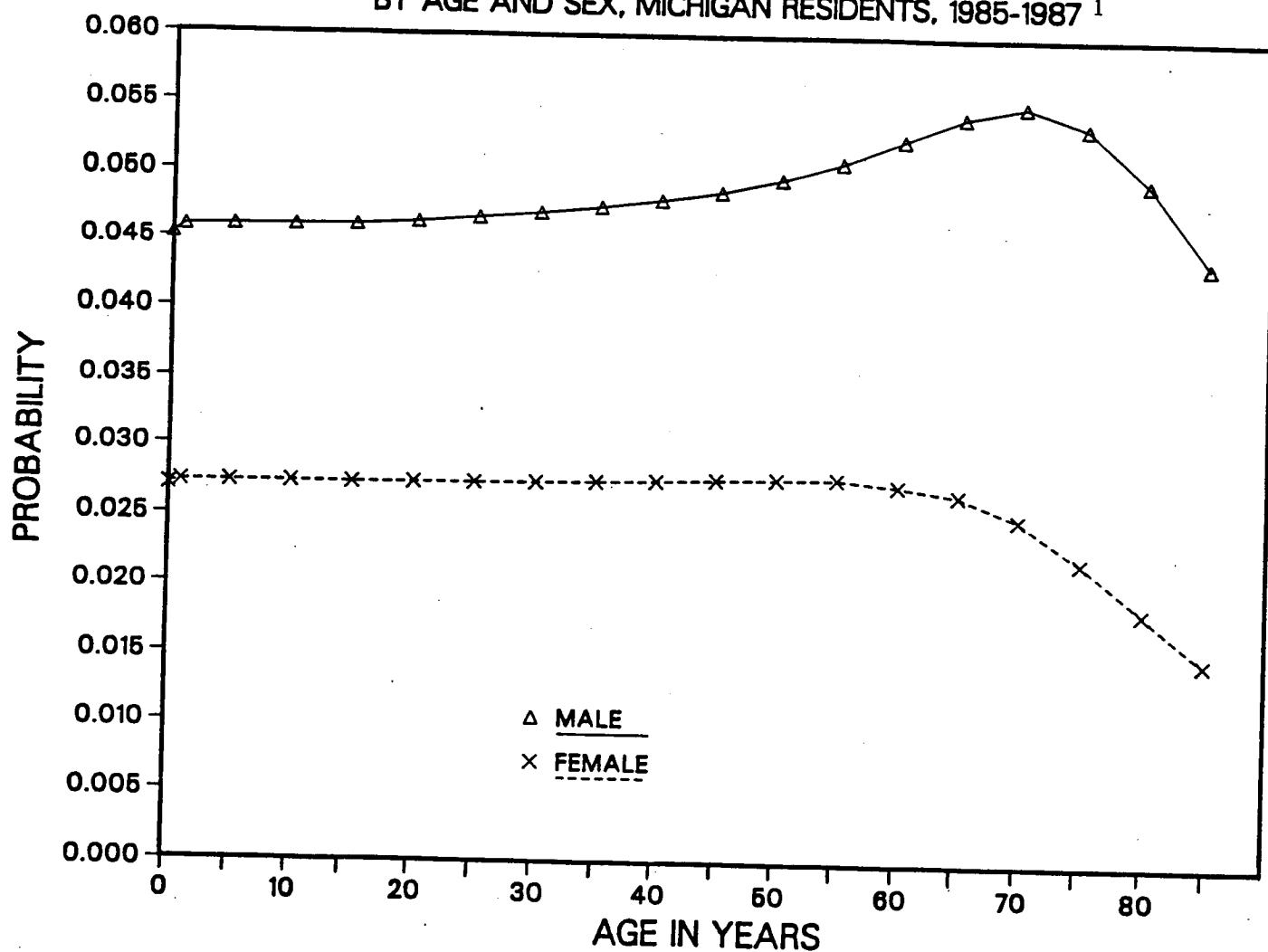


Table 2.31  
Deaths Due to Chronic Obstructive Pulmonary Diseases And Allied Conditions  
by Specific Cause  
Michigan Residents, 1987

282 LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
174	Chronic Airways Obstruction, not elsewhere classified	1,878	65.5
171	Emphysema	681	23.7
172	Asthma	166	5.8
170	Chronic Bronchitis	98	3.4
169	Bronchitis, not Specified as Acute or Chronic	27	0.9
173	Bronchiectasis and Extrinsic Allergic Alveolitis	18	0.6
TOTAL		2,868	100.0

<sup>1</sup> 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 228  
 PROBABILITY OF EVENTUALLY DYING FROM CHRONIC  
 OBSTRUCTIVE PULMONARY DISEASES AND ALLIED CONDITIONS,  
 BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987 <sup>1</sup>



<sup>1</sup> 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 34 deaths that occurred to Michigan residents in 1987 was due to pneumonia and influenza. There were a total of 2,377 such deaths of which 1,240 (52.2 percent) were to females (Table 2.32).

The overall median age at death in 1987 for those dying from pneumonia and influenza was 82 years. This is well above the median age of 73 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 84 years exceeded by 7 years that for black females. There were a total of eleven 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 79 years.

The overall crude death rate for pneumonia and influenza deaths in 1987 was 25.8, compared to a rate of 27.5 in 1986. The crude rate for females (26.3) was 3.5 percent greater than the male rate (25.4). On an age-adjusted basis, the male rate exceeded the female rate by 58.3 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 1987 than was the case for the black population. On an age-adjusted basis, however, the rate for the black group was 61.3 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 84. Among persons 85 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 25.8 in 1987 was 10.4 percent below the provisional rate of 28.8 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 1987 except 1983 and 1986 (Table 2.34). In 1987 the Michigan age-adjusted rate was 3.0 percent below the provisional national rate. Between 1970 and 1987 the age-adjusted rate for Michigan declined by 33.3 percent.

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

Table 2.32  
Deaths Due to Pneumonia and Influenza by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	22	10	12	17	8	9	5	2	3	-	-	-
1 - 4	7	2	5	5	1	4	2	1	1	-	-	-
5 - 9	1	1	-	1	1	-	-	-	-	-	-	-
10 - 14	2	1	1	2	1	1	-	-	-	-	-	-
15 - 19	6	5	1	5	4	1	1	1	-	-	-	-
20 - 24	4	1	3	2	-	2	2	1	1	-	-	-
25 - 29	13	9	4	9	7	2	4	2	2	-	-	-
30 - 34	14	7	7	6	2	4	8	5	3	-	-	-
35 - 39	23	13	10	13	8	5	10	5	5	-	-	-
40 - 44	30	15	15	12	4	8	18	11	7	-	-	-
45 - 49	26	14	12	20	10	10	6	4	2	-	-	-
50 - 54	32	20	12	19	11	8	12	8	4	1	1	-
55 - 59	47	23	24	33	16	17	14	7	7	-	-	-
60 - 64	104	67	37	83	56	27	21	11	10	-	-	-
65 - 69	160	110	50	137	97	40	22	12	10	1	1	-
70 - 74	227	123	104	205	107	98	22	16	6	-	-	-
75 - 79	329	171	158	287	144	143	38	23	15	4	4	-
80 - 84	399	193	206	357	170	187	39	20	19	3	3	-
85 - 89	445	182	263	413	168	245	29	13	16	2	1	1
90 +	486	170	316	454	159	295	31	10	21	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	2,377	1,137	1,240	2,080	974	1,106	284	152	132	11	10	1
Median Age At Last Birthday	82	79	84	83	80	84	73	72	77	79	79	89

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

Table 2.33  
Pneumonia and Influenza Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	25.8	25.4	26.3	26.5	25.4	27.6	23.1	26.3	20.2
Under 1 Year	15.7	14.0	17.5	15.0	13.8	16.2	21.1	*	*
1 - 14 Years	0.5	*	0.6	0.5	*	0.7	*	*	*
15 - 24 Years	0.7	0.8	*	0.6	*	*	*	*	*
25 - 34 Years	1.7	2.1	1.4	1.1	1.4	0.9	5.7	7.3	4.3
35 - 44 Years	4.2	4.5	3.9	2.3	2.2	2.4	18.2	23.3	14.1
45 - 54 Years	6.3	7.6	5.1	4.9	5.3	4.4	17.6	26.4	10.6
55 - 64 Years	18.3	22.9	14.1	15.9	20.6	11.6	39.3	44.4	35.0
65 - 74 Years	61.7	84.3	44.0	61.0	82.3	44.1	70.4	102.9	45.4
75 - 84 Years	224.8	296.7	181.0	219.7	284.0	180.8	265.6	376.2	193.6
85 Years and Over	843.9	1074.8	746.4	863.1	1108.3	761.1	654.2	754.8	604.2
Age-Adjusted Rate <sup>2</sup>	12.8	16.3	10.3	11.9	15.2	9.8	19.2	25.4	14.6

<sup>1</sup> 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.

<sup>2</sup> 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.

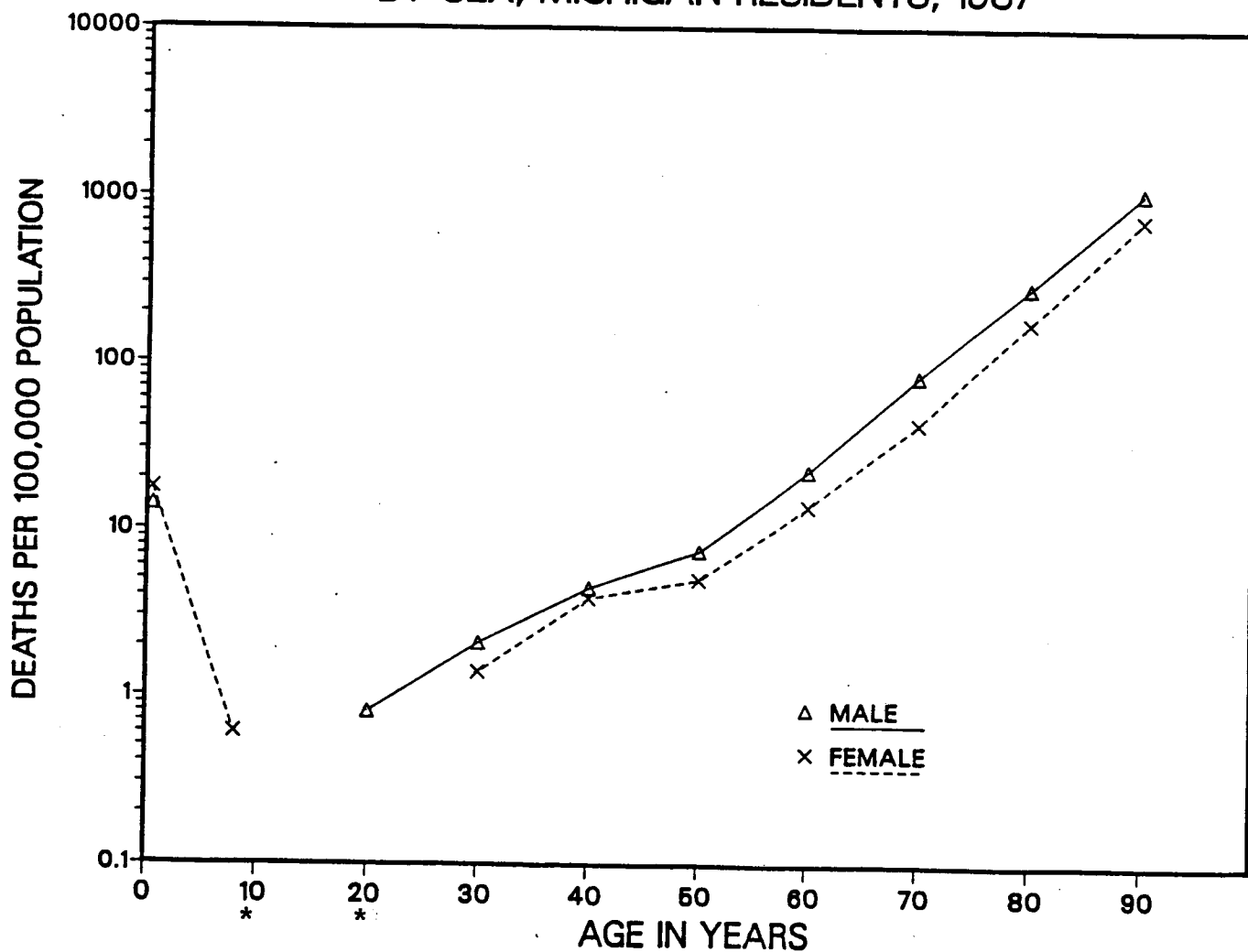
\* Rate is considered statistically unreliable.

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.

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 1987 the other than white female rate declined to 55.5 percent below the 1970 rate. The decline in the age-adjusted rate for other than white males was 47.8 percent between 1970 and 1987. 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 unspecified organisms (1,993) accounted for 83.8 percent of all Michigan pneumonia and influenza deaths in 1987 (Table 2.35). Another 6.9 percent of the deaths were due to pneumococcal and other bacterial pneumonia, and 6.8 percent were due to bronchopneumonia, organism unspecified. The three most frequent categories of pneumonia and

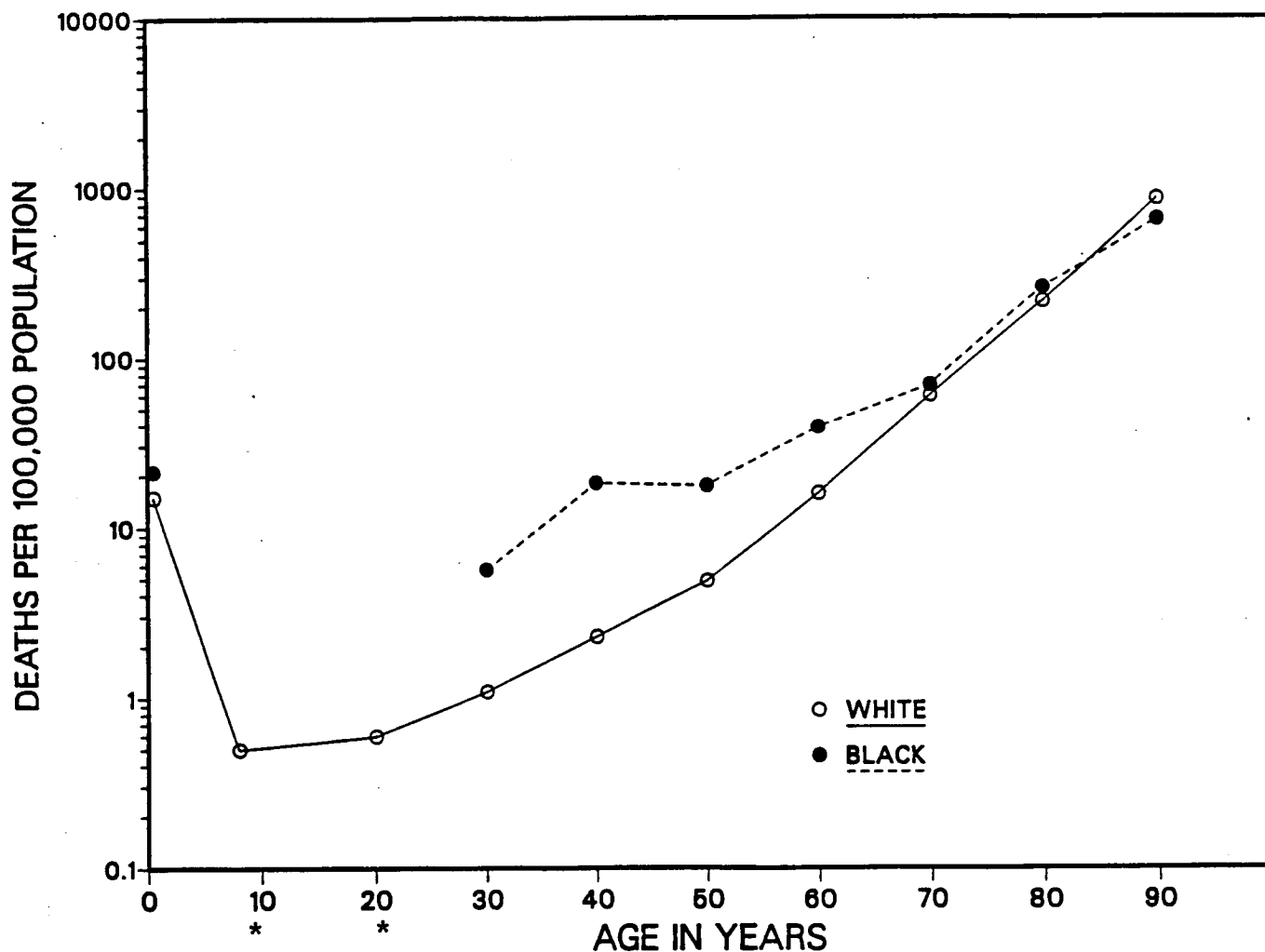
FIGURE 2.29  
AGE-SPECIFIC PNEUMONIA AND INFLUENZA DEATH RATES<sup>1</sup>  
BY SEX, MICHIGAN RESIDENTS, 1987



<sup>1</sup>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.

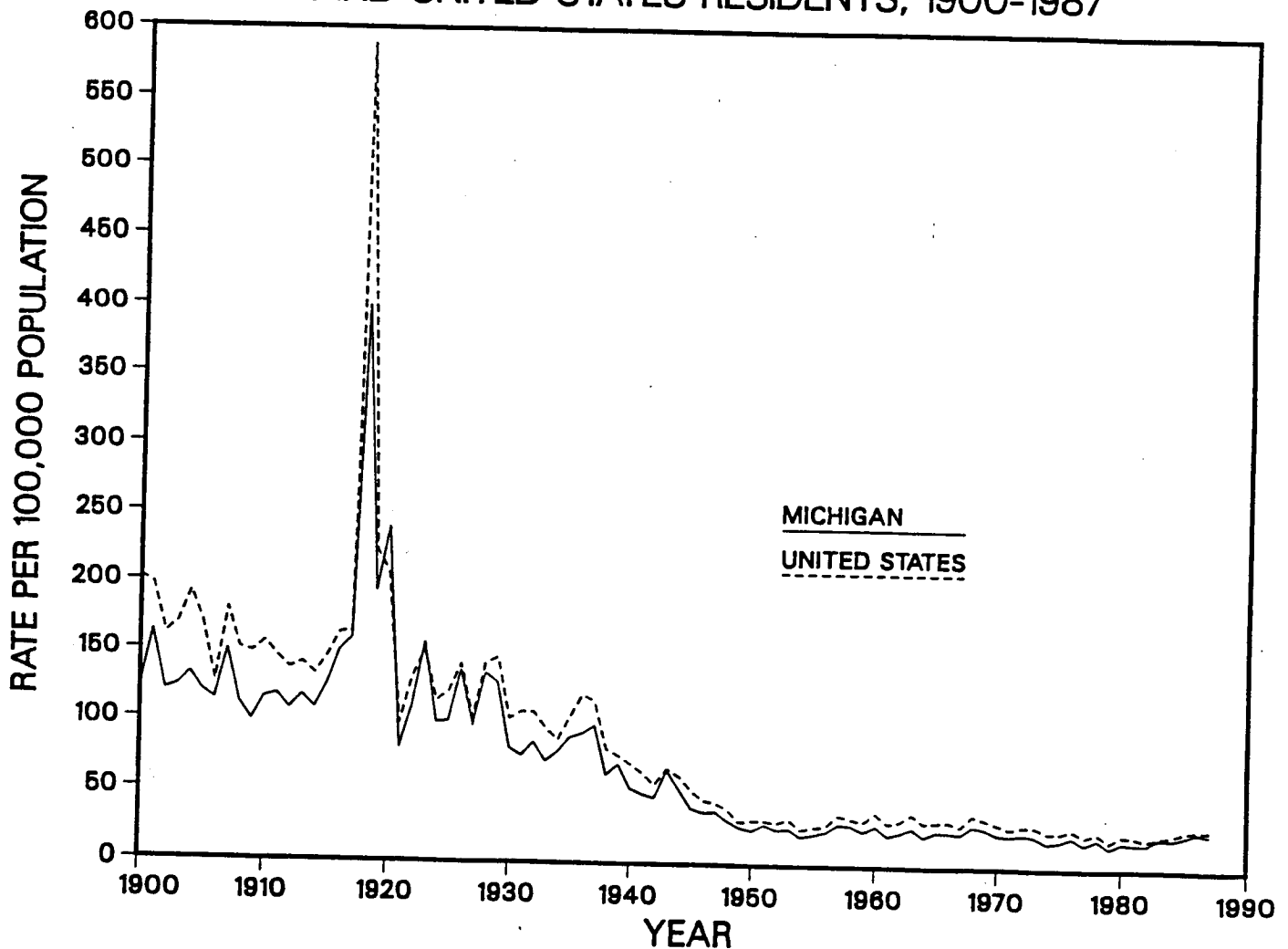
FIGURE 2.30  
AGE-SPECIFIC PNEUMONIA AND INFLUENZA DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENTS, 1987



<sup>1</sup>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 2.31  
PNEUMONIA AND INFLUENZA DEATH RATES, MICHIGAN  
AND UNITED STATES<sup>1</sup> RESIDENTS, 1900-1987<sup>2</sup>



<sup>1</sup> National rates are from Death Registration States for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>2</sup> 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.



Table 2.34  
Age - Adjusted Pneumonia and Influenza Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987<sup>3</sup>

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
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 <sup>4</sup>	13.2	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> 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.

<sup>4</sup> Provisional data.

Table 2.35  
Deaths Due to Pneumonia and Influenza by Specified Cause  
Michigan Residents, 1987

282 LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
167	Pneumonia due to Other and Unspecified Organism	1,993	83.8
165	Pneumococcal and Other Bacterial Pneumonia	165	6.9
166	Bronchopneumonia, Organism Unspecified	161	6.8
164	Viral Pneumonia	35	1.5
168	Influenza	23	1.0
TOTAL		2,377	100.0

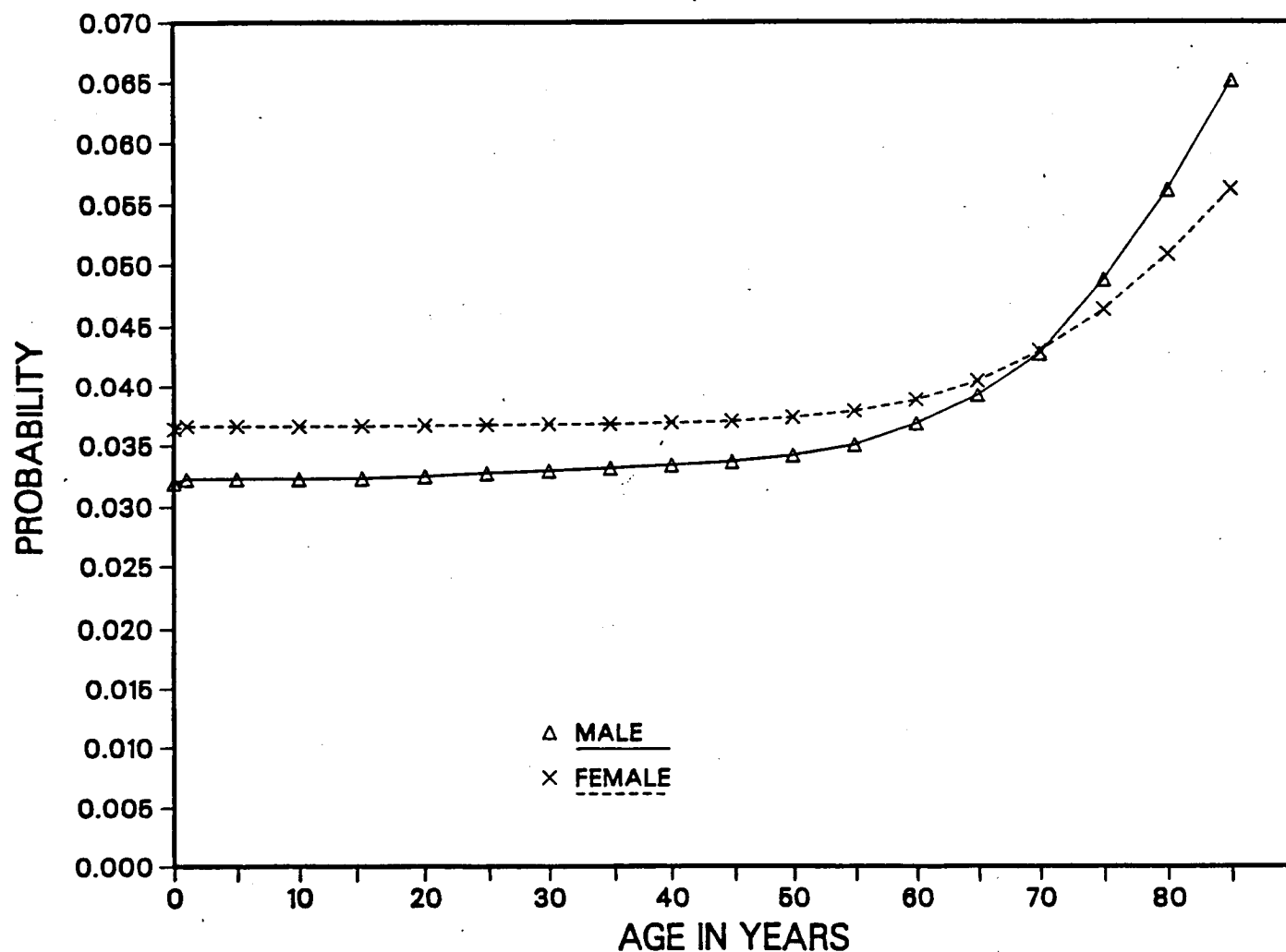
<sup>1</sup> List of 282 Selected Causes developed by the National Center for Health Statistics for tabulation of mortality data coded by the 9th Revision of the International Classification of Diseases, WHO.

influenza deaths together accounted for 97.5 percent of all such deaths. Influenza was the direct cause of 1.0 percent of the pneumonia and influenza deaths in 1987, compared to 4.9 percent in 1986.

The likelihood of eventual death being caused by pneumonia and influenza is 0.036 and 0.037 for females and between 0.032 and

0.034 for males from birth to age 49. The calculated probabilities for each sex increase after this age, with probabilities for males increasing more rapidly than those for females. Based on the Michigan mortality experience of 1985-1987 at ages 85 and above, the chances of eventually dying from pneumonia and influenza are 0.065 for males and 0.056 for females (Figure 2.32).

FIGURE 2.32  
 PROBABILITY OF EVENTUALLY DYING FROM PNEUMONIA AND  
 INFLUENZA BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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 1987 1,479 Michigan resident deaths were attributed to diabetes mellitus, the seventh leading cause of death. This was 15 less deaths than were caused by this disease in 1986. Deaths to females numbered 861 or 58.2 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 equal to 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 76 years for white females. For black males and females the medians were 67 and 70 years, respectively.

Diabetes mellitus death rates by age, race, and sex are presented in Table 2.37. The diabetes mellitus crude death rate was 16.1 in 1987. The crude rate for females was 18.2, 31.9 percent higher than the rate of 13.8 for males. When age-adjusted rates are examined, however, the rate for males was 8.2 percent higher than the rate for females.

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 through age 84. Above age 84, the male rate was less than female rate. Rates for both sexes increased steadily with advancing age.

The crude diabetes mellitus death rate for black persons was 23.6 percent above that of white persons (19.4 compared to 15.7). The age-adjusted rate for the black population was nearly twice that of the white population. The age-adjusted rate for black females exceeded that of their white counterparts by 102.3 percent, while the age-adjusted rate for black

males was 93.8 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 more than four 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 40.4 percent to 16.1 in 1987.

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 the same pattern. A peak of 19.2 was reached in 1968. Since that time the rate for the nation has declined by 18.8 percent to a provisional rate of 15.6 in 1987.

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, Michigan's rate was above that of the nation. Through the 1960'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 1987 Michigan's rate was 3.2

Table 2.36  
Deaths Due to Diabetes Mellitus by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

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	2	1	1	2	1	1	-	-	-	-	-	-
20 - 24	5	5	-	4	4	-	1	1	-	-	-	-
25 - 29	9	2	7	4	1	3	5	1	4	-	-	-
30 - 34	15	7	8	12	6	6	3	1	2	-	-	-
35 - 39	25	14	11	21	13	8	4	1	3	-	-	-
40 - 44	28	18	10	20	15	5	7	3	4	1	-	1
45 - 49	29	18	11	17	10	7	12	8	4	-	-	-
50 - 54	40	21	19	28	13	15	12	8	4	-	-	-
55 - 59	89	53	36	70	42	28	18	11	7	1	-	1
60 - 64	144	67	77	116	56	60	26	10	16	2	1	1
65 - 69	180	86	94	134	65	69	45	20	25	1	1	-
70 - 74	253	106	147	208	90	118	43	16	27	2	-	2
75 - 79	213	88	125	189	81	108	24	7	17	-	-	-
80 - 84	201	70	131	185	61	124	16	9	7	-	-	-
85 - 89	143	43	100	129	42	87	14	1	13	-	-	-
90 +	103	19	84	93	16	77	9	3	6	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,479	618	861	1,232	516	716	239	100	139	7	2	5
Median Age At Last Birthday	73	70	75	74	71	76	68	67	70	64	65	64

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

Table 2.37  
Diabetes Mellitus Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	16.1	13.8	18.2	15.7	13.4	17.9	19.4	17.3	21.3
Under 1 Year	*	*	*	*	*	*	*	*	*
1 - 14 Years	*	*	*	*	*	*	*	*	*
15 - 24 Years	0.5	0.8	*	0.5	0.8	*	*	*	*
25 - 34 Years	1.5	1.2	1.9	1.2	1.1	1.4	3.8	*	5.2
35 - 44 Years	4.2	5.1	3.2	3.7	5.1	2.4	7.2	*	8.2
45 - 54 Years	7.5	8.8	6.4	5.6	5.8	5.4	23.5	35.2	14.2
55 - 64 Years	28.3	30.6	26.2	25.5	28.0	23.1	49.4	51.8	47.3
65 - 74 Years	69.1	69.4	68.8	61.0	62.6	59.7	140.8	132.2	147.4
75 - 84 Years	127.9	128.8	127.3	127.6	128.4	127.1	138.0	140.0	136.7
85 Years and Over	223.0	189.3	237.2	221.5	196.0	232.1	250.8	*	310.3
Age-Adjusted Rate <sup>2</sup>	10.2	10.6	9.8	9.3	9.7	8.8	18.3	18.8	17.8

<sup>1</sup> 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.

<sup>2</sup> 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.

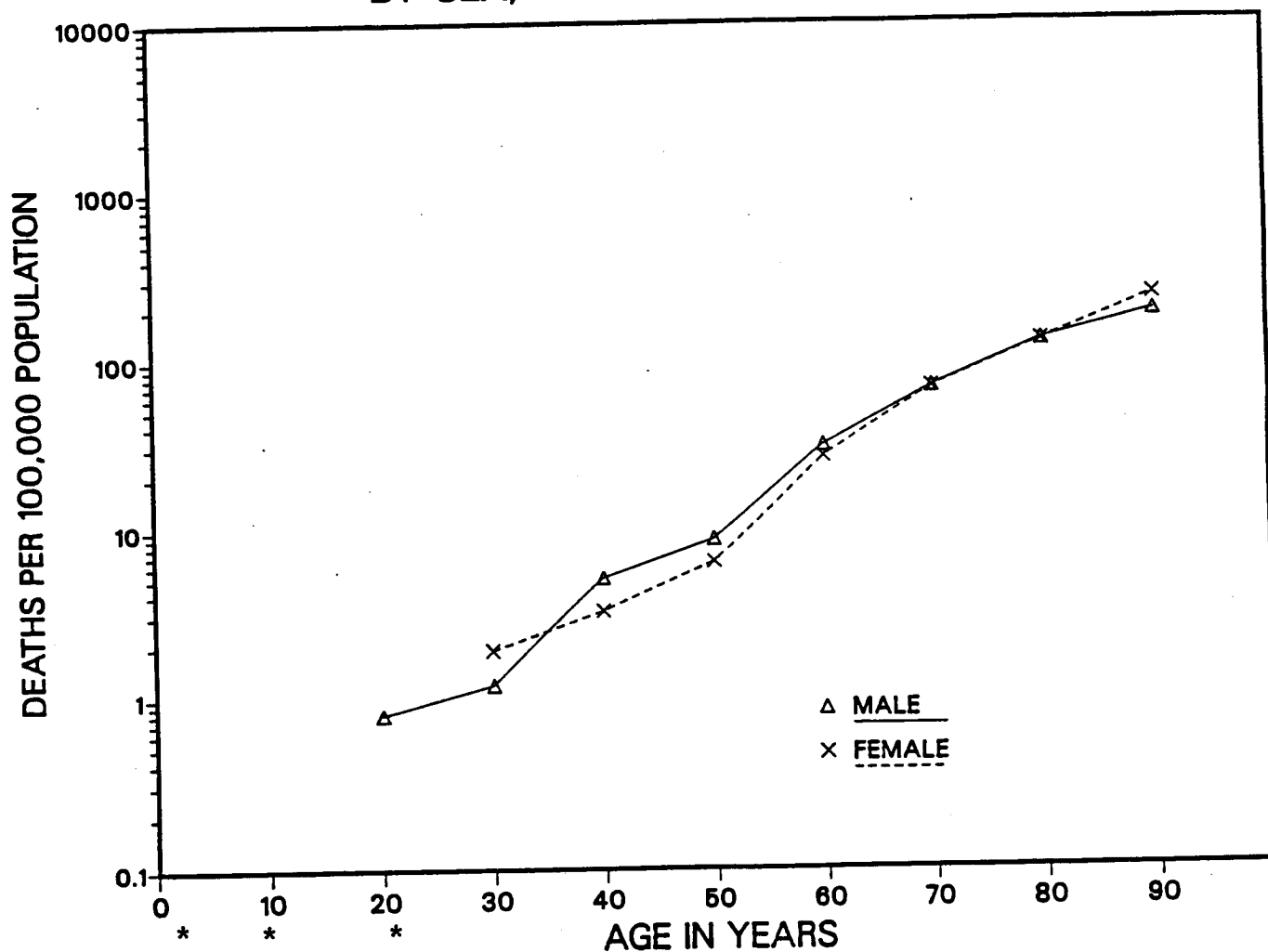
percent above the provisional rate for the United States.

Age-adjusted death rates for diabetes mellitus for the years 1970-1987 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 49.5 percent since 1970. The rate for the

United States declined by 31.9 percent between 1970 and 1987.

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

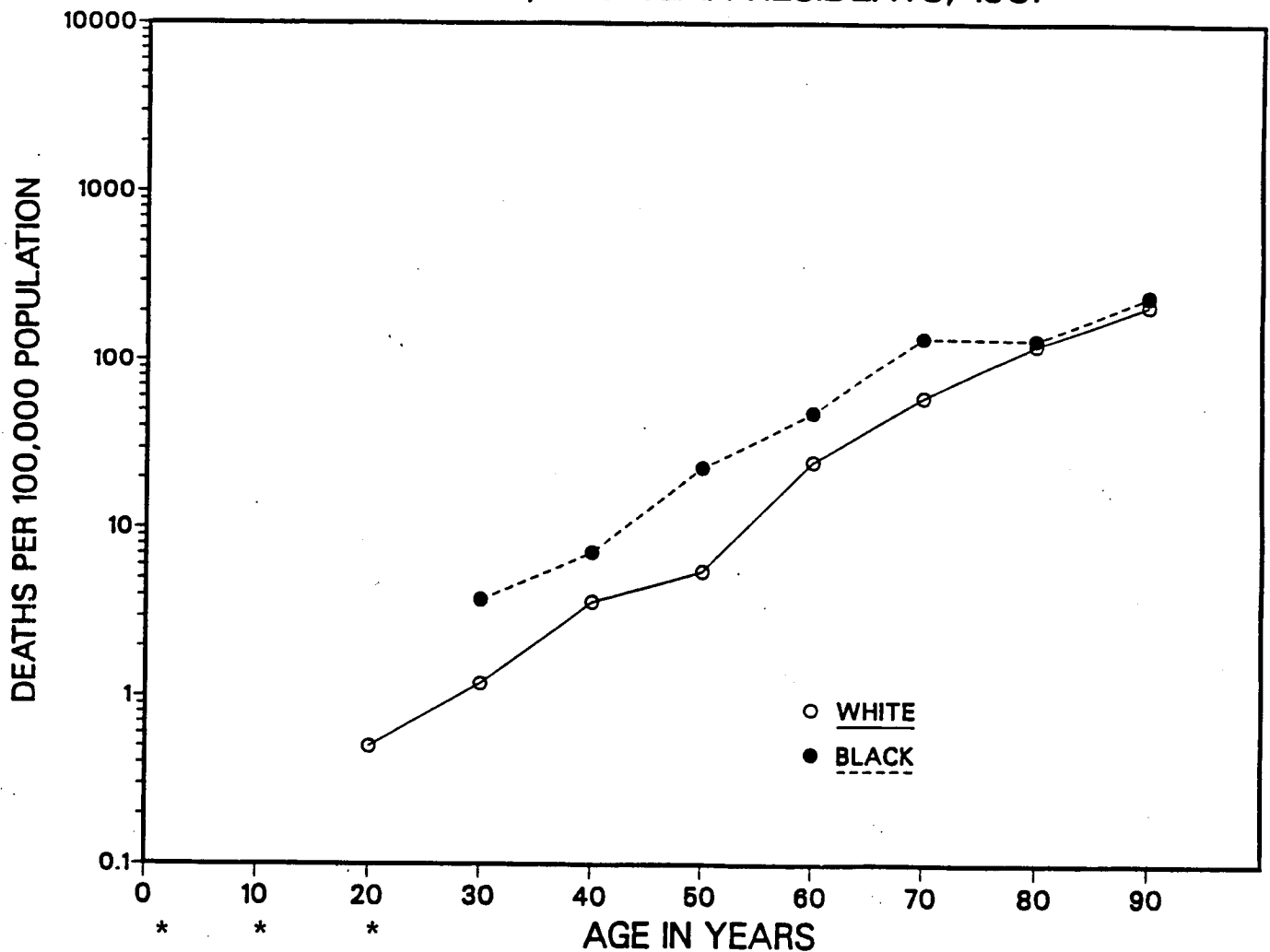
FIGURE 2.33  
AGE-SPECIFIC DIABETES MELLITUS DEATH RATES<sup>1</sup>  
BY SEX, MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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 2.34  
AGE-SPECIFIC DIABETES MELLITUS DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENTS, 1987

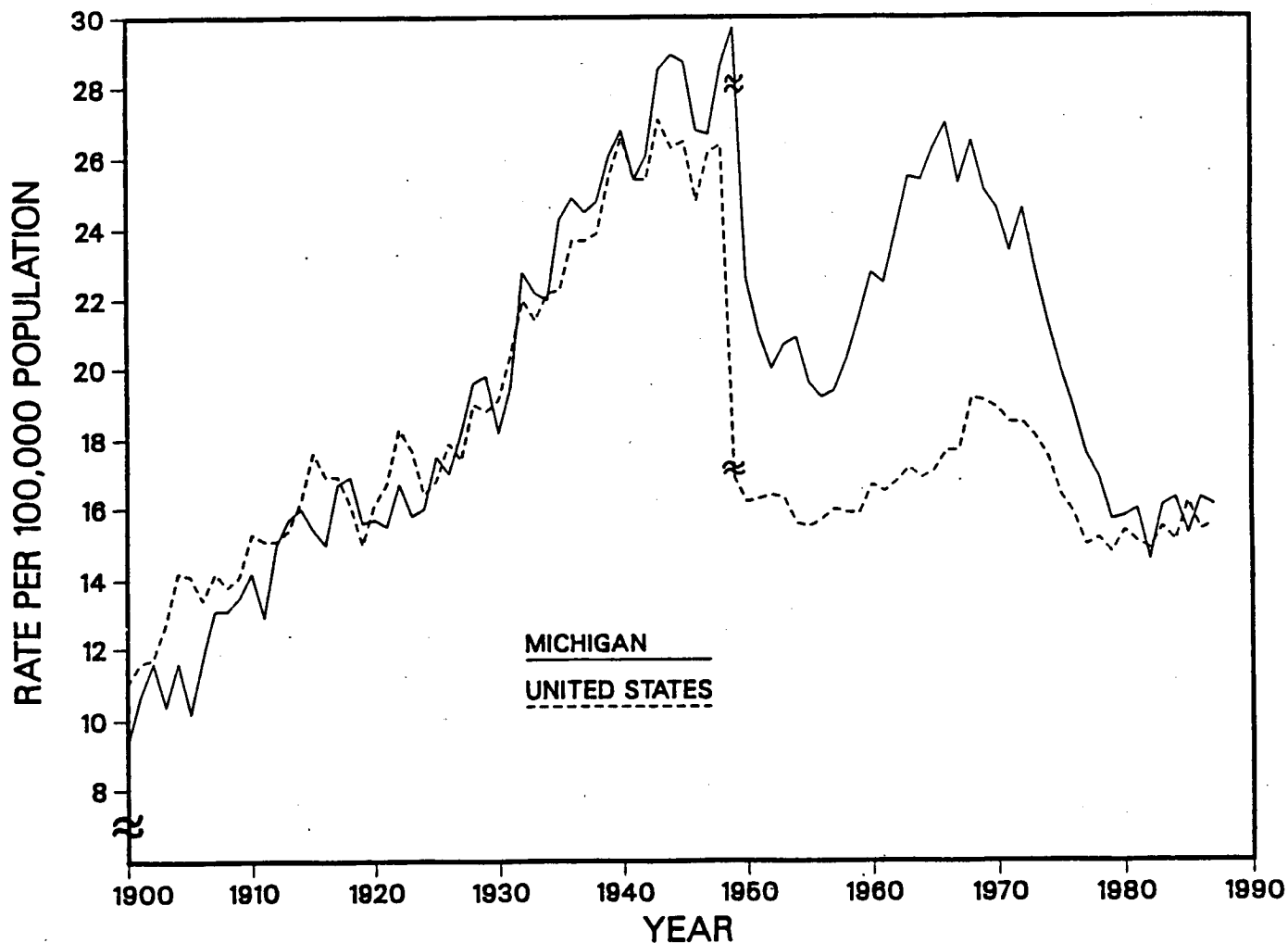


<sup>1</sup>Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

\*Rate is considered statistically unreliable.



**FIGURE 2.35**  
**DIABETES MELLITUS DEATH RATES, MICHIGAN AND**  
**UNITED STATES<sup>1</sup> RESIDENTS, 1900-1987<sup>2</sup>**



<sup>1</sup>National rates are from Death Registration States for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration.

<sup>2</sup>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.

Table 2.38  
Age - Adjusted Diabetes Mellitus Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States, 1970 - 1987

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
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 <sup>3</sup>	9.6	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

since 1979 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 1987 77.1 percent of all diabetes mellitus deaths were without mention of complication. Diabetes with renal manifestations caused 96 deaths, while diabetes with peripheral circulatory disorders resulted in an additional 86 deaths. There were 102 deaths in 1987 from diabetes with ketoacidosis or coma, which

were deaths where a diabetic crisis was involved (Table 2.39).

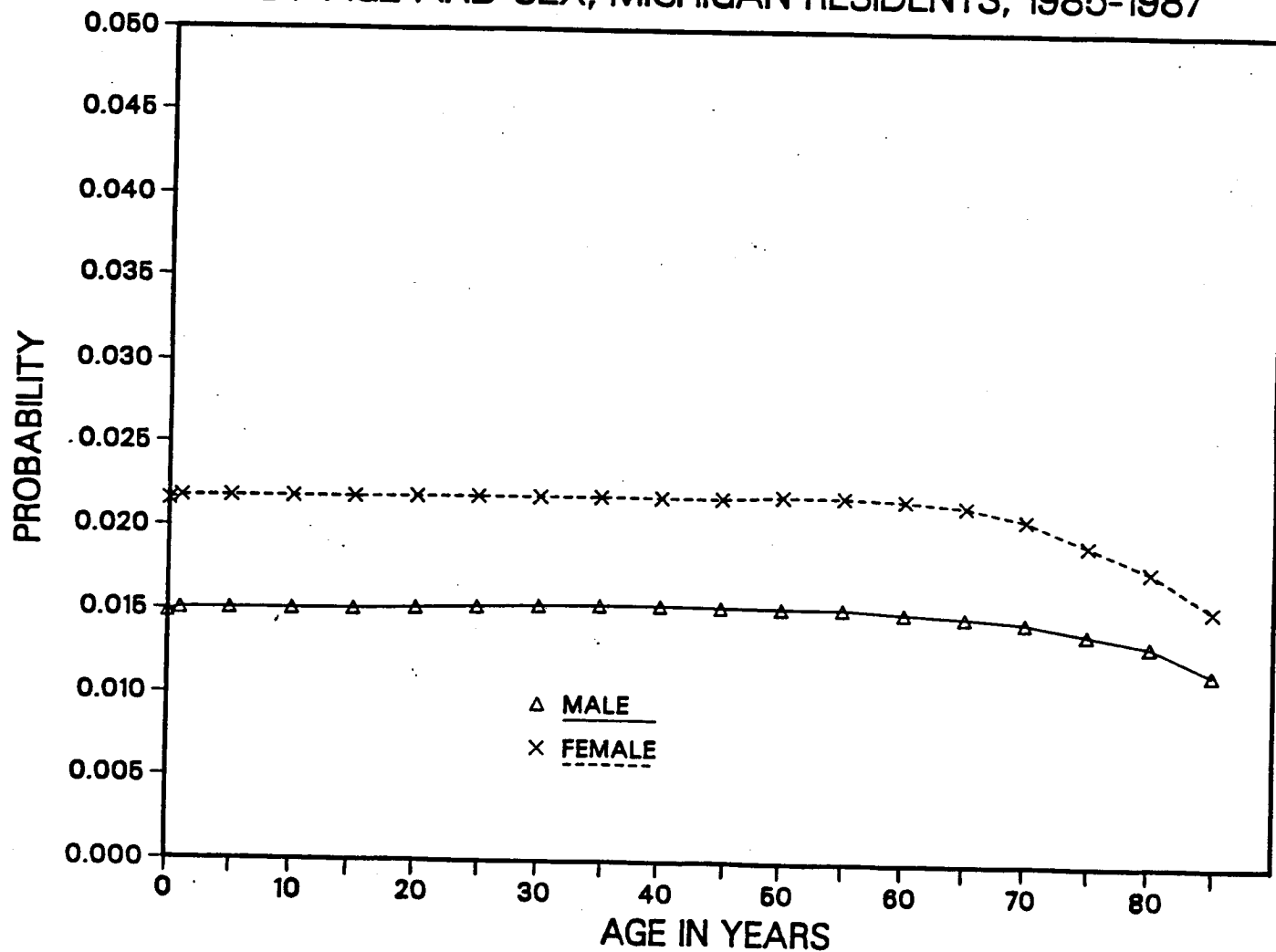
At birth, the probability of eventual death due to diabetes mellitus is 0.015 for males and 0.022 for females (Figure 2.36). The probability of death from diabetes mellitus for females is relatively stable from birth to age 69 and declines after that age. In fact, females are less likely to eventually die from this cause at ages 70 and over than when they were born. Probabilities for males are consistently less than those for females, but decline less, relatively, in the older ages.

Table 2.39  
Deaths Due to Diabetes Mellitus by Detailed Cause  
Michigan Residents, 1987

ICD LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
250.0	Diabetes Mellitus without Mention of Complications	1,140	77.1
250.3	Diabetes with Renal Manifestations	96	6.5
250.6	Diabetes with Peripheral Circulatory Disorders	86	5.8
250.1	Diabetes with Ketoacidosis	54	3.7
250.2	Diabetes with Coma	48	3.2
250.7	Diabetes with Other Specified Manifestations	38	2.6
250.5	Diabetes with Neurological Manifestations	12	0.8
250.9	Diabetes with Unspecified Complications	3	0.2
250.4	Diabetes with Ophthalmic Manifestations	2	0.1
TOTAL		1,479	100.0

<sup>1</sup> 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, 1985-1987<sup>1</sup>



<sup>1</sup>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 1,168 Michigan resident deaths attributed to atherosclerosis in 1987, 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 1987, 64.3 percent were to females, whereas 47.9 percent of the deaths due to all causes were to females. Only 90 of the 1,168 deaths were to black persons and persons of other races. This is 7.7 percent of all atherosclerosis deaths, while 14.9 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 5 years lower than that for females, and the median for black persons was 3 years lower than that for white persons (Table 2.40).

Atherosclerosis resulted in 12.7 deaths per 100,000 Michigan residents in 1987, 4.5 percent lower than the 1986 rate of 13.3. Deaths to females from this disease were relatively more frequent than for males with crude mortality rates of 15.9 and 9.3 respectively (Table 2.41). The age-adjusted rate for males, however, was 14.6 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 (Figure 2.38). The age-adjusted rate for white persons was 6.1 percent higher than the rate for black persons. Age specific rates were higher for black males between ages 55 to 64 years and lower after age 64 than rates for white males. The age specific rates for black females was higher than rates for white females between ages 75 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 1987 the Michigan rate of 12.7 exceeded by 33.7 percent the provisional rate of 9.5 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 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

Table 2.40  
Deaths Due to Atherosclerosis by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

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	-	-	-	-	-	-	-	-	-	-	-	-
25 - 29	-	-	-	-	-	-	-	-	-	-	-	-
30 - 34	1	1	-	1	1	-	-	-	-	-	-	-
35 - 39	-	-	-	-	-	-	-	-	-	-	-	-
40 - 44	6	3	3	4	2	2	2	1	1	-	-	-
45 - 49	2	2	-	2	2	-	-	-	-	-	-	-
50 - 54	4	3	1	3	3	-	1	-	1	-	-	-
55 - 59	19	12	7	17	11	6	2	1	1	-	-	-
60 - 64	28	20	8	24	16	8	4	4	-	-	-	-
65 - 69	46	28	18	41	26	15	5	2	3	-	-	-
70 - 74	85	40	45	80	36	44	5	4	1	-	-	-
75 - 79	147	58	89	131	52	79	14	5	9	2	1	1
80 - 84	230	91	139	204	84	120	26	7	19	-	-	-
85 - 89	248	75	173	232	70	162	16	5	11	-	-	-
90 +	352	84	268	339	80	259	13	4	9	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,168	417	751	1,078	383	695	88	33	55	2	1	1
Median Age At Last Birthday	85	82	87	85	82	87	82	79	83	78	78	78

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

Table 2.41  
Atherosclerosis Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	12.7	9.3	15.9	13.7	10.0	17.3	7.2	5.7	8.4
Under 1 Year	*	*	*	*	*	*	*	*	*
1 - 14 Years	*	*	*	*	*	*	*	*	*
15 - 24 Years	*	*	*	*	*	*	*	*	*
25 - 34 Years	*	*	*	*	*	*	*	*	*
35 - 44 Years	0.5	*	*	*	*	*	*	*	*
45 - 54 Years	0.7	1.1	*	0.6	1.3	*	*	*	*
55 - 64 Years	5.7	8.1	3.5	5.6	7.7	3.7	6.7	12.3	*
65 - 74 Years	20.9	24.6	18.0	21.6	25.0	18.8	16.0	22.0	*
75 - 84 Years	116.4	121.4	113.4	114.3	123.0	109.0	138.0	105.0	159.4
85 Years and Over	543.8	485.5	568.5	567.2	506.9	592.3	316.2	295.4	326.6
Age-Adjusted Rate <sup>2</sup>	5.1	5.5	4.8	5.2	5.6	4.8	4.9	4.9	4.7

<sup>1</sup> 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.

<sup>2</sup> 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.

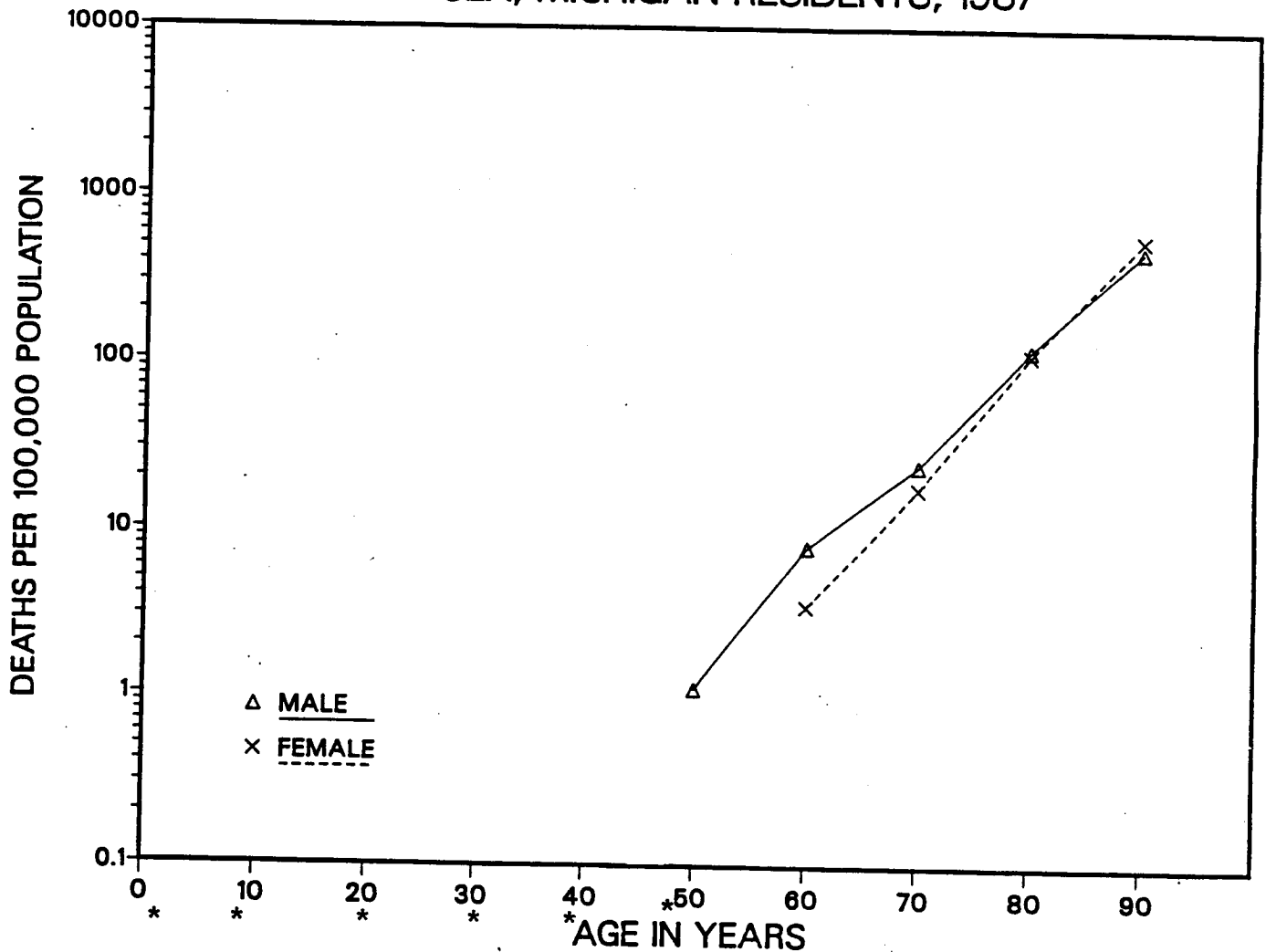
below or equal to the comparable rates for the nation from 1970 through 1983 but were higher in 1984 through 1986 (see Technical Notes). Rates for other than white persons were consistently lower than those for white persons in Michigan while these rates were roughly similar across the nation.

Nearly all atherosclerosis deaths are reported as generalized and/or unspecified as

to type. Only 47 of the 1,168 deaths were in other classifications. Of these, 40 were attributed to atherosclerosis of arteries of the extremities (Table 2.43).

The 1985 through 1987 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

FIGURE 2.37  
AGE-SPECIFIC ATHEROSCLEROSIS DEATH RATES<sup>1</sup>  
BY SEX, MICHIGAN RESIDENTS, 1987

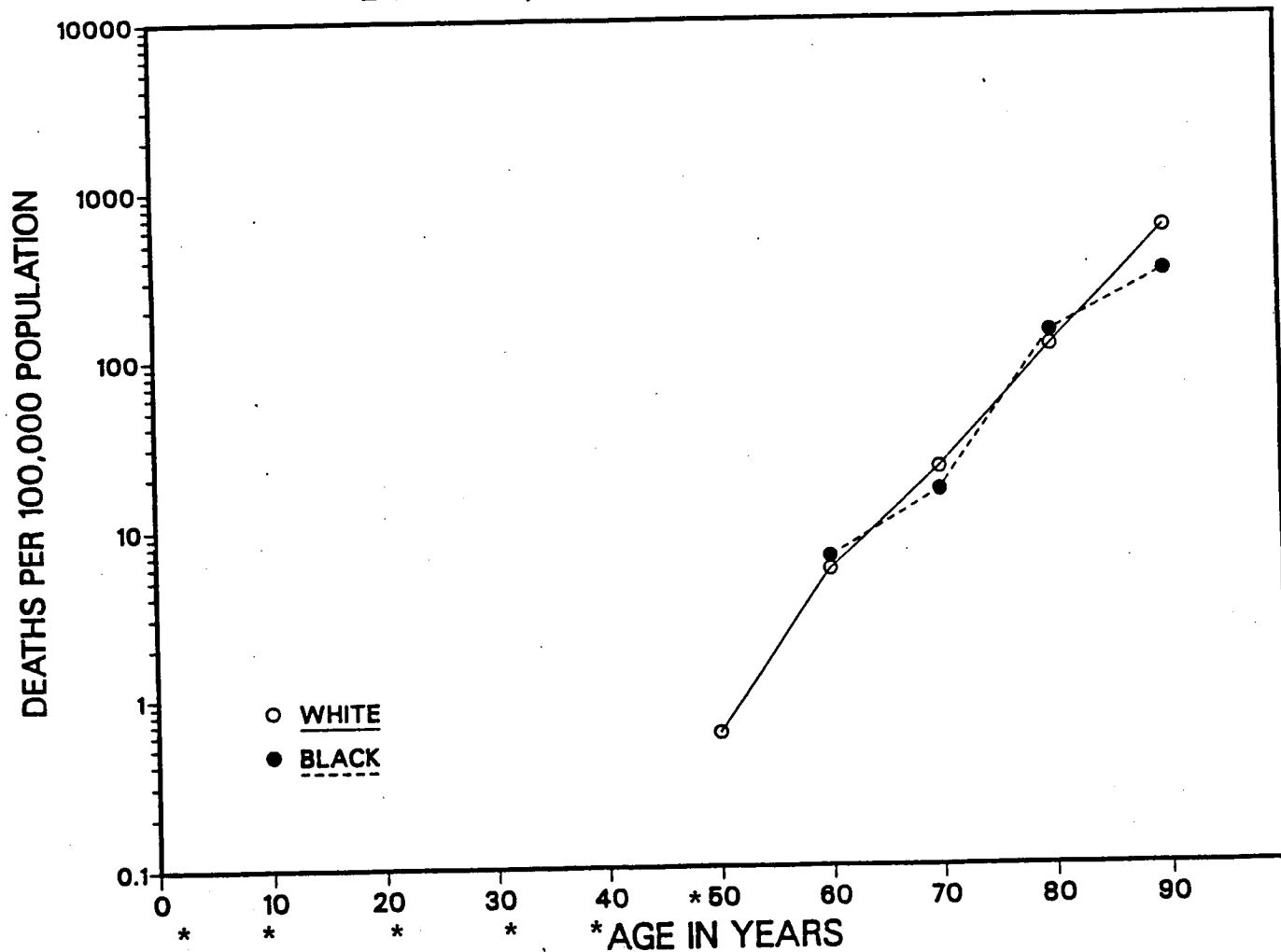


<sup>1</sup> Note that death rates are shown on a logarithmic scale: vertical distances represent relative differences in rate rather than absolute differences.

\*Rate is considered statistically unreliable.



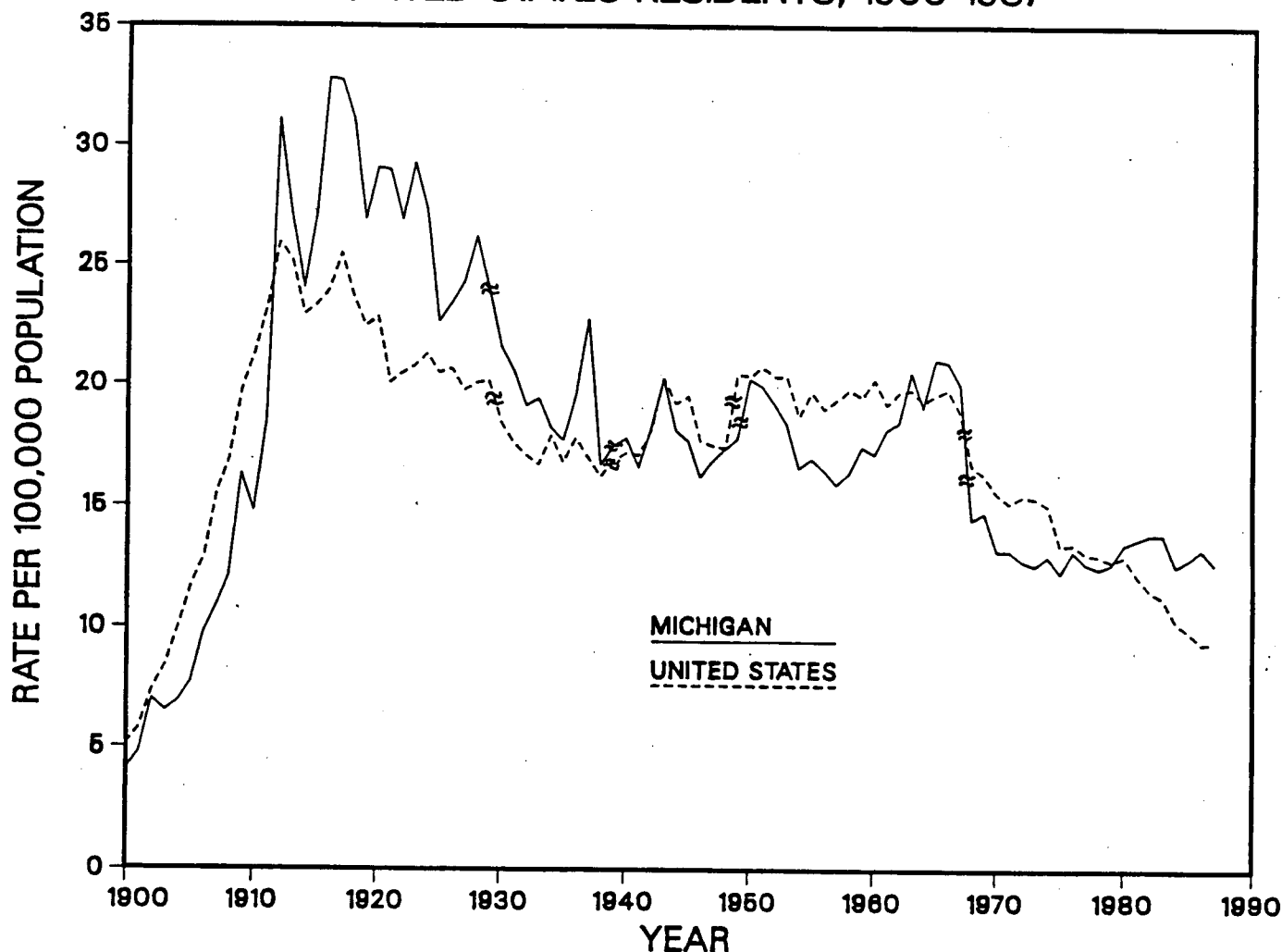
FIGURE 2.38  
AGE-SPECIFIC ATHEROSCLEROSIS DEATH RATES<sup>1</sup>  
BY RACE, MICHIGAN RESIDENTS, 1987



<sup>1</sup>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 2.39  
ATHEROSCLEROSIS<sup>1</sup> DEATH RATES, MICHIGAN AND  
UNITED STATES<sup>2</sup> RESIDENTS, 1900-1987<sup>3</sup>



<sup>1</sup>Prior to 1979 termed Arteriosclerosis.

<sup>2</sup>National rates are from death registration states for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>3</sup>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 1900-1987 requires detailed study to maintain comparability.

Table 2.42  
Age - Adjusted Atherosclerosis Death Rates<sup>1</sup> by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987<sup>3</sup>

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
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 <sup>4</sup>	3.7	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> 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.

<sup>4</sup> Provisional data.

Table 2.43  
Deaths Due to Atherosclerosis by Detailed Cause  
Michigan Residents, 1987

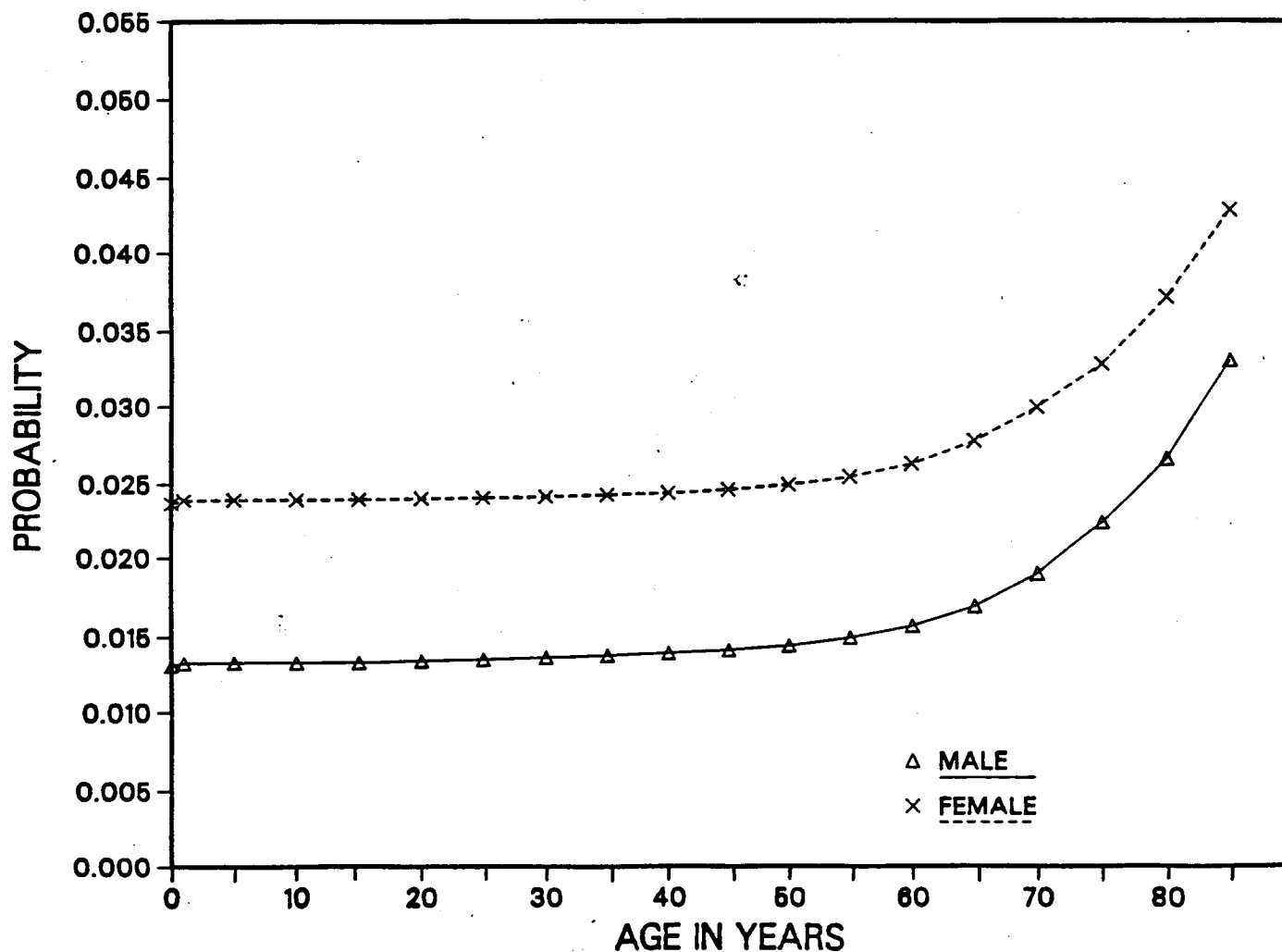
ICD LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
440.9	Generalized and Unspecified Atherosclerosis	1,121	96.0
440.2	Atherosclerosis of Arteries of the Extremities	40	3.4
440.0	Atherosclerosis of Aorta	5	0.4
440.1	Atherosclerosis of Renal Artery	2	0.2
TOTAL		1,168	100.0

<sup>1</sup> Detailed List of the 9th Revision of the International Classification of Diseases, WHO.

probabilities rise slowly through age 59 and increase rapidly beyond that age. By age 85, the probability of eventually dying from

atherosclerosis is 0.043 for females and 0.033 for males (Figure 2.40).

FIGURE 2.40  
PROBABILITY OF EVENTUALLY DYING FROM ATHEROSCLEROSIS  
BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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.

## HOMICIDE

Homicide, the 9th leading cause of death in 1987, accounted for 1,168 deaths, or 1 out of every 68 deaths. Of deaths resulting from homicide, 76.0 percent were among males. Of all homicide deaths, 70.4 percent were of black persons. The age-adjusted homicide rates were 20.6 and 8.8 times higher for Michigan black males and females than the rates for Michigan white males and females, respectively. The rates for Michigan black males and females are about twice as high as the national rates for black males and females.

More than seventy-seven percent of all homicide deaths occurred at or below the age of 39, with 72.5 percent occurring between the ages of 15 and 39. The median age at death for both males and females was 29 years. The median age at death for white males, 33 years, was 6 years above that for their black counterparts. The median age at death for white females was 30 years, 2 years above that for black females (Table 2.44).

The crude homicide death rate in 1987 was 12.7 per 100,000 population. The crude rate for males (19.8) was 3.4 times that for females (5.9). Age-specific rates for males were higher than female rates in all age groups (Table 2.45 and Figure 2.41). Homicide rates for both males and females were highest for individuals 15 to 34 years of age. The greatest relative differential by sex was for ages 35 to 44 years where the rate for males was 4.4 times the rate for females.

The crude homicide death rate for the black population was 15.6 times higher than that for the white population. The age-adjusted rate for black persons was 15.9 times higher than that for white persons. Age-specific rates by race from Table 2.45 are displayed in Figure 2.42. Age-specific rates for black persons were greater than those for white persons in

all age groups with sufficient events to calculate rates.

Before 1980, the pattern of crude homicide death rates for Michigan and the United States were similar (Figure 2.43). The Michigan rate rose from a low of 0.6 in 1900 to a high of 10.7 in 1926. The Michigan rate then decreased from its high to a low of 3.0 in 1940 and remained reasonably stable until 1960 when it began a sharp increase. From a low of 2.8 in 1958, the Michigan rate rose to a century high 13.6 in 1974. From that point the Michigan rate dropped to 9.5 in 1979, a 30.1 percent decrease. Since 1979 the Michigan rate has increased 33.7 percent to 12.7 in 1987.

The United States rates rose from a low of 1.1 in 1903 to a high of 9.8 in 1933. They decreased between 1933 and 1958 to a low of 4.5. The United States rates increased to a high in 1980 of 10.7 and has declined to the 1987 provisional rate of 8.5.

Until 1967, the national rate was generally well above the Michigan rate. Since 1967, the Michigan rate has been below the national rate only twice. In 1987, the United States provisional homicide rate was 33.1 percent below the Michigan rate.

Age-adjusted homicide rates by race and sex for Michigan and the United States are presented in Table 2.46. The rate for white males in Michigan increased between 1970 and 1974 and then decreased, remaining reasonably stable between 1977 and 1987. For white females in Michigan the rates have been fairly stable throughout the period.

Michigan rates for other than white persons rose in the early 1970's and then decreased in the late 1970's. The rates were stable until 1985 when they began another increase. Rates

Table 2.44  
Deaths Due to Homicide by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	14	9	5	4	3	1	10	6	4	-	-	-
1 - 4	19	11	8	11	7	4	8	4	4	-	-	-
5 - 9	7	5	2	1	1	-	6	4	2	-	-	-
10 - 14	19	11	8	6	3	3	13	8	5	-	-	-
15 - 19	160	136	24	24	15	9	134	119	15	1	1	-
20 - 24	210	160	50	47	25	22	163	135	28	-	-	-
25 - 29	196	151	45	50	32	18	145	119	26	1	-	1
30 - 34	172	134	38	51	36	15	119	96	23	1	1	-
35 - 39	109	92	17	29	26	3	79	65	14	1	1	-
40 - 44	73	55	18	25	20	5	48	35	13	-	-	-
45 - 49	39	27	12	15	11	4	23	15	8	-	-	-
50 - 54	18	15	3	4	3	1	14	12	2	-	-	-
55 - 59	31	23	8	13	10	3	18	13	5	-	-	-
60 - 64	30	21	9	12	8	4	18	13	5	-	-	-
65 - 69	22	11	11	14	5	9	8	6	2	-	-	-
70 - 74	18	11	7	11	6	5	7	5	2	-	-	-
75 - 79	14	9	5	11	6	5	3	3	-	-	-	-
80 - 84	9	4	5	6	3	3	3	1	2	-	-	-
85 - 89	6	3	3	3	-	3	3	3	-	-	-	-
90 +	-	-	-	-	-	-	-	-	-	-	-	-
Not Stated	2	-	2	1	-	1	-	-	-	-	-	-
All Ages	1,168	888	280	338	220	118	822	662	160	4	3	1
Median Age At Last Birthday	29	29	29	32	33	30	27	27	28	30	30	25

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

Table 2.45  
Homicide Death Rates by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	12.7	19.8	5.9	4.3	5.8	3.0	66.9	114.6	24.5
Under 1 Year	10.0	12.6	7.3	*	*	*	42.2	50.4	*
1 - 14 Years	2.3	2.7	1.9	1.1	1.4	0.9	8.5	10.0	7.0
15 - 24 Years	24.6	39.0	9.9	5.8	6.5	5.0	127.3	222.0	36.1
25 - 34 Years	23.5	36.9	10.5	7.6	10.2	5.0	125.1	224.1	42.4
35 - 44 Years	14.3	23.6	5.4	4.9	8.4	1.4	82.6	145.7	31.7
45 - 54 Years	6.2	9.4	3.2	2.5	3.8	1.2	36.3	59.3	17.7
55 - 64 Years	7.4	11.2	3.9	3.4	5.2	1.8	40.4	64.2	20.6
65 - 74 Years	6.4	8.0	5.1	4.5	4.4	4.5	24.0	40.4	*
75 - 84 Years	7.1	10.6	5.0	5.8	8.1	4.4	20.7	*	*
85 Years and Over	7.3	*	6.4	5.0	*	7.0	*	*	*
Age-Adjusted Rate <sup>2</sup>	12.8	19.8	5.9	4.2	5.6	2.8	66.7	115.1	24.5

<sup>1</sup> 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.

<sup>2</sup> 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.

for other than white persons were consistently higher than rates for white persons throughout this eighteen year period.

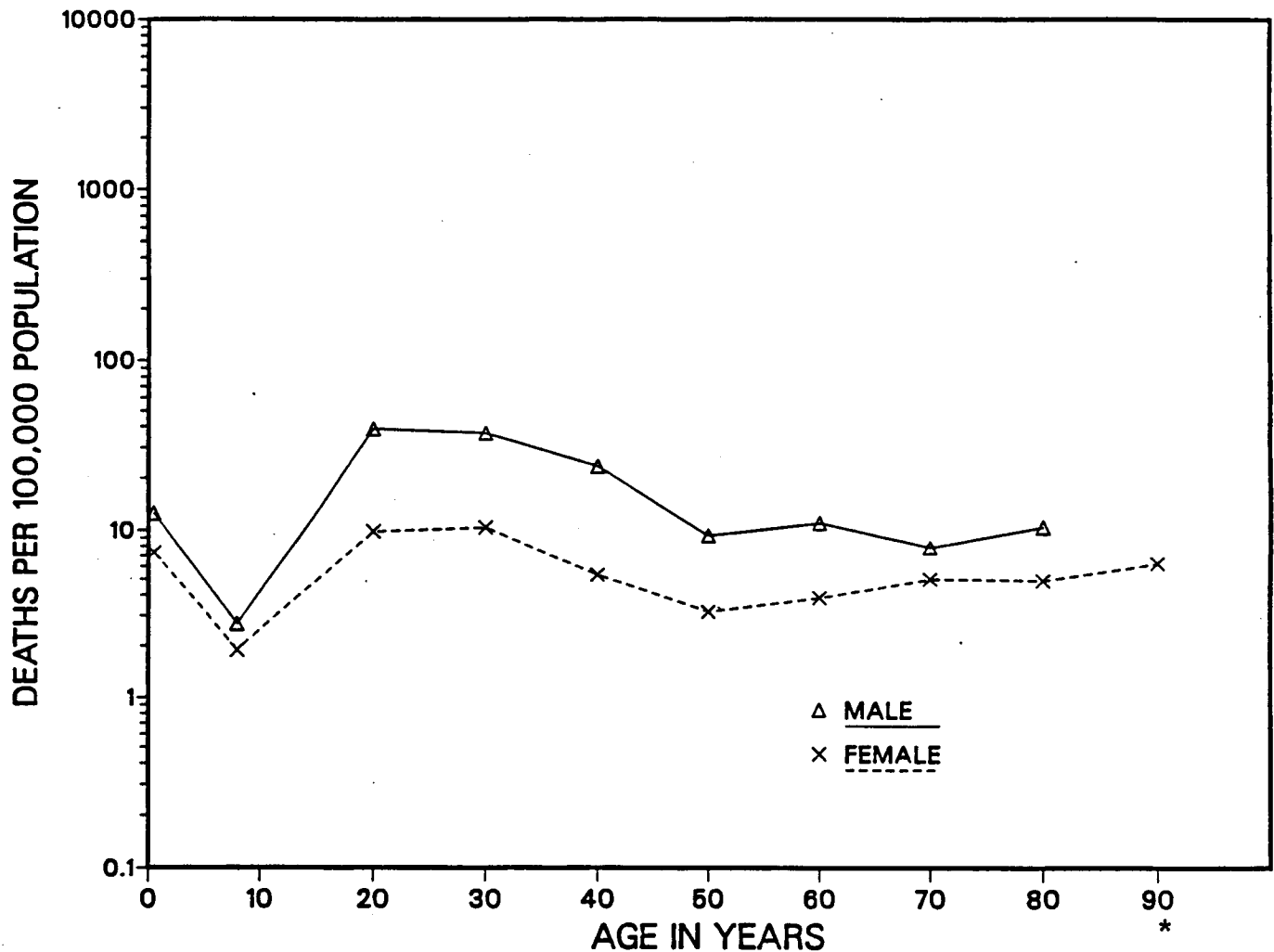
Age-adjusted homicide rates for the nation presented a somewhat different pattern. Rates for white males and females generally increased after 1970, reaching a peak in 1980. After 1980, rates for white persons of both sexes generally declined. Rates for other than

white males and females increased in the early 1970's and then gradually decreased after 1974. Since 1974, the national rate for other than white males has declined 40.8 percent. During the same period the rate for other than white females decreased 34.2 percent.

The age-adjusted death rates in Michigan for the other than white population were considerably higher than those for the nation.



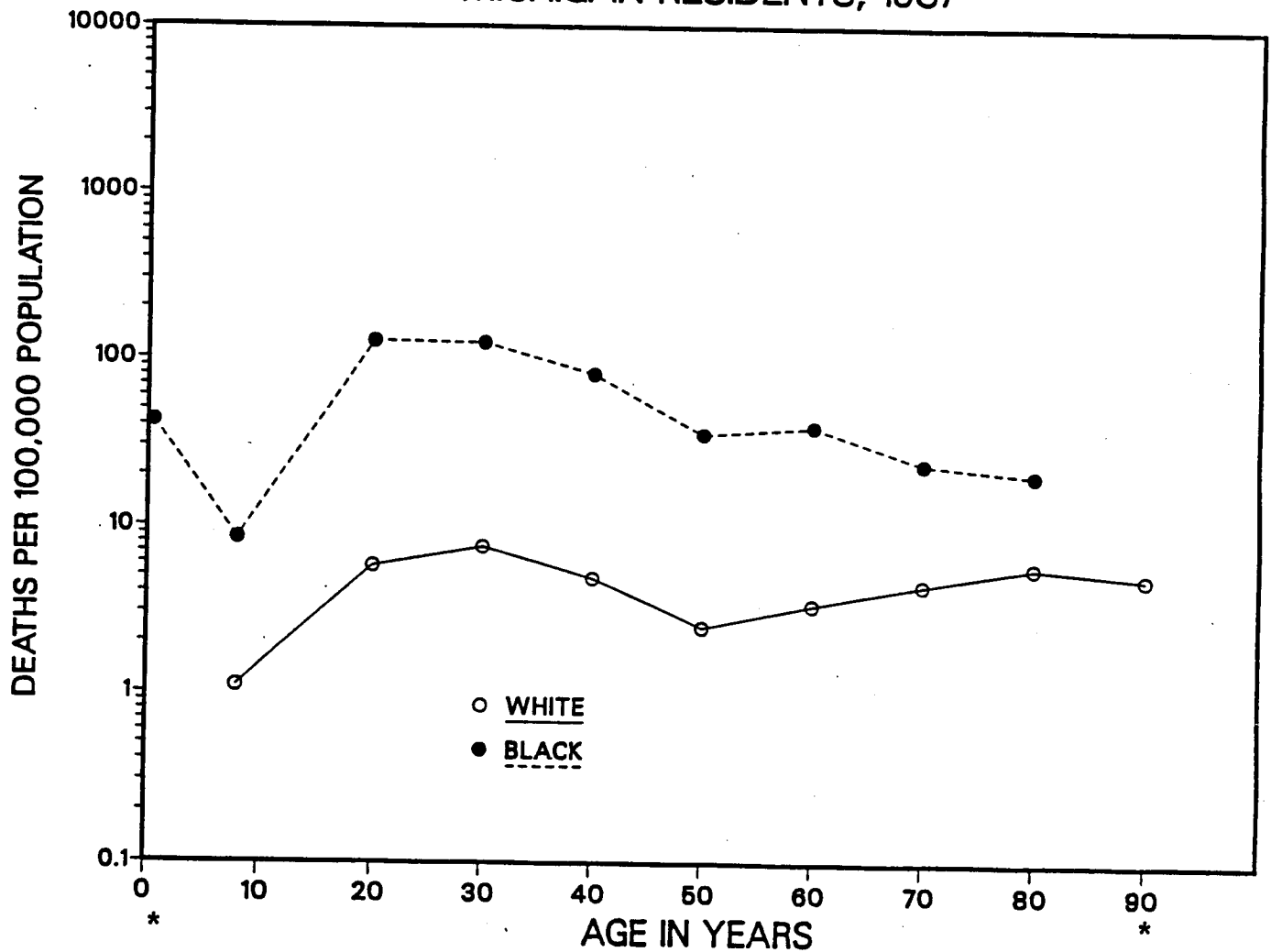
FIGURE 2.41  
AGE-SPECIFIC HOMICIDE DEATH RATES<sup>1</sup> BY SEX,  
MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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.

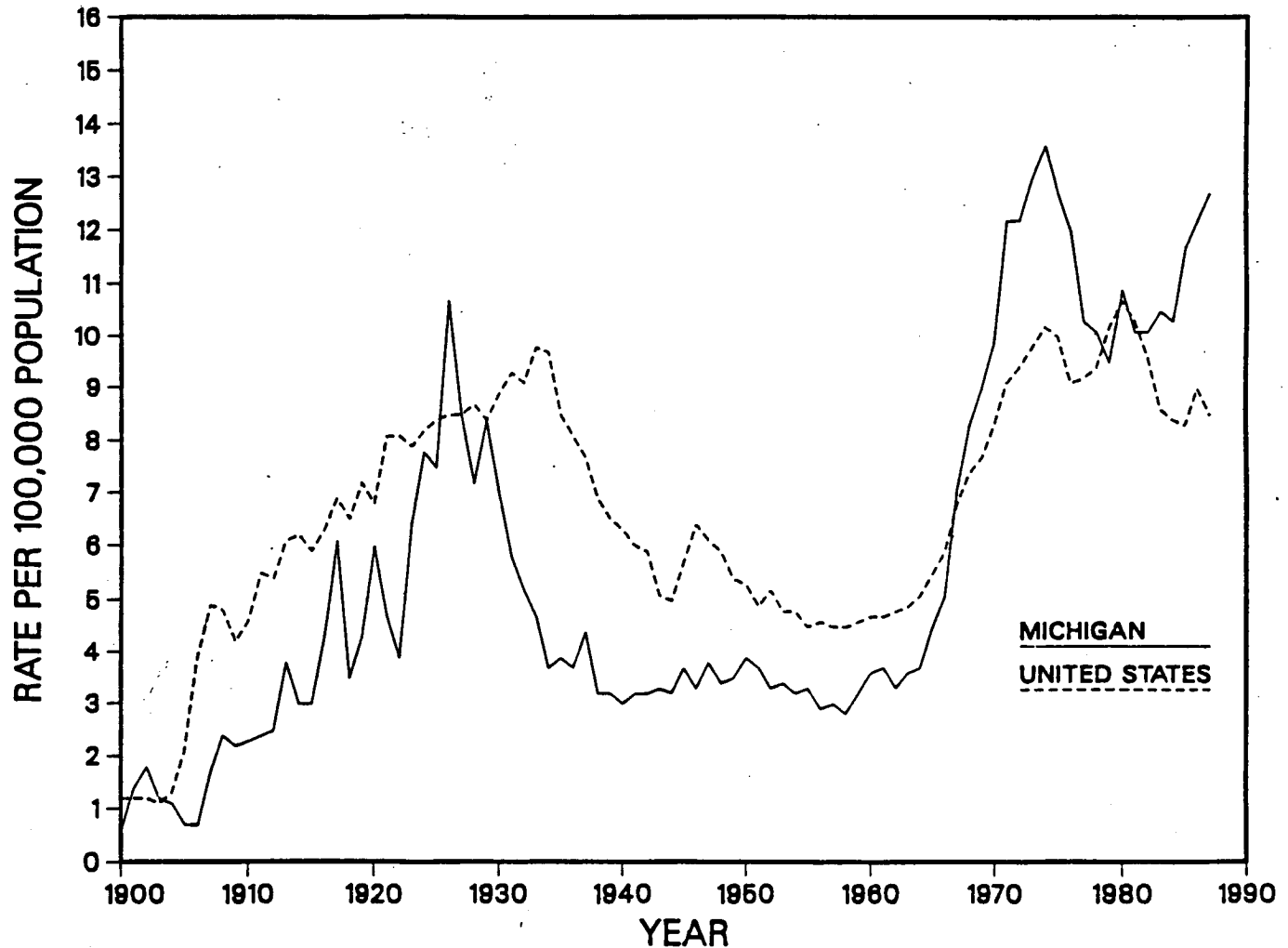
FIGURE 2.42  
AGE-SPECIFIC HOMICIDE DEATH RATES<sup>1</sup> BY RACE,  
MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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  
HOMICIDE DEATH RATES, MICHIGAN AND  
UNITED STATES<sup>1</sup> RESIDENTS, 1900-1987<sup>2</sup>



<sup>1</sup> National rates are from death registration states for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>2</sup> 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 Death Rates<sup>1</sup> For Deaths Due to Homicide by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970 - 1987

PLACE	YEAR	ALL RACES			WHITE			OTHER THAN WHITE		
		TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Mich.	1970	10.9	18.2	3.9	4.3	6.6	2.2	61.0	110.3	16.7
	1971	13.4	22.4	4.9	4.6	7.1	2.3	78.5	140.8	23.1
	1972	13.3	21.8	5.3	4.9	7.2	2.7	74.5	132.2	22.9
	1973	14.1	23.0	5.5	5.1	7.4	2.9	78.8	141.5	23.1
	1974	14.4	23.5	5.7	5.5	8.5	2.6	78.2	136.4	26.7
	1975	13.4	21.4	5.7	5.4	8.1	2.8	69.0	119.2	24.8
	1976	12.4	20.2	4.9	5.1	7.7	2.5	63.3	111.8	20.9
	1977	10.7	16.8	4.8	4.3	6.0	2.7	53.7	94.4	18.2
	1978	10.3	16.1	4.8	4.3	6.1	2.6	50.0	86.8	18.1
	1979	9.7	15.0	4.5	4.4	6.1	2.7	44.3	78.2	15.2
	1980	11.0	16.9	5.4	4.6	6.4	2.8	51.4	87.9	19.9
	1981	10.5	16.2	5.1	4.2	5.9	2.6	47.3	81.7	18.4
	1982	10.4	16.2	5.0	4.3	5.6	3.0	45.8	81.7	15.6
	1983	10.9	17.5	4.6	4.2	6.1	2.4	48.7	87.1	16.0
	1984	10.4	16.5	4.6	4.1	5.5	2.7	47.8	86.4	14.7
	1985	11.8	18.6	5.3	4.5	6.3	2.8	54.4	95.3	19.0
	1986	12.3	19.8	5.0	4.0	5.7	2.3	60.3	106.7	19.9
	1987	12.8	19.8	5.9	4.2	5.6	2.8	61.0	104.7	22.5
U.S.	1970	9.1	14.9	3.7	4.7	7.3	2.2	41.3	72.8	13.7
	1971	10.0	16.3	4.0	5.1	7.9	2.3	46.8	81.6	16.0
	1972	10.3	16.8	4.0	5.2	8.2	2.4	46.6	83.1	14.8
	1973	10.5	16.7	4.5	5.7	8.7	2.8	44.4	77.1	16.0
	1974	10.8	17.3	4.6	6.0	9.3	2.9	44.5	77.9	15.5
	1975	10.5	16.8	4.5	6.1	9.4	2.9	41.1	71.6	14.7
	1976	9.5	15.1	4.1	5.5	8.6	2.7	36.4	63.3	13.2
	1977	9.6	15.1	4.2	5.9	8.8	2.9	34.5	60.1	12.5
	1978	9.6	15.3	4.2	6.0	9.2	2.9	33.4	58.1	12.1
	1979	10.4	16.7	4.3	6.5	10.1	3.0	36.0	62.9	12.8
	1980	10.8	17.4	4.5	6.9	10.9	3.2	35.0	61.3	12.2
	1981	10.4	16.7	4.3	6.6	10.3	3.1	33.3	58.5	11.4
	1982	9.7	15.3	4.2	6.3	9.5	3.1	30.0	52.2	10.5
	1983	8.6	13.6	3.8	5.6	8.4	2.8	26.4	45.2	9.8
	1984	8.4	13.0	3.9	5.5	8.2	2.9	24.9	42.2	9.6
	1985	8.3	12.8	3.9	5.4	8.1	2.9	24.4	41.4	9.3
	1986	9.0	13.9	4.1	5.6	8.4	2.9	27.2	46.1	10.2
	1987 <sup>3</sup>	8.4	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

Rates in Michigan for the white population were lower than those of the nation. The age-adjusted homicide rate for the total population of Michigan was above the comparable national rate seventeen of the eighteen years from 1970 through 1987. In 1986, the latest year national rates are available, the homicide rates for other than white males and females were 2.3 and 2.0 times higher in Michigan than in the nation. By contrast the rates for white males and females were 32.1 and 20.7 percent lower than the rates for their national counterparts.

The major method of homicide death in Michigan was assault by firearms with 737, or 63.1 percent, of the 1,168 homicide deaths in 1987. Assault by all other means and late effects of injury purposely inflicted by other

persons accounted for 230 deaths. There were 197 deaths attributed to assault by cutting and piercing instruments. Other legal intervention and late effects of injury due to legal intervention accounted for four homicides (Table 2.47).

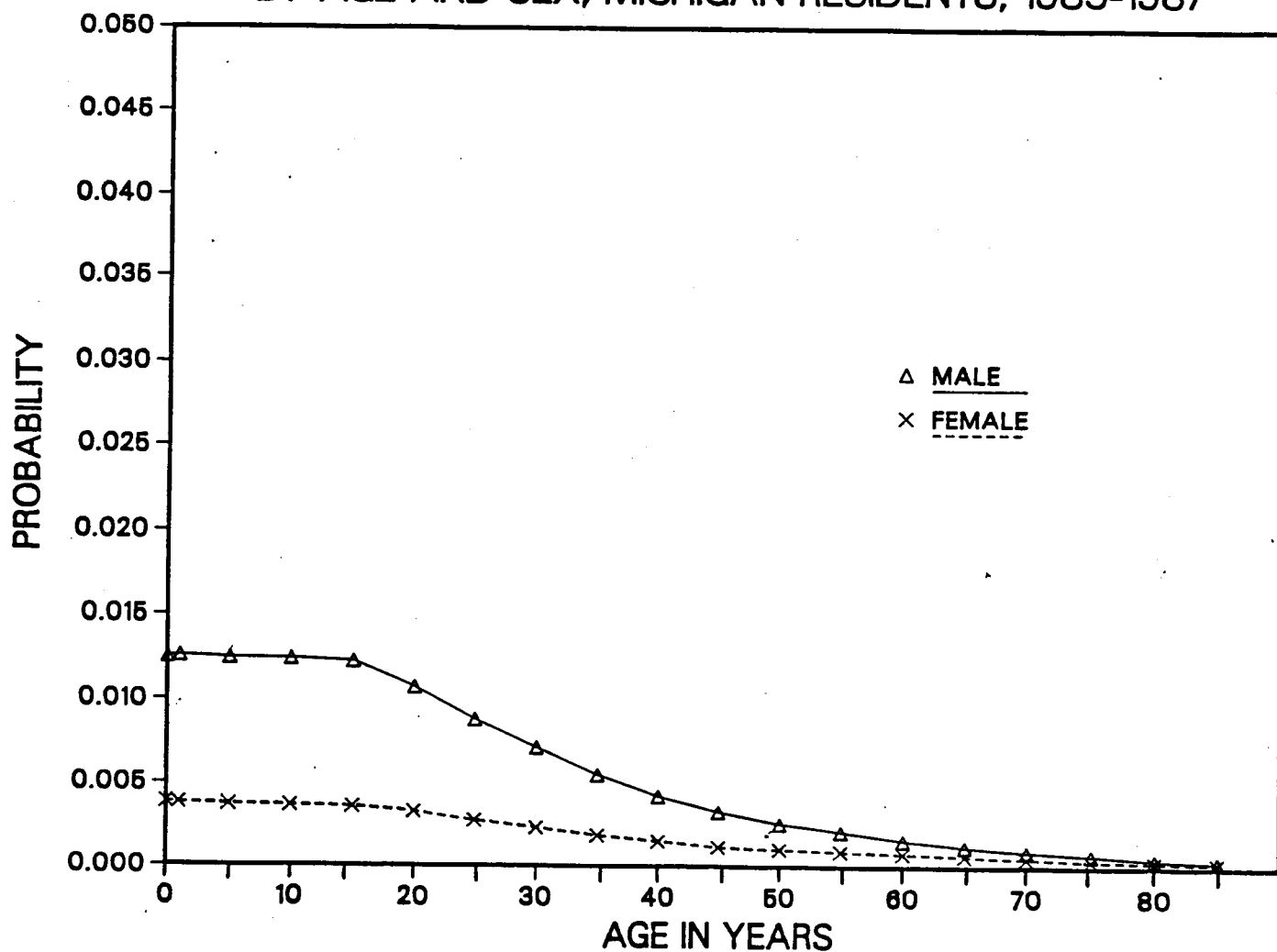
Based on the Michigan 1985 through 1987 mortality experience, the probability of a male eventually dying from homicide is 0.013 at birth. The probability for females is 0.004. The probabilities for females hold relatively constant to age 20 and then gradually taper off with advancing age. The probabilities for males hold relatively constant to age 15, dropping rapidly between 15 and 50, and then taper off slowly with advancing age (Figure 2.44).

Table 2.47  
Deaths Due to Homicide by Method  
Michigan Residents, 1987

282 LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
271, 272	Assault by Firearms	737	63.1
274	Assault by all other Means and Late Effects of Injury Purposely Inflicted by other Person	230	19.7
273	Assault by Cutting and Piercing Instrument	197	16.9
276	Other Legal Intervention and Late Effects of Injury due to Legal Intervention	4	0.3
	TOTAL	1,168	100.0

<sup>1</sup> 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 2.44  
 PROBABILITY OF EVENTUALLY DYING FROM HOMICIDE  
 BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987<sup>1</sup>



<sup>1</sup>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 1987 was chronic liver disease and cirrhosis. This category was termed cirrhosis of the liver prior to 1979. There were 1,099 deaths attributed to this category in 1987, of which 66.8 percent were to males.

The median age for deaths due to chronic liver disease and cirrhosis (59 years) was 14 years below that for deaths from all causes (Table 2.48). For deaths from this cause in 1987, the median age was 59 years for males and 61 years for females. The median ages at death for white males and females were 61 and 64 years, respectively. The median ages at death were 48 years for black males and 45 years for black females.

Death rates for chronic liver disease and cirrhosis by age, race, and sex are presented in Table 2.49. In 1987 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 1.6 to 3.9 times higher than those for females (Figure 2.45). The highest rate for females was for the age group 65-74 years. The highest rate 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 2.3 the rate for white persons. The age-adjusted rate for black persons was 3.1 times the rate for white persons. The differential can be traced mainly to the rates for ages 35 through 74. The highest age-specific rate for white persons was 39.4 deaths per 100,000 population in the age group 65-74 years. For black persons the peak rate (67.3) was observed for the age group 55-64 years (Figure 2.46).

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 1950-1987, 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 11.9 in 1987 was 39.6 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 1987 the chronic liver disease and cirrhosis death rate of 11.9 for Michigan was 11.2 percent above the provisional rate of 10.7 for the nation.

Age-adjusted death rates by sex and race for chronic liver disease and cirrhosis for the years 1970-1987 are displayed in Table 2.50 (see Technical Notes). These rates generally peaked about 1972 in Michigan and have tended to decline since then. For the United

Table 2.48

**Deaths Due to Chronic Liver Disease and Cirrhosis by Age, Race and Sex<sup>1</sup>**  
Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Under 1	1	-	1	1	-	1	-	-	-	-	-	-
1 - 4	-	-	-	-	-	-	-	-	-	-	-	-
5 - 9	-	-	-	-	-	-	-	-	-	-	-	-
10 - 14	1	-	1	-	-	-	1	-	1	-	-	-
15 - 19	-	-	-	-	-	-	-	-	-	-	-	-
20 - 24	2	2	-	2	2	-	-	-	-	-	-	-
25 - 29	16	8	8	8	4	4	8	4	4	-	-	-
30 - 34	49	32	17	28	21	7	21	11	10	-	-	-
35 - 39	76	53	23	26	19	7	50	34	16	-	-	-
40 - 44	76	58	18	29	26	3	47	32	15	-	-	-
45 - 49	78	63	15	49	40	9	28	22	6	1	1	-
50 - 54	102	64	38	73	49	24	27	13	14	2	2	-
55 - 59	162	111	51	126	87	39	34	23	11	2	1	1
60 - 64	156	112	44	128	89	39	26	22	4	2	1	1
65 - 69	147	92	55	123	75	48	23	16	7	1	1	-
70 - 74	108	65	43	97	59	38	9	4	5	1	1	-
75 - 79	76	46	30	66	40	26	8	6	2	1	-	-
80 - 84	28	15	13	25	12	13	2	2	-	-	-	1
85 - 89	14	10	4	13	10	3	1	-	1	-	-	-
90 +	7	3	4	5	1	4	2	2	-	-	-	-
Not Stated	-	-	-	-	-	-	-	-	-	-	-	-
All Ages	1,099	734	365	799	534	265	287	191	96	10	7	3
Median Age At Last Birthday	59	59	61	62	61	64	47	48	45	61	56	62

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



Table 2.49  
Death Rates for Deaths Due to Chronic Liver Disease  
And Cirrhosis by Age, Race and Sex<sup>1</sup>  
Michigan Residents, 1987

AGE	ALL RACES			WHITE			BLACK		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
All Ages Crude Rate	11.9	16.4	7.7	10.2	14.0	6.6	23.3	33.0	14.7
Under 1 Year	*	*	*	*	*	*	*	*	*
1 - 14 Years	*	*	*	*	*	*	*	*	*
15 - 24 Years	*	*	*	*	*	*	*	*	*
25 - 34 Years	4.2	5.2	3.2	2.7	3.8	1.7	13.7	15.6	12.1
35 - 44 Years	11.9	17.8	6.3	5.0	8.3	1.8	63.1	96.2	36.4
45 - 54 Years	19.7	28.6	11.3	15.2	22.6	8.1	53.9	76.9	35.4
55 - 64 Years	38.6	56.8	22.0	34.8	50.4	20.5	67.3	111.1	30.8
65 - 74 Years	40.7	56.8	28.0	39.4	54.5	27.5	51.2	73.5	34.0
75 - 84 Years	32.1	49.7	21.4	31.7	47.9	21.9	34.5	70.0	*
85 Years and Over	19.0	39.7	10.3	17.9	37.2	9.8	*	*	*
Age-Adjusted Rate <sup>2</sup>	10.4	15.0	6.3	8.3	12.1	4.9	26.0	38.9	15.7

<sup>1</sup> 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.

<sup>2</sup> 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.

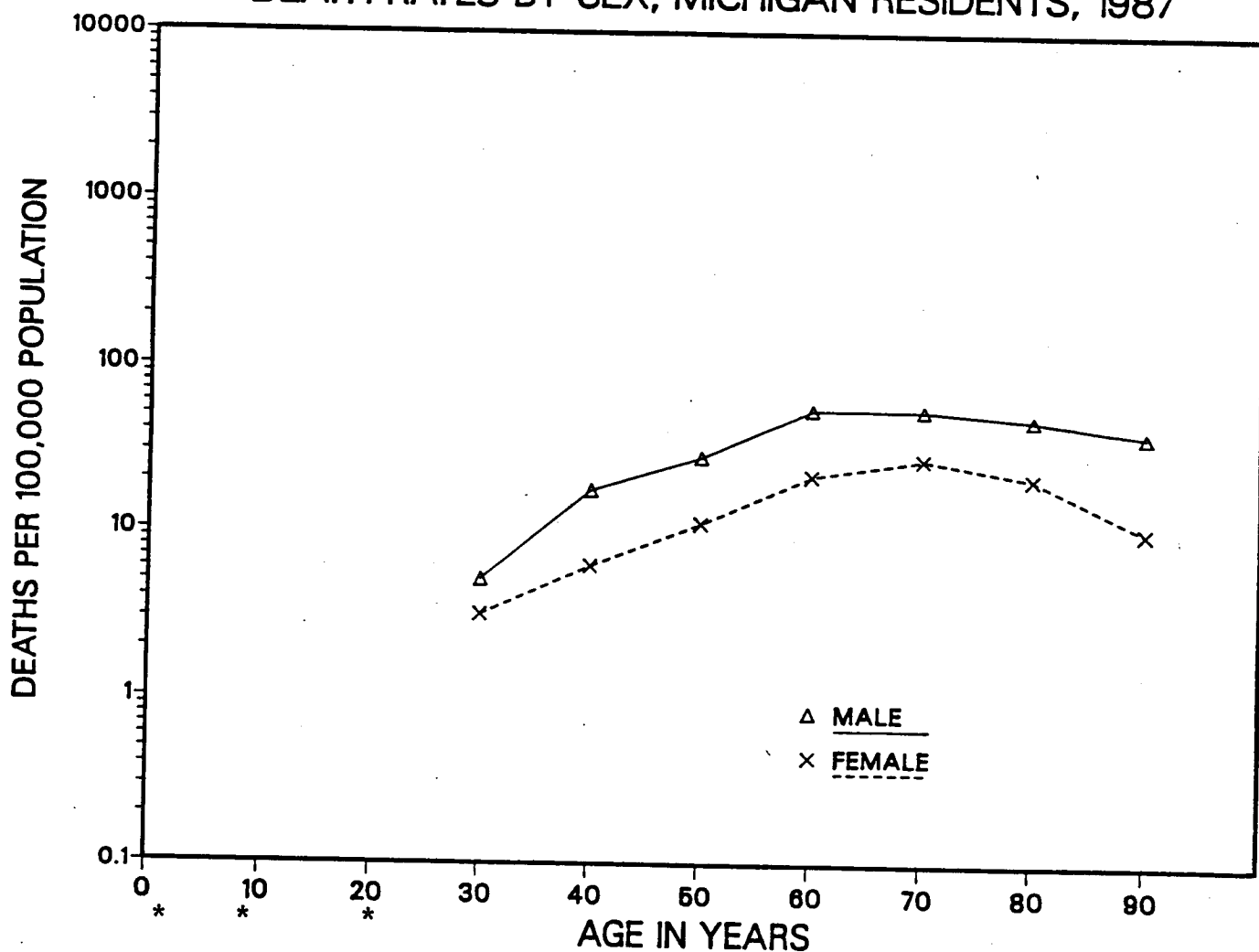
States the increases observed in the early part of the decade were less pronounced, as were the declines after that time.

The age-adjusted rates in Michigan for other than white males have been higher than for all other 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 throughout the seventeen year period. Rates for white females in Michigan were higher than for their counter-

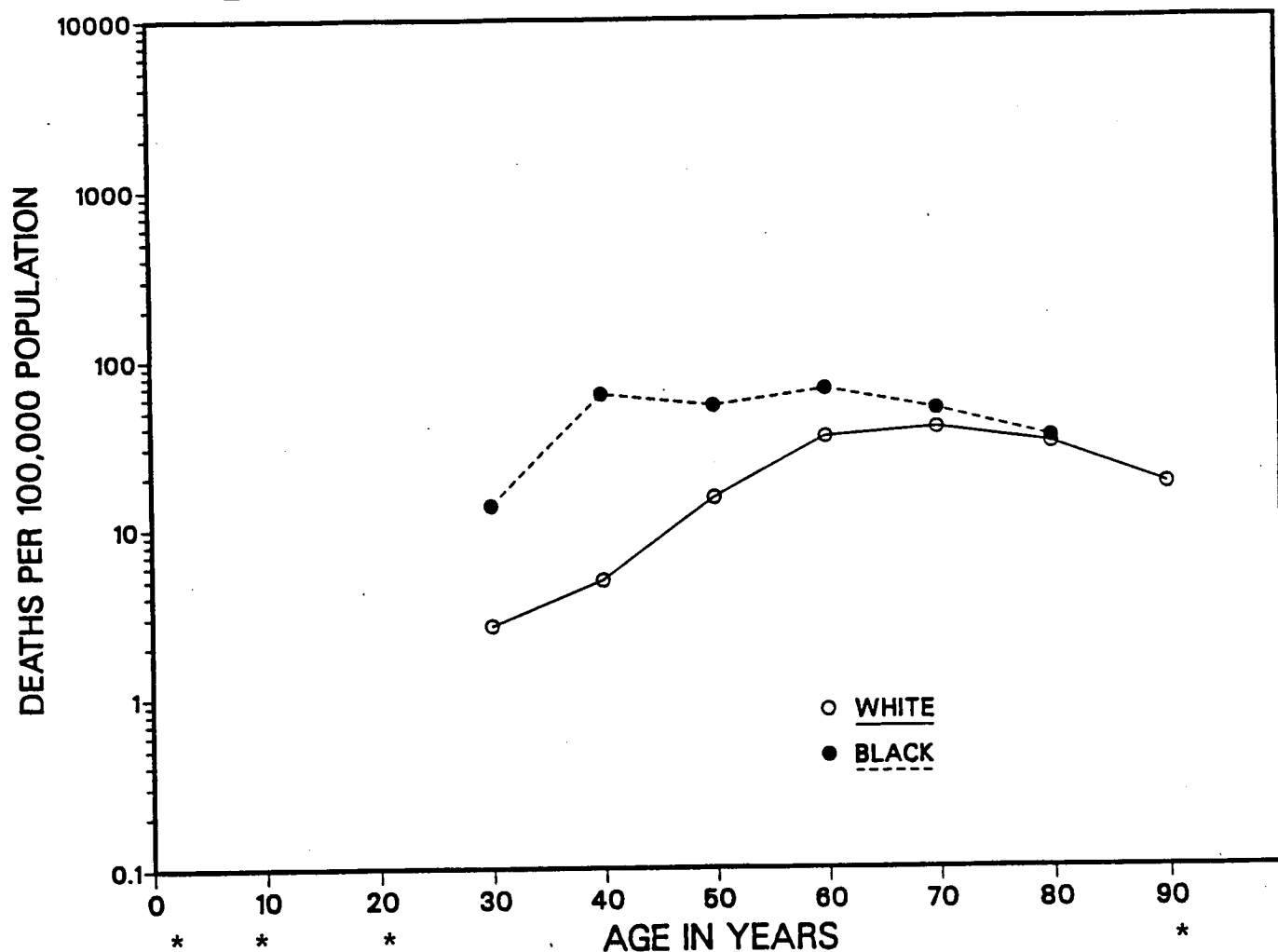
FIGURE 2.45  
AGE-SPECIFIC CHRONIC LIVER DISEASE AND CIRRHOSIS  
DEATH RATES BY SEX,<sup>1</sup> MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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.

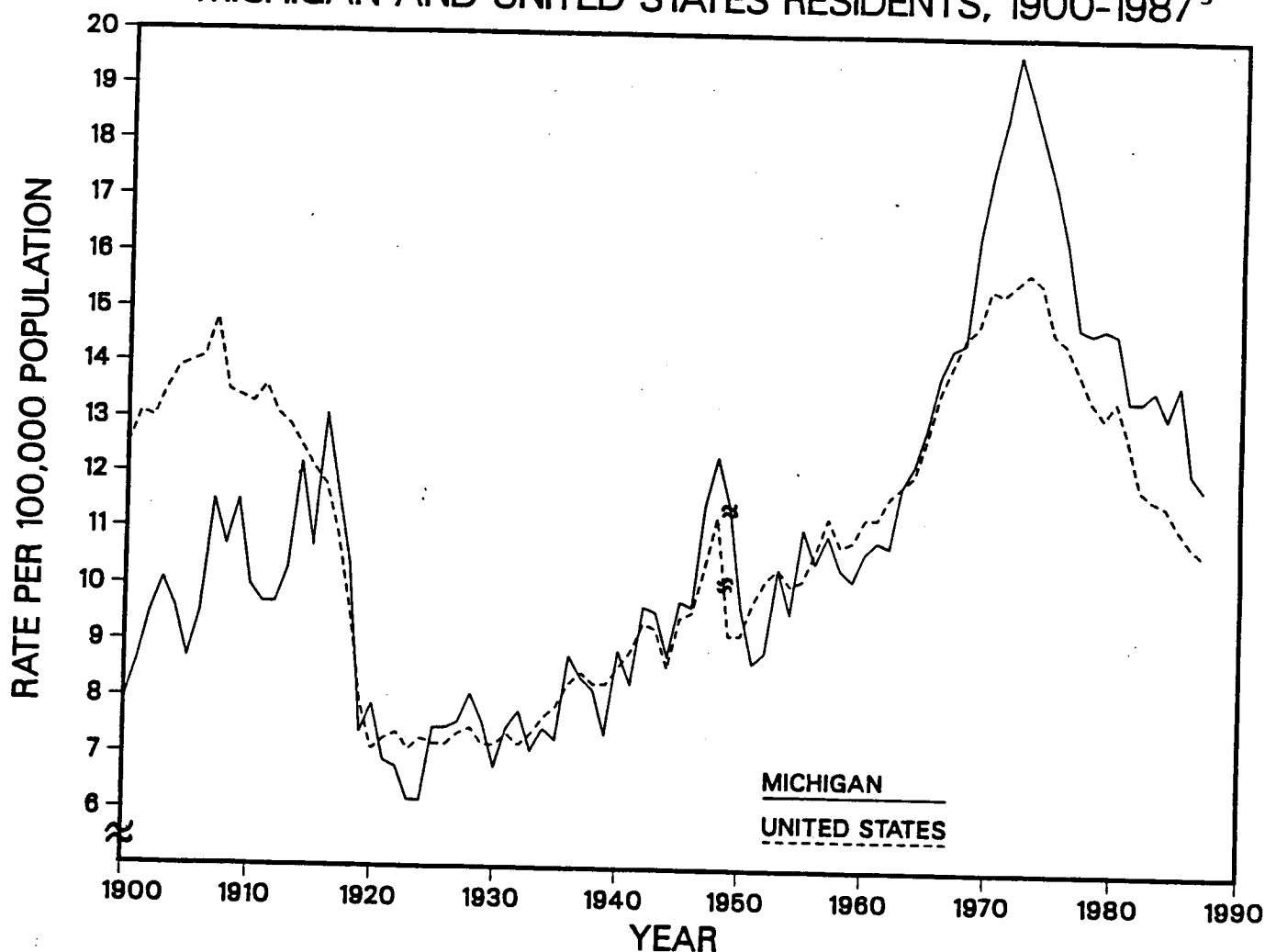
FIGURE 2.46  
AGE-SPECIFIC CHRONIC LIVER DISEASE AND CIRRHOSIS  
DEATH RATES<sup>1</sup> BY RACE, MICHIGAN RESIDENTS, 1987



<sup>1</sup> 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 2.47  
CHRONIC LIVER DISEASE AND CIRRHOSIS<sup>1</sup> DEATH RATES,  
MICHIGAN AND UNITED STATES<sup>2</sup> RESIDENTS, 1900-1987<sup>3</sup>



<sup>1</sup> Prior to 1979 termed Cirrhosis of Liver.

<sup>2</sup> National rates are from Death Registration States for 1900-1932 and the United States for 1933-1987. United States rates for 1971-1979 have been revised using population estimates based on the 1980 Census enumeration. United States rate for 1987 is provisional.

<sup>3</sup> 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.

Table 2.50  
Age - Adjusted Death Rates<sup>1</sup> for Deaths Due to Chronic Liver Disease  
and Cirrhosis by Race and Sex  
Michigan<sup>2</sup> and United States Residents, 1970-1987

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
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 <sup>3</sup>	9.0	—	—	—	—	—	—	—	—

<sup>1</sup> 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.

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

<sup>3</sup> Provisional data.

parts in the nation at the beginning of the 1970's. In recent years the rates for the two groups have been similar. In 1987 the age-adjusted rate for the total Michigan population was 15.6 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 1987, resulting in 548 deaths (Table 2.51). The second largest category was alcoholic cirrhosis of the liver with 287 deaths. Including deaths due to alcoholic cirrhosis of the liver, alcoholic fatty liver, acute alcoholic hepatitis, and unspecified alcoholic liver damage, there were 489 deaths with mention

of alcohol attributed to the category of chronic liver disease and cirrhosis.

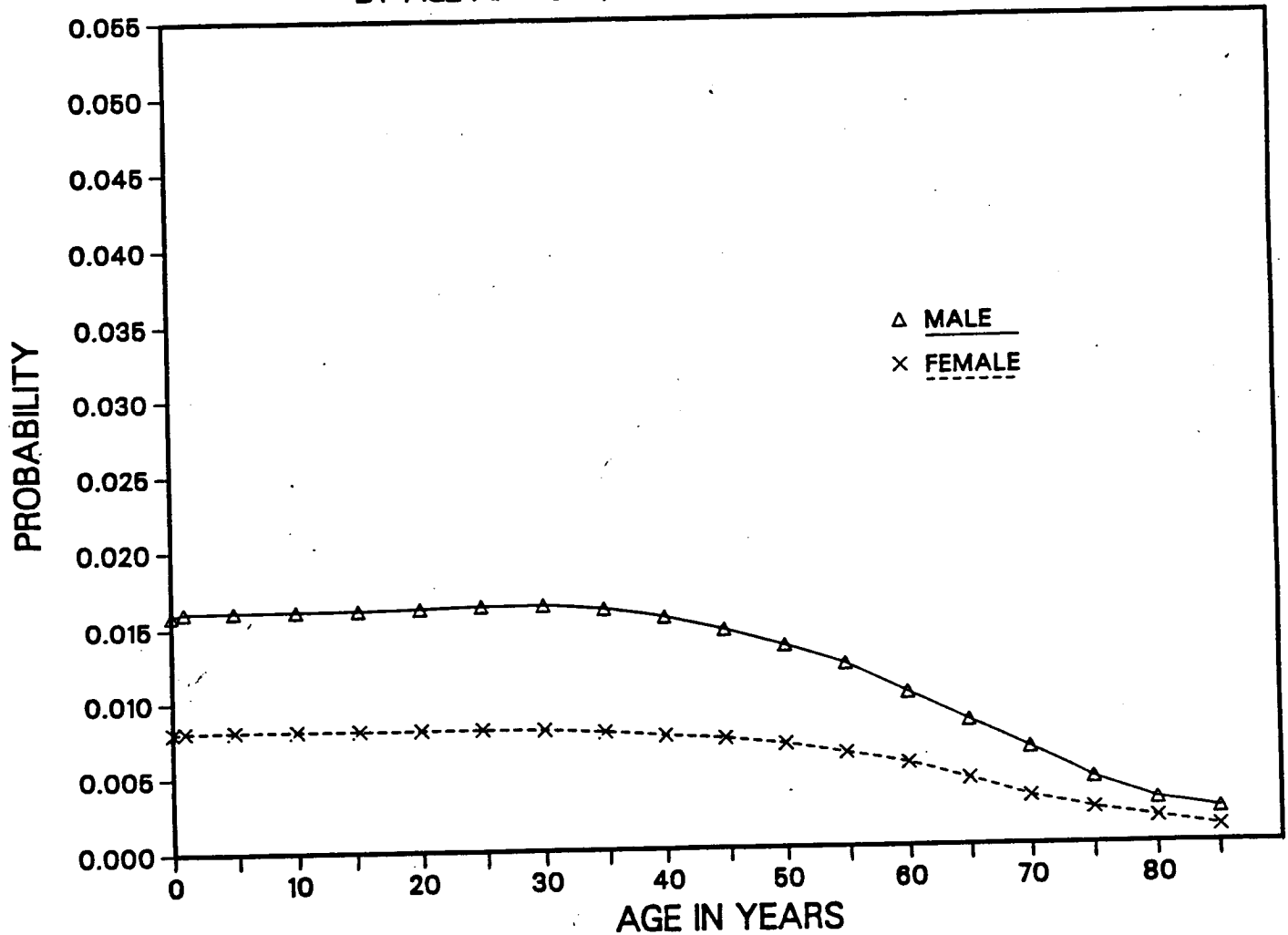
The probability of eventually dying from chronic liver disease and cirrhosis, based upon Michigan mortality data from the years 1985-1987, is displayed in Figure 2.48 by age and sex. The risk for males of dying from a disease in this category is roughly double that for females. At birth, males have a probability of 0.016 of eventually dying from chronic liver disease and cirrhosis. For females the probability is 0.008. These probabilities remain nearly constant for both sexes through age 39, whereupon the threat of death due to these diseases diminishes with advancing age. By age 85 the risk is 0.002 for males and 0.001 for females.

Table 2.51  
Deaths Due to Chronic Liver Disease and Cirrhosis by Detailed Cause  
Michigan Residents, 1987

ICD LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
571.5	Cirrhosis of Liver Without Mention of Alcohol	548	49.9
571.2	Alcoholic Cirrhosis of Liver	287	26.1
571.0	Alcoholic Fatty Liver	88	8.0
571.3	Alcoholic Liver Damage, Unspecified	76	6.9
571.1	Acute Alcoholic Hepatitis	38	3.5
571.6	Biliary Cirrhosis	22	2.0
571.4	Chronic Hepatitis	18	1.6
571.8	Other Chronic Nonalcoholic Liver Disease	13	1.2
571.9	Unspecified Chronic Liver Disease Without Mention of Alcohol	9	0.8
TOTAL		1,099	100.0

<sup>1</sup> Detailed List of the 9th Revision of the International Classification of Diseases, WHO.

FIGURE 248  
 PROBABILITY OF EVENTUALLY DYING FROM  
 CHRONIC LIVER DISEASE AND CIRRHOSIS  
 BY AGE AND SEX, MICHIGAN RESIDENTS, 1985-1987 <sup>1</sup>



<sup>1</sup>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 1985 through 1987.

The 1985 through 1987 data would indicate that 85.3 percent of all males and 85.6 percent of all 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 mellitus, and atherosclerosis than do males. At the same time, males are

DISEASE CATEGORY	PROBABILITY AT BIRTH OF EVENTUAL DEATH DUE TO CONDITION FOR:	
	Males	Female
Diseases of the Heart	.401	.429
Malignant Neoplasms	.223	.191
Cerebrovascular Diseases	.058	.094
Accidents and Adverse Effects	.037	.021
Chronic Obstructive Pulmonary Diseases and Allied Conditions	.045	.027
Pneumonia and Influenza	.032	.036
Diabetes Mellitus	.015	.022
Atherosclerosis	.013	.024
Homicide	.013	.004
Chronic Liver Disease and Cirrhosis	.016	.008
All Other Causes	.147	.144
Total	1.000	1.000



more likely to die from cancer, accidents, chronic obstructive pulmonary diseases and allied conditions, homicide, 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 1985-1987 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 homicide. 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 older age groups.

DISEASE CATEGORY ELIMINATED	YEARS GAINED IN LIFE EXPECTANCY FOR:	
	Males	Female
Diseases of the Heart	4.52	3.30
Malignant Neoplasms	2.90	2.93
Cerebrovascular Diseases	0.48	0.63
Accidents and Adverse Effects	1.12	0.53
Chronic Obstructive Pulmonary Diseases and Allied Conditions	0.40	0.31
Pneumonia and Influenza	0.22	0.20
Diabetes Mellitus	0.17	0.23
Atherosclerosis	0.06	0.08
Homicide	0.49	0.16
Chronic Liver Disease and Cirrhosis	0.31	0.17
All Causes of Infant Mortality	0.91	0.75

## INFANT DEATHS

Of the 79,795 deaths occurring to Michigan residents in 1987, 1,538 occurred to individuals less than one year of age. The number of infant deaths declined steadily each year from 1958 through 1987, with the exception of two years when it rose, 1970 and 1984 and one year when the number held steady, 1981. Since 1970, when there were 3,492 such deaths, the frequency of infant deaths has declined by 56.0 percent (Table 2.52). Nationally, the provisional number of

infant deaths in 1987 was 38,000. This was 49.1 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).

Table 2.52  
**Infant Deaths and Infant Mortality Rates**  
Michigan and United States Residents, 1970 - 1987

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
38,000 <sup>1</sup>	10.0 <sup>1</sup>	1987	1,538	10.9

<sup>1</sup> Provisional data.

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. 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 (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 1987 was 10.0.

Table 2.53 shows the numbers of infant deaths and infant death rates by age at death for the period 1970-1987. The number of infants that died during the first week of life in 1987 (877) is greater than the number of deaths of infants aged 7-364 days (661). In 1987 66.9 percent of all infant deaths occurred within the first four weeks of life and 57.0 percent occurred in the first week. These percentages were 70.3 and 60.1 percent in 1977.

A review of Table 2.53 reveals that the 22.1 percent decline in the infant mortality rate since 1977 stems largely from reductions in the rate of death for those less than 7 days of

age. There are 3.1 fewer infant deaths per 1,000 live births in 1987 than in 1977. Of these, there were 1.04 and 1.16 fewer infant deaths per 1,000 live births, respectively, for ages under 1 day of life and 1 to 6 days in 1987 than in 1977. They represented 71.5 percent of the reduction.

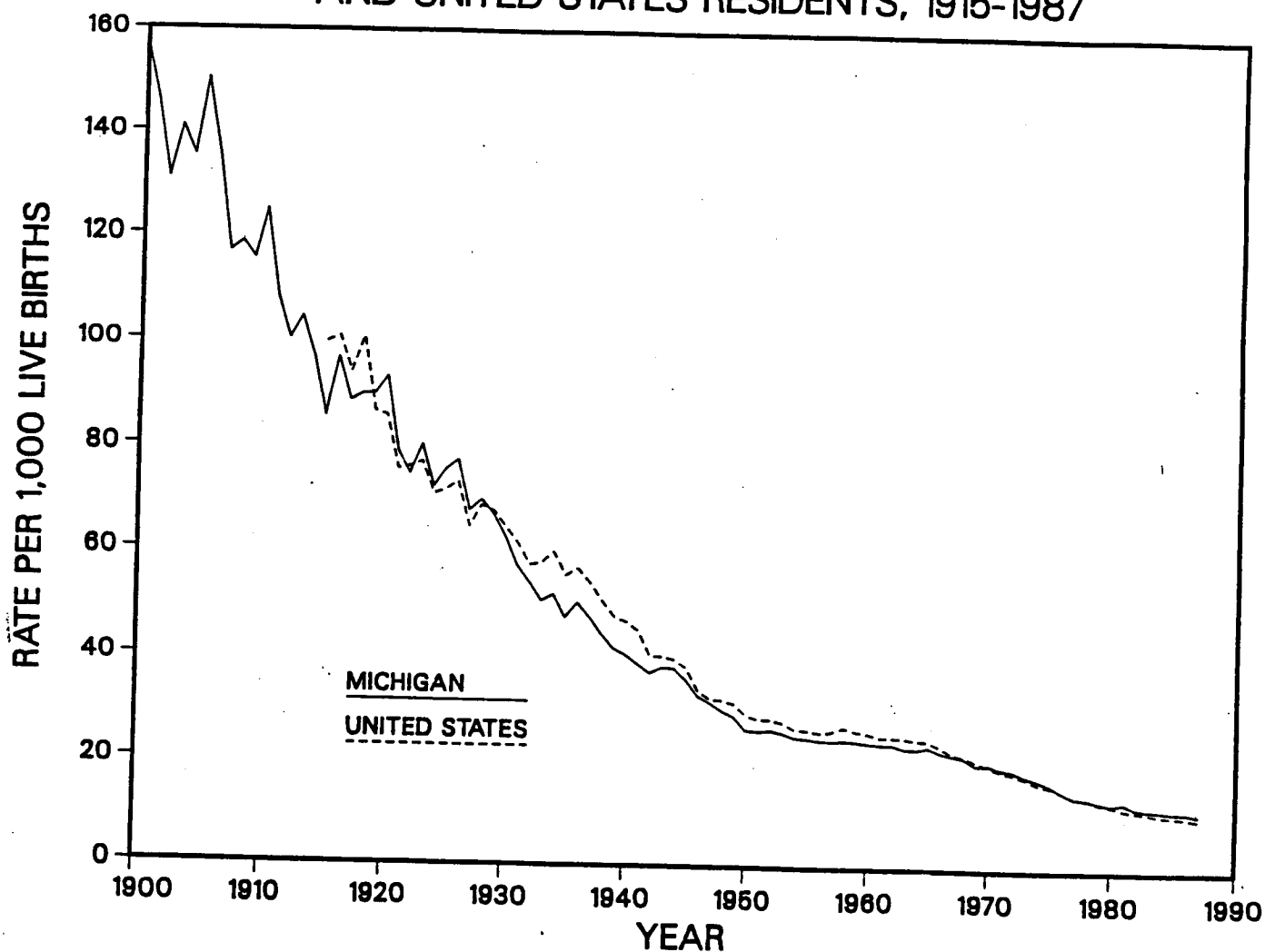
The death rate for infants during their first day of life has declined 18.1 percent since 1977. The rate decreased between 1977 and 1978, increased in the three years following 1978, and has generally decreased since 1981. The death rate for ages 1-6 days has declined steadily by 43.0 percent between 1977 and 1987. The death rate for infants aged 7-27 days had a lesser decrease of 25.0 percent below the 1977 level. The death rate for infants aged 28-364 days has generally decreased between 1977 and 1987. In 1987 the death rate for infants aged 28-364 days was 3.62, which was 13.4 percent below the comparable rate for 1977.

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 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.

Since 1970 the infant mortality rate for infants of other races dropped 59.3 percent. In the same period the rate for white infants dropped by 54.1 percent while for black

FIGURE 2.49  
INFANT MORTALITY RATES, MICHIGAN RESIDENTS, 1900-1987  
AND UNITED STATES<sup>1</sup> RESIDENTS, 1915-1987



<sup>1</sup>United States rate for 1987 is provisional.

Table 2.53  
**Infant Deaths and Infant Death Rates by Age at Death**  
Michigan Residents, 1970 - 1987

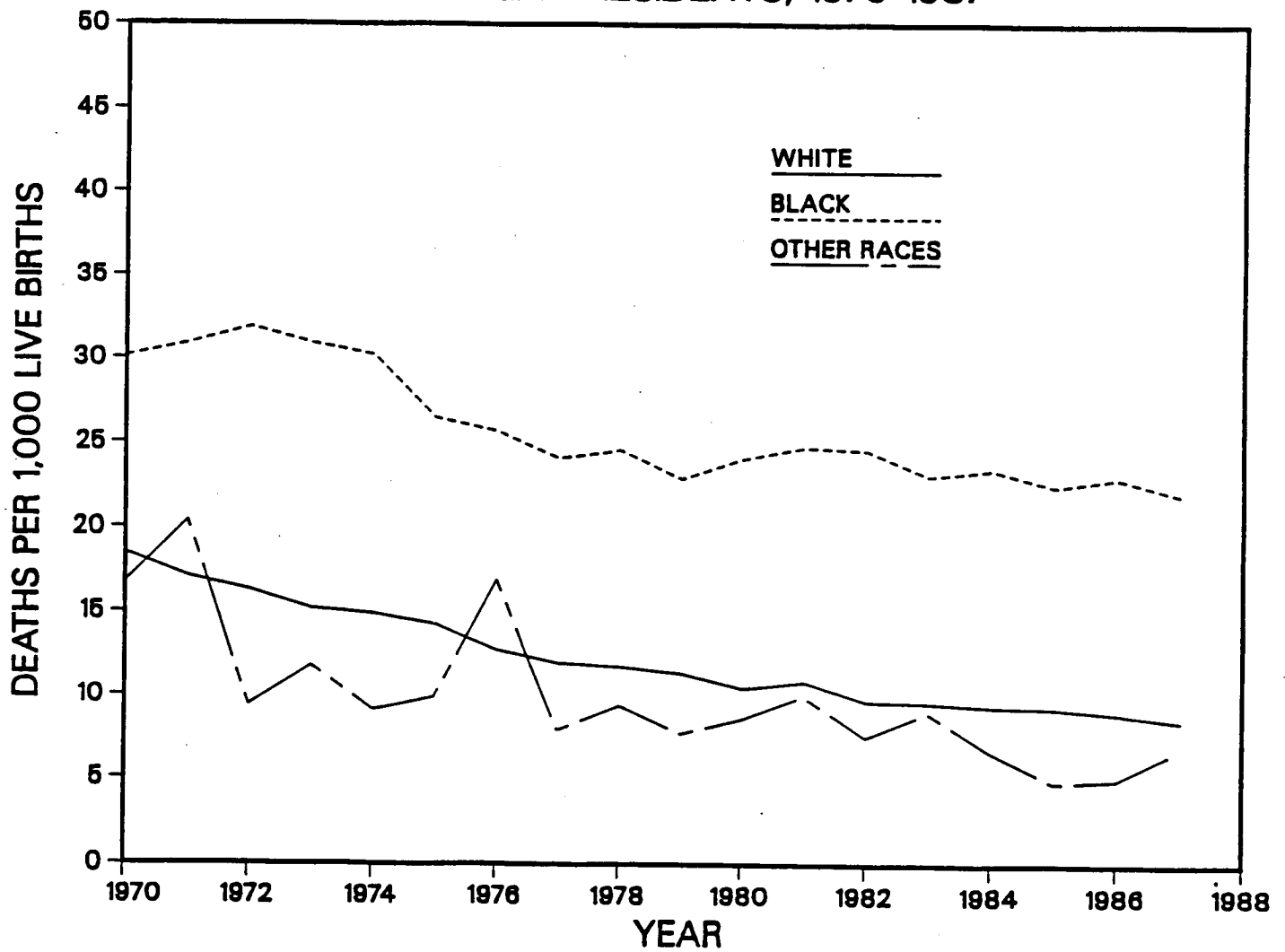
YEAR	AGE AT DEATH									
	TOTAL INFANT DEATHS		UNDER 1 DAY		1-6 DAYS		7-27 DAYS		28-364 DAYS	
	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE	NUMBER	RATE
1970	3,492	20.34	1,367	7.96	1,095	6.38	221	1.29	809	4.71
1971	3,157	19.46	1,191	7.34	1,025	6.32	196	1.21	745	4.59
1972	2,801	19.07	1,024	6.97	906	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

infants the decline was 26.9 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 1987 the rate for black infants of 22.0 was 2.6 times that for white infants (8.5) and 3.2 times that for infants of

other races (6.8). The white infant death rate in 1987 was 25.0 percent higher than the rate for infants of other races.

Michigan resident infant deaths in 1987 are listed by cause of death classification and age at death in Table 2.54. Congenital anomalies caused the death of 270 infants and was the specific disease category most frequently reported. Sudden infant death syndrome was

FIGURE 2.50  
INFANT DEATH RATES BY RACE,  
MICHIGAN RESIDENTS, 1970-1987



responsible for 239 infant deaths in 1987, while disorders relating to short gestation and unspecified low birthweight was listed as the cause of 204 deaths.

Over half (52.5 percent) of all infant deaths were attributed to conditions originating in the perinatal period. This proportion was 84.1 percent for deaths which occurred during the first day, 65.0 percent for deaths of infants at ages 1 through 6 days, and 48.7 percent for deaths of infants 1-3 weeks of age. This percentage was 5.9 percent for infants from 1-5 months and 12.0 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 (29.2 percent). Congenital anomalies were responsible for 14.1 percent of the deaths during the first day of life. Respiratory distress syndrome and other respiratory conditions of the newborn caused 7.9 and 12.0 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 (29.5 percent and 21.7 percent, respectively). For infants who died at 1-3 weeks of age the most frequent causes were congenital anomalies (32.2 percent) and respiratory distress syndrome (13.2 percent).

Sudden infant death syndrome was reported as the cause of 49.7 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 sudden infant death syndrome (25.6 percent) and congenital anomalies (17.1 percent). The 12 deaths due to accidents to infants aged 6-11 months represent 10.3 percent of the total deaths in this age group, while accidental deaths represent only 1.8 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 (203 deaths), sudden infant death syndrome (166 deaths), respiratory distress syndrome (82 deaths), other respiratory conditions of newborn (105 deaths) and disorders relating to short gestation and unspecified low birthweight (80). For black infants this latter grouping was the leading cause of death with 122 infants deaths. This cause was followed by sudden infant death syndrome (69 deaths), congenital anomalies (61 deaths), other respiratory conditions of newborn (48 deaths) and respiratory distress syndrome (43 deaths). There were a total of 17 deaths for infants of other races, 7 of which (41.2 percent) were attributed to certain conditions originating in the perinatal period, and 5 attributed to congenital anomalies.

Cause-specific infant death rates for black infants were higher for all categories with sufficient events to calculate rates for racial groups.

The infant death rate from all causes for males was 22.1 percent greater than that for females. The differentials between males and females for deaths due to sudden infant death syndrome and disorders relating to short gestation and unspecified low birth weight were 67.5 percent and 29.3 percent, respectively. The largest relative differential in rates by sex was for respiratory distress syndrome where the rate for males was 2.2 times that for females (Table 2.56).

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 1986. Note that this matched file is approximately 99.8 percent complete and, therefore, the rates presented are only slightly understated.

Table 2.54  
**Infant Deaths by Age at Death and Underlying Cause**  
Michigan Residents, 1987

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	8	-	-	-	8	-
38	Septicemia	8	-	-	-	8	-
1-7, 10-37, 39-139	Remainder of infectious and parasitic diseases	11	-	-	1	9	1
320-322	Meningitis	4	-	1	-	-	3
480-487	Pneumonia and influenza	22	-	2	3	13	4
740-759	Congenital anomalies	270	93	64	49	44	20
761	Newborn affected by maternal complications of pregnancy	65	64	-	1	-	-
762	Newborn affected by complications of placenta, cord and membranes	32	31	-	1	-	-
765	Disorders relating to short gestation and unspecified low birthweight	204	193	10	-	-	1
767	Birth trauma	7	2	4	1	-	-
768	Intrauterine hypoxia and birth asphyxia	29	13	11	5	-	-
769	Respiratory distress syndrome	125	52	47	20	4	2
770	Other respiratory conditions of newborn	154	79	37	15	13	10
771	Infections specific to the perinatal period	27	10	6	10	-	1
772	Neonatal hemorrhage	12	-	9	3	-	-
760, 763, 764, 766, 773-779	All other and ill-defined conditions originating in the perinatal period	152	111	17	18	6	-
760-779	Certain conditions originating in the perinatal period	807	555	141	74	23	14
798.0	Sudden infant death syndrome	239	-	-	14	195	30
E800-E949	Accidents and adverse effects	28	1	-	1	14	12
E960-E969	Homicide	14	-	-	-	8	6
Residual	All other causes	127	11	9	10	70	27
TOTAL		1,538	660	217	152	392	117



Table 2.55

# Infant Deaths and Infant Death Rates by Race of Infant and Underlying Cause

Michigan Residents, 1987

ICD - 9 CODE	CAUSE OF DEATH	RACE OF INFANT							
		TOTAL <sup>1</sup>		WHITE		BLACK		ALL OTHER	
		NUMBER	RATE <sup>2</sup>	NUMBER	RATE <sup>2</sup>	NUMBER	RATE <sup>2</sup>	NUMBER	RATE <sup>2</sup>
8, 9, 535, 555 - 558 38	Certain gastrointestinal diseases	8	5.7	4	*	4	*	-	-
1-7, 10-37, 39 - 139	Septicemia	8	5.7	3	*	5	19.4	-	-
	Remainder of infectious and parasitic diseases	11	7.8	7	6.2	4	*	-	-
320 - 322	Meningitis	4	*	3	*	-	-	1	*
480 - 487	Pneumonia and influenza	22	15.7	17	15.2	5	19.4	-	-
740 - 759	Congenital anomalies	270	192.2	203	181.0	61	237.1	5	201.5
761	Newborn affected by maternal complications of pregnancy	65	46.3	36	32.1	29	112.7	-	-
762	Newborn affected by complications of placenta, cord, and membranes	32	22.8	20	17.8	12	46.6	-	-
765	Disorders relating to short gestation and unspecified low birthweight	204	145.2	80	71.3	122	474.2	2	*
767	Birth trauma	7	5.0	3	*	3	*	1	*
768	Intrauterine hypoxia and birth asphyxia	29	20.6	17	15.2	12	46.6	-	-
769	Respiratory distress syndrome	125	89.0	82	73.1	43	167.1	-	-
770	Other respiratory conditions of newborn	154	109.6	105	93.6	48	186.6	1	*
771	Infections specific to the perinatal period	27	19.2	15	13.4	12	46.6	-	-
772	Neonatal hemorrhage	12	8.5	8	7.1	3	*	1	*
760, 763, 764, 766, 773 - 779	All other and ill-defined conditions originating in the perinatal period	152	108.2	72	64.2	78	303.2	2	*
760 - 779	Certain conditions originating in the perinatal period	807	574.5	438	390.5	362	1,407.0	7	282.0
798.0	Sudden infant death syndrome	239	170.1	166	148.0	69	268.2	4	*
E800 - E949	Accidents and adverse effects	28	19.9	18	16.0	10	38.9	-	-
E960 - E969	Homicide	14	10.0	4	*	10	38.9	-	-
Residual	All other causes	127	90.4	90	80.2	37	143.8	-	-
	TOTAL	1,538	1,094.9	953	849.6	567	2,203.7	17	684.9

<sup>1</sup> Records with race not stated are included only in total columns.

<sup>2</sup> Rates per 100,000 live births.

Table 2.56  
**Infant Deaths and Infant Death Rates by Sex of Infant and Underlying Cause**  
Michigan Residents, 1987

ICD - 9 CODE	CAUSE OF DEATH	SEX OF INFANT					
		TOTAL <sup>1</sup>		MALE		FEMALE	
		NUMBER	RATE <sup>2</sup>	NUMBER	RATE <sup>2</sup>	NUMBER	RATE <sup>2</sup>
8, 9, 535, 555-558	Certain gastrointestinal diseases	8	5.7	4	*	4	*
38	Septicemia	8	5.7	5	7.0	3	*
1-7, 10-37, 39-139	Remainder of infectious and parasitic diseases	11	7.8	7	9.8	4	*
320-322	Meningitis	4	*	1	*	3	*
480-487	Pneumonia and influenza	22	15.7	10	13.9	12	17.5
740-759	Congenital anomalies	270	192.2	142	198.0	127	184.8
761	Newborn affected by maternal complications of pregnancy	65	46.3	38	53.0	27	39.3
762	Newborn affected by complications of placenta, cord and membranes	32	22.8	18	25.1	14	20.4
765	Disorders relating to short gestation and unspecified low birthweight	204	145.2	116	161.7	86	125.1
767	Birth trauma	7	5.0	3	*	4	*
768	Intrauterine hypoxia and birth asphyxia	29	20.6	10	13.9	19	27.6
769	Respiratory distress syndrome	125	89.0	87	121.3	38	55.3
770	Other respiratory conditions of newborn	154	109.6	80	111.5	74	107.7
771	Infections specific to the perinatal period	27	19.2	16	22.3	11	16.0
772	Neonatal hemorrhage	12	8.5	8	11.2	4	*
760, 763, 764, 766, 773-779	All other and ill-defined conditions originating in the perinatal period	152	108.2	83	115.7	69	100.4
760-779	Certain conditions originating in the perinatal period	807	574.5	459	639.9	346	503.4
798.0	Sudden infant death syndrome	239	170.1	150	209.1	89	129.5
E800-E949	Accidents and adverse effects	28	19.9	14	19.5	14	20.4
E960-E969	Homicide	14	10.0	9	12.5	5	7.3
Residual	All other causes	127	90.4	59	82.2	68	98.9
TOTAL		1,538	1,094.9	860	1,198.9	675	982.1

<sup>1</sup> Records with sex not stated are included only in total columns.

<sup>2</sup> Rates per 100,000 live births.

The rate for black infants (23.5) was 2.6 times that for white infants (8.9). The rate for American Indians (9.3) was 4.5 percent more than the white infant death rate. The rate for other races (6.1) was 31.5 percent less 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).

Data from the matched file on infant mortality rates by age of mother and race of child are presented in Table 2.59. Infant death rates 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 26.9 for mothers under 15 years old was 2.9 times as high as the lowest rate of 9.2 for mothers aged 25-29 years. The infant mortality rate for mothers 40 or over was 73.9 percent greater than the lowest age-specific rate.

Rates for white infants generally follow the above pattern of association with mother's age. For black infants, the only divergence from the parabolic pattern is the increase associated with mothers 20-24 years of age. Rates for black infants were significantly above those for the 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 2.0 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 82.0, 17.1 times as high as the low rate of 4.8 for mothers who had 15-19 prenatal visits. The rate associated with mothers who had 1-4 visits (87.9) was 18.3 times the low rate, while the rate associated with mothers who had 5-9 visits was 3.4 times as high as the low rate.

The infant death rate for mothers with 20 or more prenatal visits was 8.3 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 3.5 times greater for mothers with inadequate care (30.0 deaths per 1,000 live births) than for mothers with adequate care (8.6 deaths per 1,000 live births) and 1.6 times greater for mothers with intermediate care (14.1 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 (17.4) was 2.5 times greater than for white infants (7.1 deaths per 1,000 live births) and 4.0 times greater than for infants of other races. For mothers with adequate care, the infant death rate for white infants was 61.4 percent greater than the rate for infants of other races.

Mothers with fewer than ten prenatal visits had 20.6 percent of all live births but 54.4 percent of all infant deaths. Mothers who had ten or more prenatal visits had 77.4 percent of the live births and 38.3 percent of the infant deaths. The infant death rate for mothers who had fewer than ten prenatal visits was 30.1. This was 5.4 times the rate of 5.6 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 1-4 prenatal visits the rates for black infants were closer to the rates for white infants (62.9 percent greater). For mothers with fewer than ten prenatal visits, the infant mortality rate for white infants was 23.7 and

Table 2.57  
**Infant Deaths, Live Births and Infant Death Rates<sup>2</sup> by Race**  
Michigan Resident Infants Born in 1986

RACE	INFANT DEATHS	LIVE BIRTHS	INFANT DEATH RATE
All Races	1,569	137,626	11.4
White	985	111,115	8.9
Black	566	24,078	23.5
American Indian	7	753	9.3
Other Races	10	1,629	6.1
Unknown	1	51	*

Table 2.58  
**Hebdomadal Deaths<sup>1</sup> and Death Rates<sup>2</sup> by Race**  
Michigan Resident Infants Born in 1986

RACE	HEBDOMADAL DEATHS	HEBDOMADAL DEATH RATE
All Races	912	6.6
White	551	5.0
Black	350	14.5
American Indian	4	*
Other Races	6	3.7
Unknown	1	*

<sup>1</sup> Deaths to infants less than seven days old.

<sup>2</sup> Per 1,000 live births.

Table 2.59  
**Infant Deaths, Live Births and Infant Death Rates by Age of Mother and Race<sup>1</sup> of Infant**  
Michigan Resident Infants Born in 1986

AGE OF MOTHER	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
All Ages	1,569	137,626	11.4	985	111,115	8.9	566	24,078	23.5	17	2,382	7.1
Under 15	9	335	26.9	1	90	*	8	242	33.1	-	3	-
15 - 19	250	16,536	15.1	124	10,753	11.5	126	5,568	22.6	-	206	-
20 - 24	515	39,611	13.0	328	31,525	10.4	178	7,525	23.7	8	550	14.5
25 - 29	428	46,421	9.2	291	39,527	7.4	133	6,086	21.9	4	796	*
30 - 39	348	33,834	10.3	228	28,522	8.0	115	4,503	25.5	5	793	6.3
40 or More	14	877	16.0	9	689	13.1	5	152	32.9	-	34	-
Not Stated	5	12	416.7	4	9	*	1	2	*	-	-	-

<sup>1</sup> Race not stated included in total columns only.

Table 2.60  
**Infant Deaths, Live Births and Infant Death Rates by Prenatal Visits and Race<sup>1</sup> of Infant**  
Michigan Resident Infants Born in 1986

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	1,569	137,626	11.4	985	111,115	8.9	566	24,078	23.5	17	2,382	7.1
0	98	1,195	82.0	35	590	59.3	62	582	106.5	1	19	*
1 - 4	286	3,255	87.9	145	2,007	72.2	136	1,156	117.6	5	90	55.6
5 - 9	469	23,861	19.7	323	18,586	17.4	140	4,760	29.4	6	508	11.8
10 - 14	499	85,604	5.8	337	71,329	4.7	159	12,868	12.4	3	1,390	*
15 - 19	83	17,408	4.8	54	13,356	4.0	29	3,764	7.7	-	281	-
20 or Over	19	3,633	5.2	16	3,019	5.3	3	569	*	-	45	-
Unknown	115	2,670	43.1	75	2,228	33.7	37	379	97.6	2	49	*

<sup>1</sup> 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 Race<sup>1</sup> of Infant**  
**Michigan Resident Infants Born in 1986**

LEVEL OF CARE (Kessner Index <sup>2</sup> )	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	1,569	137,626	11.4	985	111,115	8.9	566	24,078	23.5	17	2,382	7.1
Adequate	858	100,146	8.6	590	83,520	7.1	261	15,025	17.4	7	1,579	4.4
Intermediate	375	26,639	14.1	211	19,814	10.6	158	6,259	25.2	6	562	10.7
Inadequate	244	8,138	30.0	126	5,641	22.3	114	2,305	49.5	4	182	*
Unknown	92	2,703	34.0	58	2,140	27.1	33	489	67.5	-	59	-

<sup>1</sup> Race not stated included in total columns only.

<sup>2</sup> 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).

that for black infants 52.0. For mothers with ten or more prenatal visits, the rate for white infants was 4.6 and for black infants 11.1.

The rate for black infants was, thus, 119 percent greater where the mother had fewer than ten prenatal visits and 141 percent greater where the mother had ten or more visits. Both of these racial differentials were less than the overall racial differential of 164 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 1986, Michigan resident perinatal deaths numbered 1,777 and the perinatal death rate was 12.8. This rate was 13.3 in 1985 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 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 1986. 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 30 or greater years of age. Minimum risk in 1986 was associated with mothers 25-29 years of age. The perinatal death rate was over thirty times higher for fetuses and infants whose mothers had less than 5 prenatal visits than for those whose mothers had 15-19 visits (Table 2.63). The rate of death associated with 5-9 prenatal visits was 6.7 times higher than the rate for the lowest risk category (15-19 visits).

The overall perinatal mortality rate for black fetuses and infants was over 2.6 times higher than 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 25-29 years of age for white fetuses and infants and with mothers 20-24 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 19.4 and 69.0 percent less than the rates for white and black fetuses and infants, respectively (Table 2.62).

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 82.9 percent when the mother had 10-14 visits. The differential was least for the 15-19 visits category where the black perinatal mortality rate was 17.6 percent more than the white rate.

The perinatal death rates increased for mothers with less than adequate prenatal care. The death rate was 4.0 times higher for



Table 2.62  
Perinatal Deaths, Total Births and Perinatal Death Rates by Age of Mother and Race<sup>1</sup> of Infant or Fetus  
Births to Michigan Residents in 1986

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	1,777	138,491	12.8	1,096	111,660	9.8	622	24,350	25.5	19	2,391	7.9
Under 15.	7	337	20.8	-	90	-	7	244	28.7	-	3	-
15 - 19	285	16,666	17.1	139	10,818	12.8	145	5,632	25.7	-	206	-
20 - 24	491	39,832	12.3	297	31,662	9.4	182	7,604	23.9	7	551	12.7
25 - 29	511	46,684	10.9	342	39,704	8.6	158	6,162	25.6	5	800	6.3
30 - 39	423	34,037	12.4	296	28,676	10.3	117	4,545	25.7	7	797	8.8
40 or More	23	891	25.8	15	698	21.5	8	157	51.0	-	34	-
Not Stated	37	44	840.9	7	12	583.3	5	6	833.3	-	-	-

<sup>1</sup> Race not stated included in total columns only.

Table 2.63  
Perinatal Deaths, Total Births and Perinatal Death Rates by Prenatal Visits and Race<sup>1</sup> of Infant or Fetus  
Births to Michigan Residents in 1986

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	1,777	138,491	12.8	1,096	111,660	9.8	622	24,350	25.5	19	2,391	7.9
0	110	1,236	89.0	39	607	64.3	70	606	115.5	1	19	*
1-4	372	3,401	109.4	204	2,098	97.2	162	1,209	134.0	6	92	65.2
5-9	551	24,121	22.8	401	18,793	21.3	142	4,809	29.5	7	511	13.7
10-14	337	85,757	3.9	252	71,457	3.5	82	12,891	6.4	3	1,392	*
15-19	60	17,429	3.4	45	13,374	3.4	15	3,767	4.0	-	281	-
20 or Over	20	3,642	5.5	18	3,027	5.9	2	570	*	-	45	-
Unknown	327	2,905	112.6	137	2,304	59.5	149	498	299.2	2	51	*

<sup>1</sup> Race not stated included in total columns only.

mothers with inadequate care than for mothers with adequate care (33.9 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 1.9 times as high as the rate for white fetuses and infants and 2.1 times higher than the rate for fetuses and infants of races other than black and white with the same level of prenatal care. The rate for black fetuses and infants of mothers with inadequate care was 2.5 times higher than the rate for white fetuses and infants of mothers with inadequate care (Table 2.64).

The median birth weight of infants born in 1986 and dying prior to 1 year of age was 1,418 grams (Table 2.65). The median birth weight of all Michigan resident live births in 1986 was 3,402 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 1986.

Infant death rates by race, birth weight and age at death are displayed in Table 2.66 for infants born in 1986. While the overall infant death rate for black infants was 2.6 times that of white infants, the rates for white and black infants were quite similar for infants born

weighing 1,500 grams or less. The rate for black infants weighing 1501-2499 grams was 4.5 percent greater than the comparable rate for white infants. For infants weighing 2,500 grams or more the rate for black infants exceeded by 69.2 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 (14.0 percent for black infants compared to 5.4 percent for white infants).

The differentials in death rates by race for deaths under 28 days (neonatal deaths) and from 28-364 days (postneonatal deaths) were similar to that for all infant deaths except for infants in the 1,501 to 2,499 gram birthweight interval. The neonatal rate for white infants weighing 1501-2499 grams was 30.7 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 62.8 percent. For infants weighing 2,500 grams or more at birth, the rates were greater for black infants by 62.5 percent and 86.4 percent, respectively, for neonatal and postneonatal deaths.

Table 2.64  
Perinatal Deaths, Total Births and Perinatal Death Rates by Level of Prenatal Care  
and Race<sup>1</sup> of Infant or Fetus  
Births to Michigan Residents in 1986

LEVEL OF CARE (Kessner Index <sup>2</sup> )	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	1,777	138,491	12.8	1,096	111,660	9.8	622	24,350	25.5	19	2,391	7.9
Adequate	850	100,506	8.5	621	83,815	7.4	217	15,083	14.4	11	1,585	6.9
Intermediate	512	26,954	19.0	261	19,970	13.1	211	6,382	33.1	4	562	*
Indadequate	280	8,271	33.9	134	5,703	23.5	142	2,373	59.8	3	184	*
Unknown	135	2,760	48.9	80	2,172	36.8	52	512	101.6	1	60	*

<sup>1</sup> Race not stated included in total columns only.

<sup>2</sup> 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 constitutes adequate care).

Table 2.65  
**Infant Deaths by Birth Weight and Mother's Age<sup>1</sup>**  
Michigan Resident Infants Born in 1986

BIRTH WEIGHT IN GRAMS	MOTHER'S AGE						
	TOTAL	UNDER 15	15-19	20-24	25-29	30-39	40 OR MORE
Total	1,569	9	250	515	428	348	14
500 or Less	311	1	54	93	74	86	3
501 - 1,000	367	6	79	110	92	74	5
1,001 - 1,500	114	-	19	35	31	27	2
1,501 - 2,000	90	-	13	20	32	25	-
2,001 - 2,499	119	-	12	34	41	31	1
2,500 - 3,000	197	-	23	73	65	34	2
3,001 - 3,500	186	1	27	82	45	30	1
3,501 - 4,000	104	-	11	40	29	24	-
4,001 - 4,500	37	-	3	18	9	7	-
4,501 and Over	26	1	5	3	9	8	-
Not Stated	18	-	4	7	1	2	-
Median Weight in Grams	1,418	822	882	1,899	1,786	1,134	820

<sup>1</sup> Age not stated included in total column only.

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 1986

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	137,626	1,569	11.4	1,075	7.8	494	3.6
	White	111,115	985	8.9	662	6.0	323	2.9
	Black	24,078	566	23.5	402	16.7	164	6.8
	All Other <sup>1</sup>	2,382	17	7.1	10	4.2	7	2.9
Less Than 1,501 Grams	All Races	1,879	792	421.5	705	375.2	87	46.3
	White	1,052	433	411.6	390	370.7	43	40.9
	Black	810	351	433.3	307	379.0	44	54.3
	All Other <sup>1</sup>	15	8	533.3	8	533.3	-	-
1,501-2,499 Grams	All Races	7,658	209	27.3	128	16.7	81	10.6
	White	4,986	134	26.9	91	18.3	43	8.6
	Black	2,563	72	28.1	36	14.0	36	14.0
	All Other <sup>1</sup>	105	3	*	1	*	2	*
2,500 Grams Or Greater	All Races	128,050	550	4.3	225	1.8	325	2.5
	White	105,052	406	3.9	170	1.6	236	2.2
	Black	20,696	137	6.6	53	2.6	84	4.1
	All Other <sup>1</sup>	2,262	6	2.7	1	*	5	2.2
Unknown Birthweight	All Races	39	18	461.5	17	435.9	1	*
	White	25	12	480.0	11	440.0	1	*
	Black	9	6	666.7	6	666.7	-	-
	All Other <sup>1</sup>	-	-	-	-	-	-	-

<sup>1</sup> 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 1987, deaths from all infectious and parasitic diseases numbered 1,156. As can be observed from Table 2.67, nearly two-thirds of these deaths were caused by septicemia (733 deaths). There were 160 deaths attributable to HTLV-III/LAV infection ("AIDS"). Mycoses and tuberculosis caused 62 and 46 deaths, respectively. When deaths attributed to late effects of tuberculosis

are included, the number of deaths from tuberculosis rises to 52.

The distribution of infectious and parasitic disease deaths by age, race, and sex for 1987 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 percent of all infectious and parasitic disease deaths but only 14.6 percent of deaths from all causes. The death rates were highest for persons aged 65 years and over (64.5 deaths

Table 2.67  
Deaths from Selected Infectious and Parasitic Diseases  
Michigan Residents, 1987

ICD LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	FREQUENCY
038	Septicemia	733
042-044	HTLV-III/LAV Infection (AIDS)	160
110-118	Mycoses	62
010-018	Tuberculosis	46
070	Viral Hepatitis	27
136.3	Pneumocystosis	15
135	Sarcoidosis	12
036	Meningococcal Infection	7
054	Herpes Simplex	7
040.0	Gas Gangrene	6
137	Late Effects of Tuberculosis	6
046	Slow Virus Infection of Central Nervous System	4
053	Herpes Zoster	2
052	Chickenpox	1
Residual 000-139	All Other Infectious and Parasitic Diseases	68
Total		1,156

<sup>1</sup> Detailed list of the 9th revision of the International Classification of Diseases. WHO.

Table 2.68  
Deaths Due to Infectious and Parasitic Diseases by Age, Race and Sex  
Michigan Residents, 1987

AGE	TOTAL	MALE			FEMALE		
		WHITE	BLACK	OTHER RACES	WHITE	BLACK	OTHER RACES
All Ages	1,156	440	181	3	421	108	3
Under 1 Year	24	8	6	-	4	6	-
1 - 19 Years	20	6	4	-	6	3	1
20 - 44 Years	225	99	75	1	29	21	-
45 - 64 Years	203	88	37	-	59	18	1
65 or Over	684	239	59	2	323	60	1

Table 2.69  
Infectious and Parasitic Disease Death Rates by Age, Race and Sex  
Michigan Residents, 1987

AGE	TOTAL	MALE			FEMALE		
		WHITE	BLACK	OTHER RACES	WHITE	BLACK	OTHER RACES
All Ages	12.6	11.5	31.3	*	10.5	16.6	*
Under 1 Year	17.1	13.8	50.4	*	*	50.8	*
1 - 19 Years	0.8	0.5	*	*	0.6	*	*
20 - 44 Years	6.2	6.4	34.1	*	1.9	8.1	*
45 - 64 Years	11.7	11.8	43.0	*	7.5	17.1	*
65 or Over	64.5	61.6	141.5	*	57.0	101.8	*



per 100,000 population) and for infants under 1 year (17.1). 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.

## INJURY AT WORK

There were 171 deaths reported as resulting from injuries at work in 1987, 5 less than in

1986 (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 56 deaths. Injuries on streets and highways caused 40 deaths followed by injuries in public buildings with 35 deaths. There were 11 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 34 deaths or 19.9 percent of all such deaths (Table 2.71).

Table 2.70  
Deaths Due to Injury at Work by Place of Injury  
Michigan Residents, 1987

PLACE	NUMBER OF DEATHS
Industrial Place and Premises	56
Street and Highway	40
Public Building	35
Farm	11
Home	10
Place for Recreation and Sport	3
Resident Institution	3
Mine and Quarry	1
Other Specified Places	12
Place Not Specified	-
Total	171

Table 2.71  
Deaths Due to Injury at Work by Cause of Death  
Michigan Residents, 1987

ICD LIST <sup>1</sup> NUMBER	CAUSE OF DEATH	NUMBER OF DEATHS	PERCENT
E960-E978	Homicide and Legal Intervention	34	19.9
E810-E819	Motor Vehicle Traffic Accidents	30	17.5
E919	Accidents Caused by Machinery	23	13.5
E880-E888	Accidental Falls	19	11.1
E925	Accidents Caused by Electric Current	13	7.6
E950-E959	Suicide	9	5.3
E916	Struck Accidentally by Falling Object	8	4.7
E890-E899	Accident Caused by Fire and Flames	6	3.5
E820-E825	Motor Vehicle Nontraffic Accidents	4	2.3
E928	Other & Unspecified Environmental & Accidental Causes	4	2.3
E840-845	Air and Space Transport Accidents	3	1.8
E910	Accidental Drowning & Submersion	2	1.2
E913	Accidental Mechanical Suffocation	1	0.6
E860-E869	Accidental Poisoning Caused by Gases & Vapors	1	0.6
Residual E800-E949	All Other Accidents	37	21.6
Total		171	100.0

<sup>1</sup> Detailed List of the 9th Revision of the International Classification of Diseases, WHO.

The second most common cause was motor vehicle traffic accidents, accounting for 30 deaths and 17.5 percent of the total. Acci-

dents caused by machinery accounted for 23 deaths.

## LIFE EXPECTANCY

The life expectancy of a Michigan resident at birth was 74.2 years, based on 1987 mortality and population data. Females demonstrated a significantly greater longevity than males. In 1987 the life expectancy at birth was 71.1 years for males and 77.4 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 17.7 years for males and by 22.3 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 1987 had declined to 6.3 years. Between 1977 and 1987 life expectancy increased by 1.8 years for males and 1.1 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. 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. By 1987 the life expectancy of males and females in Michigan were 0.4 and 0.9 years, respectively, below the national provisional life expectancy. Note that females have consistently demonstrated greater longevity than males both in Michigan and in the United States.

White persons displayed a life expectancy 6.8 years greater than persons of all other races in 1987. The life expectancy of white males was 8.4 years greater than other than white males in 1987 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 other than white 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 64.0 in 1987, while the life expectancy for white males rose from 68.2 to 72.4 years in 1987. 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 1950-1987 period. In 1950, Michigan resident white females had an average longevity 8.5 years greater than females of all other races. This disparity declined to 5.2 years in 1987.

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 the older age intervals.

Table 2.72  
Life Expectancy at Birth by Sex  
Michigan and United States Residents  
Selected Years, 1901 - 1987<sup>3</sup>

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 <sup>1</sup>	56.0 <sup>1</sup>
58.1	61.6	1930	59.8 <sup>1</sup>	53.8 <sup>1</sup>
60.8	56.2	1940	63.4 <sup>1</sup>	67.4 <sup>1</sup>
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 <sup>2</sup>	78.3 <sup>2</sup>	1987	71.1	77.4

<sup>1</sup> Michigan data for years 1920, 1930, and 1940 are for white persons only.

<sup>2</sup> Provisional data.

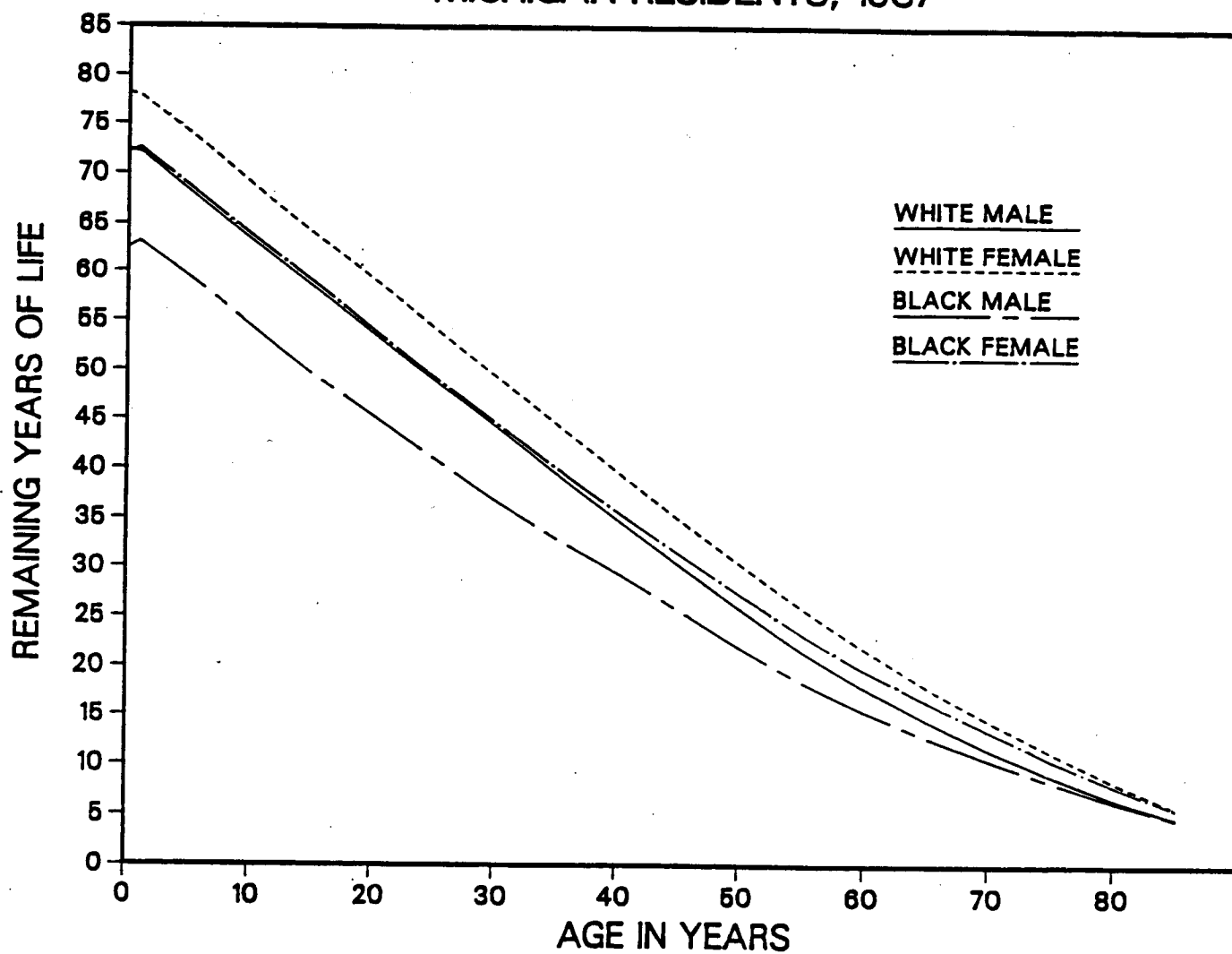
<sup>3</sup> Data for 1981 - 1985 have been revised.

Table 2.73  
Life Expectancy at Birth by Sex and Race  
Michigan Residents, Selected Years, 1950 - 1987<sup>1</sup>

POPULATION SUBGROUP	YEAR										
	1950	1960	1970	1980	1981	1982	1983	1984	1985	1986	1987
Total Population	68.3	70.0	70.8	73.4	73.7	74.0	74.1	74.1	74.0	74.1	74.2
Total Male	65.7	67.1	67.2	70.0	70.3	70.6	70.7	70.8	70.6	70.7	71.1
Total Female	71.2	73.3	74.6	76.9	77.1	77.4	77.4	77.2	77.4	77.4	77.4
Total White	68.8	70.5	71.6	74.3	74.4	74.8	74.9	75.0	74.9	75.1	75.3
White Male	66.2	67.5	68.2	71.0	71.1	71.5	71.6	71.8	71.7	71.9	72.4
White Female	71.9	74.0	75.3	77.6	77.7	78.0	78.1	78.0	78.1	78.2	78.2
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
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
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

<sup>1</sup> Data for 1981 - 1985 have been revised.

FIGURE 2.51  
REMAINING YEARS OF LIFE BY AGE, SEX, AND RACE,  
MICHIGAN RESIDENTS, 1987



## PLACE OF OCCURRENCE

There were 2,157 Michigan resident deaths in 1987 that occurred outside the state. This represents 2.7 percent of all resident deaths. Of the 2,157 deaths among Michigan residents 457 (21.2 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 17.8 percent (383 deaths). The border areas of Illinois, Indiana, Ohio, Wisconsin, and Canada accounted for 52.2 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 1987, the District of Columbia, and Canada (Table 2.74).

Of the 1,268 non-residents that died in Michigan in 1987, 44.3 percent were from the border areas while 20.1 percent were Floridians. Overall, non-residents who died in Michigan were residents of 44 states, Canada and at least seven foreign countries.

Table 2.74  
Michigan Resident Deaths Occurring Outside  
Michigan by Place of Occurrence and Deaths  
Occurring in Michigan to Non-Michigan  
Residents by Place of Residence  
1987

GEOGRAPHIC AREA	DEATHS OF RESIDENTS OCCURRING OUTSIDE MICHIGAN		DEATHS OF NONRESIDENTS OCCURRING IN MICHIGAN	
	NUMBER	PERCENT	NUMBER	PERCENT
Total	2,157	100.0	1,268	100.0
Ohio	457	21.2	185	14.6
Florida	383	17.8	255	20.1
Indiana	308	14.3	72	5.7
Wisconsin	256	11.9	182	14.4
Illinois	70	3.2	93	7.3
Minnesota	66	3.1	12	0.9
California	63	2.9	38	3.0
Texas	52	2.4	29	2.3
Arizona	87	4.0	132	10.4
Tennessee	39	1.8	13	1.0
New York	25	1.2	27	2.1
Canada	35	1.6	29	2.3
Other Areas	316	14.6	201	15.9

## YEARS OF POTENTIAL LIFE LOST

Another measure of the impact that causes of death have on a population, the potential years of life lost, is used by the national Centers for Disease Control. The potential years of 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 potential life lost to the Michigan population in 1987 for the ten

leading causes of death and selected other causes, as well as the rankings of these causes based on potential years of life lost for Michigan and the United States. Accidents, with 80,070 total years lost in Michigan, was the leading cause of potential years of 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 Due to the Ten Leading Causes of Death  
and Selected Other Causes  
Michigan Residents, 1987

RANK	CAUSE OF DEATH	YEARS OF POTENTIAL LIFE LOST			U.S. RANK <sup>2</sup>
		TOTAL <sup>1</sup>	MALE	FEMALE	
1	Accidents and Adverse Effects	80,070	57,351	22,714	1
2	Malignant Neoplasms	70,914	35,372	35,542	2
3	Homicide/Suicide	64,190	50,683	13,507	4
4	Diseases of the Heart	62,937	44,230	18,707	3
5	Congenital Anomalies	23,072	12,777	10,231	5
6	Prematurity <sup>3</sup>	21,221	13,094	7,998	6
7	Sudden Infant Death Syndrome	15,829	9,864	5,965	8
8	Chronic Liver Disease and Cirrhosis	10,577	7,285	3,292	10
9	Cerebrovascular Diseases	10,012	4,912	5,100	9
10	Pneumonia and Influenza	6,334	3,363	2,971	11
11	Chronic Obstructive Pulmonary Diseases and Allied Conditions	5,693	3,135	2,558	12
12	Diabetes Mellitus	4,680	2,570	2,110	13
13	HTLV-III/LAV Infection (AIDS)	4,342	4,000	342	7
14	Atherosclerosis	510	345	165	4
	All Other	93,326	53,214	40,112	

<sup>1</sup> Total includes data for individuals with sex unspecified.

<sup>2</sup> U.S. rankings based on a 10 percent sample of provisional data.

<sup>3</sup> Codes 765 and 769, detailed list of the 9th revision of the International Classification of Diseases, WHO.

<sup>4</sup> 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 in 1987 were reasonably similar for Michigan and the United States with the exception of AIDS. For Michigan, AIDS was the 13th leading cause of potential years of life lost. For the United States, AIDS ranked seventh as a cause of potential years of life lost.

For all but two of the causes of death listed in Table 2.75, Michigan males lost more potential years of life than Michigan females. Females lost more potential years of life from

cancer and cerebrovascular disease than males.

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 potential years of life lost. Chronic obstructive pulmonary disease, diabetes mellitus 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, 1987

TOTAL MARRIAGES	74,418
TOTAL DIVORCES AND ANNULMENTS	39,857
MARRIAGE RATE <sup>1</sup>	16.2
DIVORCE RATE <sup>1</sup>	8.7
MEDIAN AGE OF THE BRIDE	25
MEDIAN AGE OF THE GROOM	27

<sup>1</sup> Number of persons married or divorced per 1,000 population.



## MARRIAGES AND DIVORCES

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 1987 was 23,295 in 1900, while the largest number was 94,486 in 1973. After steep declines in the number of marriages in 1974 and 1975 and a smaller decline in 1976, the number of marriages increased during each of the following three years. In 1980 through 1983 the number of marriages declined. The number of marriages increased in 1984 and decreased each year thereafter. The number of marriages recorded in 1987 was 74,418, the lowest number since 1964. The number of divorces and annulments increased from a low of 2,435 in 1900 to a high of 45,047 in 1980. In 1987 the number of divorces and annulments was 39,857. This represents an increase of 0.8 percent from the figure for 1986.

### 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 that of the nation, excepting only the years 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 5.3 percent above that of Michigan. By 1980, this percent increased to 12.8 and in 1987 the provisional rate for the nation was 22.2 percent above Michigan's rate.

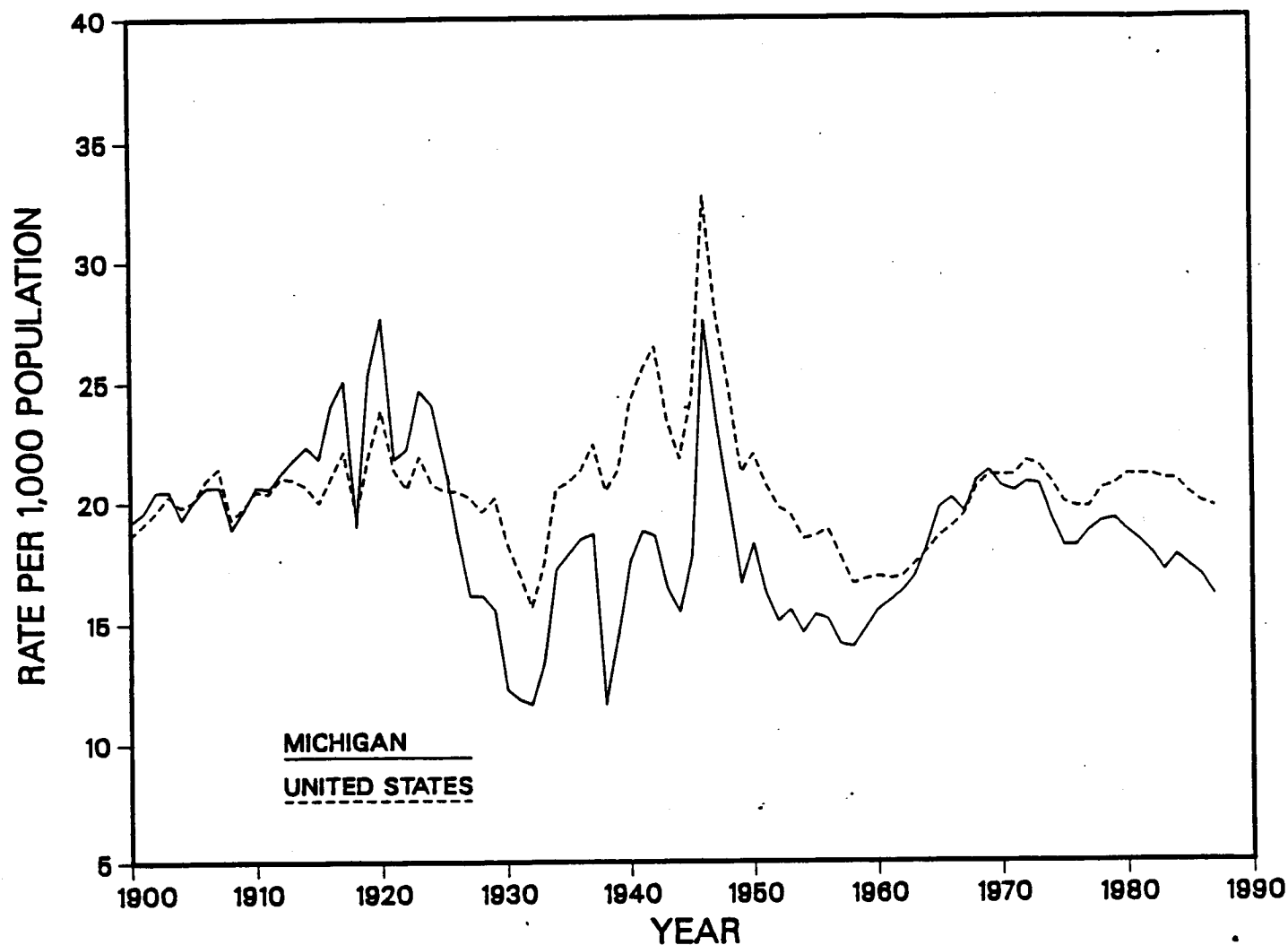
The marriage rate for Michigan in 1987 was 16.2, 4.7 percent lower than the 1986 rate of 17.0 (Table 3.1). The provisional rate for the nation in 1987 was 19.8.

### 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 resi-

FIGURE 3.1  
MARRIAGE RATES, MICHIGAN AND UNITED STATES<sup>1</sup>  
OCCURRENCES, 1900-1987



<sup>1</sup>United States rates for 1986-1987 are provisional.

Table 3.1  
**Marriages and Marriage Rates<sup>1</sup>**  
**Michigan and United States Occurrences**  
 Selected Years, 1900 - 1987

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
3,282,272	20.6	1978 <sup>2</sup>	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
2,477,000	21.0	1984	80,810	17.8
2,425,000	20.4	1985	79,022	17.4
2,400,000Pr.	20.0Pr.	1986	77,815	17.0
2,421,000Pr.	19.8Pr.	1987	74,418	16.2

<sup>1</sup> Number of persons married per 1,000 population.

<sup>2</sup> 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.



Table 3.2  
**Marriages by Residence Status of Bride and Groom**  
 Michigan Occurrences, 1977 and 1987

RESIDENCE STATUS	1977		1987	
	NUMBER	PERCENT	NUMBER	PERCENT
Both Bride and Groom Residents . . . . .	80,970	94.1	68,754	92.4
Bride Resident, Groom Non-Resident . . . . .	2,980	3.5	2,515	3.4
Groom Resident, Bride Non-Resident . . . . .	640	0.7	545	0.7
Both Bride and Groom Non-Resident . . . . .	1,497	1.7	2,604	3.5
Residence Status, Not Stated . . . . .	1	0.0	-	-
Total . . . . .	86,088	100.0	74,418	100.0

dents of the state. For marriages occurring in Michigan in 1987 95.8 percent of the brides were residents of Michigan, while 93.1 percent of the grooms were residents of the state. These figures are slightly lower than those for marriages occurring in Michigan in 1977. 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 3,149 non-resident brides married in Michigan in 1987. The figure for grooms is considerably greater than that of brides, numbering 5,119. Table 3.3 shows the most frequent residences of non-resident brides and grooms married in Michigan. The nearby states of Illinois, Indiana, Ohio and Wisconsin are the states of residence for 31.4 percent of all non-resident grooms and 33.8 percent of non-resident brides.

### MONTH OF MARRIAGE

The number of marriages occurring in Michigan varies with the seasons. The most popular months for marriages in 1987 were June and August, with 9,231 and 10,195 marriage ceremonies being performed during these months respectively. May was also a popular choice, with 8,557 marriages being performed in this month. Fewer marriages occurred during the winter months. The lowest figure was for January, with 25.5 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 is 2.7 times the corresponding number of males. Between ages 20 and 24, 23.0 percent more brides than grooms married. Among persons 25 and

**Table 3.3**  
**Place of Residence of Non-Resident**  
**Brides and Grooms**  
**Marriages Occurring in Michigan, 1987**

GEOGRAPHIC AREA	NON-RESIDENT BRIDE	NON-RESIDENT GROOM
Arizona	86	112
California	333	479
Colorado	83	122
Florida	269	412
Georgia	82	139
Illinois	367	552
Indiana	238	374
Minnesota	69	104
New York	97	212
North Carolina	50	107
Ohio	293	458
Texas	199	300
Virginia	77	137
Wisconsin	165	224
Other U.S. Places	633	1,155
Foreign Countries	108	232
Total	3,149	5,119

**Table 3.4**  
**Marriages by Month**  
**Michigan Occurrences, 1987**

MONTH	NUMBER	PERCENT
January	2,602	3.5
February	4,201	5.6
March	3,472	4.7
April	4,594	6.2
May	8,557	11.5
June	9,231	12.4
July	7,353	9.9
August	10,195	13.7
September	7,533	10.1
October	7,746	10.4
November	4,504	6.1
December	4,430	6.0
January - December	74,418	100.0

over, males marry more frequently than females. In 1987, the median age of brides (25 years) marrying in Michigan was two years lower than the median age for grooms (27 years).

Since 1977, there have been significant declines in the marriage rate for persons of both sexes under the age of 25 years. The largest decline observed is for males under the age of 20 years for whom the marriage rate has dipped 60.9 percent. The comparable decline for females was 53.5 percent. The

marriage rate declined by 40.7 percent and 19.1 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 6.8 percent since 1977. For females within the same age category, the rate of marriage has increased 17.3 percent. For individuals between 35 and 44 years of age, the marriage rate for males increased and the rate for females decreased. The rates for persons 45 and over have dropped slightly.

Table 3.5  
Number of Marriages and Marriage Rates<sup>1</sup> by Age and Sex  
Michigan Occurrences, 1977 and 1987

AGE IN YEARS	MALES			FEMALES		
	RATE 1977	NUMBER OF MARRIAGES 1987	RATE 1987	RATE 1977	NUMBER OF MARRIAGES 1987	RATE 1987
Under 20 <sup>2</sup>	20.2	2,959	7.9	47.7	8,000	22.2
20 - 24	94.6	21,564	56.1	85.3	26,515	69.0
25 - 34	44.4	31,979	41.4	28.9	26,792	33.9
35 - 44	16.0	10,670	17.1	13.8	8,488	13.1
45 or Over	6.1	7,242	5.7	3.6	4,616	3.0
Not Stated	000	4	000	000	7	000
Total	19.2	74,418	16.6	18.6	74,418	15.8
Median Age at Last Birthday	27			25		

<sup>1</sup> Number of persons married per 1,000 population.

<sup>2</sup> 15 - 19 population used to obtain rate.

The distribution of marriages by the age of bride and groom is shown in Table 3.6.

## REMARRIAGES

Between 1977 and 1987 the percent of all marriages that were remarriages increased from 30.5 to 33.0 for brides and from 32.9 to 33.9 for grooms (Tables 3.7 and 3.8). The proportion of all marriages which are remarriages is displayed graphically in Figure 3.2 for the period 1960-1987. 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 6.3 percent between 1977 and 1987, while the number of brides who had

been married at least three times previously increased by 4.9 percent. Total remarriages for grooms decreased by 11.1 percent and third or higher order marriages increased in frequency by 6.6 percent between 1977 and 1987 (Tables 3.9 and 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 both brides and grooms. Note, however, the upward shift between 1977 and 1987 in the age distribution for second and lower order marriages for brides, and third and lower order marriages for grooms.

Table 3.6  
Marriages by Age of Bride and Age of Groom  
Michigan Occurrences, 1987

AGE OF GROOM	AGE OF BRIDE													
	UNDER		20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 AND OVER	NOT STATED
	TOTAL	20												
Total	74,418	8,000	26,515	17,747	9,045	5,275	3,213	1,840	973	568	540	366	329	7
Under 20	2,959	2,160	705	67	20	5	2	-	-	-	-	-	-	-
20 - 24	21,564	4,708	13,994	2,272	428	119	34	8	-	1	-	-	-	-
25 - 29	20,947	892	8,998	8,490	1,960	471	100	27	7	-	-	-	-	2
30 - 34	11,032	173	2,035	4,319	3,101	1,056	287	44	7	5	2	1	-	2
35 - 39	6,480	43	536	1,689	2,006	1,513	528	137	24	3	1	-	-	-
40 - 44	4,190	13	156	611	964	1,182	882	316	56	7	2	1	-	-
45 - 49	2,561	8	62	196	382	554	690	505	128	30	3	1	1	1
50 - 54	1,510	3	11	63	110	220	382	377	266	54	16	7	1	-
55 - 59	1,108	-	9	23	50	100	177	260	237	163	72	15	2	-
60 - 64	848	-	7	9	20	41	84	100	156	174	181	61	15	-
65 - 69	537	-	1	6	3	10	32	37	58	82	152	112	44	-
70 or Over	678	-	-	2	1	3	15	29	34	49	111	168	266	-
Not Stated	4	-	1	-	-	1	-	-	-	-	-	-	-	2

Table 3.7  
Age at First Marriage and Remarriage: Bride  
Michigan Occurrences, 1977 and 1987

AGES	1977				1987			
	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED
Under 20 . .	22,654	22,341	299	14	8,000	7,923	76	1
Percent .	26.3	37.3	1.1	63.6	10.8	15.9	0.3	14.3
20 - 24 . . .	33,317	28,893	4,419	5	26,515	24,632	1,882	1
Percent .	38.7	48.3	16.8	22.7	35.6	49.4	7.7	14.3
25 - 29 . . .	12,885	6,348	6,535	2	17,747	12,549	5,198	-
Percent .	15.0	10.6	24.9	9.1	23.8	25.2	21.1	-
30 - 34 . . .	6,182	1,377	4,805	-	9,045	3,421	5,623	1
Percent .	7.2	2.3	18.3	-	12.2	6.9	22.9	14.3
35 - 44 . . .	5,795	558	5,236	1	8,488	1,112	7,375	1
Percent .	6.7	0.9	20.0	4.5	11.4	2.2	30.0	14.3
45 or Over .	5,254	315	4,939	1	4,616	190	4,423	3
Percent .	6.1	0.5	18.8	-	6.2	0.4	18.0	42.9
Not Stated .	1	-	1	-	7	4	3	-
Percent .	0.0	-	0.0	-	0.0	0.0	0.0	-
Total . . . . .	86,088	59,832	26,234	22	74,418	49,831	24,580	7
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	18	25	23	34	44

Table 3.8  
Age at First Marriage and Remarriage: Groom  
Michigan Occurrences, 1977 and 1987

AGES	1977				1987			
	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED	TOTAL	FIRST MARRIAGE	RE-MARRIAGE	NOT STATED
Under 20 . .	9,514	9,481	24	9	2,959	2,953	6	-
Percent . .	11.1	16.4	0.1	50.0	4.0	6.0	0.0	-
20 - 24 . . .	34,558	32,269	2,283	6	21,564	20,839	723	2
Percent . .	40.1	55.9	8.1	33.3	29.0	42.3	2.9	40.0
25 - 29 . . .	17,977	11,706	6,270	1	20,947	17,241	3,706	-
Percent . .	20.9	20.3	22.1	5.6	28.1	35.0	14.7	-
30 - 34 . . .	8,431	2,653	5,777	1	11,032	5,755	5,276	1
Percent . .	9.8	4.6	20.4	5.6	14.8	11.7	20.9	20.0
35 - 44 . . .	7,746	1,071	6,674	1	10,670	2,081	8,588	1
Percent . .	9.0	1.9	23.6	5.6	14.3	4.2	34.1	20.0
45 or Over .	7,860	556	7,304	-	7,242	345	6,896	1
Percent . .	9.1	1.0	25.8	-	9.7	0.7	27.4	20.0
Not Stated .	2	1	1	-	4	1	3	-
Percent . .	0.0	0.0	0.0	-	0.0	0.0	0.0	-
Total . . . . .	86,088	57,737	28,333	18	74,418	49,215	25,198	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	20	27	25	37	33

FIGURE 3.2  
PERCENT OF ALL MARRIAGES THAT ARE REMARRIAGES,  
MICHIGAN OCCURRENCES, 1960-1987

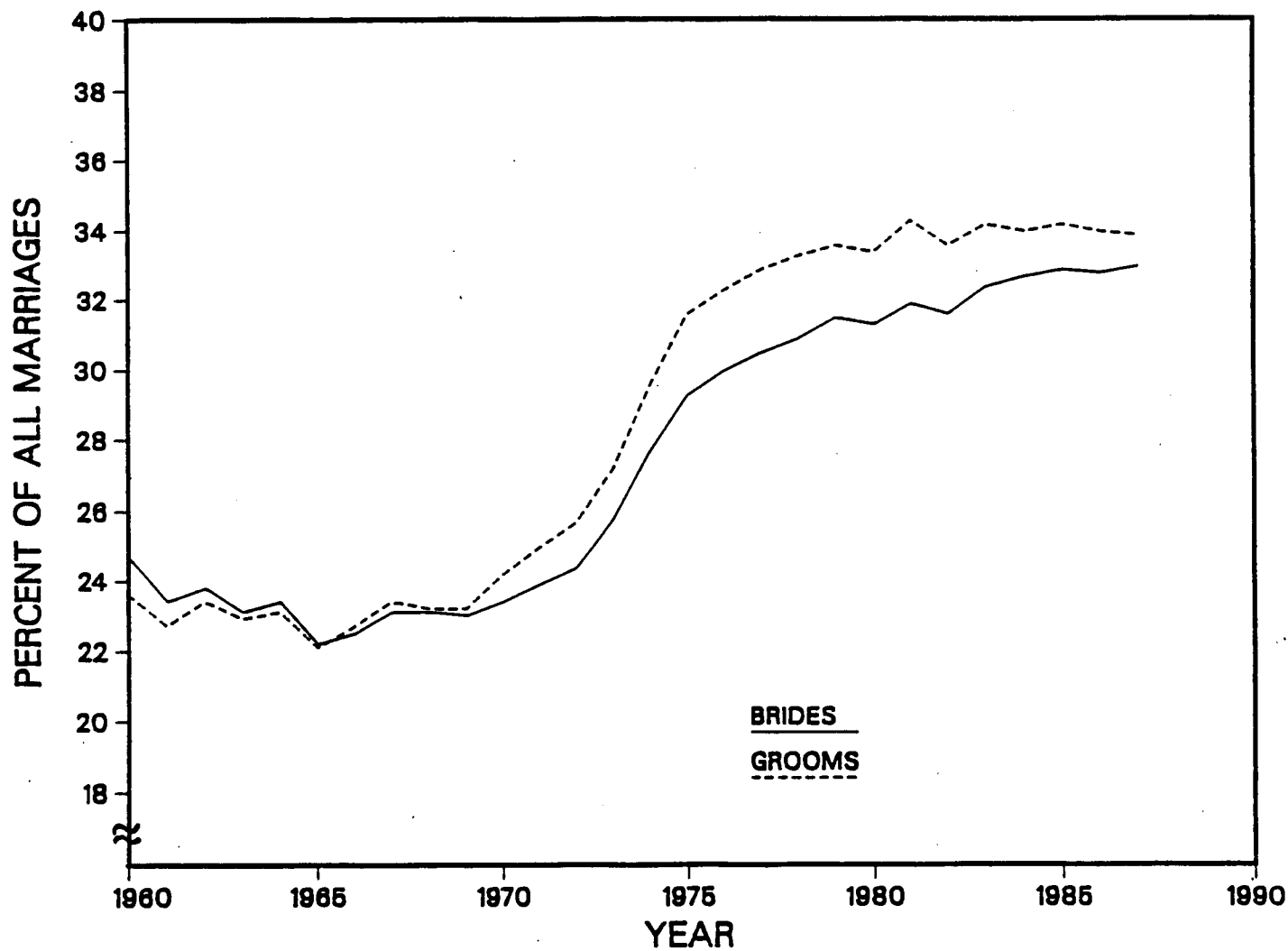


Table 3.9  
Remarriages of Brides by Age and Order of Marriage  
Michigan Occurrences, 1977 and 1987

AGES	1977				1987			
	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 . .	86,088	20,911	4,346	977	74,418	18,996	4,463	1,121
Under 20 . .	22,654	294	5	-	7,994	74	2	-
20 - 24 . . .	33,317	4,224	181	14	26,515	1,826	53	3
25 - 29 . . .	12,885	5,709	741	85	17,747	4,696	472	30
30 - 34 . . .	6,182	3,785	871	149	9,045	4,442	989	192
35 - 39 . . .	3,499	2,203	716	195	5,275	3,150	1,016	246
40 - 44 . . .	2,296	1,402	558	162	3,213	1,901	815	247
45 or Over .	5,254	3,293	1,274	372	4,616	2,904	1,116	403
Not Stated .	1	1	-	-	7	3	-	-
Median Age at Last Birthday	23	30	38	41	25	33	38	41

Table 3.10  
Remarriages of Grooms by Age and Order of Marriage  
Michigan Occurrences, 1977 and 1987

AGES	1977				1987			
	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 . .	86,088	22,729	4,681	923	74,418	19,224	4,808	1,166
Under 20 . .	9,514	22	1	1	2,959	6	-	-
20 - 24 . . .	34,558	2,224	58	1	21,564	708	15	-
25 - 29 . . .	17,977	5,764	476	30	20,947	3,491	204	11
30 - 34 . . .	8,431	4,753	919	105	11,032	4,462	735	79
35 - 39 . . .	4,697	2,990	822	137	6,480	3,618	1,032	200
40 - 44 . . .	3,049	1,892	680	153	4,190	2,490	980	268
45 or Over .	7,860	5,084	1,724	496	7,242	4,447	1,841	608
Not Stated .	2	-	1	-	4	2	1	-
Median Age at Last Birthday	25	34	40	45	27	36	41	45



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 remained the same. For grooms the median age increased two years for first and second marriages, one year for third marriages and stayed the same for 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 1977 and 1987 by 58.5 percent for females and 68.4 percent for males. The number of brides between ages 25 and 29 who had previously been married decreased by 20.5 percent between 1977 and 1987, while that of grooms declined 40.9 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 40.9 percent for females and 28.7 percent for males. For females and males 45 and over the number of remarriages declined.

The most frequent age interval for remarriage among males was 45 years of age or older in 1977 and 35-44 years of age in 1987 (Table 3.7 and 3.8). Among females in 1977 the most frequent age interval for remarriage was 25-29 years of age. It was 35-44 years of age in 1987.

## 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 direct-

ly 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 an increase followed by a decline in both the number and rate of first marriages between 1977 and 1987. Over the eleven years the number of first marriages dropped 16.7 percent for women and 14.8 percent for men. The rate of first marriages dropped by 17.2 percent for women and 14.7 percent for men. For men and women, the number and rate of first marriages increased between 1977 and 1979, and then generally fell between the years 1980 and 1987 (Tables 3.11, 3.12, 3.13 and 3.14).

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, and the decline has been consistent over the period 1977-1987. The number of first marriages in the under 20 age group dropped by 64.5 percent for brides and by 68.9 percent for grooms between 1977 and 1987 while the corresponding rate of first marriages dropped 56.3 percent for brides and 62.6 percent for grooms. The number and rate of first marriages also 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 39. Between 1977 and 1987 the number of first marriages increased by 47.3 percent, 116.9 percent, 118.1 percent and 39.5 percent for grooms aged 25-29, 30-34, 35-39 and 40-44 years respectively. For brides the comparable figures were 97.7 percent, 148.4 percent, 124.2 percent and 43.9 percent. Since 1977 the number of first marriages has declined for persons aged 45 or over.

Table 3.11  
First Marriages by Age of Bride  
Michigan Occurrences, 1977 - 1987

AGE OF BRIDE	YEAR										
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
All Ages	59,832	60,956	61,281	59,656	58,006	54,746	53,282	54,372	52,994	52,312	49,831
15 - 19 Years <sup>1</sup>	22,341	20,858	19,531	17,541	15,723	13,884	12,657	11,465	10,133	9,388	7,923
20 - 24 Years	28,893	30,356	31,260	30,620	29,931	28,100	26,934	27,945	26,872	25,938	24,632
25 - 29 Years	6,348	7,412	8,059	8,895	9,466	9,776	10,331	11,174	11,764	12,416	12,549
30 - 34 Years	1,377	1,469	1,595	1,781	2,029	2,117	2,428	2,752	3,059	3,286	3,421
35 - 39 Years	385	418	402	415	449	488	558	651	713	856	863
40 - 44 Years	173	165	166	160	160	166	167	187	211	218	249
45 - 49 Years	118	104	110	95	82	73	88	69	95	94	75
50 or Over	197	173	156	149	165	138	116	127	145	114	115
Not Stated	-	1	2	-	1	4	3	2	2	2	4

<sup>1</sup> Brides under age 15 included in age 15 - 19.

Table 3.12  
First Marriages by Age of Groom  
Michigan Occurrences, 1977 - 1987

AGE OF GROOM	YEAR										
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
All Ages	57,737	58,806	59,356	57,840	56,017	53,134	51,891	53,293	52,004	51,372	49,215
15 - 19 Years	9,481	8,267	7,906	6,810	6,070	5,309	4,794	4,330	3,706	3,454	2,953
20 - 24 Years	32,269	32,900	32,501	31,256	29,698	27,303	25,467	25,374	23,972	22,700	20,839
25 - 29 Years	11,706	13,026	13,924	14,654	14,834	14,887	15,544	16,455	16,869	17,298	17,241
30 - 34 Years	2,653	2,996	3,360	3,580	3,790	4,025	4,286	5,147	5,201	5,658	5,755
35 - 39 Years	747	797	837	816	879	956	1,074	1,228	1,456	1,504	1,629
40 - 44 Years	324	297	332	292	279	280	321	352	386	393	452
45 - 49 Years	198	183	160	170	167	137	152	140	164	152	157
50 or Over	358	340	335	262	297	237	246	263	247	211	188
Not Stated	1	-	1	-	3	-	7	4	3	2	1

Table 3.13  
First Marriage Rates<sup>1</sup> by Age of Bride  
Michigan Occurrences, 1977 - 1987

AGE OF BRIDE	YEAR										
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
All Ages	12.8	12.9	12.9	12.6	12.7	11.9	11.7	11.7	11.4	11.1	10.6
15 - 19 Years <sup>2</sup>	50.4	46.9	43.8	39.3	43.9	40.8	39.2	30.5	27.3	25.7	22.0
20 - 24 Years	67.1	69.1	69.8	67.6	77.0	74.8	74.3	69.6	68.0	66.5	64.1
25 - 29 Years	16.8	19.1	20.1	21.8	22.9	23.6	24.9	27.1	28.8	30.6	31.2
30 - 34 Years	4.2	4.3	4.5	4.9	5.4	5.6	6.3	7.4	8.1	8.5	8.8
35 - 39 Years	1.4	1.5	1.4	1.4	1.3	1.4	1.6	2.0	2.1	2.5	2.5
40 - 44 Years	0.7	0.7	0.7	0.7	0.6	0.6	0.6	0.7	0.8	0.8	0.8
45 - 49 Years	0.5	0.4	0.5	0.4	0.4	0.3	0.4	0.3	0.4	0.4	0.3
50 or Over	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

<sup>1</sup> Number of persons married per 1,000 population.

<sup>2</sup> Brides under 15 included in age 15 - 19.

Table 3.14  
First Marriage Rates<sup>1</sup> by Age of Groom  
Michigan Occurrences, 1977 - 1987

AGE OF GROOM	YEAR										
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
All Ages	12.9	13.1	13.2	12.8	12.8	12.3	12.1	12.3	11.8	11.5	11.0
15 - 19 Years	21.1	18.3	17.4	15.0	16.4	15.1	14.3	12.3	9.7	9.1	7.9
20 - 24 Years	78.8	78.1	75.0	70.8	78.6	74.7	72.2	69.5	61.7	58.7	54.2
25 - 29 Years	31.7	34.2	35.5	36.7	36.7	36.8	38.3	40.6	42.2	43.6	43.8
30 - 34 Years	8.4	9.1	9.9	10.3	10.3	10.8	11.4	13.9	14.0	15.1	15.2
35 - 39 Years	2.8	3.0	3.0	2.9	2.7	2.9	3.2	3.7	4.5	4.5	4.8
40 - 44 Years	1.4	1.3	1.4	1.3	1.1	1.1	1.2	1.3	1.5	1.4	1.6
45 - 49 Years	0.9	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7
50 or Over	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.2	0.2	0.2

<sup>1</sup> Number of persons married per 1,000 population.

## MEDIAN AGE AT FIRST MARRIAGE

The median age at first marriage declined for both brides and grooms between 1953 and the mid-1960's. This 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 1987.

The median age at first marriage in 1987 was 23 years 5 months for brides and 25 years 2 months for grooms. The 1987 figures are the highest median ages at first marriage recorded during the period 1953-1987 (Figure 3.3).

## DIVORCES AND ANNULMENTS

The number of reported divorces and annulments reached a record high in 1980, both in Michigan and the nation (Table 3.15). In 1981, the frequency for Michigan declined while the national figure reached another record high. Between 1980 and 1984, the Michigan frequency declined. The number then increased to 39,857 in 1987. The 1987 frequency was 11.5 percent below the 1980 frequency and 0.8 percent greater than the 1986 frequency. Nationally, the provisional number of divorces declined in 1987 to 4.6 percent below the record high figure set in 1981.

The number of divorces and annulments reported for Michigan in 1987 was 2.4 times the number for 1960. Between 1960 and 1970 the number of divorces and annulments increased by 80.0 percent. Between 1970 and 1975 the number of divorces and annulments increased by 36.0 percent, and from 1975 to 1980 the increase was 10.0 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 1987.

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. 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 1986. This is the same as the rate for 1987.

The national rates generally followed the same pattern, reaching a provisional rate of 9.6 in 1987. Michigan's divorce rate was higher than that for the United States each year from 1900 through 1947. In the following 40 years the Michigan divorce rate has been at or below the national rate 33 times, including each of the past 18 years (Table 3.15 and Figure 3.4). The lowest national rate was 1.5 in 1900. The highest national divorce rate during this century was recorded in 1979 and again in 1981 (10.6).

The number of children under 18 of couples dissolving marriages in 1987 was at least 39,321 (Table 3.16). This is 16.9 percent below the number in 1977. 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 3.17). It declined to 14.8 in 1984, increased to 15.7 in 1986 and then decreased again to 14.8 in 1987.

The average number of children per divorce has, nonetheless, dropped from 1.36 children

FIGURE 3.3  
MEDIAN AGE AT FIRST MARRIAGE BY SEX,  
MICHIGAN OCCURRENCES, 1953-1987

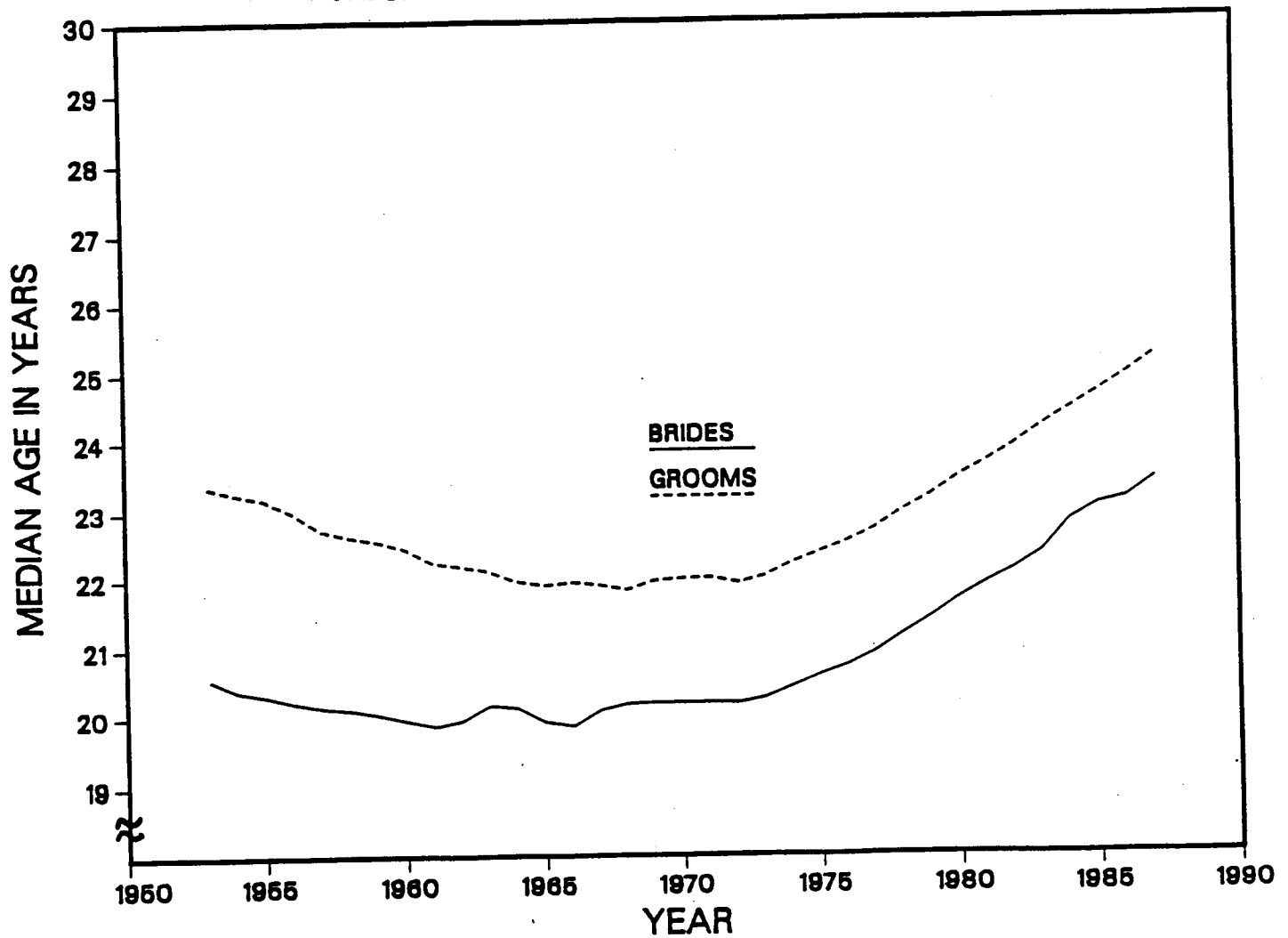


Table 3.15  
**Number of Divorces and Annulments**  
**Divorce and Annulment Rates<sup>1</sup>**  
**Michigan and United States Occurrences**  
**Selected Years, 1900 - 1987**

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 <sup>2</sup>	8.8 <sup>2</sup>
1,036,000	9.6	1975	40,782	9.0
1,083,000	10.0	1976	43,101	9.5
1,091,000	10.0	1977	43,036	9.4
1,130,000	10.2	1978	45,029	9.8
1,181,000	10.6	1979	44,242	9.6
1,189,000	10.4	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
1,159,000Pr.	9.6Pr.	1986	39,553	8.7
1,157,000Pr.	9.6Pr.	1987	39,857	8.7

<sup>1</sup> Number of persons whose marriages ended in divorce or annulment per 1,000 population.

<sup>2</sup> Estimate.



Table 3.16  
**Divorces and Annulments by Children Under 18 Present**  
Michigan Occurrences, 1977 and 1987

NUMBER OF CHILDREN	DIVORCES AND ANNULMENTS				ESTIMATED TOTAL CHILDREN (MINIMUM) <sup>1</sup>	
	NUMBER		PERCENT		1977	1987
	1977	1987	1977	1987		
Zero	17,829	14,304	41.4	35.9	-	-
One	10,510	9,835	24.4	24.7	10,510	9,835
Two	8,891	8,633	20.7	21.7	17,782	17,266
Three	3,697	2,843	8.6	7.1	11,091	8,529
Four	1,259	646	2.9	1.6	5,036	2,584
Five or More	580	206	1.3	0.5	2,900	1,107
Not Stated	270	3,390	0.6	8.5	-	-
Total	43,036	39,857	100.0	100.0	47,319	39,321

<sup>1</sup> Total children for marriages involving 6 or more children under 18 is not available.

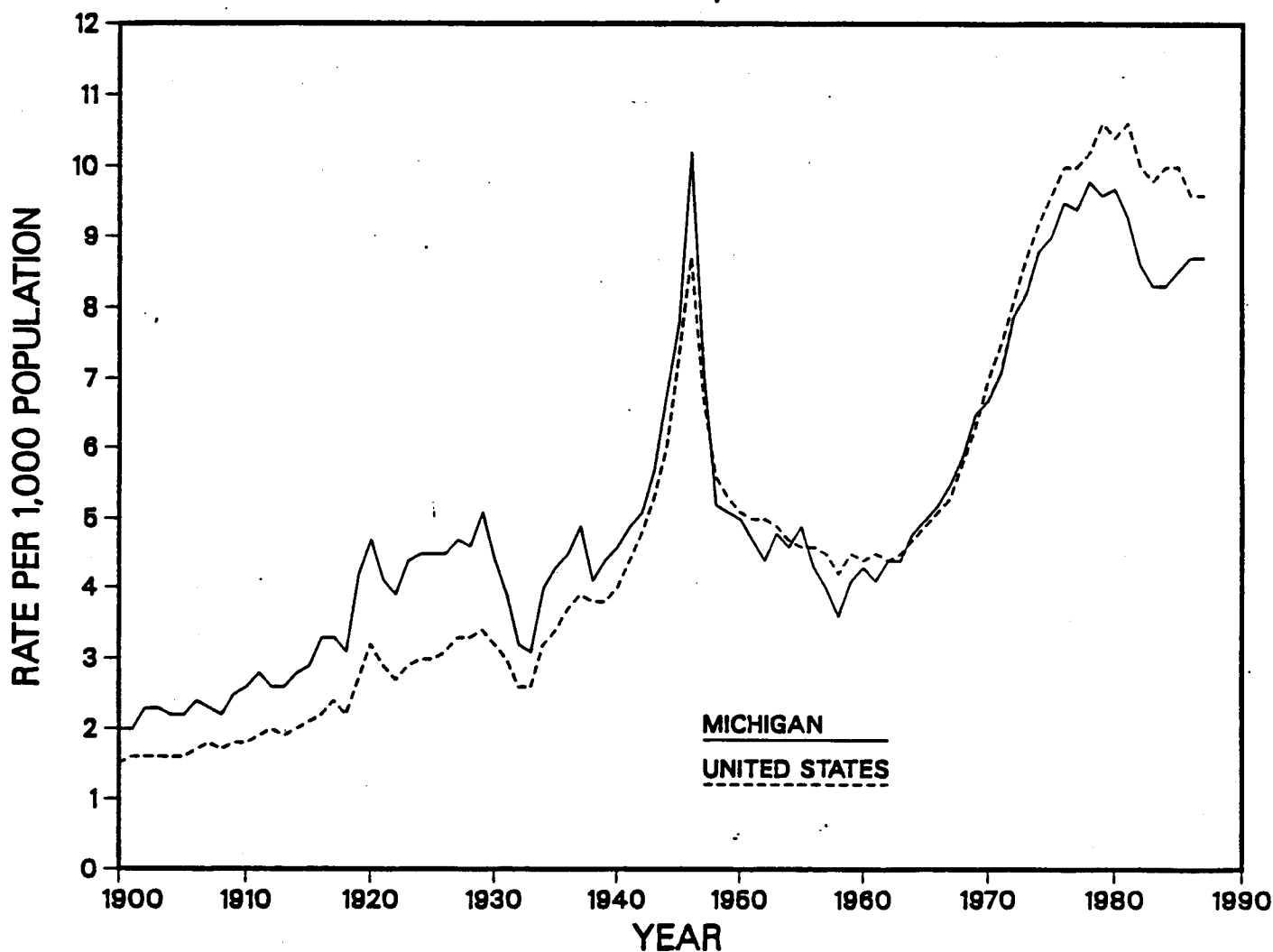
in 1970 to 1.00 in 1987. The decline primarily reflects a decline in the proportion of divorces involving three or more children. It should be noted that Michigan live birth data indicate that there has been a decline in the relative proportion of women having third or higher order live births over the past decade. Data for the United States indicate a similar pattern.

The majority of husbands and wives divorced in 1987 in Michigan were from 25 to 39 years of age (Table 3.18). The median age for husbands was 35 years and 2 months, while the median age for wives was 29 months younger (32 years and 9 months). Wives under 25 years of age accounted for 13.6 percent of wives divorced compared to

only 7.5 percent of the husbands. Conversely, 5.8 percent of the wives were 50 years of age or over compared to 9.7 percent of the husbands.

In 10.1 percent of the marriages dissolved in Michigan in 1987 the couple separated less than one year after the marriage took place. In 42.0 percent of the marriages ended by divorce or annulment the separation took place within five years of the date of marriage (Table 3.19). The median duration of marriage at the time of dissolution was 7 years and 5 months. For over fifty percent of the marriages ended by divorce or annulment in 1987, the length of time between the date of separation and the date of dissolution was 12 months or less.

FIGURE 3.4  
DIVORCE RATES, MICHIGAN AND UNITED STATES<sup>1</sup>  
OCCURRENCES, 1900-1987



<sup>1</sup>United States rates for 1986-1987 are provisional.

Table 3.17  
**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 - 1987**

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 <sup>1</sup>	—	—	—
39,321	1.00	14.8	1987	—	—	—

<sup>1</sup> There were 3,390 records on which the number of children under 18 years of age was not stated, compared to 3,019 in 1986.

Table 3.18  
**Divorces and Annulments by Age of Husband and Wife  
at Time of Decree**  
Michigan Occurrences, 1987

AGE	HUSBAND		WIFE	
	NUMBER	PERCENT <sup>1</sup>	NUMBER	PERCENT <sup>1</sup>
Total	39,857	100.0	39,857	100.0
Under 20	80	0.2	396	1.0
20 - 24	2,906	7.3	5,028	12.6
25 - 29	7,120	17.9	8,058	20.2
30 - 34	7,665	19.2	7,556	19.0
35 - 39	6,552	16.4	5,942	14.9
40 - 44	4,796	12.0	3,985	10.0
45 - 49	2,852	7.2	2,163	5.4
50 - 54	1,710	4.3	1,096	2.7
55 - 59	1,006	2.5	560	1.4
60 - 64	587	1.5	362	0.9
65 - 69	328	0.8	172	0.4
70 - 74	134	0.3	71	0.2
75 +	114	0.3	52	0.1
Unknown	4,007	10.1	4,416	11.1
Median Age	35 Years, 2 Months		32 Years, 9 Months	

<sup>1</sup> Based on records with known age only.

Table 3.19  
**Divorces and Annulments by Duration of Marriage**  
**at Time of Separation and at Time of Dissolution**  
Michigan Occurrences, 1987

DURATION IN YEARS	AT TIME OF SEPARATION		AT TIME OF DISSOLUTION	
	NUMBER	PERCENT <sup>1</sup>	NUMBER	PERCENT <sup>1</sup>
Less Than 1	4,019	10.1	1,152	2.9
1 - 4	12,696	31.9	12,240	30.7
5 - 9	8,528	21.4	11,103	27.9
10 - 14	4,610	11.6	6,028	15.1
15 - 19	3,039	7.6	4,159	10.4
20 - 24	1,711	4.3	2,516	6.3
25 - 29	834	2.1	1,261	3.2
30 - 34	413	1.0	646	1.6
35 - 39	171	0.4	321	0.8
40 - 44	56	0.1	141	0.4
45 - 49	18	0.0	55	0.1
50 +	5	0.0	13	0.0
Unknown	3,757	9.4	222	0.6
Total	39,857	100.0	39,857	100.0
Median Duration	5 Years, 7 Months		7 Years, 5 Months	

<sup>1</sup> Based on records with known duration only.

# REFERENCE APPENDIX

## SECTION IV


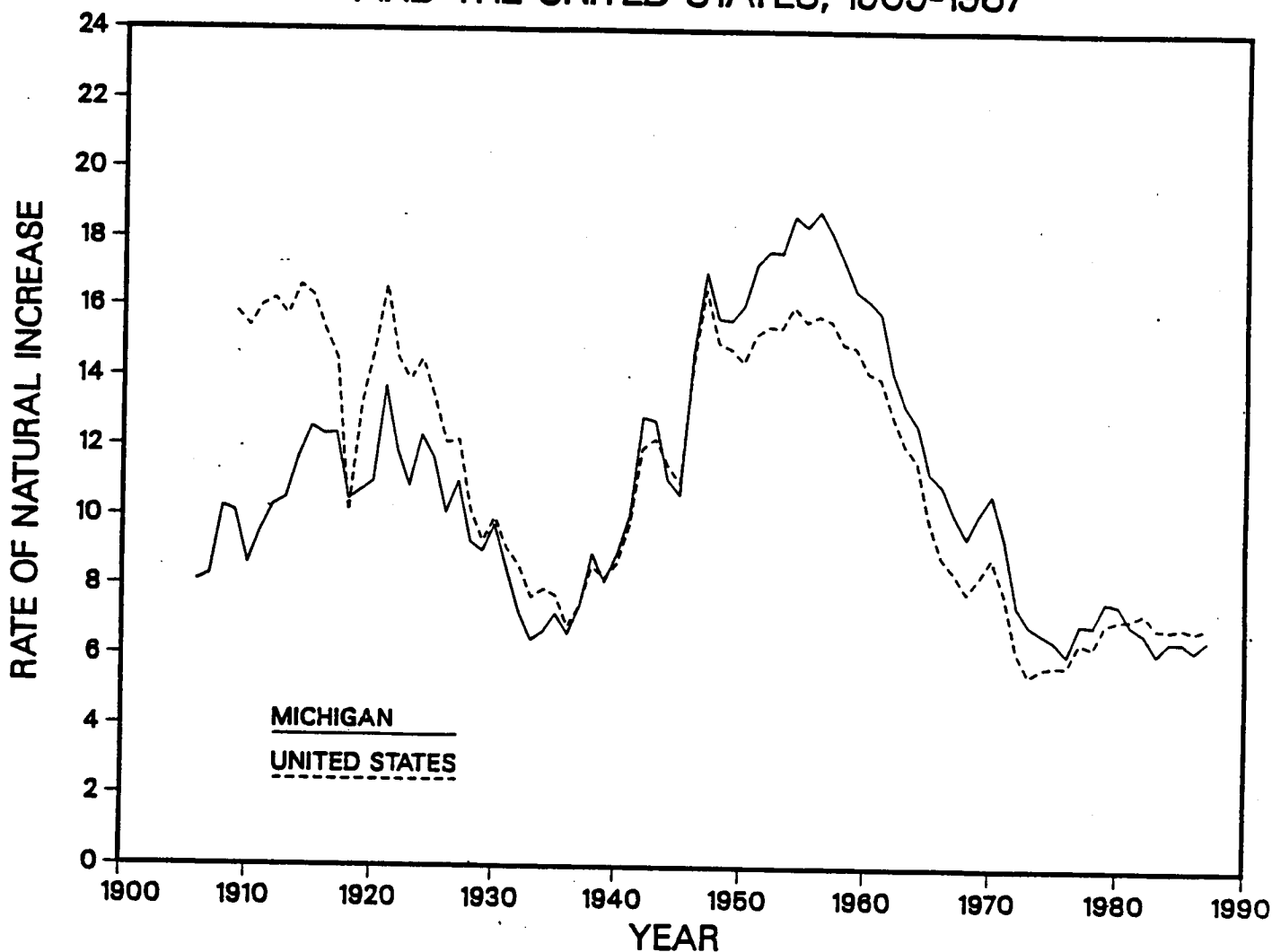




FIGURE 4.1  
RATE OF NATURAL INCREASE,<sup>1</sup> MICHIGAN, 1906-1987,  
AND THE UNITED STATES, 1909-1987<sup>2</sup>



<sup>1</sup> Excess of live births over deaths per 1,000 population.

<sup>2</sup> 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.



POPULATION, LIVE BIRTHS, DEATHS (ALL AGES, INFANT, NEONATAL, POSTNEONATAL, PERINATAL, FETAL, AND MATERNAL), MARRIAGES AND DIVORCES, MICHIGAN, 1900-1987

(Deaths exclusive of fetal deaths. Perinatal deaths include deaths under 1 week and fetal deaths. Divorces include annulments.)

Year	Population <sup>1</sup>	Live Births	DEATHS							Marriages	Divorces
			All Ages	Under 1 Year	Under 28 Days <sup>2</sup>	28-364 Days	Peri-natal	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	5,948				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				3,589	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	4,119	2,969	6,791	3,703	636	49,788	9,400
1925	4,255,347	98,983	49,417	7,498	4,022	3,476	6,667	3,670	629	46,276	9,650
1926	4,372,734	98,289	54,080	7,620	4,054	3,566	6,773	3,816	631	39,788	9,795
1927	4,490,121	99,940	50,600	6,766	3,915	2,851	6,794	3,834	667	36,276	10,617
1928	4,607,508	97,462	54,755	6,806	3,739	3,067	6,594	3,701	603	37,300	10,615
1929	4,724,895	98,695	56,117	6,605	3,777	2,828	6,613	3,710	617	36,816	12,094
1930	4,842,325	98,882	51,561	6,213	3,624	2,589	6,518	3,714	597	29,482	10,639
1931	4,883,703	90,547	49,068	5,187	3,084	2,103	5,643	3,220	539	28,856	9,507
1932	4,925,081	85,254	49,569	4,630	2,798	1,832	5,210	2,980	493	28,552	7,889
1933	4,966,459	80,482	48,507	4,094	2,591	1,503	4,906	2,776	447	33,132	7,671
1934	5,007,837	83,944	50,440	4,377	2,717	1,660	4,781	2,607	450	43,241	10,124
1935	5,049,216	87,403	51,051	4,170	2,550	1,620	4,832	2,717	438	45,313	10,844
1936	5,090,594	88,457	54,777	4,479	2,647	1,832	4,726	2,625	425	47,023	11,419
1937	5,131,972	91,566	53,468	4,374	2,700	1,674	4,919	2,707	326	47,954	12,472
1938	5,173,350	96,962	50,678	4,319	2,734	1,585	4,984	2,732	345	30,105	10,646
1939	5,214,728	94,432	52,017	3,952	2,594	1,358	4,706	2,572	280	37,725	11,589
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

TABLE 4.1 (continued)

Year	Population <sup>1</sup>	Live Births	DEATHS							Marriages	Divorces
			All Ages	Under 1 Year	Under 28 Days <sup>2</sup>	28-364 Days	Peri-natal	Fetal	Maternal		
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	2,213	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	21,133
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	16,017
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	67,812	4,702	3,580	1,122	6,247	3,008	75	61,090	16,656
1961	7,903,000	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	90,984	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 <sup>3</sup>
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	75,801	1,978	1,424	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
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

<sup>1</sup> - 1971-1979 population estimates have been revised by the U.S. Census Bureau.  
<sup>2</sup> - For years prior to 1950 deaths under 1 month of age are included in deaths under 28 days.  
<sup>3</sup> - Estimate

LIVE BIRTH RATES, DEATH RATES (ALL AGES, INFANT, NEONATAL, POSTNEONATAL, PERINATAL, AND MATERNAL), FETAL DEATH RATIOS, MARRIAGE AND DIVORCE RATES, MICHIGAN, 1900-1987

(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							PERSONS	
		All Ages	Under 1 Year	Under 28 Days	28-364 Days	Peri-natal	Fetal	Maternal	Married	Divorced
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				40.2	91.8	19.3	2.2
1905	18.0	13.3	150.2				43.5	88.6	20.1	2.2
1906	22.1	14.0	135.7				40.2	68.3	20.7	2.4
1907	21.9	13.6	117.0				39.9	66.2	20.7	2.3
1908	23.7	13.5	118.8				41.6	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	41.9	30.2	66.7	37.7	64.8	24.1	4.5
1925	23.3	11.6	75.7	40.6	35.1	64.9	37.1	63.5	21.7	4.5
1926	22.5	12.4	77.5	41.2	36.3	66.3	38.8	64.2	18.7	4.5
1927	22.3	11.3	67.7	39.2	28.5	65.5	38.4	66.7	16.2	4.7
1928	21.2	11.9	69.8	38.4	31.5	65.2	38.0	61.9	16.2	4.6
1929	20.9	11.9	66.9	38.3	28.7	64.6	37.6	62.5	15.6	5.1
1930	20.4	10.6	62.8	36.6	26.2	63.5	37.6	60.4	12.2	4.4
1931	18.5	10.1	57.3	34.1	23.2	60.2	35.6	59.5	11.8	3.9
1932	17.3	10.1	54.3	32.8	21.5	59.0	35.0	57.8	11.6	3.2
1933	16.2	9.8	50.9	32.2	18.7	58.9	34.5	55.5	13.3	3.1
1934	16.8	10.1	52.1	32.4	19.8	55.2	31.1	53.6	17.3	4.0
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

TABLE 4.2 (continued)

Year	Live Births	DEATHS							PERSONS	
		All Ages	Under 1 Year	Under 28 Days*	28-364 Days	Peri-natal	Fetal	Maternal	Married	Divorced
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	18.9	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	17.5	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
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
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

\*-1971-1979 birth, death, marriage and divorce rates have been recalculated using revised population estimates.  
 -For years prior to 1950 deaths under 1 month of age are included in deaths under 28 days.  
 -Estimate.

TABLE 4.3  
NUMBER OF LIVE BIRTHS BY AGE OF MOTHER, MICHIGAN RESIDENTS, 1920-1987

YEAR	AGE OF MOTHER								AGE NOT STATED	
	ALL AGES <sup>1</sup>	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	10,486	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	58,012	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	192,332	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)

YEAR	AGE OF MOTHER										AGE NOT STATED
	ALL AGES <sup>1</sup>	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	14,508	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	22,593	47,161	41,412	14,893	4,053	799	47	16	
1977	138,416	426	22,585	49,740	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	

<sup>1</sup> 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, 1920-1987

(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+
1920	0.2	55.7	173.1	164.0	124.2	83.8	34.3	3.8
1921	0.2	56.9	167.3	165.5	125.8	84.8	32.8	3.6
1922	0.2	50.8	149.6	149.1	117.3	77.1	30.7	3.5
1923	0.2	52.6	152.6	147.5	116.5	75.4	29.3	3.8
1924	0.2	57.4	160.0	146.1	117.3	76.7	29.9	3.1
1925	0.3	57.4	155.9	145.4	115.2	73.9	28.8	3.5
1926	0.4	56.9	153.3	140.5	109.7	70.1	26.8	3.2
1927	0.3	56.0	153.3	136.8	108.9	68.1	27.0	2.9
1928	0.2	54.8	147.1	130.3	101.5	63.7	25.0	2.6
1929	0.2	55.7	151.5	130.6	93.6	59.6	23.9	2.4
1930	0.3	55.2	145.5	130.2	92.8	58.9	23.7	2.3
1931	0.3	47.8	130.4	118.3	85.3	54.3	21.5	2.3
1932	0.3	43.4	121.5	111.2	79.4	50.8	20.8	2.2
1933	0.2	39.7	111.6	105.2	75.0	47.7	20.0	1.9
1934	0.2	41.0	117.6	108.4	77.8	45.3	18.9	1.8
1935	0.2	43.9	126.2	109.4	77.4	45.5	18.5	2.0
1936	0.2	43.1	129.5	111.4	75.5	43.8	17.3	1.8
1937	0.2	45.9	136.4	113.9	75.9	42.3	15.8	1.6
1938	0.3	47.4	143.9	120.9	78.5	44.4	15.8	1.6
1939	0.2	44.1	135.6	119.6	78.2	42.3	14.0	1.3
1940	0.2	44.9	142.8	126.8	81.5	42.8	13.7	1.2
1941	0.2	48.1	157.8	137.1	81.6	42.5	13.2	1.2
1942	0.3	54.5	186.6	155.3	89.9	44.7	13.4	1.2
1943	0.3	51.6	175.1	159.0	97.1	48.6	14.1	1.1
1944	0.3	44.1	150.5	138.5	93.2	50.6	14.3	1.0
1945	0.3	40.8	135.5	133.4	98.5	52.1	15.4	1.3
1946	0.3	48.3	188.5	165.3	106.2	53.8	15.3	1.2
1947	0.4	69.7	227.3	184.2	108.4	53.6	15.4	1.0
1948	0.4	73.2	215.5	170.0	101.9	49.8	14.2	1.0
1949	0.5	74.6	214.0	171.4	102.5	49.6	14.1	1.0
1950	0.5	74.6	212.0	175.5	106.5	52.3	13.6	0.9
1951	0.4	79.1	229.0	192.2	114.4	53.9	14.1	0.8
1952	0.5	73.5	233.0	202.5	121.7	56.1	14.4	1.1
1953	0.6	76.8	234.5	207.0	125.5	58.7	14.9	0.9
1954	0.7	82.8	246.8	214.1	133.1	61.8	15.6	1.1
1955	0.6	84.1	253.0	218.6	135.4	63.4	16.4	0.9
1956	0.6	87.2	272.4	228.9	138.0	65.0	17.4	0.8
1957	0.6	88.6	277.1	231.8	137.6	66.4	17.0	0.9
1958	0.6	83.6	273.4	221.5	134.3	65.0	17.2	0.9
1959	0.6	77.6	273.3	217.4	128.6	64.4	17.3	0.9

TABLE 4.4 (continued)

Year	AGE OF MOTHER								Total Fertility Rate
	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+	
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	176.2	154.2	76.2	32.4	8.3	0.4	2,584.5
1971	1.0	64.7	161.7	138.6	69.1	27.9	7.2	0.4	2,353.0
1972	1.1	63.7	137.6	124.1	58.6	22.8	5.9	0.4	2,071.0
1973	1.2	62.8	127.5	118.3	54.2	19.9	4.9	0.2	1,845.0
1974	1.1	58.5	121.9	115.7	51.5	16.3	4.1	0.2	1,846.5
1975	1.1	55.3	117.0	112.3	48.4	16.0	3.9	0.2	1,771.0
1976	0.9	51.1	111.6	113.0	46.9	15.0	3.2	0.2	1,709.5
1977	1.0	50.9	115.5	114.9	52.6	15.2	3.1	0.2	1,767.0
1978	0.8	48.3	112.7	112.6	54.0	16.3	3.0	0.2	1,739.5
1979	0.9	47.6	114.6	115.2	56.7	16.6	3.0	0.2	1,774.0
1980	0.8	44.8	113.1	115.6	58.4	16.4	3.1	0.1	1,761.5
1981	0.9	51.4	122.9	112.6	58.9	14.0	2.6	0.2	1,817.5
1982	1.0	51.0	121.4	111.1	59.5	15.6	2.6	0.1	1,811.5
1983	1.0	51.4	115.9	108.5	58.8	15.9	2.8	0.2	1,772.5
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

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 1971-1985 population source, see Technical Notes.



TABLE 4.5  
REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES  
MICHIGAN RESIDENTS, 1900-1987

YEAR	DIPH- THERIA	SMALL- POX	TYPHOID FEVER	WHOOP- ING COUGH	MEASLES	HEPATI- TIS. ALL TYPES	TB* (ALL FORMS)	MENIN- GOCO- CAL INFE- CTIONS	POLIO	SYPHI- LIS	GONOR- RHEA	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	5,077	7,910	
1920	10,360	4,818	1,421	7,171	22,364		4,994	203	67	8,117	11,463	
1921	12,075	4,512	1,837	6,686	3,043		5,708	173	483	7,421	9,774	
1922	8,513	1,230	1,108	5,642	12,107		5,573	159	43	7,900	9,717	
1923	7,725	2,311	982	7,617	30,041		5,471	186	39	10,480	9,597	
1924	6,011	4,527	782	4,364	18,290		5,570	157	647	13,000	10,490	
1925	3,925	784	962	7,576	10,332		5,785	128	99	14,668	10,660	
1926	5,377	549	583	8,776	39,946		5,387	96	107	14,872	10,707	
1927	4,575	1,467	581	6,818	8,303		5,406	138	282	15,713	9,318	
1928	3,724	1,335	390	9,700	27,039		5,885	276	77	15,323	8,592	
1929	4,618	2,410	310	9,340	18,040		6,248	1,864	180	16,606	9,661	
1930	3,206	2,375	504	7,937	28,129		5,128	901	208	16,538	8,554	
1931	1,831	915	424	11,448	6,212		6,132	293	1,137	14,662	7,843	
1932	1,188	222	513	13,091	42,129		7,103	129	112	11,969	6,963	
1933	1,152	46	453	11,720	21,654		6,524	86	93	7,691	6,447	
1934	614	49	486	11,255	6,528		5,264	53	230	6,483	6,188	
1935	645	16	355	13,427	79,061		5,642	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	264	76	120	11,757	20,206		6,063	49	1,228	9,999	7,650	
1941	242	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	

TABLE 4.5 (Continued)

YEAR	DIPH- THERIA	SMALL- POX	TYPHOID FEVER	WHOOP- ING COUGH	MEASLES	HEPATI- TIS, ALL TYPES	TB, <sup>1</sup> (ALL FORMS)	MENIN- <sup>1</sup> GOCOC CAL INFECTIONS	POLIO	SYPHI- LIS	GONOR- RHEA	ACQUIRED IMMUNE DEFICIENCY SYNDROME
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	9,840	
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	1	-	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	
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	-	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	
1981	-	-	26	30	34	1,700	931	93	-	1,053	32,524	2
1982	-	-	14	34	64	1,745	864	81	-	921	32,848	2
1983	-	-	10	43	8	1,788	790	91	-	731	34,065	16
1984	-	-	9	31	464	1,728	661	90	-	749	34,839	42
1985	-	-	8	54	60	1,490	535	107	-	656	33,516	85
1986	-	-	5	35	106	1,266	619	81	-	584	37,929	146
1987	-	-	5	54	42	1,610	540	111	1	621	46,348	224

<sup>1</sup>-Meningococcal infections - Prior to 1952 data were for meningococcal meningitis.

<sup>2</sup>-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, 1900-1987  
(Rates per 100,000 population)

Year	DIPH- THERIA	SMALL- POX	TYPHOID FEVER	WHOOP- ING COUGH	MEASLES	HEPATI- TIS, ALL TYPES	TB, (ALL FORMS)	MENIN- GOCO- CAL INFE- CTIONS	POLIO	SYPHI- LIS	GONOR- RHEA	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	
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	

TABLE 4.6 (continued)

Year	DIPH- THERIA	SMALL- POX	TYPHOID FEVER	WHOOP- ING COUGH	MEASLES	HEPATI- TIS, ALL TYPES	TB, (ALL FORMS)	MENINGO- COCCAL INFECTIONS	POLIO	SYPHI- LIS	GONOR- RHEA	ACQUIRED IMMUNE DEFICIENCY SYNDROME
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	127.7	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	8.1	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	
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	
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

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, 1900-1987  
(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* (all forms)	Polio-myelitis	Syphilis	Gonorrhea		
	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				
1901	502	20.4	312	12.7	27	1.1	645	26.2	163	6.6	79	3.2	2,152	87.5				
1902	504	20.2	277	11.1	42	1.7	608	24.3	289	11.6	238	9.5	2,088	83.6				
1903	686	27.0	200	7.9	29	1.1	606	23.9	383	15.1	176	6.9	2,155	84.9				
1904	515	20.0	210	8.1	26	1.0	641	24.9	148	5.7	194	7.5	2,306	89.5				
1905	478	18.3	123	4.7	74	2.8	636	24.3	131	5.0	123	4.7	2,288	87.5				
1906	472	17.8	227	8.6	3	0.1	721	27.2	469	17.7	251	9.5	2,303	86.8				
1907	421	15.6	159	5.9	8	0.3	594	22.1	223	8.3	256	9.5	2,338	86.8				
1908	343	12.6	194	7.1	11	0.4	687	25.1	305	11.2	121	4.4	2,249	82.3				
1909	395	14.3	275	9.9	4	0.1	653	23.6	217	7.8	270	9.7	2,237	80.7				
1910	495	17.6	297	10.6	121	4.3	654	23.3	318	11.3	251	8.9	2,273	80.9				
1911	473	16.3	208	7.2	7	0.2	551	19.0	254	8.8	200	6.9	2,284	78.9				
1912	465	15.6	186	6.2	3	0.1	534	17.9	252	8.5	118	4.0	2,289	76.8				
1913	676	22.0	283	9.2	5	0.2	538	17.5	292	9.5	258	8.4	2,243	73.1				
1914	507	16.1	177	5.6	2	0.1	400	12.7	304	9.6	180	5.7	2,325	73.7				
1915	354	10.9	107	3.3	5	0.2	353	10.9	236	7.3	101	3.1	2,527	78.0				
1916	507	15.2	177	5.3	2	0.1	424	12.8	228	6.9	363	10.9	2,573	77.4				
1917	851	24.9	340	10.0	9	0.3	386	11.3	360	10.6	259	7.6	2,779	81.5				
1918	686	19.6	181	5.2	18	0.5	337	9.6	496	14.2	270	7.7	3,059	87.5				
1919	764	21.3	179	5.0	10	0.3	272	7.6	172	4.8	183	5.1	2,620	73.1				
1920	888	24.2	305	8.3	14	0.4	297	8.1	511	13.9	436	11.9	2,645	72.1				
1921	954	25.2	334	8.8	12	0.3	285	7.5	316	8.3	58	1.5	2,285	60.4				
1922	620	15.9	217	5.6	20	0.5	192	4.9	232	5.9	232	5.9	2,232	57.2				
1923	675	16.8	304	7.6	13	0.3	202	5.0	323	8.0	258	6.4	2,410	59.9				
1924	470	11.4	255	6.4	226	5.5	149	3.6	169	4.1	221	5.3	2,474	59.8				
1925	358	8.4	208	4.9	22	0.5	157	3.7	260	6.1	69	1.6	2,410	56.6				
1926	677	15.5	235	5.4	4	0.1	119	2.7	355	8.1	577	13.2	2,601	59.5				
1927	516	11.5	168	3.7	-	-	94	2.1	201	4.5	67	1.5	2,514	56.0				
1928	384	8.3	178	3.9	2	0.0	83	1.8	219	4.8	303	6.6	2,647	57.4				
1929	498	10.5	145	3.1	9	0.2	81	1.7	255	5.4	146	3.1	2,685	56.8				
1930	299	6.2	130	2.7	9	0.2	87	1.8	176	3.6	231	4.8	2,443	50.5				
1931	172	3.5	122	2.5	4	0.1	73	1.5	180	3.9	28	0.6	2,263	46.3				
1932	106	2.2	112	2.3	1	0.0	56	1.1	159	4.0	183	3.7	2,101	42.7				
1933	112	2.3	157	3.2	-	-	50	1.0	153	3.1	111	2.2	1,996	40.2				
1934	38	0.8	171	3.4	-	-	65	1.3	141	2.8	36	0.7	1,909	38.1				
1935	58	1.1	98	1.9	-	-	34	0.7	132	2.6	184	3.6	1,741	34.5				
1936	52	1.0	114	2.2	-	-	37	0.7	107	2.1	12	0.2	1,816	35.7				
1937	72	1.4	148	2.9	1	0.0	29	0.6	132	2.6	11	0.2	1,860	36.2				
1938	44	0.9	87	1.7	-	-	23	0.4	116	2.2	100	1.9	1,633	31.6				
1939	25	0.5	69	1.3	-	-	25	0.5	76	1.5	29	0.6	1,651	31.7				
1940	20	0.4	41	0.8	1	0.0	11	0.2	59	1.1	19	0.4	1,547	29.4				
1941	18	0.3	32	0.6	1	0.0	14	0.3	91	1.7	65	0.1	1,532	28.2				
1942	24	0.4	23	0.4	-	-	5	0.1	72	1.3	8	0.1	1,630	29.4				
1943	21	0.4	11	0.2	-	-	9	0.2	101	1.9	89	1.7	1,588	29.5				
1944	32	0.6	7	0.1	1	0.0	7	0.1	33	0.6	49	0.9	1,544	28.7				
1950	495	17.6	297	10.6	121	4.3	654	23.3	318	11.3	251	8.9	2,273	80.9				
1951	473	16.3	208	7.2	7	0.2	551	19.0	254	8.8	200	6.9	2,284	78.9				
1952	465	15.6	186	6.2	3	0.1	534	17.9	252	8.5	118	4.0	2,289	76.8				
1953	676	22.0	283	9.2	5	0.2	538	17.5	292	9.5	258	8.4	2,243	73.1				
1954	507	16.1	177	5.6	2	0.1	400	12.7	304	9.6	180	5.7	2,325	73.7				
1955	354	10.9	107	3.3	5	0.2	353	10.9	236	7.3	101	3.1	2,527	78.0				
1956	507	15.2	177	5.3	2	0.1	424	12.8	228	6.9	363	10.9	2,573	77.4				
1957	851	24.9	340	10.0	9	0.3	386	11.3	360	10.6	259	7.6	2,779	81.5				
1958	686	19.6	181	5.2	18	0.5	337	9.6	496	14.2	270	7.7	3,059	87.5				
1959	764	21.3	179	5.0	10	0.3	272	7.6	172	4.8	183	5.1	2,620	73.1				
1960	888	24.2	305	8.3	14	0.4	297	8.1	511	13.9	436	11.9	2,645	72.1				
1961	954	25.2	334	8.8	12	0.3	285	7.5	316	8.3	58	1.5	2,285	60.4				
1962	620	15.9	217	5.6	20	0.5	192	4.9	232	5.9	232	5.9	2,232	57.2				
1963	675	16.8	304	7.6	13	0.3	202	5.0	323	8.0	258	6.4	2,410	59.9				
1964	470	11.4	255	6.4	226	5.5	149	3.6	169	4.1	221	5.3	2,474	59.8				
1965	358	8.4	208	4.9	22	0.5	157	3.7	260	6.1	69	1.6	2,410	56.6				
1966	677	15.5	235	5.4	4	0.1	119	2.7	355	8.1	577	13.2	2,601	59.5				
1967	516	11.5	168	3.7	-	-	94	2.1	201	4.5	67	1.5	2,514	56.0				
1968	384	8.3	178	3.9	2	0.0	83	1.8	219	4.8	303	6.6	2,647	57.4				
1969	498	10.5	145	3.1	9	0.2	81	1.7	255	5.4	146	3.1	2,685	56.8				
1970	299	6.2	130	2.7	9	0.2	87	1.8	176	3.6	231	4.8	2,443	50.5				
1971	172	3.5	122	2.5	4	0.1	73	1.5	180	3.9	28	0.6	2,263	46.3				
1972	106	2.2	112	2.3	1	0.0	56	1.1	159	4.0	183	3.7	2,101	42.7				
1973	112	2.3	157	3.2	-	-	50	1.0	153	3.1	111	2.2	1,996	40.2				
1974	38	0.8	171	3.4	-	-	65	1.3	141	2.8	36	0.7	1,909	38.1				
1975	58	1.1	98	1.9	-	-	34	0.7	132	2.6	184	3.6	1,741	34.5				
1976	52	1.0	114	2.2	-	-	37	0.7	107	2.1	12	0.2	1,816	35.7				
1977	72	1.4	148	2.9	1	0.0	29	0.6	132	2.6	11	0.2	1,860	36.2				
1978	44	0.9	87	1.7	-	-	23	0.4	116	2.2	100	1.9	1,633	31.6				
1979	25	0.5	69	1.3	-	-	25	0.5	76	1.5	29	0.6	1,651	31.7				
1980	20	0.4	41	0.8	1	0.0	11	0.2	59	1.1	19	0.4	1,547	29.4				
1981	18	0.3	32	0.6	1	0.0	14	0.3	91	1.7	65	0.1	1,532	28.2				
1982	24	0.4	23	0.4	-	-	5	0.1	72	1.3	8	0.1	1,630	29.4				
1983	21	0.4	11	0.2	-	-	9	0.2	101	1.9	89	1.7	1,588	29.5				
1984	32	0.6	7	0.1	1	0.0	7	0.1	33	0.6	49	0.9	1,544	28.7				
1985	495	17.6	297	10.6	121	4.3	654	23.3	318	11.3	251	8.9	2,273	80.9				
1986	473	16.3	208	7.2	7	0.2	551	19.0	254	8.8	200	6.9	2,284	78.9				
1987	465	15.6	186	6.2	3	0.1	534	17.9	252	8.5	118	4.0	2,289	76.8				
1988	676	22.0	283	9.2	5	0												

TABLE 4.7 (Continued)

Year	Diphtheria		Strep. Sore Throat Incl. Scarlet Fever		Smallpox		Typhoid Fever		Whooping Cough		Measles		TB of the Respiratory System		Tuberculosis <sup>1</sup> (all forms)		Polio-myelitis		Syphilis <sup>2</sup>		Gonorrhea	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
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	-	-	-	-	-	-	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	-	-	-	-	-	-	-	-	-	-	5	0.1	261	3.2	285	3.5	-	-	65	0.8	2	0.0
1966	1	0.0	-	-	-	-	-	-	-	-	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
1970	-	-	-	-	-	-	-	-	-	-	1	0.0	134	1.5	180	2.0	-	-	17	0.2	2	0.0
1971	-	-	2	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	-	-	-	-	-	-	-	-	2	0.0	-	-	109	1.2	142	1.6	3	0.0	11	0.1	-	-
1975	-	-	1	0.0	-	-	-	-	1	0.0	1	0.0	81	0.9	110	1.2	5	0.1	10	0.1	1	0.0
1976	-	-	-	-	-	-	-	-	-	-	-	-	80	0.9	102	1.1	6	0.1	11	0.1	-	-
1977	-	-	1	0.0	-	-	-	-	-	-	-	-	67	0.7	97	1.1	6	0.1	3	0.0	-	-
1978	-	-	-	-	-	-	-	-	1	0.0	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	-	-	-	-	-	-	-	-	-	-	1	0.0	30	0.3	41	0.4	-	-	-	-	-	-
1983	-	-	1	0.0	-	-	-	-	-	-	-	-	28	0.3	39	0.4	-	-	3	0.0	-	-
1984	-	-	-	-	-	-	-	-	-	-	-	-	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	-	-

<sup>1</sup>-From 1901 through 1920, syphilis includes all other venereal diseases, beginning with 1968 excludes aortic aneurysms not specified as syphilitic.

<sup>2</sup>-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, 1900-1987  
(Rates per 100,000 population)

Year	Heart Disease		Cancer (all forms) <sup>1</sup>		Cerebrovascular Disease <sup>2</sup>		Accidents (all forms) <sup>3</sup>		Motor Vehicle Accidents <sup>4</sup>		Diabetes		Pneumonia		Chronic Liver Disease & Cirrhosis <sup>5</sup>		Atherosclerosis <sup>6</sup>	
	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	2,630	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	261	6.9		
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	267	6.8		
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	251	6.2		
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	256	6.2		
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	319	7.5		
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	326	7.5		
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	340	7.6		
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	373	8.1		
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	361	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				
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	329	6.8	1,047	21.6
1931	10,206	209.0	4,763	97.5	4,388	89.8	3,630	74.3	1,516	31.0	950	19.5	2,863	59.0	365	7.5	1,005	20.6
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	354	7.8	948	19.2
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	356	7.1	966	19.5
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	378	7.5	914	18.3
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	70.8	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	78.5	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

TABLE 4.8 (Continued)

Year	Heart Disease		Cancer (all forms) <sup>1</sup>		Cerebrovascular Disease <sup>2</sup>		Accidents (all forms) <sup>3</sup>		Motor Vehicle Accidents <sup>4</sup>		Diabetes		Pneumonia		Chronic Liver Disease & Cirrhosis <sup>5</sup>		Atherosclerosis <sup>6</sup>	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
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	3,925	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	4,416	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	1,973	22.9	1,240	14.4	1,730	20.1
1968	29,680	342.1	13,292	152.6	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
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	1,200	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	2,018	22.2	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	2,513	27.5	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	2,377	25.8	1,099	11.9	1,168	12.7

<sup>1</sup>-Cancer includes leukemias, a leukemias, and Hodgkin's disease beginning with 1921.

<sup>2</sup>-Cerebrovascular disease was called Vascular Lesions Affecting Central Nervous System prior to 1968.

<sup>3</sup>-Accidents exclude injuries undetermined whether accidentally or purposely inflicted since 1968.

<sup>4</sup>-Motor vehicle accidents do not include collision with heavier vehicles from 1910 through 1922. Motorcycle accidents are included beginning 1923.

<sup>5</sup>-Chronic liver disease and cirrhosis was called cirrhosis of the liver prior to 1979.

<sup>6</sup>-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, 1987

AREA	POPULATION ESTIMATE	LIVE BIRTHS	LOW WEIGHT LIVE BIRTHS	DEATHS	INFANT DEATHS	NEONATAL DEATHS	PERI- NATAL DEATHS	FETAL DEATHS	MARRIAGES <sup>1</sup>	DIVORCES <sup>1</sup>
Michigan	9,199,871	140,466	10,095	79,795	1,538	1,029	1,701	824	74,418	39,857
Alcona	10,294	112	9	145	2	1	2	1	85	41
Alger	8,555	99	5	108	-	-	1	1	66	28
Allegan	87,914	1,346	79	649	11	3	11	9	652	417
Alpena	31,106	392	21	294	3	2	3	1	264	114
Antrim	16,967	239	20	181	2	2	3	1	158	75
Arenac	15,248	203	12	140	1	1	3	2	128	26
Baraga	8,157	112	6	103	3	1	1	-	46	24
Barry	48,500	696	34	404	4	1	2	2	385	227
Bay	114,844	1,588	90	951	6	3	9	6	954	428
Benzie	11,371	164	13	124	2	1	1	-	111	56
Berrien	164,831	2,565	193	1,567	34	24	47	25	1,501	830
Branch	39,827	620	33	369	4	4	5	2	395	232
Calhoun	137,580	1,985	140	1,365	27	14	25	12	1,263	623
Cass	48,336	627	46	454	7	4	5	2	394	264
Charlevoix	20,575	316	9	224	3	2	4	2	211	94
Cheboygan	20,847	276	18	238	2	1	4	3	156	64
Chippewa	29,332	348	21	266	2	1	3	2	264	132
Clare	25,530	361	23	290	1	-	4	4	200	95
Clinton	56,367	886	41	292	3	2	15	13	442	206
Crawford	10,418	174	14	110	4	4	4	1	87	53
Delta	37,975	501	23	364	5	3	8	7	303	140
Dickinson	26,182	315	14	272	2	1	2	1	225	105
Eaton	91,885	1,216	50	600	13	10	16	8	715	326
Emmet	24,034	365	15	243	4	3	7	6	501	113
Genesee	435,087	6,667	541	3,601	83	54	67	22	3,485	2,146
Gladwin	22,152	300	18	233	3	3	3	2	179	75
Gogebic	18,263	195	15	292	1	1	1	-	118	65
Gd Traverse	60,997	939	33	491	9	4	4	-	638	333
Gratiot	38,948	543	28	420	4	3	7	4	317	170
Hillsdale	42,776	612	26	353	3	2	3	2	318	230
Houghton	36,085	431	17	384	5	3	4	2	226	100
Huron	36,288	514	21	363	3	-	-	-	228	109
Ingham	279,559	4,484	284	1,768	45	28	51	29	2,712	1,279
Ionia	54,660	820	59	397	7	2	6	4	470	248
Iosco	30,237	548	28	327	5	3	3	-	272	170
Iron	13,611	139	6	191	1	1	1	-	69	46
Isabella	53,626	659	28	301	3	3	6	5	399	278
Jackson	146,866	2,147	143	1,292	16	9	20	13	1,261	728
Kalamazoo	218,516	3,349	250	1,595	35	25	41	21	1,978	953
Kalkaska	12,302	193	10	103	3	1	3	2	95	79
Kent	481,952	8,885	557	3,791	88	58	109	61	4,782	2,179
Keweenaw	1,936	28	-	31	-	-	-	-	14	2

Table 4.9  
Selected Vital Statistics By County, Michigan Residents, 1987 (continued)

AREA	POPULATION ESTIMATE	LIVE BIRTHS	LOW WEIGHT LIVE BIRTHS	DEATHS	INFANT DEATHS	NEONATAL DEATHS	PERI- NATAL DEATHS	FETAL DEATHS	MARRIAGES <sup>1</sup>	DIVORCES <sup>1</sup>
Lake	8,690	101	3	122	1	-	2	2	59	21
Lapeer	72,257	1,008	59	487	10	5	10	5	609	334
Leelanau	15,210	207	13	129	5	4	4	-	157	58
Lenawee	89,332	1,250	74	756	8	4	15	12	651	371
Livingston	108,546	1,567	64	754	11	5	12	7	825	505
Luce	5,747	66	2	72	-	-	1	1	57	22
Mackinac	10,416	144	6	130	4	3	2	1	175	44
Macomb	707,409	9,635	543	5,420	75	49	94	51	5,850	3,298
Manistee	22,022	287	16	253	3	2	4	3	134	76
Marquette	70,150	1,066	52	512	8	7	12	6	505	308
Mason	25,937	340	17	269	1	1	2	1	219	127
Macosta	38,208	434	15	256	3	-	4	4	202	93
Menominee	25,725	312	13	310	1	-	2	2	214	93
Midland	73,250	1,048	56	461	12	6	10	5	609	302
Missaukee	11,235	179	6	120	1	-	1	1	99	45
Monroe	134,133	1,850	113	1,005	14	12	17	8	947	517
Montcalm	51,956	809	55	479	5	4	7	3	487	281
Montmorency	8,081	97	10	107	-	-	1	1	66	27
Muskegon	158,709	2,422	155	1,489	26	13	35	24	1,476	857
Newaygo	38,433	631	35	361	8	3	7	4	478	199
Oakland	1,044,425	15,275	913	7,913	135	96	176	98	9,046	5,110
Oceana	22,648	348	19	215	3	4	2	2	185	108
Ogemaw	17,916	254	19	223	1	1	3	2	154	71
Ontonagon	8,956	113	8	106	3	1	2	1	61	40
Osceola	20,749	297	18	185	1	1	4	3	145	66
Oscoda	7,129	110	2	94	2	1	1	-	59	21
Otsego	16,245	264	13	152	3	3	5	2	144	64
Ottawa	175,038	3,005	135	1,110	33	21	22	7	1,395	196
Presque Isle	13,870	161	4	173	4	3	4	1	73	29
Roscommon	19,735	194	10	270	1	-	1	1	129	193
Saginaw	216,305	3,377	254	1,847	33	25	44	21	1,675	687
St Clair	142,380	2,109	132	1,276	20	12	14	6	1,239	659
St Joseph	59,236	942	62	542	11	6	10	4	512	336
Sanilac	40,854	596	36	415	6	3	3	-	329	141
Schoolcraft	8,188	88	4	85	1	1	1	-	68	29
Shiawassee	69,710	1,032	68	548	7	3	7	5	570	297
Tuscola	55,615	715	41	487	9	6	11	5	449	224
Van Buren	67,825	1,062	67	668	8	7	10	5	582	302
Washtenaw	267,792	4,064	244	1,516	41	29	46	20	2,417	1,268
Wayne	2,152,456	35,681	3,723	22,525	556	400	565	212	14,030	8,414
Wexford	26,817	362	23	245	3	2	3	2	270	121
Co. Not Stated	-	5	-	22	2	2	11	9	-	-

<sup>1</sup> By county of occurrence rather than county of residence.

AREA	LIVE BIRTHS	LOW WEIGHT LIVE BIRTHS <sup>1</sup>	DEATHS	INFANT DEATHS	NEONATAL DEATHS	PERI-NATAL DEATHS	FETAL DEATHS	MARRIAGES <sup>2</sup>	DIVORCES <sup>2</sup>
Lake	11.6	29.7	14.0	9.9	0.0	19.4	19.8	13.6	4.8
Lapeer	14.0	58.5	6.7	9.9	5.0	9.9	5.0	16.9	9.2
Leelanau	13.6	62.8	8.5	24.2	19.3	19.3	0.0	20.6	7.6
Lenawee	14.0	59.2	8.5	6.4	3.2	11.9	9.6	14.6	8.3
Livingston	14.4	40.8	6.9	7.0	3.2	7.6	4.5	15.2	9.3
Luce	11.5	30.3	12.5	0.0	0.0	14.9	15.2	19.8	7.7
Mackinac	13.8	41.7	12.5	27.8	20.8	13.8	6.9	33.6	8.4
Macomb	13.6	56.4	7.7	7.8	5.1	9.7	5.3	16.5	9.3
Manistee	13.0	55.7	11.5	10.5	7.0	13.8	10.5	12.2	6.9
Marquette	15.2	48.8	7.3	7.5	6.6	11.2	5.6	14.4	8.8
Mason	13.1	50.0	10.4	2.9	2.9	5.9	2.9	16.9	9.8
Mecosta	11.4	34.6	6.7	6.9	0.0	9.1	9.2	10.6	4.9
Menominee	12.1	41.7	12.1	3.2	0.0	6.4	6.4	16.6	7.2
Midland	14.3	53.4	6.3	11.5	5.7	9.5	4.8	16.6	8.2
Missaukee	15.9	33.5	10.7	5.6	0.0	5.6	5.6	17.6	8.0
Monroe	13.8	61.1	7.5	7.6	6.5	9.1	4.3	14.1	7.7
Montcalm	15.6	68.0	9.2	6.2	4.9	8.6	3.7	18.7	10.8
Montmorency	12.0	103.1	13.2	0.0	0.0	10.2	10.3	16.3	6.7
Muskegon	15.3	64.0	9.4	10.7	5.4	14.3	9.9	18.6	10.8
Newaygo	16.4	55.5	9.4	12.7	4.8	11.0	6.3	24.9	10.4
Oakland	14.6	59.8	7.6	8.8	6.3	11.4	6.4	17.3	9.8
Oceana	15.4	54.6	9.5	8.6	5.7	11.4	5.7	16.3	9.5
Ogemaw	14.2	74.8	12.4	3.9	3.9	11.7	7.9	17.2	7.9
Ontonagon	12.6	70.8	11.8	26.5	8.8	17.5	8.8	13.6	8.9
Oscoda	14.3	60.6	8.9	3.4	3.4	13.3	10.1	14.0	6.4
Oscoda	15.4	18.2	13.2	18.2	9.1	9.1	0.0	16.6	5.9
Otsego	16.3	49.2	9.4	11.4	11.4	18.8	7.6	17.7	7.9
Ottawa	17.2	44.9	6.3	11.0	7.0	7.3	2.3	15.9	2.2
Presque Isle	11.6	24.8	12.5	24.8	18.6	24.7	6.2	10.5	4.2
Roscommon	9.8	51.5	13.7	5.2	0.0	5.1	5.2	13.1	19.6
Saginaw	15.6	75.2	8.5	9.8	7.4	12.9	6.2	15.5	6.4
St Clair	14.8	62.6	9.0	9.5	5.7	6.6	2.8	17.4	9.3
St Joseph	15.9	65.8	9.1	11.7	6.4	10.6	4.2	17.3	11.3
Sanilac	14.6	60.4	10.2	10.1	5.0	5.0	0.0	16.1	6.9
Schoolcraft	10.7	45.5	10.4	11.4	11.4	11.4	0.0	16.6	7.1
Shiawassee	14.8	65.9	7.9	6.8	2.9	6.8	4.0	16.4	8.5
Tuscola	12.9	57.3	8.8	12.6	8.4	15.3	7.0	16.1	8.1
Van Buren	15.7	63.1	9.8	7.5	6.6	9.4	4.7	17.2	8.9
Washtenaw	15.2	60.0	5.7	10.1	7.1	11.3	4.9	18.1	9.5
Wayne	16.6	104.3	10.5	15.6	11.2	15.7	5.9	13.0	7.8
Wexford	13.5	63.5	9.1	8.3	5.5	8.2	5.5	20.1	9.0

<sup>1</sup> Ratio per 1,000 live births.  
<sup>2</sup> By county of occurrence rather than county of residence. Rate of persons per 1,000 population rather than events per population.

Table 4.10  
Selected Vital Statistics Rates By County, Michigan Residents, 1987

AREA	LIVE BIRTHS	LOW WEIGHT LIVE BIRTHS	DEATHS	INFANT DEATHS	NEONATAL DEATHS	PERI-NATAL DEATHS	FETAL DEATHS	MARRIAGES	DIVORCES
Michigan	15.3	71.9	8.7	10.9	7.3	12.0	5.7	16.2	8.7
Alcona	10.9	80.4	14.1	17.9	8.9	17.7	8.9	16.5	8.0
Alger	11.6	50.5	12.6	0.0	0.0	10.0	10.1	15.4	6.5
Allegan	15.3	58.7	7.4	8.2	2.2	8.1	6.7	14.8	9.5
Alpena	12.6	53.6	9.5	7.7	5.1	7.5	2.6	17.0	7.3
Antrim	14.1	83.7	10.7	8.4	8.4	12.5	4.2	18.6	8.8
Arenac	13.3	59.1	9.2	4.9	4.9	14.6	9.9	16.8	3.4
Baraga	13.7	53.6	12.6	26.8	8.9	8.9	0.0	11.3	5.9
Barry	14.4	48.9	8.3	5.7	1.4	2.9	2.9	15.9	9.4
Bay	13.8	56.7	8.3	3.8	1.9	5.6	3.8	16.6	7.5
Benzie	14.4	79.3	10.9	12.2	6.1	6.1	0.0	19.5	9.8
Berrien	15.6	75.2	9.5	13.3	9.4	18.1	9.7	18.2	10.1
Branch	15.6	53.2	9.3	6.5	6.5	8.0	3.2	19.8	11.7
Calhoun	14.4	70.5	9.9	13.6	7.1	12.5	6.0	18.4	9.1
Cass	13.0	73.4	9.4	11.2	6.4	7.9	3.2	16.3	10.9
Charlevoix	15.4	28.5	10.9	9.5	6.3	12.6	6.3	20.5	9.1
Cheboygan	13.2	65.2	11.4	7.2	3.6	14.3	10.9	15.0	6.1
Chippewa	11.9	60.3	9.1	5.7	2.9	8.6	5.7	18.0	9.0
Clare	14.1	63.7	11.4	2.8	0.0	11.0	11.1	15.7	7.4
Clinton	15.7	46.3	5.2	3.4	2.3	16.7	14.7	15.7	7.3
Crawford	16.7	80.5	10.6	23.0	23.0	22.9	5.7	16.7	10.2
Delta	13.2	45.9	9.6	10.0	6.0	15.7	14.0	16.0	7.4
Dickinson	12.0	44.4	10.4	6.3	3.2	6.3	3.2	17.2	8.0
Eaton	13.2	41.1	6.5	10.7	8.2	13.1	6.7	15.6	7.1
Emmet	15.2	41.1	10.1	11.0	8.2	18.9	16.4	41.7	9.4
Genesee	15.3	81.1	8.3	12.4	8.1	10.0	3.3	16.0	9.9
Gladwin	13.5	60.0	10.5	10.0	10.0	9.9	6.7	16.2	6.8
Gogebic	10.7	76.9	16.0	5.1	5.1	5.1	0.0	12.9	7.1
Gd Traverse	15.4	35.1	8.0	9.6	4.3	4.3	0.0	20.9	10.9
Gratiot	13.9	51.6	10.8	7.4	5.5	12.8	7.4	16.3	8.7
Hillsdale	14.3	42.5	8.3	4.9	3.3	4.9	3.3	14.9	10.8
Houghton	11.9	39.4	10.6	11.6	7.0	9.2	4.6	12.5	5.5
Huron	14.2	40.9	10.0	5.8	0.0	0.0	0.0	12.6	6.0
Ingham	16.0	63.3	6.3	10.0	6.2	11.3	6.5	19.4	9.2
Ionia	15.0	72.0	7.3	8.5	2.4	7.3	4.9	17.2	9.1
Iosco	18.1	51.1	10.8	9.1	5.5	5.5	0.0	18.0	11.2
Iron	10.2	43.2	14.0	7.2	7.2	7.1	7.2	10.1	6.8
Isabella	12.3	42.5	5.6	4.6	1.5	9.0	7.6	14.9	10.4
Jackson	14.6	66.6	8.8	7.4	4.2	9.3	6.1	17.2	9.9
Kalamazoo	15.3	74.7	7.3	10.5	7.5	12.2	6.3	18.1	8.7
Kalkaska	15.7	51.8	8.4	15.5	5.2	15.4	10.4	15.4	12.8
Kent	18.4	62.7	7.9	9.9	6.5	12.2	6.7	19.8	9.0
Keeweenaw	14.5	0.0	16.0	0.0	0.0	0.0	0.0	14.5	2.1

Table 4.11  
Live Births with Selected Risk Factors by County of Residence,  
Michigan Residents, 1987

STATE AND COUNTIES	COMPLICATIONS REPORTED		CONGENITAL ANOMALIES REPORTED		4TH BIRTH OR HIGHER		MOTHER'S EDUCATION 11TH GRADE OR LESS		INADEQUATE PRENATAL CARE <sup>1</sup>		MOTHERS UNDER 18 YEARS OF AGE	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
MICHIGAN	43,242	30.8	791	0.6	13,378	9.5	26,940	19.2	8,614	6.1	6,661	4.7
ALCONA	63	56.3	1	0.9	8	7.1	23	20.5	1	0.9	4	3.6
ALGER	38	38.4	1	1.0	9	9.1	10	10.1	9	9.1	6	6.1
ALLEGAN	382	28.4	10	0.7	119	8.8	270	20.1	85	6.3	67	5.0
ALPENA	229	58.4	2	0.5	29	7.4	57	14.5	14	3.6	10	2.6
ANTRIM	81	33.9	1	0.4	21	8.8	56	23.4	24	10.0	11	4.6
ARENAC	49	24.1	1	0.5	17	8.4	36	17.7	8	3.9	10	4.9
BARAGA	56	50.0	4	3.6	13	11.6	22	19.6	6	5.4	6	5.4
BARRY	359	51.6	5	0.7	73	10.5	111	15.9	15	2.2	28	4.0
BAY	401	25.3	5	0.3	124	7.8	292	18.4	55	3.5	69	4.3
BENZIE	34	20.7	0	0.0	20	12.2	28	17.1	19	11.6	6	3.7
BERRIEN	836	32.6	19	0.7	236	9.2	655	25.5	163	6.4	207	8.1
BRANCH	116	18.7	7	1.1	67	10.8	154	24.8	57	9.2	28	4.5
CALHOUN	493	24.8	7	0.4	173	8.7	433	21.8	120	6.0	131	6.6
CASS	217	34.6	2	0.3	52	8.3	179	28.5	54	8.6	39	6.2
CHARLEVOIX	95	30.1	3	0.9	25	7.9	37	11.7	9	2.8	8	2.5
CHEBOYGAN	122	44.2	7	2.5	32	11.6	46	16.7	19	6.9	13	4.7
CHIPPEWA	79	22.7	3	0.9	29	8.3	79	22.7	30	8.6	20	5.7
CLARE	98	27.1	2	0.6	39	10.8	83	23.0	26	7.2	26	7.2
CLINTON	287	32.4	8	0.9	89	10.0	87	9.8	29	3.3	15	1.7
CRAWFORD	88	50.6	4	2.3	18	10.3	49	28.2	3	1.7	10	5.7
DELTA	144	28.7	3	0.6	51	10.2	62	12.4	25	5.0	16	3.2
DICKINSON	59	18.7	4	1.3	33	10.5	34	10.8	12	3.8	12	3.8
EATON	417	34.3	9	0.7	84	6.9	137	11.3	78	6.4	40	3.3
EMMET	131	35.9	0	0.0	24	6.6	34	9.3	15	4.1	15	4.1
GENESEE	2,510	37.6	11	0.2	627	9.4	1,549	23.2	256	3.8	445	6.7
GLADWIN	132	44.0	2	0.7	45	15.0	81	27.0	30	10.0	4	1.3
GOGEBIC	100	51.3	3	1.5	22	11.3	30	15.4	18	9.2	12	6.2
GRAND TRAVERSE	244	26.0	3	0.3	64	6.8	110	11.7	119	12.7	23	2.4
GRATIOT	169	31.1	4	0.7	50	9.2	77	14.2	31	5.7	16	2.9
HILLSDALE	202	33.0	5	0.8	60	9.8	127	20.8	63	10.3	29	4.7
HOUGHTON	161	37.4	10	2.3	87	20.2	33	7.7	12	2.8	9	2.1
HURON	148	28.8	5	1.0	57	11.1	68	13.2	20	3.9	14	2.7
INGHAM	1,283	28.6	27	0.6	362	8.1	771	17.2	312	7.0	208	4.6
IONIA	315	38.4	7	0.9	84	10.2	162	19.8	40	4.9	41	5.0
IOSCO	257	46.9	6	1.1	27	4.9	66	12.0	12	2.2	12	2.2
IRON	54	38.8	3	2.2	24	17.3	25	18.0	6	4.3	9	6.5
ISABELLA	218	33.1	0	0.0	59	9.0	97	14.7	46	7.0	18	2.7
JACKSON	874	40.7	12	0.6	197	9.2	424	19.7	154	7.2	132	6.1
KALAMAZOO	1,136	33.9	11	0.3	281	8.4	533	15.9	158	4.7	140	4.2
KALKASKA	45	23.3	3	1.6	17	8.8	57	29.5	24	12.4	9	4.7
KENT	2,235	25.2	68	0.8	833	9.4	1,450	16.3	370	4.2	369	4.2
KEWEENAW	11	39.3	1	3.6	5	17.9	2	7.1	1	3.6	0	0.0
LAKE	30	29.7	0	0.0	12	11.9	26	25.7	15	14.9	7	6.9

Table 4.11 (Continued)

STATE AND COUNTIES	COMPLICATIONS REPORTED		CONGENITAL ANOMALIES REPORTED		4TH BIRTH OR HIGHER		MOTHER'S EDUCATION 11TH GRADE OR LESS		INADEQUATE PRENATAL CARE <sup>1</sup>		MOTHERS UNDER 18 YEARS OF AGE	
	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT	NUMBER	PERCENT
LAPEER	311	30.9	11	1.1	104	10.3	164	16.3	29	2.9	32	3.2
LEELANAU	50	24.2	1	0.5	22	10.6	31	15.0	30	14.5	5	2.4
LENAWEE	361	28.9	14	1.1	130	10.4	265	21.2	89	7.1	55	4.4
LIVINGSTON	515	32.9	5	0.3	128	8.2	162	10.3	83	5.3	31	2.0
LUCE	19	28.8	1	1.5	15	22.7	25	37.9	4	6.1	6	9.1
MACKINAC	52	36.1	2	1.4	15	10.4	23	16.0	14	9.7	4	2.8
MACOMB	2,855	29.6	49	0.5	613	6.4	1,130	11.7	391	4.1	180	1.9
MANISTEE	64	22.3	4	1.4	31	10.8	51	17.8	24	8.4	12	4.2
MARQUETTE	519	48.7	12	1.1	71	6.7	81	7.6	33	3.1	25	2.3
MASON	102	30.0	3	0.8	37	10.9	54	15.9	19	5.6	12	3.5
MECOSTA	137	31.6	8	1.8	50	11.5	76	17.5	29	6.7	16	3.7
MEMORINEE	139	44.6	1	0.3	26	8.3	33	10.6	10	3.2	5	1.6
MIDLAND	632	60.3	11	1.0	89	8.5	146	13.9	35	3.3	26	2.5
MISSAUKEE	59	33.0	1	0.6	26	14.5	31	17.3	9	5.0	4	2.2
MONROE	784	42.4	12	0.6	173	9.4	333	18.0	72	3.9	76	4.1
MONTCALM	304	37.6	8	1.0	73	9.0	190	23.5	40	4.9	33	4.1
MONTMORENCY	42	43.3	3	3.1	16	16.5	23	23.7	6	6.2	4	4.1
MUSKEGON	579	23.9	8	0.3	245	10.1	508	21.0	1,191	49.2	151	6.2
NEWAYGO	204	32.3	7	1.1	63	10.0	135	21.4	53	8.4	28	4.4
OAKLAND	3,933	25.7	56	0.4	1,120	7.3	1,818	11.9	462	3.0	379	2.5
OCEANA	98	28.2	3	0.9	34	9.8	88	25.3	52	14.9	19	5.5
OGEMAW	41	16.1	2	0.8	30	11.8	55	21.7	5	2.0	14	5.5
ONTONAGON	54	47.8	4	3.5	16	14.2	12	10.6	2	1.8	4	3.5
OSCEOLA	114	38.4	2	0.7	41	13.8	61	20.5	25	8.4	12	4.0
OSCODA	20	18.2	3	2.7	12	10.9	35	31.8	7	6.4	5	4.5
OTSEGO	82	31.1	3	1.1	25	9.5	25	9.5	32	12.1	5	1.9
OTTAWA	677	22.5	18	0.6	271	9.0	347	11.5	180	6.0	62	2.1
PRESQUE ISLE	62	38.5	2	1.2	27	16.8	16	9.9	5	3.1	1	0.6
ROSCOMMON	72	37.1	3	1.5	19	9.8	52	26.8	6	3.1	5	2.6
SAGINAW	771	22.8	6	0.2	348	10.3	802	23.7	180	5.3	253	7.5
ST. CLAIR	670	31.8	18	0.9	206	9.8	450	21.3	94	4.5	85	4.0
ST. JOSEPH	316	33.5	10	1.1	97	10.3	238	25.3	53	5.6	41	4.4
SANILAC	241	40.4	6	1.0	60	10.1	108	18.1	39	6.5	21	3.5
SCHOOLCRAFT	25	28.4	1	1.1	10	11.4	14	15.9	3	3.4	3	3.4
SHIAWASSEE	299	29.0	9	0.9	76	7.4	196	19.0	48	4.7	42	4.1
TUSCOLA	207	29.0	7	1.0	86	12.0	121	16.9	34	4.8	30	4.2
VAN BUREN	357	33.6	4	0.4	118	11.1	273	25.7	93	8.8	60	5.6
WASHTENAW	1,316	32.4	14	0.3	322	7.9	443	10.9	165	4.1	118	2.9
WAYNE	11,035	30.9	165	0.5	4,198	11.8	9,580	26.8	2,389	6.7	2,494	7.0
WEXFORD	124	34.3	5	1.4	36	9.9	82	22.7	16	4.4	9	2.5
COUNTY NOT STATED	2	40.0	0	0.0	1	20.0	1	20.0	0	0.0	0	0.0

<sup>1</sup>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, 1987

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	140,466	329	913	2,062	3,357	4,686	5,893	16,911	39,314	47,052	27,795	8,038	1,015	12	
Alcona	112	-	-	3	1	2	3	9	50	34	14	2	3	-	
Alger	99	-	1	3	2	3	3	12	32	30	20	3	2	-	
Allegan	1,346	1	4	24	38	45	58	169	428	455	227	56	10	-	
Alpena	392	-	1	5	4	10	13	33	105	149	91	12	2	-	
Antrim	239	-	1	1	8	15	11	37	81	75	33	13	-	-	
Arenac	203	-	2	1	4	5	14	29	83	50	32	9	-	-	
Baraga	112	-	1	5	4	7	7	20	34	31	20	7	-	-	
Barry	696	-	5	9	14	18	27	73	240	232	118	30	3	-	
Bay	1,588	3	6	24	36	51	60	177	461	590	275	74	8	-	
Benzie	164	-	-	1	5	4	9	19	56	48	31	9	1	-	
Berrien	2,565	10	44	66	87	124	141	462	773	777	383	137	22	1	
Branch	620	3	1	10	14	21	29	75	219	211	89	19	3	1	
Calhoun	1,985	10	18	38	65	84	107	312	651	603	314	86	9	-	
Cass	627	1	7	11	20	27	39	104	225	162	98	33	4	-	
Charlevoix	316	-	2	2	4	11	12	31	99	116	51	18	1	-	
Cheboygan	276	-	1	2	10	7	21	41	70	99	54	6	6	-	
Chippewa	348	1	4	5	10	12	19	50	119	104	55	17	2	-	
Clare	361	-	2	8	16	19	19	64	127	106	46	16	2	-	
Clinton	886	-	-	6	9	21	21	57	245	344	181	53	6	-	
Crawford	174	1	3	3	3	12	5	26	63	55	23	5	1	-	
Delta	501	1	1	4	10	24	22	61	136	165	108	25	5	-	
Dickinson	315	-	4	2	6	7	13	32	92	112	67	9	3	-	
Eaton	1,216	2	4	16	18	30	47	115	356	420	242	67	14	-	
Emmet	365	1	1	5	8	4	5	23	92	126	93	25	5	-	
Genesee	6,667	21	67	142	215	298	371	1,093	2,042	2,114	1,084	275	38	-	
Gladwin	300	-	1	2	1	13	19	36	119	87	45	11	2	-	
Gogebic	195	-	-	3	9	14	11	37	55	60	30	11	2	-	
Grand Traverse	939	-	-	4	19	25	25	73	252	320	218	69	7	1	
Gratiot	543	2	-	6	8	17	24	55	203	175	91	14	2	-	
Hillsdale	612	2	3	13	11	21	31	79	227	188	90	24	2	-	
Houghton	431	-	1	2	6	10	14	33	128	139	87	39	5	-	
Huron	514	-	3	3	8	11	25	50	168	176	88	26	6	-	
Ingham	4,484	10	30	59	109	137	191	526	1,223	1,471	955	271	28	-	
Ionia	820	1	9	19	12	34	45	119	286	273	105	30	6	-	
Iosco	548	-	2	2	8	14	26	52	228	171	71	23	3	-	
Iron	139	-	2	2	5	3	7	19	34	43	24	17	2	-	
Isabella	659	1	1	5	11	13	34	64	221	209	124	36	4	-	
Jackson	2,147	4	21	33	74	83	102	313	665	683	365	100	17	-	
Kalamazoo	3,349	6	20	37	77	107	130	371	845	1,096	781	235	15	-	
Kalkaska	193	-	3	2	4	3	19	31	73	56	26	7	-	-	
Kent	8,085	17	51	110	191	287	341	980	2,373	3,202	1,795	463	55	-	
Keweenaw	28	-	-	-	-	1	-	1	9	6	9	3	-	-	
Lake	101	-	-	2	5	10	3	20	44	19	15	2	1	-	

Table 4.12 (Continued)

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	
Lapeer	1,008	-	3	8	21	24	53	109	317	349	179	45	9
Leelanau	207	-	1	1	3	4	7	16	34	70	60	26	1
Lenawee	1,250	4	7	17	27	41	72	164	413	387	216	54	12
Livingston	1,567	1	3	10	17	34	45	109	372	557	392	126	10
Luce	66	-	1	3	2	6	4	16	16	15	12	6	1
Mackinac	144	-	1	1	2	2	9	15	50	53	18	7	1
Macomb	9,635	2	19	57	102	173	258	609	2,238	3,836	2,249	544	56
Manistee	287	-	1	5	6	13	10	35	74	110	54	14	-
Marquette	1,066	-	2	7	16	21	36	82	381	356	183	59	-
Mason	340	1	-	6	5	11	7	29	105	116	68	17	5
Mecosta	434	-	1	7	8	14	17	47	158	155	49	21	4
Menominee	312	-	-	2	3	12	7	24	108	114	54	11	-
Midland	1,048	-	5	5	16	33	26	85	294	372	233	56	8
Missaukee	179	-	1	2	1	9	6	19	76	57	21	5	1
Monroe	1,850	4	9	26	37	73	88	233	558	627	326	91	1
Montcalm	809	3	5	7	18	47	44	121	303	242	106	30	10
Montmorency	97	-	-	2	2	4	5	13	30	31	17	5	1
Muskegon	2,422	6	18	41	86	118	141	404	779	764	383	77	9
Newaygo	631	-	2	8	18	27	33	88	236	196	87	19	5
Oakland	15,275	18	41	124	196	289	369	1,019	3,131	5,579	4,069	1,300	159
Oceana	348	-	3	2	14	17	8	44	117	117	56	14	-
Ogemaw	254	-	3	1	10	11	13	38	91	74	40	8	3
Ontonagon	113	-	-	1	3	6	8	18	29	34	22	9	1
Osceola	297	1	1	7	3	6	10	27	102	110	41	13	3
Oscoda	110	-	-	2	3	5	6	16	36	37	16	4	1
Otsego	264	-	-	5	-	8	14	27	82	86	57	11	1
Ottawa	3,005	1	7	19	35	60	79	200	811	1,197	648	132	16
Presque Isle	161	-	-	-	1	5	6	12	36	68	32	12	1
Roscommon	194	-	-	2	3	5	6	16	73	62	32	9	2
Saginaw	3,377	16	29	83	125	151	159	547	973	1,116	559	150	16
St. Clair	2,109	1	7	21	56	69	87	240	717	685	369	87	10
St. Joseph	942	2	4	13	22	33	47	119	354	276	139	49	3
Sanilac	596	1	2	9	9	18	29	67	209	210	83	23	3
Schoolcraft	88	-	-	3	-	6	4	13	29	28	14	3	1
Shiawassee	1,032	2	6	11	23	34	58	132	356	348	156	34	4
Tuscola	715	1	-	9	20	19	32	80	234	260	101	38	1
Van Buren	1,062	2	6	27	25	44	52	154	327	333	181	61	4
Washtenaw	4,064	3	16	34	65	94	121	330	802	1,379	1,089	404	55
Wayne	35,681	162	381	773	1,178	1,456	1,774	5,562	10,093	10,851	6,659	2,067	283
Wexford	362	-	1	1	7	20	20	49	134	113	56	10	-
Co. Not Stated	5	-	-	-	-	-	-	-	4	-	1	-	-



FIGURE 4.2 Total Population, Percent Under Age 20 and Percent Age 65 and Over by Region, Michigan, 1987

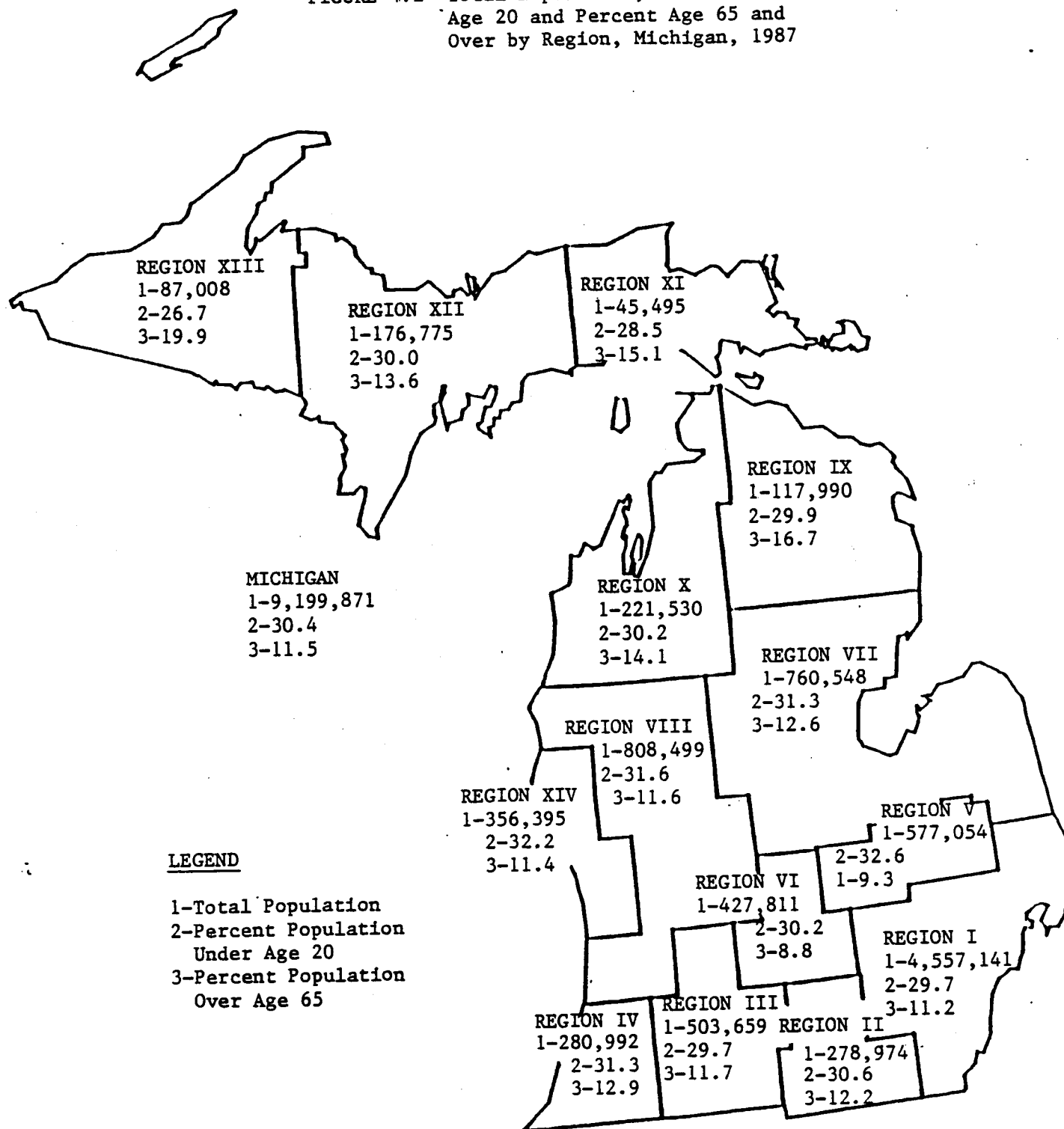


Table 4.13  
Vital Statistics for Residents of Selected  
Michigan Cities<sup>1</sup>, 1987

AREA	LIVE BIRTHS	DEATHS	INFANT DEATHS		FETAL DEATHS	
			NUMBER	RATE	NUMBER	RATE
ALLEN PARK	335	370	1	3.0	2	5.9
ANN ARBOR	1,446	518	13	9.0	6	4.1
BATTLE CREEK	1,013	659	18	17.8	8	7.8
BAY CITY	719	413	2	2.8	5	6.9
BURTON CITY	359	252	3	8.4	0	0.0
DEARBORN	1,308	968	16	12.2	5	3.8
DEARBORN HEIGHTS	767	596	5	6.5	1	1.3
DETROIT	20,056	12,854	409	20.4	140	6.9
EAST DETROIT	489	370	1	2.0	1	2.0
EAST LANSING	452	99	2	4.4	1	2.2
FARMINGTON HILLS	941	456	4	4.3	2	2.1
FERNDAL	487	312	4	8.2	2	4.1
FLINT	3,187	1,521	56	17.6	14	4.4
GARDEN CITY	443	201	5	11.3	4	8.9
GRAND RAPIDS	4,081	2,039	51	12.5	27	6.6
HIGHLAND PARK	415	319	17	41.0	1	2.4
HOLLAND	562	251	6	10.7	1	1.8
INKSTER	531	320	12	22.6	1	1.9
JACKSON	795	432	5	6.3	8	10.0
KALAMAZOO	1,503	702	23	15.3	13	8.6
KENTWOOD	461	122	4	8.7	5	10.7
LANSING	2,653	1,040	33	12.4	18	6.7
LINCOLN PARK	609	473	5	8.2	5	8.1
LIVONIA	1,280	917	3	2.3	5	3.9
MADISON HEIGHTS	508	292	5	9.8	5	9.7
MIDLAND	481	284	7	14.6	2	4.1
MUSKEGON	799	501	13	16.3	15	18.4
OAK PARK	477	238	6	12.6	2	4.2
PONTIAC	1,700	722	20	11.8	19	11.1
PORTAGE	553	192	4	7.2	1	1.8
PORT HURON	672	335	9	13.4	1	1.5
ROSEVILLE	751	465	5	6.7	2	2.7
ROYAL OAK	976	606	6	6.1	15	15.1
SAGINAW	1,608	779	16	10.0	11	6.8
ST. CLAIR SHORES	819	701	4	4.9	3	3.6
SOUTHFIELD	908	862	12	13.2	2	2.2
SOUTHGATE	378	260	1	2.6	1	2.6
STERLING HEIGHTS	1,407	633	11	7.8	9	6.4
TAYLOR	1,210	492	10	8.3	2	1.7
TROY	884	371	12	13.6	2	2.3
WARREN	1,912	1,362	19	9.9	13	6.8
WESTLAND	1,261	645	6	4.8	2	1.6
WYANDOTTE	516	330	3	5.8	1	1.9
WYOMING	1,025	370	11	10.7	7	6.8

<sup>1</sup> 25,000 population or over according to the 1980 census.  
<sup>2</sup> 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, 1987

AREA	All Causes	Tubercu- losis All Forms	All Other Infectious and Parasitic Diseases	MALIGNANT NEOPLASMS						Leukemia	Other
				Total	Digestive Organs and Peritoneum	Respira- tory and Intra- thoracic Organs	Breast	Genital Organs	Urinary Organs		
Michigan	79,795	46	1,110	17,669	4,143	5,016	1,583	2,016	770	647	3,494
Alcona	145	-	1	28	7	11	3	2	1	-	4
Alger	108	-	-	30	6	10	2	2	2	3	5
Allegan	649	-	5	153	36	44	10	12	2	7	42
Alpena	294	-	3	68	12	23	4	6	1	4	18
Antrim	181	-	3	42	12	9	3	5	2	-	11
Arenac	140	-	-	30	7	8	3	2	2	-	8
Baraga	103	-	1	25	11	3	-	5	1	-	5
Barry	404	-	3	92	17	22	8	11	4	-	30
Bay	951	1	4	245	62	75	23	19	10	2	54
Benzie	124	-	-	29	4	13	-	4	-	2	6
Berrien	1,567	-	22	343	76	100	30	43	12	11	71
Branch	369	-	4	85	16	30	6	6	6	3	18
Calhoun	1,365	-	13	305	57	83	34	32	13	17	69
Cass	454	-	1	102	22	28	7	11	8	2	25
Charlevoix	224	-	2	53	10	11	4	12	2	2	12
Cheboygan	238	-	2	52	11	22	5	-	3	4	7
Chippewa	266	-	5	60	23	12	1	9	6	3	6
Clare	290	-	2	68	19	25	1	8	3	1	11
Clinton	292	-	1	62	15	16	5	10	4	2	10
Crawford	110	-	3	24	5	6	2	5	-	-	6
Delta	364	-	6	80	20	16	9	14	2	1	18
Dickinson	272	1	1	9	9	14	5	6	2	2	11
Eaton	600	-	12	136	35	33	19	9	4	8	28
Emmet	243	-	3	55	16	6	6	10	4	2	11
Genesee	3,601	1	30	811	180	243	72	96	47	25	148
Gladwin	233	1	3	56	12	24	3	2	3	2	10
Gogebic	292	1	4	72	18	15	5	13	6	-	15
Grand Traverse	491	1	4	101	20	33	9	13	6	2	18
Gratiot	420	-	9	86	16	27	5	7	7	4	20
Hillsdale	353	-	7	79	22	21	8	5	4	-	19
Houghton	384	-	1	89	26	20	6	11	6	2	18
Huron	363	-	3	75	21	22	7	10	4	2	24
Ingham	1,768	2	31	387	90	102	29	40	14	24	88
Ionia	397	-	2	93	25	26	5	9	6	3	19
Iosco	327	-	-	64	21	21	6	4	1	-	11
Iron	191	-	3	41	9	16	2	3	1	1	9
Isabella	301	-	1	71	16	23	6	8	3	-	16
Jackson	1,292	1	15	305	49	101	28	35	15	13	64
Kalamazoo	1,595	4	19	358	72	100	39	40	14	14	79
Kalkaska	103	-	2	20	4	10	2	-	-	-	4
Kent	3,791	2	46	869	206	196	94	103	35	39	196
Keweenaw	31	-	-	10	4	2	1	-	-	-	3
Lake	122	-	-	36	13	7	5	3	-	1	7
Lapeer	487	-	5	103	27	26	10	11	6	3	20

Table 4.14  
Number of Deaths by Underlying Cause and County of Residence, Michigan, 1987 (Continued)

AREA	All Causes	Tuberculosis All Forms	All Other Infectious and Parasitic Diseases	MALIGNANT NEOPLASMS						Leukemia	Other
				Total	Digestive Organs and Peritoneum	Respira- tory and Intra- thoracic Organs	Breast	Genital Organs	Urinary Organs		
Leelanau	129	-	2	37	10	9	4	7	-	1	6
Lenawee	756	1	13	157	39	47	14	19	5	6	27
Livingston	754	-	7	167	44	44	14	20	9	5	31
Luce	72	-	2	13	3	5	-	2	1	1	1
Mackinac	130	-	1	40	6	16	5	-	3	1	9
Macomb	5,420	1	62	1,299	314	364	125	124	53	57	262
Manistee	253	-	-	48	13	12	6	7	2	3	5
Marquette	512	-	9	123	29	41	12	13	5	6	17
Mason	269	-	-	71	18	15	5	10	5	5	14
Mecosta	256	-	-	66	10	23	5	5	3	2	18
Menominee	310	-	2	81	26	15	11	8	5	3	13
Midland	461	-	6	108	23	34	6	17	4	6	18
Missaukee	120	-	2	35	6	13	2	2	2	1	9
Monroe	1,005	1	15	209	45	74	23	20	7	6	34
Montcalm	479	1	5	110	28	30	7	12	4	4	25
Montmorency	107	-	-	33	8	5	3	3	4	-	10
Muskegon	1,489	-	14	372	84	122	23	54	19	5	65
Newaygo	361	-	4	90	15	26	12	6	3	6	22
Oakland	7,813	3	124	1,832	426	478	177	228	69	71	383
Oceana	215	-	3	35	5	12	4	2	1	1	10
Ogemaw	223	-	2	63	19	18	5	5	4	-	12
Ontonagon	106	-	1	16	5	5	-	2	-	-	4
Osceola	185	1	2	46	10	10	5	5	2	4	10
Oscoda	94	-	-	19	5	7	1	2	-	-	4
Otsego	152	-	2	32	10	8	3	4	-	1	6
Ottawa	1,110	-	7	244	57	51	19	36	13	15	53
Presque Isle	173	-	-	36	10	8	5	3	-	2	8
Roscommon	270	-	3	82	14	30	3	12	10	3	10
Saginaw	1,847	1	19	417	102	121	27	46	26	15	80
St Clair	1,276	1	16	309	81	91	22	31	13	14	57
St Joseph	542	-	4	106	21	28	10	17	5	2	23
Sanilac	415	1	4	103	23	27	7	16	2	4	24
Schoolcraft	85	-	-	19	5	6	-	2	2	-	4
Shiawassee	548	-	8	119	22	26	16	11	4	5	35
Tuscola	487	-	4	90	20	29	5	9	3	6	18
Van Buren	668	-	3	148	40	44	9	16	14	3	22
Washtenaw	1,516	-	28	363	82	94	36	50	13	15	73
Wayne	22,525	22	448	4,527	1,096	1,356	415	519	184	157	800
Waxford	245	-	6	59	9	16	5	14	1	1	13
Co Not Stated	22	-	-	3	1	1	-	1	-	-	0

Table 4.14  
Number of Deaths by Underlying Cause and County of Residence, Michigan, 1987 (Continued)

AREA	Dia- betes Melli- tus	Nutri- tional Defi- cien- cies	Major Cardiovascular Diseases						Pneu- monia and Influ- enza	Chronic Obstructive Pulmonary Diseases and Allied Conditions	Ulcer of Stomach and Duo- denum	Chronic Liver Disease and Cirrhosis
			Total	Diseases of the Heart	Hyper- tension with or without Renal Disease	Cerebro- vascular Diseases	Athero- sclerosis	Other Diseases of Arteries, Arterioles, and Capil- laries				
Michigan	1,479	101	38,343	30,521	264	5,481	1,168	909	2,377	2,868	233	1,099
Alicona	3	2	71	58	-	11	2	0	6	6	1	5
Alger	1	1	58	46	-	9	2	1	2	3	1	4
Allegan	7	3	293	225	2	45	15	6	27	19	1	4
Alpena	2	-	148	112	2	32	1	1	7	11	-	5
Antrim	3	-	84	63	-	14	3	4	6	12	1	1
Arenac	4	1	74	60	-	8	4	2	2	6	-	3
Baraga	4	-	48	43	-	4	-	1	1	8	-	4
Barry	7	1	177	136	1	27	6	7	18	10	2	1
Bay	16	-	498	405	5	44	35	9	13	38	1	4
Benzie	6	-	55	43	-	9	2	1	2	3	-	1
Berrien	44	2	737	587	6	118	16	10	36	73	1	19
Branch	14	-	169	123	2	34	2	8	18	19	-	4
Calhoun	32	2	614	470	3	91	31	19	63	54	6	23
Cass	10	4	206	159	3	33	5	6	9	32	1	5
Charlevoix	5	1	101	87	1	7	2	4	10	14	-	2
Cheboygan	4	-	113	94	1	17	1	0	7	13	3	4
Chippewa	17	-	105	82	1	17	2	3	8	13	2	2
Clare	-	-	163	147	-	9	3	4	13	8	2	0
Clinton	5	-	139	109	-	28	-	2	13	9	1	5
Crawford	1	-	52	39	1	9	3	0	5	6	-	0
Delta	10	-	162	114	2	34	4	8	7	15	3	5
Dickinson	7	1	137	105	3	21	4	4	13	14	2	4
Eaton	11	1	289	206	4	55	14	10	13	22	-	2
Emmet	6	1	112	87	1	16	1	7	17	3	1	3
Genesee	71	2	1,743	1,386	6	258	62	31	75	145	10	41
Gladwin	5	-	118	91	-	15	8	4	7	6	-	1
Gogebic	4	1	129	100	-	22	1	6	11	6	-	5
Grand Traverse	9	2	250	185	-	42	18	5	15	23	2	2
Gratiot	6	-	224	149	-	67	6	2	16	12	-	6
Hillsdale	7	1	155	124	2	22	3	4	14	21	2	1
Houghton	10	-	189	146	-	30	3	10	17	14	1	4
Huron	5	-	207	163	1	37	3	3	13	11	1	3
Ingham	35	4	830	637	4	129	29	31	61	50	6	20
Ionia	12	-	180	145	1	29	4	1	14	20	2	3
Iosco	4	-	167	133	-	20	9	5	9	15	1	0
Iron	5	-	96	73	3	16	1	3	8	6	1	3
Isabella	8	-	153	122	2	25	2	2	12	7	2	3
Jackson	34	-	621	479	5	84	33	20	39	61	4	13
Kalamazoo	34	4	723	546	4	130	17	26	79	75	6	17
Kalkaska	3	-	51	29	-	8	9	5	1	6	-	1
Kent	54	3	1,782	1,343	7	298	82	52	140	146	17	45
Keweenaw	-	-	18	14	-	2	1	1	1	-	-	0
Lake	2	-	48	41	-	4	1	2	5	4	-	4

Table 4.14  
Number of Deaths by Underlying Cause and County of Residence, Michigan, 1987 (Continued)

AREA	Dia- betes Melli- tus	Nutri- tional Defi- cien- cies	Major Cardiovascular Diseases						Pneu- monia and Influ- enza	Chronic Obstructive Pulmonary Diseases and Allied Conditions	Ulcer of Stomach and Duo- denum	Chronic Liver Disease and Cirrhosis
			Total	Dis- eases of the Heart	Hyper- tension with or without Renal Disease	Cerebro- vascular Diseases	Athero- sclero- sis	Other Diseases of Arteries, Arterioles, and Capil- laries				
Lapeer	10	-	237	200	4	26	6	1	11	19	-	7
Leelanau	1	-	53	43	1	6	3	0	8	5	1	1
Lenawee	18	-	368	253	4	82	17	12	32	32	-	8
Livingston	9	1	379	318	3	43	9	5	23	26	1	5
Luce	1	-	29	22	-	6	-	1	5	6	-	2
Mackinac	2	-	56	44	-	8	2	2	7	4	-	0
Macomb	90	4	2,735	2,190	18	374	101	52	144	188	12	83
Manistee	4	1	133	91	3	23	13	3	11	13	-	3
Marquette	6	-	231	180	1	36	9	5	19	14	1	9
Mason	2	-	140	108	2	20	7	3	8	7	-	2
Mecosta	1	-	137	115	-	10	2	10	6	5	-	3
Menominee	10	1	146	106	2	27	9	2	4	10	1	4
Midland	10	4	217	163	1	28	12	13	17	13	1	8
Missaukee	-	-	57	46	-	7	4	0	3	2	-	3
Monroe	16	2	487	400	-	59	9	19	27	42	3	13
Montcalm	15	2	217	165	3	35	6	8	12	24	3	3
Montmorency	-	-	49	41	2	4	1	1	3	4	1	2
Muskegon	30	2	748	595	1	108	25	19	44	53	4	14
Newaygo	4	-	162	139	3	15	2	3	17	7	-	4
Oakland	137	8	3,912	3,165	30	510	110	97	209	278	18	89
Oceana	2	1	112	95	-	14	1	2	13	8	3	0
Ogemaw	3	-	101	78	-	13	9	1	8	16	-	2
Ontonagon	2	-	60	39	-	17	1	3	4	5	-	2
Osceola	2	-	86	63	-	18	3	2	8	7	-	2
Oscoda	3	1	50	37	-	11	1	1	4	3	2	0
Otsego	1	-	74	57	-	11	2	4	6	5	-	3
Ottawa	16	5	513	374	3	86	37	13	46	37	3	9
Presque Isle	1	-	86	67	-	14	2	3	7	3	2	1
Roscommon	1	1	134	111	1	15	6	1	6	10	1	3
Saginaw	39	2	900	698	7	149	25	21	41	65	6	15
St Clair	26	2	584	470	2	92	7	13	37	70	1	15
St Joseph	10	1	286	224	3	35	15	9	13	14	-	4
Sanilac	6	-	213	177	-	30	1	5	8	10	1	4
Schoolcraft	3	-	40	34	1	4	-	1	2	3	1	3
Shiawassee	12	-	267	186	2	67	9	3	18	26	1	6
Tuscola	8	-	252	201	2	39	6	4	10	17	4	2
Van Buren	13	3	312	245	1	44	6	16	20	29	1	10
Washtenaw	27	-	643	509	5	92	19	18	48	45	10	13
Wayne	408	22	10,732	8,883	85	1351	214	199	600	696	65	458
Wexford	3	1	112	79	1	21	7	4	15	8	-	1
Co Not Stated	-	-	4	3	-	1	0	-	-	-	-	0

Table 4.14  
Number of Deaths by Underlying Cause and County of Residence, Michigan, 1987 (Continued)

AREA	Neph- ritis, Neph- rotic Syndrome and Nephrosis	Compli- cations of Preg- nancy, Childbx and the puerper- ium	Congen- ital Anom- alies	Certain Conditions Origi- nating in the Perinatal Period	Symptoms, Signs, and Illi- defined Condi- tions	All Other Diseases	ACCIDENTS			Suicide	Homicide and Legal Inter- vention	All Other Ex- ternal Causes
							Total	Motor Vehicle	All Other			
Michigan	810	8	449	815	452	6412	3143	1725	1418	1084	1168	129
Alcona	3	-	2	1	-	9	3	2	1	2	1	1
Alger	1	-	-	-	-	2	3	2	1	1	1	-
Allegan	10	-	7	1	4	54	51	35	16	8	2	-
Alpena	2	-	1	2	-	29	13	7	6	3	-	-
Antrim	2	-	5	-	-	15	7	-	7	-	-	-
Arenac	1	-	-	1	1	5	10	7	3	1	1	-
Antrim	1	-	-	1	1	4	3	3	-	1	1	-
Arenac	2	-	-	1	1	53	23	15	8	7	3	-
Baraga	3	-	2	1	1	51	35	24	11	12	5	2
Barry	16	-	6	1	3	16	8	5	3	1	-	-
Bay	2	-	-	1	-	-	-	-	-	-	-	-
Benzie	2	-	-	1	-	-	-	-	-	-	-	-
Berrien	8	-	15	18	11	138	74	37	37	16	10	-
Branch	1	-	4	1	-	30	12	10	2	7	1	-
Calhoun	26	1	8	14	11	114	46	24	22	20	12	1
Cass	8	1	2	4	10	32	21	15	6	4	2	-
Charlevoix	3	-	1	1	1	11	16	8	8	3	-	-
Cheboygan	1	-	2	1	1	24	9	3	6	2	1	-
Chippewa	3	-	1	-	3	34	12	7	5	1	2	-
Clare	4	-	-	-	-	12	12	6	6	4	2	-
Clinton	6	-	-	2	6	22	16	8	8	2	2	-
Crawford	1	-	1	3	-	10	3	3	-	1	-	-
Delta	7	-	3	1	3	41	16	6	10	4	1	-
Dickinson	6	-	-	1	2	26	10	6	4	4	-	-
Eaton	6	-	8	8	4	50	32	22	10	5	1	-
Emmet	3	-	2	3	1	21	6	3	3	5	1	-
Genesee	39	-	24	42	22	264	163	91	72	50	64	4
Gladwin	6	-	-	3	-	12	9	5	4	6	-	-
Gogebic	5	-	1	-	1	15	15	6	9	-	-	-
Grand Traverse	-	-	3	2	4	48	16	6	10	9	-	-
Gratiot	5	-	2	2	2	28	19	15	4	2	1	-
Hillsdale	4	-	-	1	1	34	21	13	8	5	-	-
Houghton	3	-	4	-	1	26	18	8	10	7	-	-
Huron	6	-	1	-	3	18	15	8	7	2	-	-
Ingham	20	-	12	23	18	150	71	40	31	34	13	1
Ionia	4	-	5	1	-	40	18	12	6	2	1	-
Iosco	3	-	1	3	4	38	12	4	8	5	1	-
Iron	2	-	1	-	-	13	6	2	4	6	-	-
Isabella	1	-	3	1	1	17	13	7	6	8	-	-
Jackson	14	-	8	4	5	83	62	37	25	15	8	-
Kalamazoo	15	-	16	15	5	133	56	31	25	28	7	1
Kalkaska	1	-	1	1	2	8	6	5	1	-	-	-
Kent	33	1	33	39	18	331	163	103	60	43	22	4
Keweenaw	1	-	-	-	-	-	1	-	1	-	-	-
Lake	2	-	-	-	2	7	10	3	7	2	-	-

Table 4.14  
Number of Deaths by Underlying Cause and County of Residence, Michigan, 1987 (Continued)

AREA	Neph- ritis, Neph- rotic Syndrome and Nephrosis	Compli- cations of Preg- nancy, Childbx and the puerper- ium	Congen- ital Anom- alies	Certain Condi- tions Origin- ating in the perinatal period	Symptoms, Signs, and Illi- defined Condi- tions	All Other Diseases	ACCIDENTS			Suicide	Homicide and Legal Inter- vention	All Other Ex- ternal Causes
							Total	Motor Vehicle	All Other			
Lapeer	10	-	1	5	2	33	37	25	12	5	2	-
Leelanau	-	-	2	2	-	11	4	2	2	2	-	-
Lenawee	4	-	3	4	4	65	35	28	7	11	1	-
Livingston	8	-	5	3	5	48	55	36	19	10	1	-
Luce	-	-	1	-	-	7	5	1	4	1	-	1
Mackinac	1	-	1	3	-	5	6	4	2	3	1	-
Macomb	60	-	23	39	20	371	178	101	77	77	33	1
Manistee	-	-	1	2	3	19	11	9	2	4	-	-
Marquette	3	-	3	5	1	42	32	16	16	13	1	-
Mason	2	-	-	1	1	24	9	4	5	2	-	-
Mecosta	2	-	1	-	4	21	8	4	4	2	-	-
Menominee	-	-	2	-	3	22	18	10	8	5	1	-
Midland	3	-	4	5	5	24	25	19	6	6	4	-
Missaukee	1	-	1	-	1	7	3	3	-	5	5	1
Monroe	9	-	7	9	5	89	53	34	19	13	4	1
Montcalm	11	-	2	2	2	30	31	19	12	8	2	-
Montmorency	-	-	-	-	1	7	5	1	4	2	-	-
Muskegon	10	-	5	10	8	92	63	37	26	11	9	-
Newaygo	5	-	3	3	3	31	20	13	7	6	2	-
Oakland	58	-	34	74	38	617	263	144	119	114	77	28
Oceana	3	-	-	2	-	15	15	10	5	2	1	-
Ogemaw	1	-	1	-	-	14	9	3	6	2	1	-
Ontonagon	-	-	-	1	-	10	3	2	1	2	1	-
Osceola	1	-	-	1	1	10	12	7	5	2	1	-
Oscoda	-	-	1	-	1	8	2	1	1	-	-	-
Otsego	1	-	1	2	-	21	3	2	1	1	-	-
Ottawa	10	-	11	15	6	101	68	40	28	16	3	-
Presque Isle	1	-	1	3	2	21	7	4	3	2	-	-
Roscommon	3	-	-	-	-	15	7	4	3	4	-	-
Saginaw	20	1	11	21	5	144	85	40	45	26	29	-
St Clair	19	-	7	10	6	100	45	26	19	25	3	-
St Joseph	5	-	2	6	4	43	30	17	13	12	2	-
Sanilac	6	-	3	2	1	24	22	20	2	7	-	-
Schoolcraft	-	-	1	-	-	9	3	3	-	1	-	-
Shiawassee	8	-	4	2	4	48	14	9	5	9	2	-
Tuscola	13	-	2	5	3	32	40	19	21	5	-	-
Van Buren	5	-	5	5	3	61	36	23	13	8	6	-
Washtenaw	13	-	9	23	20	163	62	25	37	35	14	-
Wayne	231	4	105	343	138	1902	660	293	367	285	799	80
Wexford	-	-	-	2	1	14	20	9	11	2	1	-
CO Not Stated	-	-	1	2	-	1	4	4	-	-	5	2



Table 4.15  
Reported Cases of Certain Communicable Diseases by County  
Michigan Residents, 1987

AREA	TOTAL	GONOR- RHEA	CHICK- EN POX	HEPA- TITIS (ALL TYPES)	SAMO- NELLA INFE- CTIONS	TUBER- CULO- SIS	SYPHI- LIS	MUMPS	DYSEN- TERY BACIL- LARY	MEAS- LES	RU- BELLA	MENIN- GOCO- CAL INFE- CTIONS	WHOOP- ING COUGH
Michigan	86,597	37,348	43,698	1,610	1,436	540	621	1,108	31	32	9	111	53
Alcona	44	7	35	-	-	2	-	-	-	-	-	-	-
Alger	4	4	-	-	-	3	1	1	-	-	-	-	1
Allegan	226	37	166	10	7	3	-	-	-	-	-	-	-
Alpena	494	9	472	2	6	2	-	-	1	-	1	1	1
Antrim	57	6	40	3	1	1	-	5	-	-	-	-	-
Arenac	11	1	6	-	1	3	-	-	-	-	-	-	-
Arenac	122	-	122	-	-	-	-	-	-	-	-	-	-
Baraga	274	50	206	6	6	1	1	2	-	-	-	2	1
Barry	692	67	570	4	17	9	2	-	-	-	-	-	-
Bay	90	1	89	-	-	-	-	-	-	-	-	-	-
Benzie	-	-	-	-	-	-	-	-	-	-	-	-	-
Berrien	2,873	1,032	1,673	39	26	10	5	81	2	-	-	5	3
Branch	156	44	97	6	4	-	1	1	-	-	-	1	-
Calhoun	849	454	303	17	21	6	1	44	-	-	-	3	-
Cass	398	82	285	5	14	-	2	9	1	-	-	3	1
Charlevoix	285	1	268	9	2	1	-	-	-	-	-	-	-
Cheboygan	19	-	17	-	1	1	1	-	-	-	-	-	-
Cheboygan	16	15	-	-	1	-	-	-	-	-	-	-	-
Chippewa	46	3	22	13	6	-	-	2	-	-	-	-	-
Clare	46	3	128	17	8	-	-	3	-	-	-	-	-
Clinton	182	26	19	2	-	1	-	1	-	-	-	1	-
Crawford	27	3	-	-	-	-	-	-	-	-	-	-	-
Delta	168	40	112	6	9	-	-	-	-	-	-	-	-
Dickinson	89	5	77	1	4	2	-	-	-	-	-	-	-
Eaton	436	80	316	20	19	-	-	1	-	-	-	-	-
Emmet	52	17	31	2	1	-	1	-	-	-	-	-	-
Genesee	4,214	2,904	1,136	31	56	16	11	57	1	-	-	1	1
Gladwin	95	3	85	-	1	5	-	1	-	-	-	-	-
Gladwin	297	1	295	-	1	-	-	-	-	-	-	-	-
Gogebic	446	27	385	12	16	3	1	-	2	-	-	-	-
Gd Traverse	255	20	216	3	8	1	-	4	1	-	-	1	1
Gratiot	152	16	118	6	10	-	-	-	-	-	-	2	-
Hillsdale	-	-	-	-	-	-	-	-	-	-	-	-	-
Houghton	175	34	132	-	6	2	1	-	-	-	-	-	-
Huron	119	2	105	1	9	1	1	-	-	-	-	-	-
Ingham	2,606	1,311	1,072	137	52	13	16	1	1	-	-	1	2
Ionia	531	44	455	14	3	1	-	6	-	-	7	1	-
Ionia	87	12	67	-	1	1	-	1	1	-	-	1	3
Iosco	56	3	51	-	-	2	-	-	-	-	-	-	-
Iron	310	27	256	1	16	2	1	6	1	-	-	-	-
Isabella	893	411	435	9	14	7	10	2	-	-	-	1	1
Jackson	2,419	1,106	1,221	41	38	6	2	2	-	-	-	2	-
Kalamazoo	81	3	66	5	6	1	-	-	-	-	-	-	-
Kalamazoo	-	-	-	-	-	-	-	-	-	-	-	-	-
Kalkaska	-	-	-	-	-	-	-	-	-	-	-	-	-
Kent	4,186	2,347	1,595	115	65	27	16	7	5	-	-	7	2
Keweenaw	1	1	-	-	-	-	-	-	-	-	-	-	-
Lake	17	15	-	2	-	-	-	-	-	-	-	-	-
Lapeer	815	10	730	5	9	3	-	56	-	-	1	1	-

Table 4.15 (Continued)

AREA	TOTAL	GONOR- RHEA	CHICK- EN POX	HEPA- TITIS (ALL TYPES)	SAMO- NELLA INFECTIONS	TUBER- CULOSIS	SYPHI- LIS	MUMPS	DYSEN- TERY BACIL- LARY	MEAS- LES	RU- BELLA	MENIN- GOCOCCAL INFECTIONS	WHOOP- ING COUGH
Leelanau	75	3	67	1	4	-	-	-	-	-	-	-	-
Lenawee	528	74	422	10	10	4	1	2	-	2	-	3	-
Livingston	412	29	357	7	11	-	2	4	-	-	-	1	1
Luce	10	10	-	-	-	-	-	-	-	-	-	-	-
Mackinac	18	8	10	-	-	-	-	-	-	-	-	-	-
Macomb	3,611	625	2,661	126	97	24	8	55	2	-	-	11	2
Manistee	232	4	226	1	-	1	-	-	-	-	-	-	-
Marquette	680	76	584	5	14	1	-	-	-	-	-	-	-
Mason	428	14	409	2	1	1	1	-	-	-	-	-	-
Mecosta	177	56	109	2	2	-	3	-	1	-	-	-	4
Menominee	75	4	68	-	1	1	-	-	-	-	-	-	1
Midland	177	28	134	3	7	1	2	-	-	-	-	1	1
Missaukee	48	1	42	2	-	-	-	3	-	-	-	-	2
Monroe	887	61	756	7	54	4	2	1	-	-	-	2	-
Montcalm	82	18	49	8	1	1	3	-	-	-	-	-	-
Montmorency	18	-	15	1	-	-	2	-	-	-	-	-	-
Muskegon	1,178	541	534	57	37	2	4	1	-	-	-	1	1
Newaygo	328	24	291	2	4	-	-	1	-	3	-	-	3
Oakland	8,465	1,846	6,058	233	172	43	32	68	-	2	-	7	4
Oceana	83	10	53	12	-	6	1	-	-	-	-	1	-
Ogemaw	86	2	75	2	-	2	1	4	-	-	-	-	-
Ontonagon	38	1	37	-	-	1	-	-	-	-	-	-	-
Osceola	70	7	57	5	1	1	-	-	-	-	-	-	-
Oscoda	8	4	2	-	1	1	-	-	-	-	-	-	-
Otsego	128	3	114	2	4	1	-	1	-	-	-	2	1
Ottawa	1,043	99	884	23	22	6	1	2	1	-	-	3	2
Presque Isle	17	-	10	-	5	-	2	-	-	-	-	-	-
Roscommon	55	1	51	-	3	-	-	-	-	-	-	-	-
Saginaw	2,685	1,373	1,185	44	39	13	15	12	-	-	-	2	2
St Clair	681	202	424	17	17	8	2	8	2	-	-	-	1
St Joseph	789	76	662	44	6	-	1	-	-	-	-	-	-
Sanilac	119	8	100	4	2	3	-	2	-	-	-	-	-
Schoolcraft	2	2	-	-	-	-	-	-	-	-	-	-	-
Shiawassee	476	19	446	5	2	-	-	2	-	-	-	2	-
Tuscola	393	22	356	2	7	2	-	3	-	-	-	-	1
Van Buren	494	88	384	4	14	1	2	-	-	-	-	1	-
Washtenaw	1,001	680	188	45	43	11	16	11	5	-	-	1	1
Wayne	35,526	21,043	12,307	388	388	269	446	610	4	25	-	37	9
Wexford	109	5	97	2	4	-	-	-	-	-	-	1	-

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
	<b>I. INFECTIOUS AND PARASITIC DISEASES (001-139)</b>	
8	Intestinal infections due to other organisms . . . . .	4
9	Ill-defined intestinal infections . . . . .	4
11	Pulmonary tuberculosis . . . . .	39
15	Tuberculosis of bones and joints . . . . .	1
18	Miliary tuberculosis . . . . .	6
23	Brucellosis . . . . .	1
27	Other zoonotic bacterial diseases . . . . .	5
31	Diseases due to other mycobacteria . . . . .	2
35	Erysipelas . . . . .	1
36	Meningococcal infection . . . . .	7
38	Septicemia . . . . .	733
39	Actinomycotic infections . . . . .	4
40	Other bacterial diseases . . . . .	6
41	Bacterial infection in conditions classified elsewhere and of unspecified site . . . . .	7
42	Human Immunodeficiency Virus Infection With Specified Conditions . . . . .	155
43	Human Immunodeficiency Virus Infection Causing Other Specified Conditions . . . . .	2
44	Other Human Immunodeficiency Virus Infection . . . . .	3
46	Slow virus infection of central nervous system . . . . .	4
47	Meningitis due to enterovirus . . . . .	1
48	Other enterovirus diseases of central nervous system . . . . .	1
49	Other non-arthropod-borne viral diseases of central nervous system . . . . .	1
52	Chickenpox . . . . .	1
53	Herpes zoster . . . . .	2
54	Herpes simplex . . . . .	7
62	Mosquito-borne viral encephalitis . . . . .	1
70	Viral hepatitis . . . . .	27
78	Other diseases due to viruses and Chlamydiae . . . . .	5
79	Viral infection in conditions classified elsewhere and of unspecified site . . . . .	12
90	Congenital syphilis . . . . .	1
94	Neurosyphilis . . . . .	1
112	Candidiasis . . . . .	31
115	Histoplasmosis . . . . .	1
116	Blastomycotic infection . . . . .	1
117	Other mycoses . . . . .	29
135	Sarcoidosis . . . . .	12
136	Other and unspecified infectious and parasitic diseases . . . . .	26
137	Late effects of tuberculosis . . . . .	6
138	Late effects of acute poliomyelitis . . . . .	6
	<b>II. NEOPLASMS (140-239)</b>	
140	Malignant neoplasm of lip . . . . .	1
141	Malignant neoplasm of tongue . . . . .	52
142	Malignant neoplasm of major salivary glands . . . . .	18
143	Malignant neoplasm of gum . . . . .	3
144	Malignant neoplasm of floor of mouth . . . . .	15
145	Malignant neoplasm of other and unspecified parts of mouth . . . . .	50
146	Malignant neoplasm of oropharynx . . . . .	38
147	Malignant neoplasm of nasopharynx . . . . .	22
148	Malignant neoplasm of hypopharynx . . . . .	9
149	Malignant neoplasm of other and ill-defined sites within the lip, oral cavity and pharynx. . . . .	52
150	Malignant neoplasm of oesophagus . . . . .	334
151	Malignant neoplasm of stomach . . . . .	502
152	Malignant neoplasm of small intestine, including duodenum . . . . .	35
153	Malignant neoplasm of colon . . . . .	1608
154	Malignant neoplasm of rectum, rectosigmoid junction and anus . . . . .	305
155	Malignant neoplasm of liver and intrahepatic bile ducts . . . . .	273
156	Malignant neoplasm of gallbladder and extrahepatic bile ducts . . . . .	150
157	Malignant neoplasm of pancreas . . . . .	829
158	Malignant neoplasm of retroperitoneum and peritoneum . . . . .	22
159	Malignant neoplasm of other and ill-defined sites within the digestive	

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
	organs and peritoneum . . . . .	85
160	Malignant neoplasm of nasal cavities, middle ear and accessory sinuses . . . . .	18
161	Malignant neoplasm of larynx . . . . .	138
162	Malignant neoplasm of trachea, bronchus and lung . . . . .	4836
163	Malignant neoplasm of pleura . . . . .	12
164	Malignant neoplasm of thymus, heart and mediastinum . . . . .	12
170	Malignant neoplasm of bone and articular cartilage . . . . .	36
171	Malignant neoplasm of connective and other soft tissue . . . . .	120
172	Malignant melanoma of skin . . . . .	175
173	Other malignant neoplasm of skin . . . . .	60
174	Malignant neoplasm of female breast . . . . .	1573
175	Malignant neoplasm of male breast . . . . .	10
179	Malignant neoplasm of uterus, part unspecified . . . . .	119
180	Malignant neoplasm of cervix uteri . . . . .	148
182	Malignant neoplasm of body of uterus . . . . .	126
183	Malignant neoplasm of ovary and other uterine adnexa . . . . .	482
184	Malignant neoplasm of other and unspecified female genital organs . . . . .	34
185	Malignant neoplasm of prostate . . . . .	1079
186	Malignant neoplasm of testis . . . . .	20
187	Malignant neoplasm of penis and other male genital organs . . . . .	8
188	Malignant neoplasm of bladder . . . . .	379
189	Malignant neoplasm of kidney and other and unspecified urinary organs . . . . .	391
190	Malignant neoplasm of eye . . . . .	11
191	Malignant neoplasm of brain . . . . .	463
192	Malignant neoplasm of other and unspecified parts of nervous system . . . . .	4
193	Malignant neoplasm of thyroid gland . . . . .	31
194	Malignant neoplasm of other endocrine glands and related structures . . . . .	28
195	Malignant neoplasm of other and ill-defined sites . . . . .	122
199	Malignant neoplasm without specification of site . . . . .	1141
200	Lymphosarcoma and reticulosarcoma . . . . .	104
201	Hodgkin's disease . . . . .	80
202	Other malignant neoplasm of lymphoid and histiocytic tissue . . . . .	561
203	Multiple myeloma and immunoproliferative neoplasms . . . . .	298
204	Lymphoid leukemia . . . . .	179
205	Myeloid leukemia . . . . .	269
206	Monocytic leukemia . . . . .	14
207	Other specified leukemia . . . . .	10
208	Leukemia of unspecified cell type . . . . .	175
211	Benign neoplasm of other parts of digestive system . . . . .	7
212	Benign neoplasm of respiratory and intrathoracic organs . . . . .	4
213	Benign neoplasm of bone and articular cartilage . . . . .	1
214	Lipoma . . . . .	1
215	Other benign neoplasm of connective and other soft tissue . . . . .	1
225	Benign neoplasm of brain and other parts of nervous system . . . . .	34
227	Benign neoplasm of other endocrine glands and related structures . . . . .	5
228	Hemangioma and lymphangioma, any site . . . . .	4
229	Benign neoplasm of other and unspecified sites . . . . .	3
230	Carcinoma in situ of digestive organs . . . . .	1
231	Carcinoma in situ of respiratory system . . . . .	1
235	Neoplasm of uncertain behavior of digestive and respiratory systems . . . . .	5
236	Neoplasm of uncertain behavior of genitourinary organs . . . . .	1
237	Neoplasm of uncertain behavior of endocrine glands and nervous system . . . . .	8
238	Neoplasm of uncertain behavior of other and unspecified sites and tissues . . . . .	32
239	Neoplasm of unspecified nature . . . . .	41
	III. ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES AND IMMUNITY DISORDERS (240-279)	
241	Nontoxic nodular goitre . . . . .	1
242	Thyrotoxicosis with or without goitre . . . . .	4
244	Acquired hypothyroidism . . . . .	14
246	Other disorders of thyroid . . . . .	2
250	Diabetes mellitus . . . . .	1479
251	Other disorders of pancreatic internal secretion . . . . .	5
252	Disorders of parathyroid gland . . . . .	3

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
253	Disorders of the pituitary gland and its hypothalamic control . . . . .	3
255	Disorders of adrenal glands . . . . .	7
259	Other endocrine disorders . . . . .	4
261	Nutritional marasmus . . . . .	13
263	Other and unspecified protein-calorie malnutrition . . . . .	81
265	Thiamine and niacin deficiency states . . . . .	1
269	Other nutritional deficiencies . . . . .	6
270	Disorders of amino-acid transport and metabolism . . . . .	1
271	Disorders of carbohydrate transport and metabolism . . . . .	1
272	Disorders of lipid metabolism . . . . .	20
273	Disorders of plasma protein metabolism . . . . .	17
274	Gout . . . . .	2
275	Disorders of mineral metabolism . . . . .	13
276	Disorders of fluid, electrolyte and acid-base balance . . . . .	220
277	Other and unspecified disorders of metabolism . . . . .	47
278	Obesity and other hyperalimentation . . . . .	55
279	Disorders involving the immune mechanism . . . . .	14
IV. DISEASES OF BLOOD AND BLOOD-FORMING ORGANS (280-289)		
280	Iron deficiency anemias . . . . .	4
281	Other deficiency anemias . . . . .	8
282	Hereditary hemolytic anemias . . . . .	28
283	Acquired hemolytic anemias . . . . .	7
284	Aplastic anemia . . . . .	53
285	Other and unspecified anemias . . . . .	50
286	Coagulation defects . . . . .	43
287	Purpura and other hemorrhagic conditions . . . . .	23
288	Diseases of white blood cells . . . . .	29
289	Other diseases of blood and blood-forming organs . . . . .	83
V. MENTAL DISORDERS (290-319)		
290	Senile and presenile organic psychotic conditions . . . . .	113
291	Alcoholic psychoses . . . . .	17
293	Transient organic psychotic conditions . . . . .	1
295	Schizophrenic psychoses . . . . .	7
296	Affective psychoses . . . . .	2
298	Other nonorganic psychoses . . . . .	50
300	Neurotic disorders . . . . .	4
303	Alcohol dependence syndrome . . . . .	104
304	Drug dependence . . . . .	10
305	Nondependent abuse of drugs . . . . .	299
306	Physiological malfunction arising from mental factors . . . . .	1
307	Special symptoms or syndromes not elsewhere classified . . . . .	4
308	Acute reaction to stress . . . . .	1
309	Adjustment reaction . . . . .	1
310	Specific nonpsychotic mental disorders following organic brain damage . . . . .	166
311	Depressive disorder, not elsewhere classified . . . . .	7
318	Other specified mental retardation . . . . .	2
319	Unspecified mental retardation . . . . .	8
VI. DISEASES OF THE NERVOUS SYSTEM AND SENSE ORGANS (320-389)		
320	Bacterial meningitis . . . . .	21
322	Meningitis of unspecified cause . . . . .	16
323	Encephalitis, myelitis and encephalomyelitis . . . . .	14
324	Intracranial and intraspinal abscess . . . . .	5
326	Late effects of intracranial abscess or pyogenic infection . . . . .	3
330	Cerebral degenerations usually manifest in childhood . . . . .	3
331	Other cerebral degenerations . . . . .	324
332	Parkinson's disease . . . . .	188
333	Other extrapyramidal disease and abnormal movement disorders . . . . .	27
334	Spinocerebellar disease . . . . .	9

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
335	Anterior horn cell disease . . . . .	141
336	Other diseases of spinal cord . . . . .	9
340	Multiple sclerosis . . . . .	78
341	Other demyelinating diseases of central nervous system . . . . .	2
342	Hemiplegia . . . . .	6
343	Infantile cerebral palsy . . . . .	28
344	Other paralytic syndromes . . . . .	30
345	Epilepsy . . . . .	86
348	Other conditions of brain . . . . .	137
349	Other and unspecified disorders of the nervous system . . . . .	7
355	Mononeuritis of lower limb . . . . .	3
356	Hereditary and idiopathic peripheral neuropathy . . . . .	18
357	Inflammatory and toxic neuropathy . . . . .	8
358	Myoneural disorders . . . . .	16
359	Muscular dystrophies and other myopathies . . . . .	31
380	Disorders of external ear . . . . .	1
382	Suppurative and unspecified otitis media . . . . .	4
VII. DISEASES OF THE CIRCULATORY SYSTEM (390-459)		
390	Rheumatic fever without mention of heart involvement . . . . .	1
391	Rheumatic fever with heart involvement . . . . .	3
394	Diseases of mitral valve . . . . .	118
395	Diseases of aortic valve . . . . .	6
396	Diseases of mitral and aortic valves . . . . .	39
397	Diseases of other endocardial structures . . . . .	20
398	Other rheumatic heart disease . . . . .	63
401	Essential hypertension . . . . .	124
402	Hypertensive heart disease . . . . .	649
403	Hypertensive renal disease . . . . .	140
404	Hypertensive heart and renal disease . . . . .	97
410	Acute myocardial infarction . . . . .	10285
411	Other acute and subacute form of ischemic heart disease . . . . .	64
412	Old myocardial infarction . . . . .	40
413	Angina pectoris . . . . .	44
414	Other forms of chronic ischemic heart disease . . . . .	10750
415	Acute pulmonary heart disease . . . . .	284
416	Chronic pulmonary heart disease . . . . .	74
417	Other diseases of pulmonary circulation . . . . .	2
420	Acute pericarditis . . . . .	4
421	Acute and subacute endocarditis . . . . .	33
422	Acute myocarditis . . . . .	12
423	Other diseases of pericardium . . . . .	16
424	Other diseases of endocardium . . . . .	361
425	Cardiomyopathy . . . . .	713
426	Conduction disorders . . . . .	35
427	Cardiac dysrhythmias . . . . .	1405
428	Heart failure . . . . .	1542
429	Ill-defined descriptions and complications of heart disease . . . . .	3861
430	Subarachnoid hemorrhage . . . . .	278
431	Intracerebral hemorrhage . . . . .	678
432	Other and unspecified intracranial hemorrhage . . . . .	135
433	Occlusion and stenosis of precerebral arteries . . . . .	60
434	Occlusion of cerebral arteries . . . . .	1055
435	Transient cerebral ischemia . . . . .	13
436	Acute but ill-defined cerebrovascular disease . . . . .	2538
437	Other and ill-defined cerebrovascular disease . . . . .	390
438	Late effects of cerebrovascular disease . . . . .	334
440	Atherosclerosis . . . . .	1168
441	Aortic aneurysm . . . . .	654
442	Other aneurysm . . . . .	18
443	Other peripheral vascular disease . . . . .	105
444	Arterial embolism and thrombosis . . . . .	57
446	Polyarteritis nodosa and allied conditions . . . . .	32

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
447	Other disorders of arteries and arterioles . . . . .	41
448	Diseases of capillaries . . . . .	2
451	Phlebitis and thrombophlebitis . . . . .	69
452	Portal vein thrombosis . . . . .	6
453	Other venous embolism and thrombosis . . . . .	15
454	Varicose veins of lower extremities . . . . .	7
455	Hemorrhoids . . . . .	1
456	Varicose veins of other sites . . . . .	17
457	Noninfective disorders of lymphatic channels . . . . .	1
458	Hypotension . . . . .	44
459	Other disorders of circulatory system . . . . .	27
VIII. DISEASES OF THE RESPIRATORY SYSTEM (460-519)		
463	Acute tonsillitis . . . . .	1
464	Acute laryngitis and tracheitis . . . . .	4
465	Acute upper respiratory infections of multiple or unspecified sites . . . . .	7
466	Acute bronchitis and bronchiolitis . . . . .	17
473	Chronic sinusitis . . . . .	2
478	Other diseases of upper respiratory tract . . . . .	8
480	Viral pneumonia . . . . .	35
481	Pneumococcal pneumonia . . . . .	76
482	Other bacterial pneumonia . . . . .	89
483	Pneumonia due to other specified organism . . . . .	7
485	Bronchopneumonia, organism unspecified . . . . .	161
486	Pneumonia, organism unspecified . . . . .	1986
487	Influenza . . . . .	23
490	Bronchitis, not specified as acute or chronic . . . . .	27
491	Chronic bronchitis . . . . .	98
492	Emphysema . . . . .	681
493	Asthma . . . . .	166
494	Bronchiectasis . . . . .	18
496	Chronic airways obstruction, not elsewhere classified . . . . .	1878
500	Coalworkers' pneumoconiosis . . . . .	6
501	Asbestosis . . . . .	5
502	Pneumoconiosis due to other silica or silicates . . . . .	9
505	Pneumoconiosis, unspecified . . . . .	2
506	Respiratory conditions due to chemical fumes and vapors . . . . .	1
507	Pneumonitis due to solids and liquids . . . . .	240
508	Respiratory conditions due to other and unspecified external agents . . . . .	3
510	Empyema . . . . .	19
511	Pleurisy . . . . .	31
512	Pneumothorax . . . . .	11
513	Abscess of lung and mediastinum . . . . .	37
514	Pulmonary congestion and hypostasis . . . . .	31
515	Postinflammatory pulmonary fibrosis . . . . .	188
516	Other alveolar and parietoalveolar pneumopathy . . . . .	42
518	Other diseases of lung . . . . .	194
519	Other diseases of respiratory system . . . . .	40
IX. DISEASES OF THE DIGESTIVE SYSTEM (520-579)		
522	Diseases of pulp and periapical tissues . . . . .	2
527	Diseases of the salivary glands . . . . .	2
528	Diseases of the oral soft tissues, excluding lesions specific for gingiva and tongue . . . . .	58
530	Diseases of oesophagus . . . . .	76
531	Gastric ulcer . . . . .	73
532	Duodenal ulcer . . . . .	84
533	Peptic ulcer, site unspecified . . . . .	2
534	Gastrojejunal ulcer . . . . .	29
535	Gastritis and duodenitis . . . . .	3
536	Disorders of function of stomach . . . . .	18
537	Other disorders of stomach and duodenum . . . . .	23
540	Acute appendicitis . . . . .	

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
541	Appendicitis, unqualified	
550	Inguinal hernia	2
551	Other hernia of abdominal cavity, with gangrene	7
552	Other hernia of abdominal cavity with obstruction, without mention of gangrene	1
553	Other hernia of abdominal cavity without mention of obstruction or gangrene	17
555	Regional enteritis	21
556	Idiopathic proctocolitis	10
557	Vascular insufficiency of intestine	14
558	Other noninfective gastroenteritis and colitis	236
560	Intestinal obstruction without mention of hernia	39
562	Diverticula of intestine	152
564	Functional digestive disorders, not elsewhere classified	89
566	Abscess of anal and rectal regions	5
567	Peritonitis	3
568	Other disorders of peritoneum	56
569	Other disorders of intestine	7
570	Acute and subacute necrosis of liver	66
571	Chronic liver disease and cirrhosis	22
572	Liver abscess and sequelae of chronic liver disease	1099
573	Other disorders of liver	155
574	Cholelithiasis	42
575	Other disorders of gallbladder	40
576	Other disorders of biliary tract	66
577	Diseases of pancreas	36
578	Gastrointestinal hemorrhage	99
579	Intestinal malabsorption	198
		2
X. DISEASES OF THE GENITOURINARY SYSTEM (580-629)		
580	Acute glomerulonephritis	
581	Nephrotic syndrome	4
582	Chronic glomerulonephritis	8
583	Nephritis and nephropathy, not specified as acute or chronic	43
584	Acute renal failure	10
585	Chronic renal failure	133
586	Renal failure, unspecified	195
587	Renal sclerosis, unspecified	413
588	Disorders resulting from impaired renal function	2
590	Infections of kidney	2
591	Hydronephrosis	53
592	Calculus of kidney and ureter	4
593	Other disorders of kidney and ureter	8
594	Calculus of lower urinary tract	67
595	Cystitis	1
596	Other disorders of bladder	8
598	Urethral stricture	5
599	Other disorders of urethra and urinary tract	4
600	Hyperplasia of prostate	352
602	Other disorders of prostate	10
608	Other disorders of male genital organs	6
611	Other disorders of breast	2
614	Inflammatory disease of ovary, fallopian tube, pelvic cellular tissue and peritoneum	2
620	Noninflammatory disorders of ovary, fallopian tube and broad ligament	2
622	Noninflammatory disorders of cervix	1
626	Disorders of menstruation and other abnormal bleeding from female genital tract	1
		1
XI. COMPLICATIONS OF PREGNANCY, CHILDBIRTH, AND THE PUERPERIUM (630-676)		
633	Ectopic pregnancy	
641	Antepartum hemorrhage, abruptio placentae, and placenta praevia	1
642	Hypertension complicating pregnancy, childbirth and the puerperium	1
646	Other complications of pregnancy, not elsewhere classified	4
674	Other and unspecified complications of the puerperium, not elsewhere classified	1
		1



Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
XII. DISEASES OF THE SKIN AND SUBCUTANEOUS TISSUE (680-709)		
682	Other cellulitis and abscess . . . . .	24
686	Other local infections of skin and subcutaneous tissue . . . . .	2
694	Bullous dermatoses . . . . .	2
695	Erythematous conditions . . . . .	11
707	Chronic ulcer of skin . . . . .	108
XIII. DISEASES OF THE MUSCULOSKELETAL SYSTEM AND CONNECTIVE TISSUE (710-739)		
710	Diffuse diseases of connective tissue . . . . .	71
711	Arthropathy associated with infections . . . . .	3
714	Rheumatoid arthritis and other inflammatory polyarthropathies . . . . .	39
715	Osteoarthritis and allied disorders . . . . .	19
716	Other and unspecified arthropathies . . . . .	4
720	Ankylosing spondylitis and other inflammatory spondylopathies . . . . .	2
721	Spondylosis and allied disorders . . . . .	2
722	Intervertebral disc disorders . . . . .	3
724	Other and unspecified disorders of back . . . . .	1
728	Disorders of muscle, ligament and fascia . . . . .	8
729	Other disorders of soft tissues . . . . .	16
730	Osteomyelitis, periostitis and other infections involving bone . . . . .	19
731	Osteitis deformans and osteopathies associated with other disorders classified elsewhere . . . . .	1
732	Osteochondropathies . . . . .	1
733	Other disorders of bone and cartilage . . . . .	14
737	Curvature of spine . . . . .	4
XIV. CONGENITAL ANOMALIES (740-759)		
740	Anencephalus and similar anomalies . . . . .	14
741	Spina bifida . . . . .	9
742	Other congenital anomalies of nervous system . . . . .	45
745	Bulbus cordis anomalies and anomalies of cardiac septal closure . . . . .	39
746	Other congenital anomalies of heart . . . . .	112
747	Other congenital anomalies of circulatory system . . . . .	37
748	Congenital anomalies of respiratory system . . . . .	40
750	Other congenital anomalies of upper alimentary tract . . . . .	1
751	Other congenital anomalies of digestive system . . . . .	4
753	Congenital anomalies of urinary system . . . . .	27
754	Certain congenital musculoskeletal deformities . . . . .	2
756	Other congenital musculoskeletal anomalies . . . . .	19
757	Congenital anomalies of the integument . . . . .	1
758	Chromosomal anomalies . . . . .	57
759	Other and unspecified congenital anomalies . . . . .	42
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 . . . . .	4
761	Fetus or newborn affected by maternal complications of pregnancy . . . . .	65
762	Fetus or newborn affected by complications of placenta, cord and membranes . . . . .	32
763	Fetus or newborn affected by other complications of labor and delivery . . . . .	2
765	Disorders relating to short gestation and unspecified low birthweight . . . . .	204
767	Birth trauma . . . . .	7
768	Intrauterine hypoxia and birth asphyxia . . . . .	29
769	Respiratory distress syndrome . . . . .	125
770	Other respiratory conditions of fetus and newborn . . . . .	161
771	Infections specific to the perinatal period . . . . .	27
772	Fetal and neonatal hemorrhage . . . . .	12
776	Hematological disorders of fetus and newborn . . . . .	3
777	Perinatal disorders of digestive system . . . . .	12
778	Conditions involving the integument and temperature regulation of fetus and newborn . . . . .	5

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
779	Other and ill-defined conditions originating in the perinatal period . . . . .	127
	XVI. SYMPTOMS, SIGNS AND ILL-DEFINED CONDITIONS (780-799)	
780	General symptoms . . . . .	18
783	Symptoms concerning nutrition, metabolism and development . . . . .	2
785	Symptoms involving cardiovascular system . . . . .	30
786	Symptoms involving respiratory system and other chest symptoms . . . . .	7
788	Symptoms involving urinary system . . . . .	1
789	Other symptoms involving abdomen and pelvis . . . . .	1
790	Nonspecific findings on examination of blood . . . . .	1
797	Senility without mention of psychosis . . . . .	18
798	Sudden death, cause unknown . . . . .	252
799	Other ill-defined and unknown causes of morbidity and mortality . . . . .	122
	EXVII. EXTERNAL CAUSES OF INJURY AND POISONING (E800-E999)	
E805	Hit by rolling stock . . . . .	9
E810	Motor vehicle traffic accident involving collision with train . . . . .	23
E812	Other motor vehicle traffic accident involving collision with another motor vehicle . . . . .	791
E813	Motor vehicle traffic accident involving collision with other vehicle . . . . .	41
E814	Motor vehicle traffic accident involving collision with pedestrian . . . . .	234
E815	Other motor vehicle traffic accident involving collision on the highway . . . . .	181
E816	Motor vehicle traffic accident due to loss of control, without collision on the highway. . . . .	305
E818	Other noncollision motor vehicle traffic accident . . . . .	30
E819	Motor vehicle traffic accident of unspecified nature . . . . .	77
E820	Nontraffic accident involving motor-driven snow vehicle . . . . .	6
E821	Nontraffic accident involving other off-road motor vehicle . . . . .	7
E822	Other motor vehicle nontraffic accident involving collision with moving object . . . . .	13
E823	Other motor vehicle nontraffic accident involving collision with stationary object . . . . .	6
E824	Other motor vehicle nontraffic accident while boarding and alighting . . . . .	1
E825	Other motor vehicle nontraffic accident of other and unspecified nature . . . . .	10
E826	Pedal cycle accident . . . . .	1
E828	Accident involving animal being ridden . . . . .	4
E830	Accident to watercraft causing submersion . . . . .	17
E832	Other accidental submersion or drowning in water transport accident . . . . .	12
E834	Other fall from one level to another in water transport . . . . .	1
E838	Other and unspecified water transport accident . . . . .	5
E841	Accident to powered aircraft, other and unspecified . . . . .	50
E850	Accidental poisoning by analgesics, antipyretics, antirheumatics . . . . .	13
E852	Accidental poisoning by other sedatives and hypnotics . . . . .	1
E853	Accidental poisoning by tranquilizers . . . . .	2
E854	Accidental poisoning by other psychotropic agents . . . . .	1
E855	Accidental poisoning by other drugs acting on central and autonomic nervous systems . . . . .	13
E856	Accidental poisoning by antibiotics . . . . .	1
E858	Accidental poisoning by other drugs . . . . .	55
E860	Accidental poisoning by alcohol, not elsewhere classified . . . . .	6
E862	Accidental poisoning by petroleum products, other solvents and their vapors, not elsewhere classified. . . . .	5
E866	Accidental poisoning by other and unspecified solid and liquid substances . . . . .	1
E867	Accidental poisoning by gas distributed by pipeline . . . . .	1
E868	Accidental poisoning by other utility gas and other carbon monoxide . . . . .	39
E869	Accidental poisoning by other gases and vapors . . . . .	4
E870	Accidental cut, puncture, perforation or hemorrhage during medical care . . . . .	7
E874	Mechanical failure of instrument or apparatus during procedure . . . . .	1
E876	Other and unspecified misadventures during medical care . . . . .	6
E878	Surgical operation and other surgical procedures as the cause of abnormal reaction of patient, or of later complication, without mention of misadven. . . . .	62
E879	Other procedures, without mention of misadventure at the time of procedure, as the cause of abnormal reaction of patient, or of later complication. . . . .	21
E880	Fall on or from stairs or steps . . . . .	43
E881	Fall on or from ladders or scaffolding . . . . .	8
E882	Fall from or out of building or other structure . . . . .	16

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
E883	Fall into hole or other opening in surface . . . . .	5
E884	Other fall from one level to another . . . . .	25
E885	Fall on same level from slipping, tripping or stumbling . . . . .	6
E887	Fracture, cause unspecified . . . . .	94
E888	Other and unspecified fall . . . . .	150
E890	Conflagration in private dwelling . . . . .	151
E891	Conflagration in other and unspecified building or structure . . . . .	2
E892	Conflagration not in building or structure . . . . .	1
E893	Accident caused by ignition of clothing . . . . .	4
E894	Ignition of highly inflammable material . . . . .	2
E898	Accident caused by other specified fire and flames . . . . .	3
E899	Accident caused by unspecified fire . . . . .	6
E900	Excessive heat . . . . .	3
E901	Excessive cold . . . . .	19
E903	Travel and motion . . . . .	1
E904	Hunger, thirst, exposure, neglect . . . . .	14
E905	Venomous animals and plants as the cause of poisoning and toxic reactions . . . . .	6
E906	Other injury caused by animals . . . . .	2
E907	Lightning . . . . .	2
E908	Cataclysmic storms, and floods resulting from storms . . . . .	5
E910	Accidental drowning and submersion . . . . .	135
E911	Inhalation and ingestion of food causing obstruction of respiratory tract or suffocation . . . . .	66
E912	Inhalation and ingestion of other object causing obstruction of respiratory tract or suffocation . . . . .	76
E913	Accidental mechanical suffocation . . . . .	29
E915	Foreign body accidentally entering other orifice . . . . .	1
E916	Struck accidentally by falling object . . . . .	26
E917	Striking against or struck accidentally by objects or persons . . . . .	6
E918	Caught accidentally in or between objects . . . . .	5
E919	Accidents caused by machinery . . . . .	32
E920	Accidents caused by cutting and piercing instruments or objects . . . . .	4
E922	Accident caused by firearm missile . . . . .	33
E923	Accident caused by explosive material . . . . .	6
E924	Accident caused by hot substance or object, caustic or corrosive material and steam . . . . .	4
E925	Accident caused by electric current . . . . .	16
E927	Overexertion and strenuous movements . . . . .	1
E928	Other and unspecified environmental and accidental causes . . . . .	46
E929	Late effects of accidental injury . . . . .	21
E939	Psychotropic agents . . . . .	1
E945	Agents primarily acting on the smooth and skeletal muscles and respiratory system . . . . .	1
E947	Other and unspecified drugs and medicaments . . . . .	3
E950	Suicide and selfinflicted poisoning by solid or liquid substances . . . . .	107
E951	Suicide and selfinflicted poisoning by gases in domestic use . . . . .	1
E952	Suicide and selfinflicted poisoning by other gases and vapors . . . . .	159
E953	Suicide and selfinflicted injury by hanging, strangulation and suffocation . . . . .	160
E954	Suicide and selfinflicted injury by submersion (drowning) . . . . .	22
E955	Suicide and selfinflicted injury by firearms and explosives . . . . .	585
E956	Suicide and selfinflicted injury by cutting and piercing instruments . . . . .	17
E957	Suicide and selfinflicted injuries by jumping from high place . . . . .	12
E958	Suicide and selfinflicted injury by other and unspecified means . . . . .	21
E963	Assault by hanging and strangulation . . . . .	55
E964	Assault by submersion [drowning] . . . . .	4
E965	Assault by firearms and explosives . . . . .	738
E966	Assault by cutting and piercing instrument . . . . .	197
E967	Child battering and other maltreatment . . . . .	20
E968	Assault by other and unspecified means . . . . .	146
E969	Late effects of injury purposely inflicted by other person . . . . .	4
E970	Injury due to legal intervention by firearms . . . . .	4
E980	Poisoning by solid or liquid substances, undetermined whether accidentally or purposely inflicted . . . . .	70
E982	Poisoning by other gases, undetermined whether accidentally or purposely inflicted . . . . .	4
E984	Submersion [drowning], undetermined whether accidentally or purposely inflicted . . . . .	13
E985	Injury by firearms and explosives, undetermined whether accidentally	

Table 4.16 Number of Deaths by Cause, Michigan Residents, 1987 (Continued)

ICD LIST NUMBER	CAUSE OF DEATH	NUMBER
E987	or purposely inflicted. . . . .	17
E988	Falling from high place, undetermined whether accidentally or purposely inflicted .	3
E989	Injury by other and unspecified means, undetermined whether accidentally or purposely inflicted . . . . .	20
	Late effects of injury, undetermined whether accidentally or purposely inflicted . .	2

Table 4.17

Population Changes by County,  
Michigan, 1977 and 1987

AREA	POPULATION ESTIMATE JULY 1, 1977	POPULATION ESTIMATE JULY 1, 1987	NET CHANGE	PERCENT CHANGE	NATURAL INCREASE	ESTIMATED NET MIGRATION
Michigan	9157357	9199871	42514	0.5	697477	-654963
Alcona	9264	10294	1030	11.1	-74	1104
Alger	9352	8555	-797	-8.5	387	-1184
Allegan	77414	87914	10500	13.6	7772	2728
Alpena	32277	31106	-1171	-3.6	1999	-3170
Antrim	15782	16967	1185	7.5	757	428
Arenac	13864	15248	1384	10.0	721	663
Baraga	8437	8157	-280	-3.3	318	-598
Barry	43536	48500	4964	11.4	3642	1322
Bay	121501	114844	-6657	-5.5	8907	-15564
Benzie	10759	11371	612	5.7	489	123
Berrien	174866	164831	-10035	-5.7	12502	-22537
Branch	39572	39827	255	0.6	2950	-2695
Calhoun	142765	137580	-5185	-3.6	9383	-14568
Cass	48064	48336	272	0.6	3120	-2848
Charlevoix	19382	20575	1193	6.2	1537	-344
Cheboygan	19966	20847	881	4.4	1180	-299
Chippewa	36670	28332	-7338	-20.0	1414	-8752
Clare	22370	25530	3160	14.1	950	2210
Clinton	54775	56367	1592	2.9	5539	-3947
Crawford	9089	10418	1329	14.6	796	533
Delta	39258	37975	-1283	-3.3	2369	-3652
Dickinson	25374	26182	808	3.2	962	-154
Eaton	82523	81885	9362	11.3	7287	2065
Emmet	22143	24034	1891	8.5	1501	390
Genesee	446543	435087	-11456	-2.6	40601	-52057
Gladwin	18071	22152	4081	22.6	971	3110
Gogebic	20842	18263	-2579	-12.4	-311	-2268
Gd Traverse	49341	60897	11656	23.6	5097	6559
Gratiot	40242	38948	-1294	-3.2	2595	-3889
Hillsdale	41052	42776	1724	4.2	2930	-1206
Houghton	38906	36085	-2821	-7.3	926	-3747
Huron	36502	36288	-214	-0.6	1955	-2169
Ingham	267103	279559	12456	4.7	29243	-16787
Ionia	50141	54660	4519	9.0	5112	-593
Iosco	28828	30237	1409	4.9	3161	-1752
Iron	14065	13611	-454	-3.2	-134	-320
Isabella	52673	53626	953	1.8	4293	-3340
Jackson	150317	146866	-3451	-2.3	9917	-13368
Kalamazoo	207496	218516	11020	5.3	18134	-7114
Kalkaska	9797	12302	2505	25.6	1185	1320
Kent	427714	481952	54238	12.7	51320	2918
Keveeenaw	2079	1936	-143	-6.9	-86	-57
Lake	7467	8690	1223	16.4	67	1156

Table 4.17  
Population Changes by County,  
Michigan, 1977 and 1987 (Cont.)

AREA	POPULATION ESTIMATE JULY 1, 1977	POPULATION ESTIMATE JULY 1, 1987	NET CHANGE	PERCENT CHANGE	NATURAL INCREASE	ESTIMATED NET MIGRATION
Lapeer	64302	72257	7955	12.4	6587	1368
Leelanau	13252	15210	1958	14.8	842	1116
Lenawee	88749	89332	583	0.7	7043	-6460
Livingston	84728	108546	23818	28.1	8776	18042
Luce	7044	5747	-1297	-18.4	247	-1544
Mack Inac	10379	10416	37	0.4	335	-298
Macomb	672214	707409	35195	5.2	48999	-13804
Manistee	22577	22022	-555	-2.5	483	-1038
Marquette	73237	70150	-3087	-4.2	8123	-11210
Mason	25614	25937	323	1.3	1321	-998
Mecosta	35609	38208	2599	7.3	2347	252
Menominee	25931	25725	-206	-0.8	1095	-1301
Midland	70890	73250	2360	3.3	7173	-4813
Missaukee	9121	11235	2114	23.2	1014	1100
Monroe	129998	134133	4135	3.2	10845	-6710
Montcalm	45775	51956	6181	13.5	3865	2316
Montmorency	7155	8081	926	12.9	144	782
Muskegon	157482	158709	1217	0.8	13156	-11939
Newaygo	33212	38433	5221	15.7	2783	2438
Oakland	978935	1044425	65490	6.7	73746	-8256
Oceana	21713	22648	935	4.3	1840	-905
Ogemaw	14944	17916	2972	19.9	678	2294
Ontonagon	11013	8956	-2057	-18.7	106	-2163
Osceola	18664	20749	2085	11.2	1375	710
Oscoda	6064	7128	1065	17.6	247	818
Otsego	14002	16245	2243	16.0	1357	886
Ottawa	145762	175038	29276	20.1	18558	10708
Presque Isle	14359	13870	-489	-3.4	642	-1131
Roscommon	15375	18735	4360	28.4	101	4259
Saginaw	226861	216305	-10556	-4.7	20103	-30659
St Clair	134861	142380	7519	5.6	9462	-1943
St Joseph	53602	59236	5634	10.5	4708	926
Sanilac	39813	40854	1041	2.6	2387	-1346
Schoolcraft	8840	8188	-652	-7.4	274	-926
Shiawassee	69447	69710	263	0.4	6370	-6107
Tuscola	54926	55615	689	1.3	4522	-3833
Van Buren	64563	67825	3262	5.1	5192	-1930
Washtenaw	257406	267792	10386	4.0	25631	-15245
Wayne	2416929	2152456	-264473	-10.9	140043	-404516
Wexford	23817	26817	3000	12.6	1702	1298
County Not Stated	-0	-0	-0	-0	-74	-0

Table 4.18  
Population by Age, Race, and Sex, Michigan Residents, 1987

AGE IN YEARS	ALL RACES			WHITE			BLACK			ALL OTHER		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
UNDER 1	140142	71425	68717	113389	57949	55440	23696	11894	11802	3057	1582	1475
1 - 4	548478	280872	267606	450579	231253	219326	87710	44432	43278	10189	5187	5002
5 - 9	674105	345163	328942	551795	283429	268366	110757	55934	54823	11553	5800	5753
10 - 14	696886	357079	339807	568094	292233	275861	117695	59221	58474	11097	5625	5472
15 - 19	735566	374737	360829	606454	310246	296208	119102	59389	59713	10010	5102	4908
20 - 24	768665	384236	384429	645061	324520	320541	114285	55034	59251	9319	4682	4637
25 - 29	795304	393439	401865	674936	337889	337047	110122	50574	59548	10246	4976	5270
30 - 34	767442	378657	388785	653846	327292	326554	101740	45815	55925	11856	5550	6306
35 - 39	690139	338843	351296	592751	295114	297637	86015	38359	47656	11373	5370	6003
40 - 44	582366	284917	297449	505797	250257	255540	67692	30261	37431	8877	4399	4478
45 - 49	482845	235258	247587	422828	208013	214815	53816	24119	29697	6201	3126	3075
50 - 54	432373	209356	223017	379807	185805	194002	48195	21392	26803	4371	2159	2212
55 - 59	424091	203897	220194	374214	181297	192917	46574	21029	25545	3303	1571	1732
60 - 64	400590	188767	211823	355507	168144	187363	42556	19477	23079	2527	1146	1381
65 - 69	349793	158213	191580	312264	141522	170742	35549	15822	19727	1980	869	1111
70 - 74	276971	118299	158672	248493	106230	142263	26952	11400	15552	1526	669	857
75 - 79	198368	78279	120089	179030	70461	108569	18286	7369	10917	1052	449	603
80 - 84	125420	44424	80996	114052	40102	73950	10707	4061	6646	661	261	400
85 +	110327	32750	77577	100678	29594	71084	9171	3047	6124	478	109	369
TOTAL	9199871	4478611	4721260	7849575	3841350	4008225	1230620	578629	651991	119676	58632	61044

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

15-64  
2588577  
365,440

Table 4.19  
Abridged Life Table, Michigan Residents, 1987

Age	nx(1)'	lx(2)'	ndx(3)'	nlx(4)'	Tx(5)'	ex(6)'
0-1	0.01098	100000	1098	99033	7423847	74.2
1-5	0.00231	98902	228	395045	7324814	74.1
5-10	0.00121	98675	118	493048	6929769	70.2
10-15	0.00134	98556	131	492531	6436720	65.3
15-20	0.00503	98425	495	490970	5944189	60.4
20-25	0.00536	97930	524	488367	5453219	55.7
25-30	0.00636	97406	619	485527	4964853	51.0
30-35	0.00765	96787	740	482148	4479325	46.3
35-40	0.00961	96047	923	478016	3997177	41.6
40-45	0.01227	95124	1167	472875	3519161	37.0
45-50	0.01860	93957	1747	465734	3046286	32.4
50-55	0.02907	92210	2680	454915	2580552	28.0
55-60	0.04974	89530	4453	437379	2125637	23.7
60-65	0.07997	85078	6803	409340	1688258	19.8
65-70	0.11566	78275	9053	369733	1278918	16.3
70-75	0.16701	69222	11561	318202	909185	13.1
75-80	0.23981	57661	13827	254471	590983	10.2
80-85	0.34411	43834	15083	181259	336511	7.7
85+	1.00000	28750	28750	155252	155252	5.4

'Definitions of life table values are contained in the Technical Notes.

Table 4.20  
Abridged Life Table for Males, Michigan Residents, 1987

Age	nx(1)'	lx(2)'	ndx(3)'	nlx(4)'	Tx(5)'	ex(6)'
0-1	0.01207	100000	1207	98931	7105997	71.1
1-5	0.00249	98793	246	394574	7007066	70.9
5-10	0.00142	98547	140	492351	6612492	67.1
10-15	0.00163	98407	160	491756	6120141	62.2
15-20	0.00724	98248	711	489594	5628384	57.3
20-25	0.00817	97537	796	485729	5138791	52.7
25-30	0.00915	96740	885	481535	4653062	48.1
30-35	0.01059	95855	1015	476824	4171527	43.5
35-40	0.01364	94840	1293	471059	3694703	39.0
40-45	0.01549	93547	1449	464283	3223644	34.5
45-50	0.02282	92098	2101	455618	2759361	30.0
50-55	0.03632	89997	3268	442502	2303744	25.6
55-60	0.06225	86729	5398	421194	1861242	21.5
60-65	0.10187	81331	8285	387062	1440048	17.7
65-70	0.14752	73046	10775	339365	1052986	14.4
70-75	0.21580	62271	13437	278563	713620	11.5
75-80	0.29958	48833	14629	207853	435058	8.9
80-85	0.42940	34204	14687	133524	227204	6.6
85+	1.00000	19517	19517	93681	93681	4.8

'Definitions of life table values are contained in the Technical Notes.



Table 4.21  
Abridged Life Table for Females, Michigan Residents, 1987

Age	nxq(1)'	lx(2)'	ndx(3)'	nLx(4)'	Tx(5)'	ex(6)'
0-1	0.00984	100000	984	99139	7739424	77.4
1-5	0.00211	99016	208	395536	7640285	77.2
5-10	0.00098	98808	96	493775	7244750	73.3
10-15	0.00103	98712	102	493340	6750975	68.4
15-20	0.00273	98610	269	492409	6257634	63.5
20-25	0.00254	98341	249	491101	5765225	58.6
25-30	0.00362	98092	355	489619	5274124	53.8
30-35	0.00478	97738	467	487563	4784505	49.0
35-40	0.00571	97271	555	485055	4296942	44.2
40-45	0.00918	96716	887	481537	3811887	39.4
45-50	0.01457	95829	1396	475907	3330350	34.8
50-55	0.02222	94433	2098	467362	2854443	30.2
55-60	0.03802	92335	3510	453575	2387082	25.9
60-65	0.06004	88825	5333	431603	1933507	21.8
65-70	0.08854	83492	7392	399914	1501904	18.0
70-75	0.12887	76100	9806	357187	1101990	14.5
75-80	0.19842	66294	13154	299784	744803	11.2
80-85	0.29278	53140	15558	227045	445019	8.4
85+	1.00000	37582	37582	217975	217975	5.8

'Definitions of life table values are contained in the Technical Notes.

Table 4.22  
Abridged Life Table for Whites, Michigan Residents, 1987

Age	nxq(1)'	lx(2)'	ndx(3)'	nLx(4)'	Tx(5)'	ex(6)'
0-1	0.00841	100000	841	99271	7532118	75.3
1-5	0.00218	99159	215	396095	7432847	75.0
5-10	0.00108	98943	107	494423	7036752	71.1
10-15	0.00118	98837	117	493957	6542329	66.2
15-20	0.00428	98720	422	492608	6048372	61.3
20-25	0.00432	98298	424	490445	5555764	56.5
25-30	0.00516	97873	504	488131	5065319	51.8
30-35	0.00557	97369	542	485525	4577188	47.0
35-40	0.00689	96827	667	482550	4091663	42.3
40-45	0.00972	96160	934	478647	3609113	37.5
45-50	0.01612	95226	1535	472606	3130465	32.9
50-55	0.02591	93692	2427	462950	2657859	28.4
55-60	0.04625	91265	4220	446626	2194910	24.1
60-65	0.07502	87044	6529	419875	1748283	20.1
65-70	0.11068	80515	8911	381376	1328409	16.5
70-75	0.16360	71604	11714	329820	947033	13.2
75-80	0.23595	59890	14130	264937	617213	10.3
80-85	0.34154	45759	15628	189568	352275	7.7
85+	1.00000	30131	30131	162707	162707	5.4

'Definitions of life table values are contained in the Technical Notes.

Table 4.23  
Abridged Life Table for White Males, Michigan Residents, 1987

Age	qx(1)'	lx(2)'	ndx(3)'	nlx(4)'	Tx(5)'	ex(6)'
0-1	0.00904	100000	904	99214	7237745	72.4
1-5	0.00239	99096	236	395810	7138531	72.0
5-10	0.00138	98859	136	493924	6742721	68.2
10-15	0.00151	98724	149	493335	6248797	63.3
15-20	0.00568	98575	559	491579	5755463	58.4
20-25	0.00652	98016	638	488517	5263884	53.7
25-30	0.00745	97377	725	485094	4775367	49.0
30-35	0.00760	96652	734	481467	4290273	44.4
35-40	0.00960	95918	920	477373	3808806	39.7
40-45	0.01195	94998	1134	472346	3331433	35.1
45-50	0.01968	93863	1847	465081	2859088	30.5
50-55	0.03222	92016	2965	453355	2394007	26.0
55-60	0.05765	89052	5134	433484	1940652	21.8
60-65	0.09595	83918	8051	400617	1507168	18.0
65-70	0.14079	75867	10681	353826	1106551	14.6
70-75	0.21156	65185	13790	292390	752725	11.5
75-80	0.29556	51395	15190	219354	460335	9.0
80-85	0.42780	36205	15488	141541	240981	6.7
85+	1.00000	20717	20717	99440	99440	4.8

'Definitions of life table values are contained in the Technical Notes.

Table 4.24  
Abridged Life Table for White Females, Michigan Residents, 1987

Age	qx(1)'	lx(2)'	ndx(3)'	nlx(4)'	Tx(5)'	ex(6)'
0-1	0.00776	100000	776	99331	7821331	78.2
1-5	0.00195	99224	193	396393	7722000	77.8
5-10	0.00077	99031	76	494947	7325607	74.0
10-15	0.00084	98955	82	494613	6830660	69.0
15-20	0.00282	98873	278	493694	6336048	64.1
20-25	0.00209	98594	206	492458	5842354	59.3
25-30	0.00285	98389	280	491273	5349896	54.4
30-35	0.00354	98109	346	489705	4858623	49.5
35-40	0.00420	97762	410	487867	4368918	44.7
40-45	0.00753	97352	733	485100	3881051	39.9
45-50	0.01266	96620	1223	480282	3395951	35.1
50-55	0.01983	95397	1891	472691	2915669	30.6
55-60	0.03542	93506	3312	459906	2442978	26.1
60-65	0.05586	90194	5038	439195	1983072	22.0
65-70	0.08501	85157	7239	408683	1543877	18.1
70-75	0.12608	77918	9823	365288	1135194	14.6
75-80	0.19489	68095	13271	308565	768906	11.3
80-85	0.29021	54824	15910	234639	460340	8.4
85+	1.00000	38914	38914	225701	225701	5.8

'Definitions of life table values are contained in the Technical Notes.

Table 4.25  
Abridged Life Table for Blacks, Michigan Residents, 1987

Age	nx(1)'	lx(2)'	ndx(3)'	nlx(4)'	Tx(5)'	ex(6)'
0-1	0.02393	100000	2393	97828	6720318	67.2
1-5	0.00315	97607	307	389697	6622490	67.8
5-10	0.00194	97300	189	485983	6232793	64.1
10-15	0.00200	97112	194	485219	5746810	59.2
15-20	0.00912	96918	883	482567	5261591	54.3
20-25	0.01132	96035	1087	477553	4779024	49.8
25-30	0.01417	94948	1345	471569	4301471	45.3
30-35	0.02141	93603	2004	463286	3829902	40.9
35-40	0.02929	91600	2682	451468	3366616	36.8
40-45	0.03207	88917	2851	437591	2915148	32.8
45-50	0.03858	86066	3320	422370	2477556	28.8
50-55	0.05419	82746	4484	403117	2055186	24.8
55-60	0.07898	78262	6181	376757	1652069	21.1
60-65	0.12200	72081	8794	339252	1275312	17.7
65-70	0.16052	63288	10159	291447	936060	14.8
70-75	0.20212	53129	10738	239162	644614	12.1
75-80	0.28072	42391	11900	182384	405451	9.6
80-85	0.38035	30491	11597	122929	223067	7.3
85+	1.00000	18894	18894	100138	100138	5.3

'Definitions of life table values are contained in the Technical Notes.

Table 4.26  
Abridged Life Table for Black Males, Michigan Residents, 1987

Age	nx(1)'	lx(2)'	ndx(3)'	nlx(4)'	Tx(5)'	ex(6)'
0-1	0.02741	100000	2741	97496	6239717	62.4
1-5	0.00324	97259	315	388264	6142221	63.2
5-10	0.00179	96944	173	484244	5753957	59.4
10-15	0.00228	96771	221	483585	5269712	54.5
15-20	0.01580	96550	1525	479251	4786127	49.6
20-25	0.01811	95025	1720	470921	4306877	45.3
25-30	0.02134	93305	1991	461810	3835955	41.1
30-35	0.03268	91314	2983	449538	3374145	37.0
35-40	0.04575	88331	4041	431725	2924607	33.1
40-45	0.04539	84289	3825	411893	2492882	29.6
45-50	0.05077	80464	4085	392457	2080989	25.9
50-55	0.07202	76379	5501	368822	1688532	22.1
55-60	0.10355	70878	7339	336931	1319709	18.6
60-65	0.15356	63539	9757	294119	982778	15.5
65-70	0.20911	53783	11246	241073	688660	12.8
70-75	0.26044	42536	11078	184872	447587	10.5
75-80	0.33991	31459	10693	130223	262715	8.4
80-85	0.45549	20766	9458	79349	132492	6.4
85+	1.00000	11307	11307	53144	53144	4.7

'Definitions of life table values are contained in the Technical Notes.

Table 4.27  
Abridged Life Table for Black Females, Michigan Residents, 1987

Age	qx(1)'	lx(2)'	ndx(3)'	nLx(4)'	Tx(5)'	ex(6)'
0-1	0.02042	100000	2042	98165	7204334	72.0
1-5	0.00305	97958	298	391142	7106169	72.5
5-10	0.00210	97660	205	487736	6715027	68.8
10-15	0.00171	97455	167	486866	6227291	63.9
15-20	0.00243	97289	236	485919	5740426	59.0
20-25	0.00497	97053	482	484170	5254507	54.1
25-30	0.00804	96570	776	481054	4770337	49.4
30-35	0.01209	95795	1158	476230	4289283	44.8
35-40	0.01583	94637	1498	469609	3813053	40.3
40-45	0.02116	93139	1971	460999	3343444	35.9
45-50	0.02857	91168	2604	449654	2882445	31.6
50-55	0.03973	88564	3518	434516	2432791	27.5
55-60	0.05827	85046	4955	413687	1998275	23.5
60-65	0.09453	80091	7570	382302	1584588	19.8
65-70	0.11957	72521	8671	341431	1202286	16.6
70-75	0.15663	63849	10000	295110	860855	13.5
75-80	0.23800	53849	12816	237944	565745	10.5
80-85	0.33002	41033	13542	171099	327801	8.0
85+	1.00000	27492	27492	156702	156702	5.7

'Definitions of life table values are contained in the Technical Notes.

FIGURE 4.3

1116391

LF \_\_\_\_\_  
CF \_\_\_\_\_

STATE OF MICHIGAN  
DEPARTMENT OF PUBLIC HEALTH

STATE FILE NUMBER \_\_\_\_\_

**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 4c. M

**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: \_\_\_\_\_ 6b. NAME AND TITLE OF ATTENDANT AT BIRTH IF OTHER THAN CERTIFIER

7a. CERTIFIER NAME AND TITLE (PRINT OR TYPE) \_\_\_\_\_ MAILING ADDRESS (NO., CITY OR VILLAGE, STATE, ZIP) \_\_\_\_\_

8a. REGISTRAR'S SIGNATURE \_\_\_\_\_ DATE RECEIVED BY LOCAL REGISTRAR - (MO, DAY, YEAR) \_\_\_\_\_

**MOTHER**

9a. MOTHER - MAIDEN NAME (FIRST) (MIDDLE) (LAST) 9b. SOCIAL SECURITY NUMBER 9c. AGE (AT TIME OF THIS BIRTH) 9d. STATE OF BIRTH - NAME COUNTRY IF NOT USA

10a. RESIDENCE (Check one box and specify) 10b. INSIDE CITY LIMITS OF \_\_\_\_\_ 10c. INSIDE VILLAGE LIMITS OF \_\_\_\_\_ 10d. TWP. OF \_\_\_\_\_ 10e. COUNTY \_\_\_\_\_ 10f. STATE \_\_\_\_\_

**FATHER**

11a. FATHER - NAME (FIRST) (MIDDLE) (LAST) 11b. SOCIAL SECURITY NUMBER 11c. AGE (AT TIME OF THIS BIRTH) 11d. STATE OF BIRTH - NAME COUNTRY IF NOT USA

12a. I CERTIFY THAT THE PERSONAL INFORMATION PROVIDED ON THIS CERTIFICATE IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF 12b. RELATION TO CHILD

13a. SIGNATURE (PARENT OR OTHER INFORMANT) \_\_\_\_\_ DATE: \_\_\_\_\_ 13b. \_\_\_\_\_

**CONFIDENTIAL INFORMATION FOR PUBLIC HEALTH USE ONLY**

14a. BIRTHWEIGHT \_\_\_\_\_ grams 14b. ESTIMATED WEEKS GESTATION \_\_\_\_\_ 14c. APGAR SCORE 1 MIN. \_\_\_\_\_ 5 MIN. \_\_\_\_\_ 14d. HAVE EYES OF CHILD BEEN TREATED WITH AN APPROVED PROPHYLAXIS? 14e. 1. YES 2. NO 3. UNKNOWN

**CHILD**

15. APPARENT CONGENITAL MALFORMATIONS OR ANOMALIES OF CHILD (DESCRIBE) \_\_\_\_\_

16. RACE 1. WHITE 2. BLACK 3. AM. INDIAN 4. OTHER (SPECIFY) \_\_\_\_\_

17. EDUCATION (SPECIFY ONLY HIGHEST GRADE COMPLETED; CHECK ONLY ONE BOX) 17a. ELEMENTARY OR SECONDARY 17b. COLLEGE

18. WAS MOTHER'S BLOOD TESTED FOR SYPHILIS DURING THIS PREGNANCY? 18a. 1. YES 2. NO 3. UNKNOWN 18b. (CITY OR VILLAGE) (STATE) (ZIP)

**MOTHER**

19. RACE 1. WHITE 2. BLACK 3. AM. INDIAN 4. OTHER (SPECIFY) \_\_\_\_\_

20. EDUCATION (SPECIFY ONLY HIGHEST GRADE COMPLETED; CHECK ONLY ONE BOX) 20a. ELEMENTARY OR SECONDARY 20b. COLLEGE

**FATHER**

21. RACE 1. WHITE 2. BLACK 3. AM. INDIAN 4. OTHER (SPECIFY) \_\_\_\_\_

22. EDUCATION (SPECIFY ONLY HIGHEST GRADE COMPLETED; CHECK ONLY ONE BOX) 22a. ELEMENTARY OR SECONDARY 22b. COLLEGE

**PREGNANCY HISTORY**

23. PRIOR DELIVERIES 23a. LIVE BIRTHS (Do not include this Child) 23b. OTHER TERMINATIONS (Spontaneous and induced) 23c. DATE OF LAST LIVE BIRTH (Month, Year) 23d. DATE OF LAST OTHER TERMINATION (Month, Year)

24. THIS PREGNANCY 24a. DATE LAST NORMAL MENSTRUATION 24b. MONTH OF PREGNANCY PRENATAL CARE BEGAN 24c. TOTAL PRENATAL VISITS 24d. ATTENDANT AT BIRTH 24e. 1. MD. 2. D.O. 3. NURSE 4. MIDWIFE 5. CERTIFIED NURSE MIDWIFE 6. OTHER (SPECIFY)

25. COMPLICATIONS OF PREGNANCY (DESCRIBE) 25a. 26. NONE 27. CONCURRENT ILLNESSES OR CONDITIONS AFFECTING THIS PREGNANCY (DESCRIBE) 27a. 27b. NONE 27c. COMPLICATIONS OF LABOR AND/OR DELIVERY (DESCRIBE) 27d. 28. NONE 29. \_\_\_\_\_

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 \_\_\_\_\_

<b>FETUS</b>	DATE OF DELIVERY		13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100																																																																																										
	13 (MONTH) (DAY) (YEAR)		14 (HOUR)		15 (SEX OF FETUS) 1 MALE 2 FEMALE 3 UNDETERMINABLE		16 THIS DELIVERY 1 SINGLE 2 TWINS 3 ETC. (SPECIFY)		17 IF NOT SINGLE 1 BORN 2 OR DELIVERY UNKNOWN 3 ETC. (SPECIFY)		18 FETUS DIED BEFORE LABOR 1 DURING LABOR 2 BEFORE DELIVERY 3 UNKNOWN 4 ETC. (SPECIFY)		19 WEIGHT OF FETUS 1 (POUNDS) (OUNCES) 2 (GRAMS)		20 PHYSICIAN'S 1 ESTIMATE OF 2 GESTATION 3 WEEKS																																																																																																																																																																					
<b>CAUSE OF FETAL DEATH</b>	PART 1		IMMEDIATE CAUSE		13 (MONTH) (DAY) (YEAR)		14 (HOUR)		15 (SEX OF FETUS)		16 THIS DELIVERY		17 IF NOT SINGLE		18 FETUS DIED BEFORE LABOR		19 WEIGHT OF FETUS		20 PHYSICIAN'S		21 ESTIMATE OF		22 GESTATION		23 WEEKS		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54		55		56		57		58		59		60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86		87		88		89		90		91		92		93		94		95		96		97		98		99		100	
	13 (MONTH) (DAY) (YEAR)		14 (HOUR)		15 (SEX OF FETUS)		16 THIS DELIVERY		17 IF NOT SINGLE		18 FETUS DIED BEFORE LABOR		19 WEIGHT OF FETUS		20 PHYSICIAN'S		21 ESTIMATE OF		22 GESTATION		23 WEEKS		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54		55		56		57		58		59		60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86		87		88		89		90		91		92		93		94		95		96		97		98		99		100					
	13 (MONTH) (DAY) (YEAR)		14 (HOUR)		15 (SEX OF FETUS)		16 THIS DELIVERY		17 IF NOT SINGLE		18 FETUS DIED BEFORE LABOR		19 WEIGHT OF FETUS		20 PHYSICIAN'S		21 ESTIMATE OF		22 GESTATION		23 WEEKS		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54		55		56		57		58		59		60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86		87		88		89		90		91		92		93		94		95		96		97		98		99		100					
	13 (MONTH) (DAY) (YEAR)		14 (HOUR)		15 (SEX OF FETUS)		16 THIS DELIVERY		17 IF NOT SINGLE		18 FETUS DIED BEFORE LABOR		19 WEIGHT OF FETUS		20 PHYSICIAN'S		21 ESTIMATE OF		22 GESTATION		23 WEEKS		24		25		26		27		28		29		30		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45		46		47		48		49		50		51		52		53		54		55		56		57		58		59		60		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75		76		77		78		79		80		81		82		83		84		85		86		87		88		89		90		91		92		93		94		95		96		97		98		99		100					

**MOTHER**

**FATHER**

**MEDICAL AND PREGNANCY HISTORY INFORMATION**

**PLACE**

13 (MONTH) (DAY) (YEAR)

14 (HOUR)

15 (SEX OF FETUS)

16 THIS DELIVERY

17 IF NOT SINGLE

18 FETUS DIED BEFORE LABOR

19 WEIGHT OF FETUS

20 PHYSICIAN'S

21 ESTIMATE OF

22 GESTATION

23 WEEKS

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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.



STATE FILE NUMBER

# CERTIFICATE OF DEATH

<b>DECEDENT NAME</b>		FIRST	MIDDLE	LAST	SEX	DATE OF DEATH (Mo., Day, Yr.)
1.						
<b>RACE</b> - (If Sp., White, Black, American Indian, etc.) (Specify)	<b>AGE</b> - Last Birthday (Yrs.)	<b>UNDER 1 YEAR</b>		<b>UNDER 1 DAY</b>	<b>DATE OF BIRTH (Mo., Day, Yr.)</b>	
		MOB.	DAYS	HOURS	MINUTE	<b>COUNTY OF DEATH</b>
4.	5a.	5b.	5c.	5d.	6.	7a.
<b>LOCATION OF DEATH</b> (Check one and specify) <input type="checkbox"/> INSIDE CITY LIMITS OF _____ <input type="checkbox"/> INSIDE VILLAGE LIMITS OF _____ <input type="checkbox"/> TWP. OF _____		<b>HOSPITAL OR OTHER INSTITUTION</b> - Name (if not in other, give street and number) _____				
7b.	7c.					
<b>STATE OF BIRTH</b> (If not in U.S.A. name country)	<b>CITIZEN OF WHAT COUNTRY</b>	<b>MARRIED, NEVER MARRIED, WIDOWED, DIVORCED</b> (Specify)		<b>SURVIVING SPOUSE</b> (If wife, give maiden name)		<b>WAS DECIDENT EVER IN U.S. ARMED FORCES?</b> (Specify Yes or No)
8.	9.	10.		11.		12.
<b>SOCIAL SECURITY NUMBER</b>		<b>USUAL OCCUPATION</b> (Give kind of work done during most of working life, even if retired)			<b>KIND OF BUSINESS OR INDUSTRY</b>	
13.	14a.			14b.		
<b>CURRENT RESIDENCE-STATE</b>	<b>COUNTY</b>	<b>LOCALITY</b> (Check one and specify) <input type="checkbox"/> INSIDE CITY LIMITS OF _____ <input type="checkbox"/> INSIDE VILLAGE LIMITS OF _____ <input type="checkbox"/> TWP. OF _____		<b>STREET AND NUMBER</b>		
15a.	15b.	15c.		15d.		
<b>FATHER-NAME</b>		FIRST	MIDDLE	LAST	<b>MOTHER-MAIDEN NAME</b>	
16.						
<b>INFORMANT</b>		<b>MAILING ADDRESS</b>		<b>STREET</b>		<b>CITY OR TOWN</b>
18a. (Signature) _____		18b. _____		_____		<b>STATE</b>
19. IMMEDIATE CAUSE PART I		(ENTER ONLY ONE CAUSE PER FORM FOR (b), (c), (d))				
(a) _____		Interval between onset and death _____				
(b) DUE TO, OR AS A CONSEQUENCE OF _____		Interval between onset and death _____				
(c) DUE TO, OR AS A CONSEQUENCE OF _____		Interval between onset and death _____				
(d) _____		Interval between onset and death _____				
<b>PART II OTHER SIGNIFICANT CONDITIONS</b> - Conditions contributing to death but not reported in cause given in PART I		<b>AUTOPSY</b> (Specify Yes or No)		<b>WAS CASE REFERRED TO MEDICAL EXAMINER?</b> (Specify Yes or No)		
20.		21.				
<b>PLACE OF DEATH</b> (Home, Nursing Home, Hospital, Ambulance) (Specify)		<b>IF HOSP. OR INST., INCLUDE OCA, OP, Emer. Rm., Institution</b> (Specify)		24a. _____		
22a. _____		22b. _____		24b. _____		
23a. To the best of my knowledge, death occurred at the time, date and place and due to _____ (Signature and Title) _____		DATE SIGNED (Mo., Day, Yr.) _____		HOUR OF DEATH _____		
23b. _____		23c. _____		23d. _____		
NAME OF ATTENDING PHYSICIAN IF OTHER THAN CERTIFIER (Type or Print)		23e. _____		23f. _____		
23d. _____		23e. _____		23f. _____		
NAME AND ADDRESS OF CERTIFIER (PHYSICIAN OR MEDICAL EXAMINER) (Type or Print)		23g. _____		23h. _____		
23i. _____		23j. _____		23k. _____		
23l. _____		23m. _____		23n. _____		
23o. _____		23p. _____		23q. _____		
23r. _____		23s. _____		23t. _____		
23u. _____		23v. _____		23w. _____		
23x. _____		23y. _____		23z. _____		
23aa. _____		23ab. _____		23ac. _____		
23ad. _____		23ae. _____		23af. _____		
23ag. _____		23ah. _____		23ai. _____		
23aj. _____		23ak. _____		23al. _____		
23am. _____		23an. _____		23ao. _____		
23ap. _____		23aq. _____		23ar. _____		
23as. _____		23at. _____		23au. _____		
23av. _____		23aw. _____		23ax. _____		
23ay. _____		23az. _____		23ba. _____		
23ba. _____		23bb. _____		23bc. _____		
23bd. _____		23be. _____		23bf. _____		
23bg. _____		23bh. _____		23bi. _____		
23bj. _____		23bk. _____		23bl. _____		
23bm. _____		23bn. _____		23bo. _____		
23bp. _____		23bv. _____		23bw. _____		
23bq. _____		23bx. _____		23by. _____		
23bz. _____		23ca. _____		23cb. _____		
23cc. _____		23cd. _____		23ce. _____		
23cd. _____		23cf. _____		23cg. _____		
23ce. _____		23ch. _____		23ci. _____		
23cf. _____		23cj. _____		23ck. _____		
23cg. _____		23cl. _____		23cm. _____		
23ch. _____		23cn. _____		23co. _____		
23ci. _____		23cp. _____		23cq. _____		
23cj. _____		23cr. _____		23cs. _____		
23ck. _____		23ct. _____		23cu. _____		
23cl. _____		23cv. _____		23cw. _____		
23cm. _____		23cx. _____		23cy. _____		
23cn. _____		23cz. _____		23da. _____		
23co. _____		23db. _____		23dc. _____		
23cp. _____		23dd. _____		23de. _____		
23cq. _____		23de. _____		23df. _____		
23cr. _____		23df. _____		23dg. _____		
23cs. _____		23dh. _____		23di. _____		
23ct. _____		23dj. _____		23dk. _____		
23cu. _____		23dl. _____		23dm. _____		
23cv. _____						

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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	Full name of female
Age at last birthday	Age at last birthday
Residence No.	Residence No.
City	City
State	State
Zip Code	Zip Code
Birthplace—city and state	
Number of times previously married	Number of times previously married
Father's full name	Father's full name
Mother's maiden name	Mother's maiden name

An affidavit has been filed in the County of \_\_\_\_\_, State of Michigan, 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\_\_\_\_

Date of Application \_\_\_\_\_

This marriage license void on or after \_\_\_\_\_

County Clerk \_\_\_\_\_

Deputy County Clerk \_\_\_\_\_

### Certificate of Marriage

Between Mr. \_\_\_\_\_ and M. \_\_\_\_\_

I hereby certify that in accordance with the above license, the persons hereto mentioned were joined in marriage by me, at \_\_\_\_\_ county of \_\_\_\_\_ MICHIGAN, on this \_\_\_\_\_ day of \_\_\_\_\_ A. D. 19\_\_\_\_ in the presence of \_\_\_\_\_

Full name \_\_\_\_\_ of \_\_\_\_\_ Residence—city and state \_\_\_\_\_

Full name \_\_\_\_\_ of \_\_\_\_\_ Residence—city and state \_\_\_\_\_

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.**

0473971

Blank must be completed by typewriter or printed legibly.  
Keep for signature, spaces left

By authority of Act No. 366 of the Public Acts of 1978.  
This space reserved for blinding.

B138 5/83

0473971

ORIGINAL

No. \_\_\_\_\_ 19\_\_\_\_

### 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 marriages 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. THE DUPLICATES must be delivered to one of the parties joined in marriage.**



FIGURE 4.7

0315216

RECORD OF  
DIVORCE OR ANNULMENT

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

COUNTY

STATE FILE NO.

DOCKET NO.

HUSBAND-NAME		FIRST	MIDDLE	LAST
1. USUAL RESIDENCE-STREET ADDRESS		LOCALITY: <input type="checkbox"/> INSIDE CITY LIMITS OF: <input type="checkbox"/> INSIDE VILLAGE LIMITS OF: AND SPECIFY <input type="checkbox"/> TWP. OF:		
2A. COUNTY	STATE	3. BIRTHPLACE (STATE OR FOREIGN COUNTRY)	DATE OF BIRTH (MO., DAY, YR.)	
2C. COUNTY	STATE	3. BIRTHPLACE (STATE OR FOREIGN COUNTRY)	DATE OF BIRTH (MO., DAY, YR.)	
WIFE-NAME		FIRST	MIDDLE	LAST
5A. USUAL RESIDENCE-STREET ADDRESS		LOCALITY: <input type="checkbox"/> INSIDE CITY LIMITS OF: <input type="checkbox"/> INSIDE VILLAGE LIMITS OF: AND SPECIFY <input type="checkbox"/> TWP. OF:		
6A. COUNTY	STATE	7. BIRTHPLACE (STATE OR FOREIGN COUNTRY)	DATE OF BIRTH (MO., DAY, YR.)	
9A. PLACE OF THIS MARRIAGE-CITY	COUNTY	STATE	DATE OF THIS MARRIAGE (MO., DAY, YR.)	DATE COUPLE SEPARATED (MO., DAY, YR.)
9A. NUMBER OF CHILDREN EVER BORN ALIVE OF THIS MARRIAGE (SPECIFY)		10. CHILDREN OF THIS MARRIAGE (SPECIFY)		PETITIONER-HUSBAND, WIFE, BOTH, OTHER (SPECIFY)
11A. ATTORNEY FOR PETITIONER-NAME (TYPE OR PRINT)	11B. 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	YEAR	TYPE OF DECREE-DIVORCE, DISSOLUTION OR ANNULMENT (SPECIFY)
14A. COUNTY OF DECREE		14B. TITLE OF COURT		14C. DATE OF ENTRY (MO., DAY, YEAR.)
14D. SIGNATURE OF CERTIFYING OFFICIAL		14E. TITLE OF OFFICIAL		

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

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+
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									
17.	18.			0	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5+