

3.2 All-Cause Mortality

3.2.1 Total Population

The table below shows the number of deaths by year in Kalamazoo County and Michigan with the crude rate of death per year. A crude death rate is simply the number of deaths per population, and does not adjust for the age structure of the population. Because the crude rate does not take age distribution into account, it has limited usefulness for comparing death rates among different populations, different groups in a population, or rates in one population over time.

**Number of Deaths and Crude Death Rates per 100,000 Population,
Kalamazoo County and Michigan 1990 – 2004**

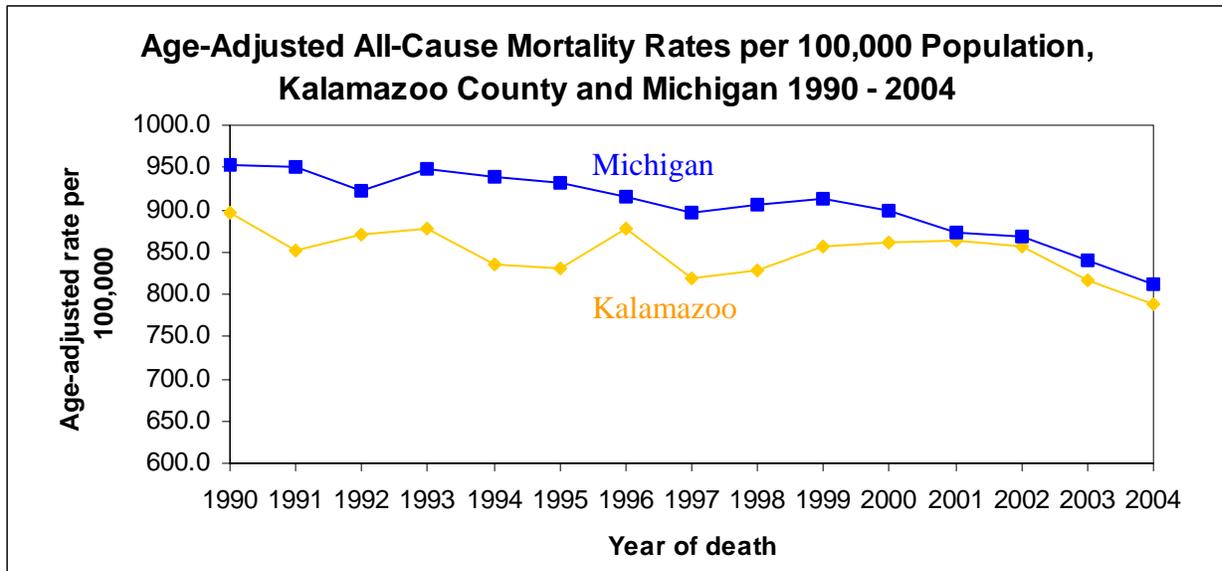
| Kalamazoo County | | Year | Michigan | |
|------------------|------------------------|------|------------------|------------------------|
| Number of Deaths | Crude Rate per 100,000 | | Number of Deaths | Crude Rate per 100,000 |
| 1,646 | 735.0 | 1990 | 78,501 | 843.1 |
| 1,602 | 712.0 | 1991 | 79,738 | 848.2 |
| 1,671 | 735.4 | 1992 | 78,916 | 832.5 |
| 1,724 | 751.2 | 1993 | 82,286 | 862.5 |
| 1,669 | 723.9 | 1994 | 82,644 | 861.1 |
| 1,692 | 728.7 | 1995 | 83,405 | 862.0 |
| 1,823 | 779.3 | 1996 | 83,496 | 855.6 |
| 1,737 | 738.9 | 1997 | 82,994 | 846.1 |
| 1,786 | 755.8 | 1998 | 84,906 | 862.2 |
| 1,875 | 789.2 | 1999 | 86,835 | 877.4 |
| 1,921 | 804.3 | 2000 | 86,988 | 873.7 |
| 1,940 | 811.5 | 2001 | 86,250 | 862.1 |
| 1,957 | 814.0 | 2002 | 87,534 | 871.6 |
| 1,899 | 785.7 | 2003 | 86,306 | 856.0 |
| 1,866 | 775.2 | 2004 | 85,122 | 841.7 |

Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

In contrast to crude rates, age-adjusted rates do take the age structure of a population into account. Age-adjusted rates are calculated by applying a community's age-specific death rates to a standard population distribution (the population age structure in the United States in 2000) in order to eliminate differences in observed rates that result from age differences in population composition. This allows comparison among populations that may have different age distributions (i.e. the mortality rate in a population with a high proportion of older people can be meaningfully compared with the mortality rate in a population with a high proportion of younger people and few older people). Age-adjusted rates are used to compare risks of two or more populations at one point in time or one population at two or more points in time, and should be viewed as relative indexes rather than actual measures of risk.

Kalamazoo County has had a lower age-adjusted mortality rate than Michigan overall between 1990 and 2003. The age-adjusted mortality rate in Michigan has been declining since the early 1990s and the rate in Kalamazoo County has declined overall with some yearly fluctuations in rates.



Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

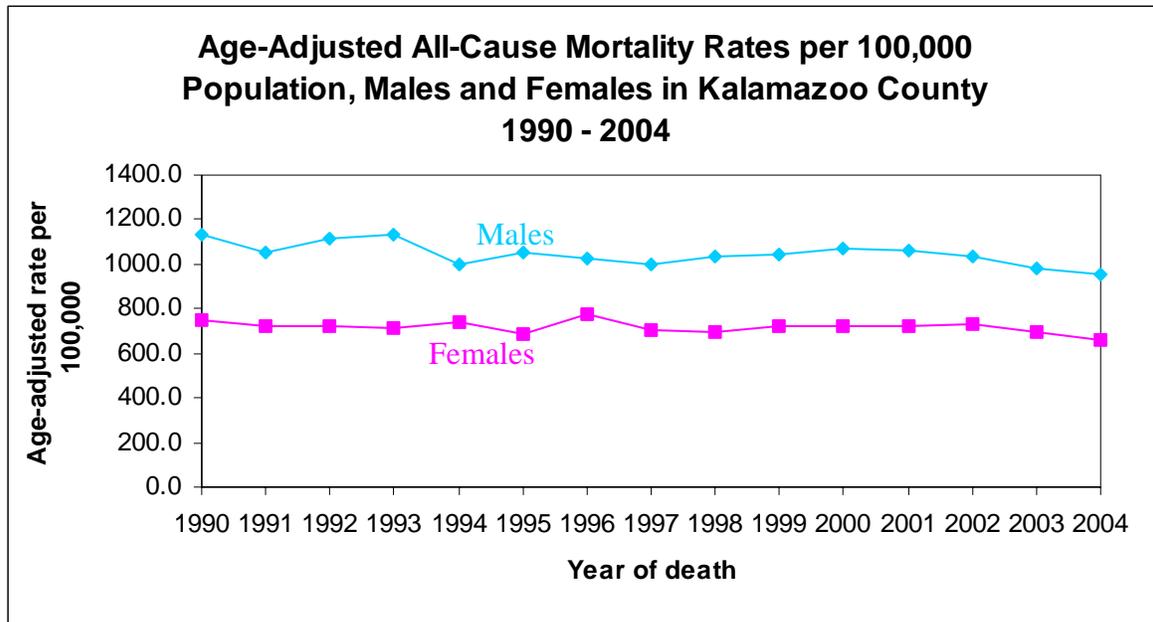
Age-Adjusted All-Cause Mortality Rate per 100,000 Population, Kalamazoo County and Michigan 1990 – 2004

| Year | Kalamazoo County | Michigan |
|------|------------------|----------|
| 1990 | 896.7 | 953.6 |
| 1991 | 852.9 | 950.8 |
| 1992 | 870.0 | 923.4 |
| 1993 | 876.6 | 948.9 |
| 1994 | 834.5 | 938.6 |
| 1995 | 830.9 | 931.7 |
| 1996 | 877.8 | 916.2 |
| 1997 | 819.5 | 896.8 |
| 1998 | 828.6 | 904.9 |
| 1999 | 856.5 | 913.1 |
| 2000 | 860.6 | 898.5 |
| 2001 | 863.3 | 873.5 |
| 2002 | 857.0 | 869.0 |
| 2003 | 816.1 | 838.9 |
| 2004 | 788.1 | 812.2 |

Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

The age-adjusted mortality rate among males has been consistently higher than the rate among females in Kalamazoo County, and rates have been stable between 1990 and 2004. (In Michigan overall and nationally males also consistently have had higher age-adjusted mortality rates than females.)



Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

Age-Adjusted All-Cause Mortality Rate per 100,000 Population, Males and Females in Kalamazoo County 1990 – 2004

| Year | Males | Females |
|------|---------|---------|
| 1990 | 1,131.7 | 752.8 |
| 1991 | 1,056.0 | 719.7 |
| 1992 | 1,110.6 | 720.4 |
| 1993 | 1,135.9 | 711.3 |
| 1994 | 998.0 | 738.5 |
| 1995 | 1,051.9 | 690.4 |
| 1996 | 1,029.7 | 775.7 |
| 1997 | 1,003.1 | 705.1 |
| 1998 | 1,038.0 | 697.9 |
| 1999 | 1,044.6 | 724.1 |
| 2000 | 1,070.0 | 723.2 |
| 2001 | 1,057.2 | 722.7 |
| 2002 | 1,034.8 | 728.9 |
| 2003 | 983.8 | 698.5 |
| 2004 | 956.0 | 660.7 |

Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

3.2.2 Mortality Within Age Groups

Age-specific mortality rates are presented in this section. Age-specific rates are calculated by dividing the number of deaths in a specific age group by the total number of persons in that age group. Like age-adjusted rates, age-specific mortality rates are useful to compare rates among different populations or within one population over time.

Mortality rates typically are higher among infants and young children and decrease with age until adulthood. In comparison to Michigan age-specific rates, the mortality rates among the population groups aged 15 to 24 years and 25 to 34 years were lower in Kalamazoo County between 2002 and 2004 (county rates in other the age groups were similar to Michigan rates).

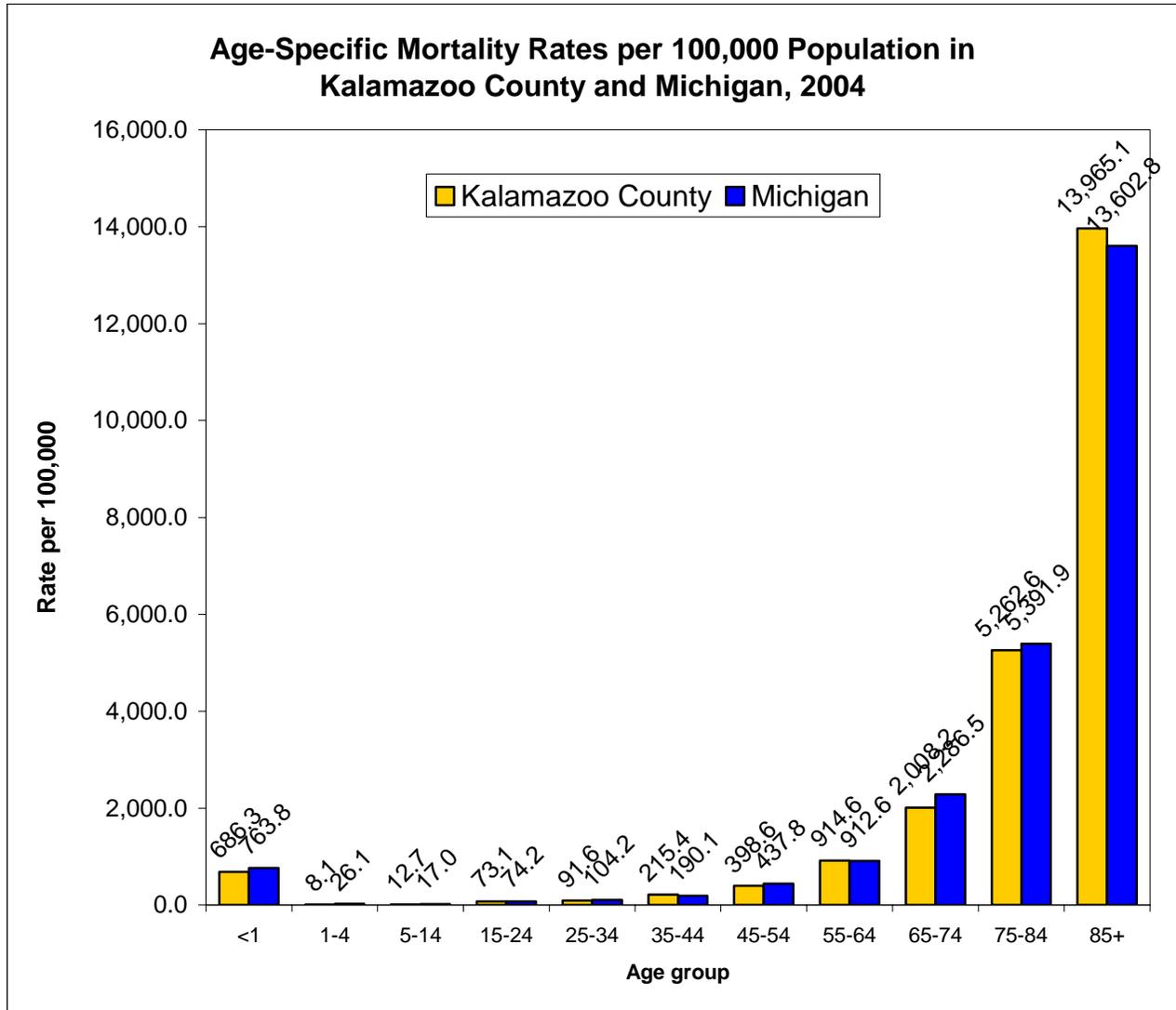
For additional analysis and information about infant mortality in Kalamazoo County, please refer to “Section 9: Pregnancy, Natality and Infant Mortality” of the Health Surveillance Data Book.

Age-Specific All-Cause Mortality, Kalamazoo County and Michigan, 2002 – 2004

| Age group (years) | Kalamazoo County | | | Michigan | | |
|-------------------|------------------------------|---------------------------------------|------------------------------|------------------------------|---------------------------------------|------------------------------|
| | Average # of deaths per year | Average age-specific rate per 100,000 | +/- Age-specific rate 95% CI | Average # of deaths per year | Average age-specific rate per 100,000 | +/- Age-specific rate 95% CI |
| <1 | 27 | 889.7 | 191.7 | 1,050 | 816.2 | 28.4 |
| 1-4 | 3 | 26.9 | 16.7 | 144 | 27.4 | 2.6 |
| 5-14 | 7 | 20.9 | 9.1 | 266 | 18.3 | 1.3 |
| 15-24 | 23 | 54.4 | 12.8 | 1,039 | 72.7 | 2.5 |
| 25-34 | 28 | 78.6 | 16.7 | 1,387 | 105.7 | 3.2 |
| 35-44 | 68 | 206.7 | 28.4 | 3,005 | 195.4 | 4.0 |
| 45-54 | 136 | 404.0 | 39.2 | 6,543 | 443.6 | 6.2 |
| 55-64 | 185 | 865.3 | 71.7 | 9,226 | 940.9 | 11.0 |
| 65-74 | 300 | 2,235.9 | 144.4 | 14,564 | 2,366.7 | 21.9 |
| 75-84 | 553 | 5,446.6 | 254.8 | 25,386 | 5,568.3 | 38.4 |
| 85+ | 577 | 14,806.3 | 643.8 | 23,709 | 14,193.7 | 96.6 |

Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.



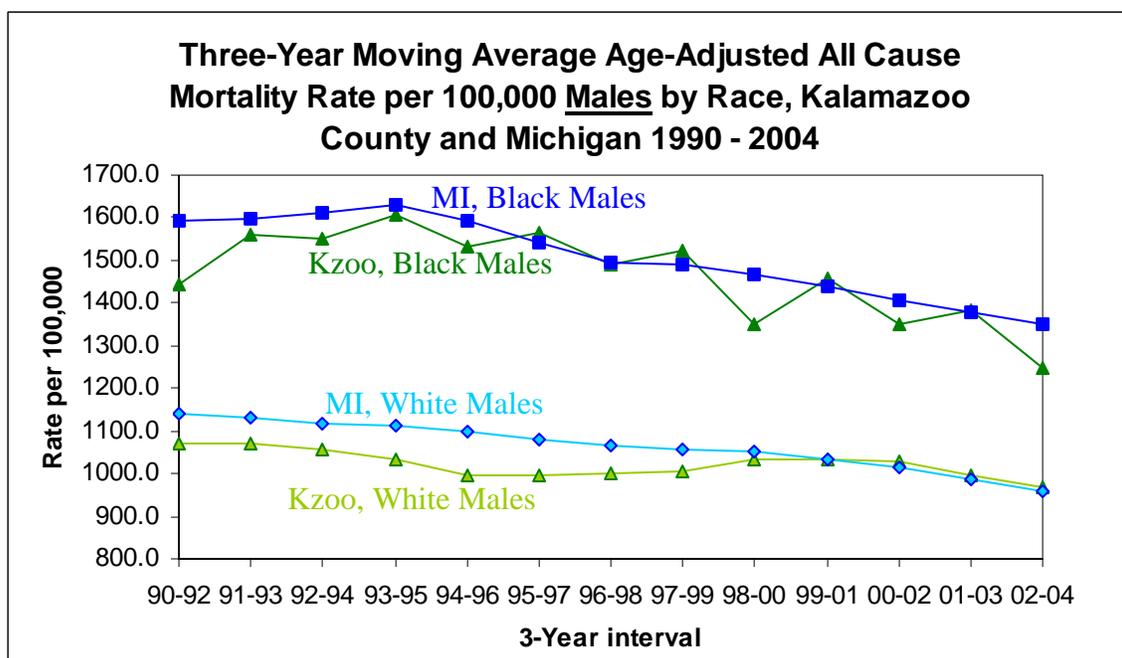
Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

3.2.3 Racial Disparities

Racial disparities in all-cause age-adjusted mortality rates are evident between white and black populations in Kalamazoo County, Michigan, and in the United States overall. The racial disparity in rates between black males and white males is similar to the disparity between black females and white females in Kalamazoo County. Between 2002 and 2004 in Kalamazoo County, black males were 1.3 times more likely to die than white males; likewise, black females were 1.5 times more likely to die than white females.

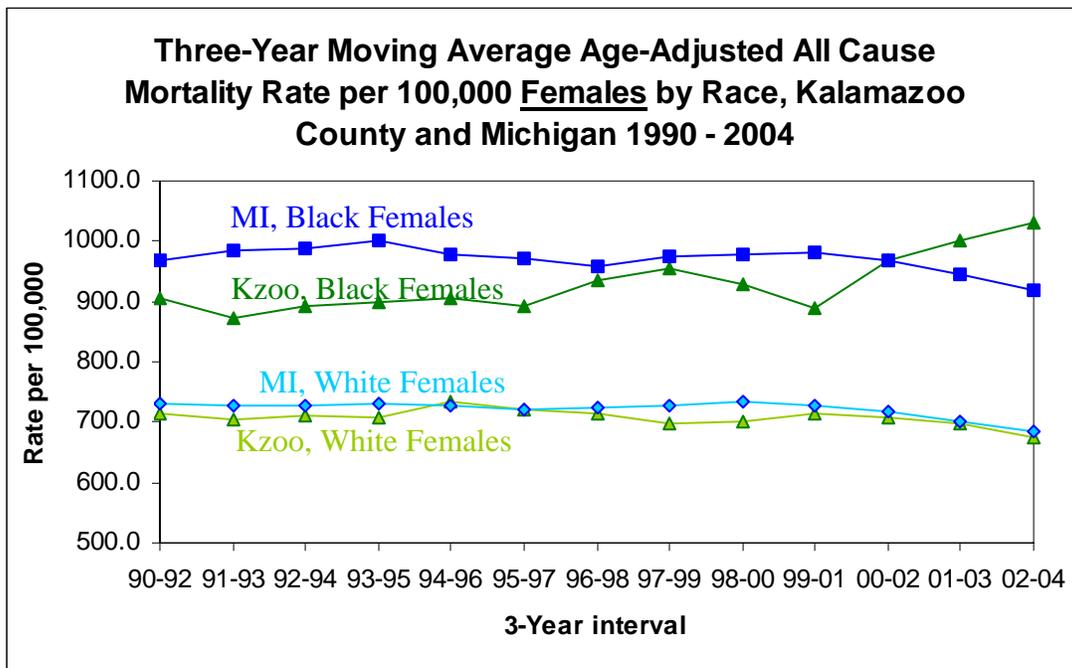
Age-adjusted mortality rates among black males appear to have been declining slightly over the past several years in both Michigan and in Kalamazoo County. Trends in Kalamazoo County rates have mirrored trends in Michigan rates among black and white males.



Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

Rates among black women have been higher in Michigan throughout the 1990s than rates among black women in Kalamazoo County, but while rates have been steady in Michigan in this time period, they appear to have increased slightly in Kalamazoo County in recent years. Between 2002 and 2004, the age-adjusted all-cause mortality rate among black women was higher in Kalamazoo County than in Michigan.



Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File
 Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

Three-Year Moving Average All-Cause Age-Adjusted Mortality Rate per 100,000 by Sex and Race, Kalamazoo County and Michigan 1990 – 2004

| Three-Year Interval | Kalamazoo County | | | | Michigan | | | |
|---------------------|------------------|---------------|-------------|---------------|-------------|---------------|-------------|---------------|
| | White Males | White Females | Black Males | Black Females | White Males | White Females | Black Males | Black Females |
| 1990-1992 | 1,072.4 | 715.3 | 1,442.8 | 906.3 | 1,139.3 | 730.5 | 1,593.2 | 969.6 |
| 1991-1993 | 1,072.3 | 703.1 | 1,560.2 | 871.7 | 1,132.2 | 728.7 | 1,596.0 | 985.9 |
| 1992-1994 | 1,056.2 | 710.1 | 1,549.6 | 891.3 | 1,119.3 | 726.9 | 1,612.4 | 988.4 |
| 1993-1995 | 1,031.2 | 709.1 | 1,604.4 | 898.5 | 1,114.2 | 729.9 | 1,628.0 | 1,000.7 |
| 1994-1996 | 997.6 | 733.0 | 1,531.4 | 906.1 | 1,098.1 | 727.8 | 1,593.9 | 979.6 |
| 1995-1997 | 993.9 | 721.9 | 1,565.2 | 890.9 | 1,080.3 | 721.4 | 1,539.3 | 972.8 |
| 1996-1998 | 999.0 | 713.9 | 1,488.2 | 936.0 | 1,066.6 | 723.3 | 1,496.5 | 956.6 |
| 1997-1999 | 1,003.2 | 696.7 | 1,523.3 | 956.5 | 1,057.1 | 726.6 | 1,490.6 | 975.7 |
| 1998-2000 | 1034.3 | 702.6 | 1349.4 | 928.2 | 1050.3 | 732.8 | 1467.9 | 979.2 |
| 1999-2001 | 1031.6 | 713.3 | 1456.2 | 889.9 | 1033.1 | 726.4 | 1438.0 | 981.8 |
| 2000-2002 | 1030.4 | 708.6 | 1348.4 | 969.0 | 1014.1 | 716.2 | 1404.9 | 969.2 |
| 2001-2003 | 997.8 | 697.1 | 1381.5 | 1000.8 | 988.5 | 700.8 | 1380.4 | 944.3 |
| 2002-2004 | 968.8 | 673.2 | 1247.1 | 1029.1 | 958.6 | 685.3 | 1350.6 | 917.6 |

Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File
 Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

Analysis of age-specific mortality rates shows that within age groups less than 25 years, 25 to 64 years, and 65 to 74 years, mortality has been lower among the white population than the black population over time in both Michigan and in Kalamazoo County. Trends in age-specific mortality rates presented in the charts and table on the following two pages are discussed below.

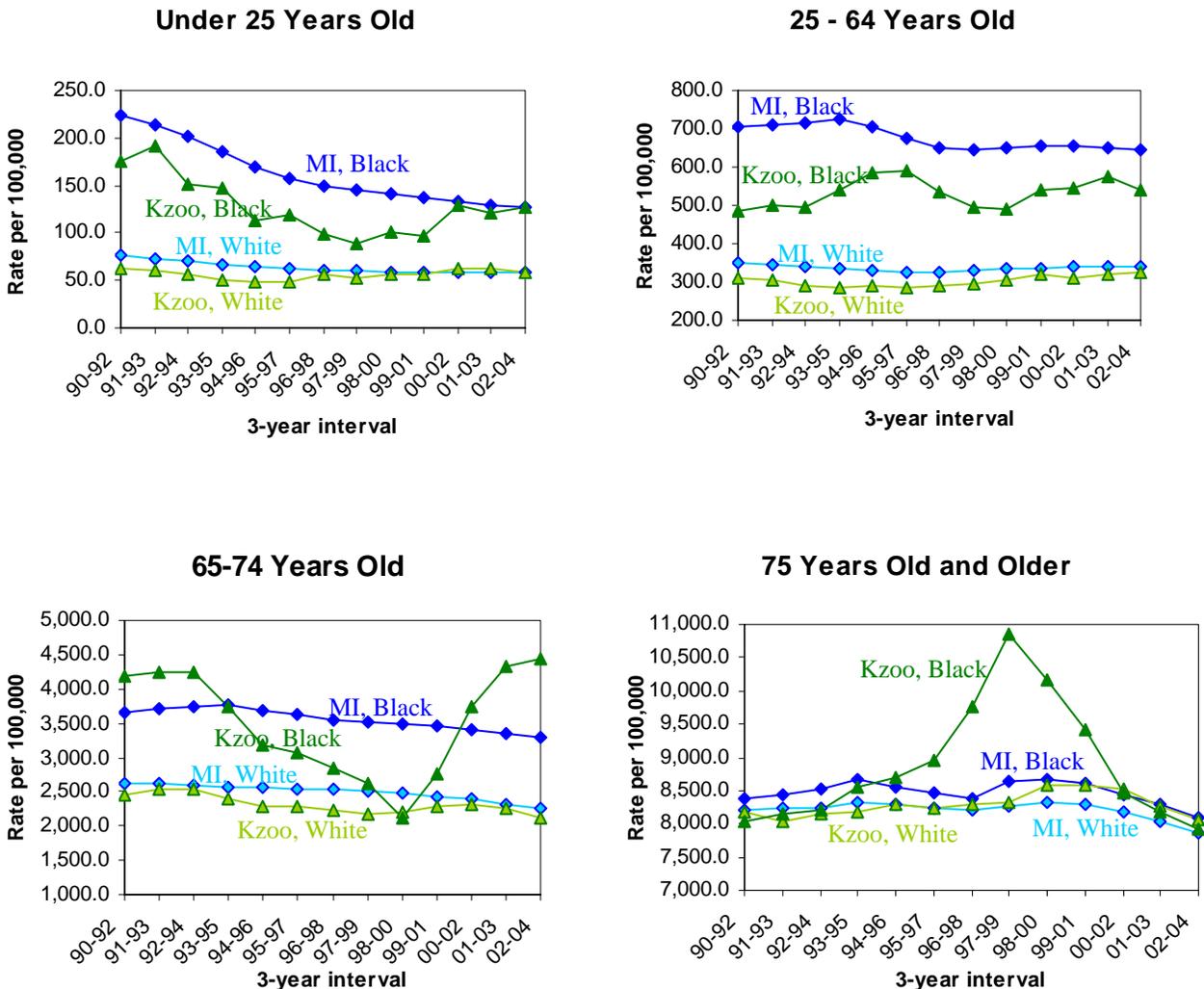
Death rates among both black and white residents under 25 years of age have been declining in Michigan since the early 1990s. In Kalamazoo County, rates among black residents under 25 years of age declined somewhat from the early 1990s to the late 1990s, but in recent years have increased. Rates among white Kalamazoo County residents in this age group have not changed significantly since the early 1990s. Between 2002 and 2004, the mortality rate among black Kalamazoo County residents under 25 years of age was 2.2 times higher than the rate among white Kalamazoo County residents in this age group.

Among both black and white adults aged 25 to 64 years of age, mortality rates in Kalamazoo County have not changed significantly since the early 1990s. Between 2002 and 2004 in Kalamazoo County, black residents in this age group were 1.7 times more likely to die than their white counterparts.

The mortality rate among adults between the ages of 65 and 74 years has been unchanged for the white population since the early 1990s, and has fluctuated for the black population between 1990 and 2004. In Michigan, mortality rates among both the black and white population in this age group have declined since 1990. Among the population aged 65 to 74 years, black Kalamazoo County residents were 2.1 times more likely to die than white residents between 2002 and 2004.

Among the population aged 75 years and older, black and white mortality rates have been similar over time since 1990 in both Kalamazoo County and in Michigan, with the exception of a period in the late 1990s when the mortality rate among black seniors in this age group was elevated for a few years. One possible reason for this increase in mortality among the black population aged 75 years and older could be a corresponding decrease in mortality among the black population aged 65 to 74 years a few years earlier. Because fewer people died in the younger age group than usual, as this group aged and its members joined the 75 and older group a few years later, there would have been a higher risk of death among the surviving members (i.e. the group would then include not only people “expected” to survive to reach this age group but also people who had been “expected” to die at a younger age).

Three-Year Moving Average All-Cause Mortality Rate per 100,000 Population, by Age Group and Race, Kalamazoo County and Michigan 1990 - 2004



Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File
 Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.

**Three-Year Moving Average All-Cause Mortality Rate per 100,000 Population
by Age Group and Race, Kalamazoo County and Michigan 1990 – 2004**

| 3-Year Interval | <25 Years Old | | | | 25-64 Years Old | | | |
|-----------------|-----------------|------------|----------|----------|--------------------|------------|----------|----------|
| | Kzoo White | Kzoo Black | MI White | MI Black | Kzoo White | Kzoo Black | MI White | MI Black |
| 90-92 | 63.2 | 176.0 | 76.0 | 223.2 | 308.5 | 484.7 | 349.9 | 703.3 |
| 91-93 | 61.0 | 191.6 | 72.9 | 214.4 | 305.6 | 502.3 | 344.6 | 708.2 |
| 92-94 | 55.8 | 151.9 | 69.8 | 201.6 | 291.0 | 492.7 | 337.8 | 713.6 |
| 93-95 | 49.8 | 148.1 | 67.2 | 185.2 | 283.9 | 540.1 | 336.7 | 723.9 |
| 94-96 | 49.0 | 112.7 | 64.2 | 170.1 | 291.6 | 584.9 | 331.4 | 702.6 |
| 95-97 | 48.5 | 119.3 | 62.2 | 157.4 | 287.4 | 591.2 | 327.0 | 675.9 |
| 96-98 | 57.5 | 99.1 | 61.1 | 149.4 | 291.1 | 534.8 | 324.7 | 647.8 |
| 97-99 | 53.2 | 89.6 | 60.2 | 145.6 | 294.6 | 494.7 | 327.9 | 646.2 |
| 98-00 | 56.7 | 100.6 | 59.1 | 141.7 | 303.0 | 490.4 | 332.8 | 648.9 |
| 99-01 | 56.2 | 96.7 | 58.8 | 136.9 | 317.5 | 542.2 | 336.7 | 652.6 |
| 00-02 | 62.6 | 128.6 | 58.9 | 133.1 | 312.2 | 546.9 | 339.5 | 654.5 |
| 01-03 | 62.3 | 121.2 | 59.2 | 128.4 | 318.5 | 573.9 | 342.1 | 651.2 |
| 02-04 | 58.2 | 126.3 | 57.5 | 127.2 | 323.9 | 539.3 | 342.3 | 643.8 |
| 3-Year Interval | 65-74 Years Old | | | | 75 Years and Older | | | |
| | Kzoo White | Kzoo Black | MI White | MI Black | Kzoo White | Kzoo Black | MI White | MI Black |
| 90-92 | 2,441.5 | 4,199.1 | 2,625.6 | 3,653.2 | 8,193.2 | 8,025.8 | 8,217.9 | 8,367.7 |
| 91-93 | 2,535.1 | 4,245.8 | 2,612.1 | 3,706.0 | 8,027.2 | 8,157.9 | 8,231.8 | 8,450.6 |
| 92-94 | 2,547.5 | 4,255.3 | 2,599.1 | 3,735.0 | 8,154.9 | 8,214.6 | 8,237.6 | 8,510.9 |
| 93-95 | 2,407.3 | 3,750.6 | 2,578.9 | 3,759.5 | 8,176.5 | 8,560.0 | 8,325.3 | 8,677.5 |
| 94-96 | 2,296.4 | 3,184.7 | 2,555.7 | 3,694.2 | 8,290.1 | 8,702.3 | 8,303.5 | 8,545.0 |
| 95-97 | 2,285.3 | 3,058.5 | 2,527.6 | 3,618.2 | 8,250.1 | 8,958.5 | 8,229.2 | 8,463.0 |
| 96-98 | 2,243.7 | 2,858.4 | 2,525.9 | 3,546.3 | 8,305.3 | 9,771.3 | 8,213.9 | 8,393.3 |
| 97-99 | 2,179.9 | 2,624.9 | 2,504.8 | 3,527.7 | 8,336.8 | 10,853.7 | 8,256.4 | 8,627.6 |
| 98-00 | 2,201.5 | 2,125.9 | 2,494.4 | 3,496.1 | 8,583.7 | 10,165.2 | 8,333.0 | 8,659.1 |
| 99-01 | 2,279.6 | 2,766.3 | 2,425.5 | 3,454.2 | 8,578.8 | 9,430.5 | 8,290.3 | 8,624.2 |
| 00-02 | 2,306.3 | 3,754.1 | 2,387.1 | 3,413.5 | 8,539.1 | 8,456.5 | 8,185.7 | 8,452.0 |
| 01-03 | 2,251.9 | 4,335.1 | 2,319.6 | 3,340.3 | 8,278.8 | 8,171.4 | 8,040.0 | 8,297.2 |
| 02-04 | 2,105.6 | 4,429.3 | 2,260.7 | 3,289.8 | 8,056.2 | 7,915.3 | 7,876.0 | 8,083.4 |

Mortality data source: Michigan Department of Community Health, Division for Vital Records and Health Data Development, Michigan Resident Mortality File

Population data source: National Center for Health Statistics, U.S. Census Populations with Bridged Race Categories, updated 9/2005.