



2B.

LEADING CAUSES OF DEATH

Beginning with the 2000 data year in Arizona (1999 nationally) two major changes have occurred that affect the computation of mortality rates, tabulation of leading causes of death and analyses of mortality data over time. First, a new revision of the International Classification of Diseases (ICD), used to classify causes of death, was implemented. The Tenth Revision (ICD-10) has replaced the Ninth Revision (ICD-9), which was in effect since 1979. Second, a new population standard for the age adjustment of mortality rates has replaced the standard based on the 1940 population and used since 1943. The new set of age-adjustment weights uses the year 2000 U.S. population as a standard.

Both changes have profound effects on the comparability of mortality data and continuity in statistical trends. Age-adjusted rates can only be compared to other age-adjusted rates that use the same population standard. In this report, ALL age-adjusted mortality rates (including those for 1980, 1990, and 1992-2002) are based on the (new) 2000 standard, and they CANNOT BE compared to rates using the 1940 standard population. This is because the age structures of the 1940 and year 2000 populations differ. From 1940 to 2000 the U.S. population "aged" considerably. The age-adjusted rates based on the year 2000 standard are different because the year 2000 population standard, which has an older age structure, gives more weight than the 1940 standard to death rates at older ages where mortality is higher. More than 1,800 age-adjusted mortality rates in this report were recomputed for the new population standard so that mortality rates can be compared over time.

Breaks in comparability of mortality statistics effective with deaths occurring in 2000 also result from the implementation of ICD-10. ICD-10 is far more detailed than ICD-9, with about 8,000 categories compared with about 5,000 categories. Some of the coding rules and rules for selecting the underlying cause of death have been changed. Moreover, cause-of-death titles have been changed and the cause-of-death categories regrouped.

The new population standard and the revision of the ICD are not the only factors affecting the comparability of cause of death and the continuity of statistical trends in mortality. The mortality data for Arizona residents for 1999-2002 are not quite as complete as they used to be in the past. There seems to be a problem with the out-of-State deaths of the residents of Arizona: their records (copies of death certificates from other states) are not always sent to the Office of Vital Records of the Arizona Department of Health Services:

Data year	1996	1997	1998	1999	2000	2001	2002
Reported out-of-State deaths of AZ residents	1,608	1,431	1,569	792	844	1,009	678

Since mortality rates express the likelihood (or risk) of death in a specified population (i.e., all Arizona residents) regardless of the place of occurrence, missing data about the number of events in the numerator (i.e., resident deaths occurring out-of-State) continue to contribute to misrepresentation of mortality risks for Arizonans.

In particular, mortality rates for 1999-2002 were understated because the numerators used to calculate them were too small.

Another disturbing peculiarity of the mortality data collection process is a growing number of records where cause of death is missing. The majority of those records are, again, for Arizonans who died outside Arizona in 2002. Unfortunately, missing cause of death accounted for 704 records, more than *Chronic liver disease and cirrhosis* (647 deaths), the tenth leading cause of death in 2002.

Data year	1996	1997	1998	1999	2000	2001	2002
Missing cause of death	16	30	12	11	197	970	704

As a result, the cause-of-death-specific numbers and rates for 2000-2002 also are understated.

Last but not least, before data for 2000, mortality medical information was based on manual coding of an underlying death for each certificate in accordance with WHO rules, and done locally by the Office of Vital Records. Effective with the 2000 data year, cause-of-death data presented in this publication were coded by the National Center for Health Statistics, using computerized procedures of SuperMICAR (Mortality Medical Indexing and Retrieval) and ACME (Automated Classification of Medical Entities) systems.

It seems that the conversion to computerized coding contributed to at least some of the breaks in comparability over time of cause-of-death statistics for *drug-induced deaths*, *intentional self-harm (suicide)*, *firearm-suicide*, and *accidental discharge of firearms*:

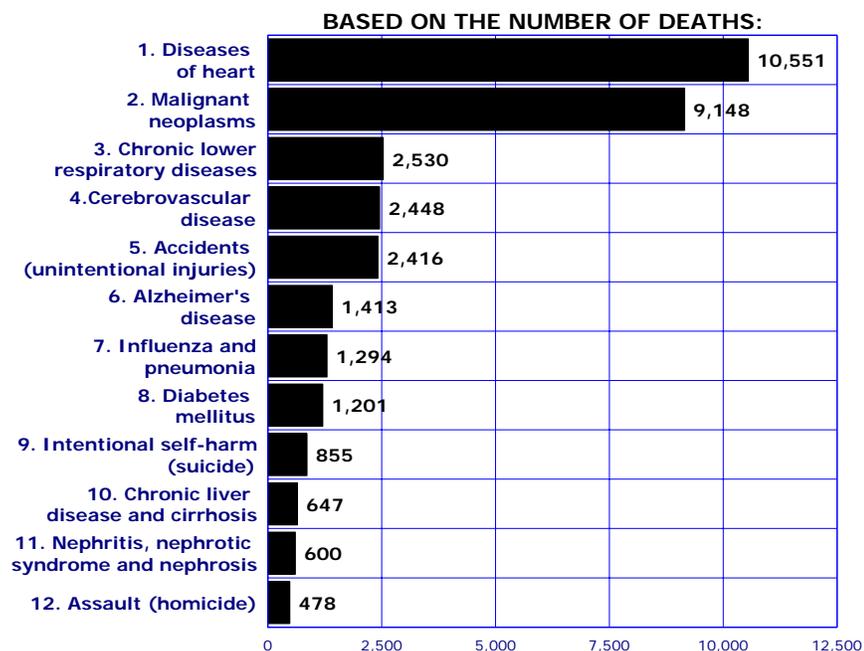
Data year	1999	2000	2001	2002
Drug-induced deaths	543	331	577	645
Suicide	773	737	600	855
Suicide by firearms	495	486	358	544
Accidental discharge of firearms	7	11	114	26

Unprecedented decline in 2001 in the number of suicides seems to be associated with the equally unprecedented increase in the number of firearm deaths classified as accidental. It looks like approximately 100 firearm fatalities, that would have been classified as suicides had the manual coding system been in place, were classified as accidents in 2001.

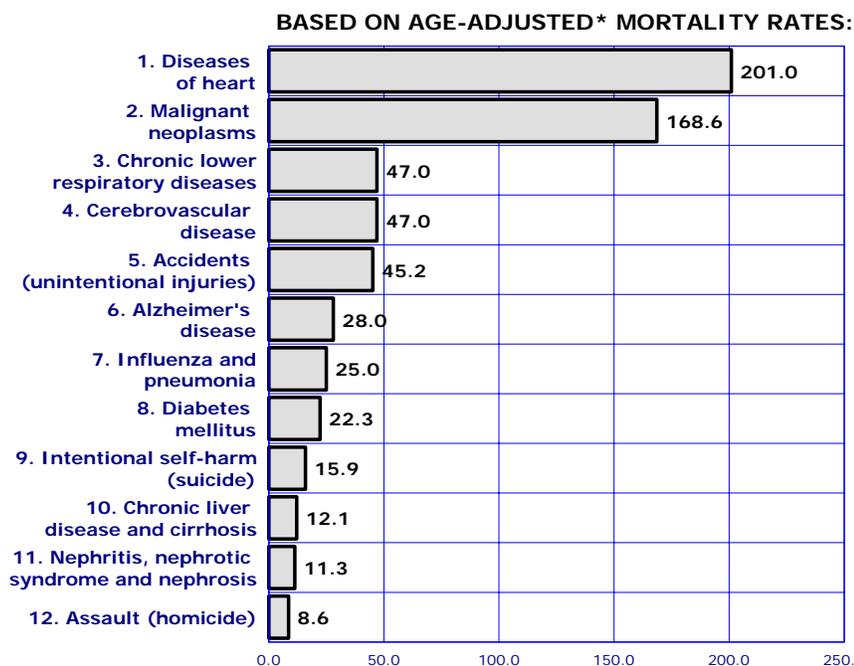
Some experience is usually necessary before the data are collected and coded as accurately and completely as possible in changed circumstances. Data in future years will indicate if this assumption is reasonable.

2B. LEADING CAUSES OF DEATH

**Figure 2B-1
Twelve Leading Causes of Death Among Arizona Residents
in 2002**



The leading cause of death to Arizona residents in 2002 continued to be *heart disease*, which accounted for 10,551 or 24.9 percent of all deaths (**Figure 2B-1, Table 2B-1, Table 5E-14**). *Cancer* remained the second most frequent cause of death to residents of the state, being responsible for 21.6 percent of all deaths in 2002. Deaths due to *chronic lower respiratory diseases* (a title change from ICD-9 title *chronic obstructive pulmonary disease*) ranked third in 2002, with 2,530 resident deaths reported. In 2002, *chronic lower respiratory diseases* accounted for 6 percent of all deaths. The fourth leading cause of death, *cerebrovascular disease*, accounted for 2,448 or 5.8 percent of total deaths. Deaths due to *accidents (unintentional injuries)* ranked fifth in 2002, with 2,416 resident deaths reported. Together, these five causes accounted for 64 percent of total deaths in 2002.



Because the age pattern of mortality varies greatly by cause of death, changes in crude death rates over time can be influenced by the changing composition of the population. In contrast, age-adjusted death rates eliminate the influence of such shifts in the population age structure. Therefore, age-adjusted death rates are better indicators than crude rates for showing changes in mortality risk over time and among causes of death. Beginning with the 2000 report, all age-adjusted mortality rates use the estimated year 2000 population as a standard. In order to provide continuity and ease of interpretation, all age-adjusted mortality rates for years before 2000 have been re-calculated using the year 2000 standard population.

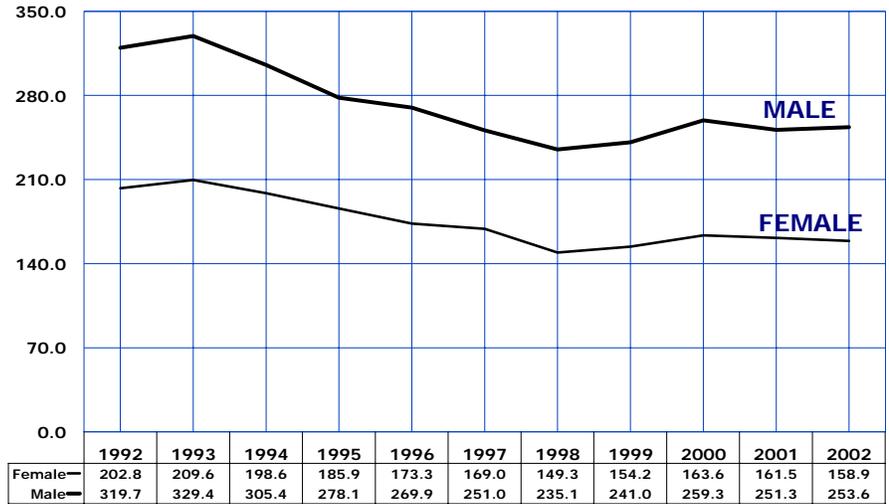
* Number of deaths per 100,000 population age-adjusted to the 2000 U.S. standard.
Note: the cause-of-death titles are according to the Tenth Revision of the International Classification of Diseases (ICD-10).

The age-adjusted mortality rates for four of the 12 leading causes of death showed an increase from 2001 to 2002: *influenza and pneumonia, Alzheimer's disease, diabetes, suicide*.

2B. LEADING CAUSES OF DEATH
Diseases of heart

Figure 2B-2
Age-Adjusted Mortality Rates for Diseases of Heart
by Gender and Year, Arizona, 1992-2002

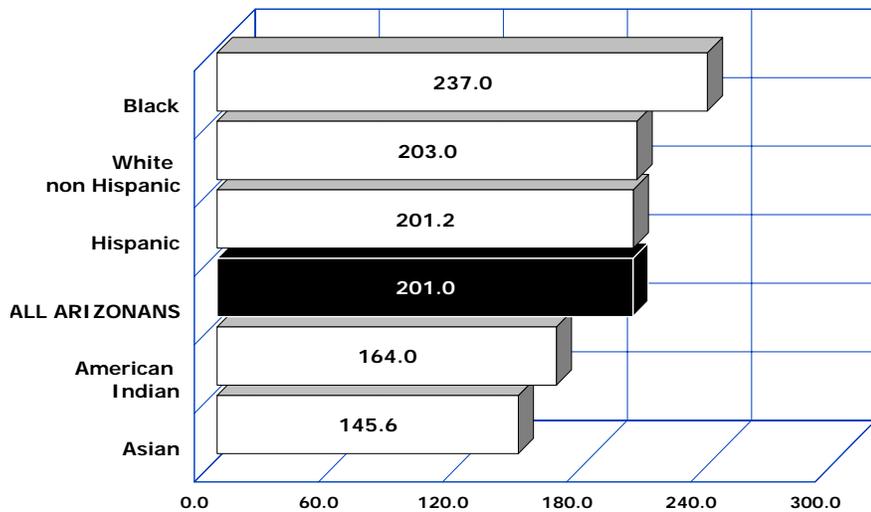
Female but not male residents of the State experienced a decline in heart disease mortality rates from 2001 to 2002. The 2002 male mortality risk for a heart disease death (253.6/100,000) exceeded the female risk (158.9/100,000) by 59.6 percent (Figure 2B-2, Table 2B-2).



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

Figure 2B-3
Age-Adjusted Mortality Rates for Diseases of Heart
by Race/Ethnic Group, Arizona, 2002

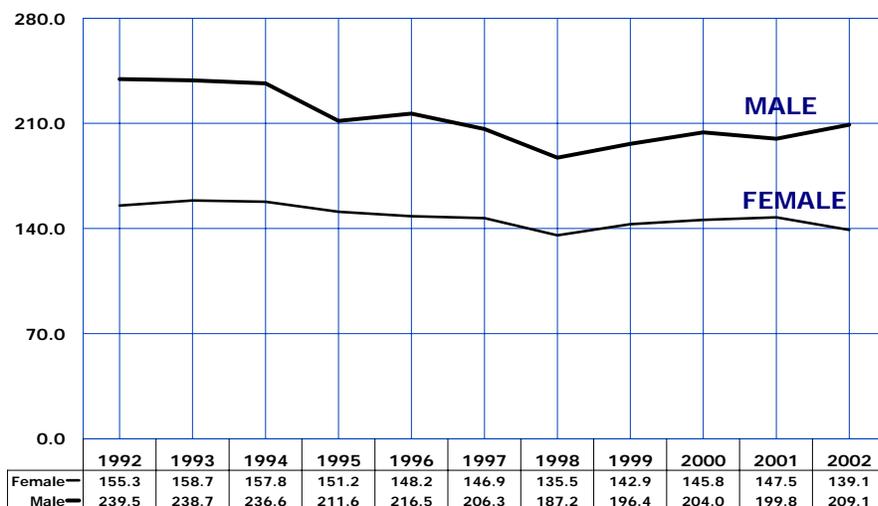
Black residents of Arizona were 1.6 times more likely to die from diseases of heart in 2002 than Asians who were at the lowest risk of death from diseases of the heart among ethnic groups in Arizona (Figure 2B-3, Table 2B-4). Black males had the highest mortality risk for diseases of the heart (311.6/100,000) among the gender by race subgroups (Table 2B-4).



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

2B. LEADING CAUSES OF DEATH
Malignant neoplasms

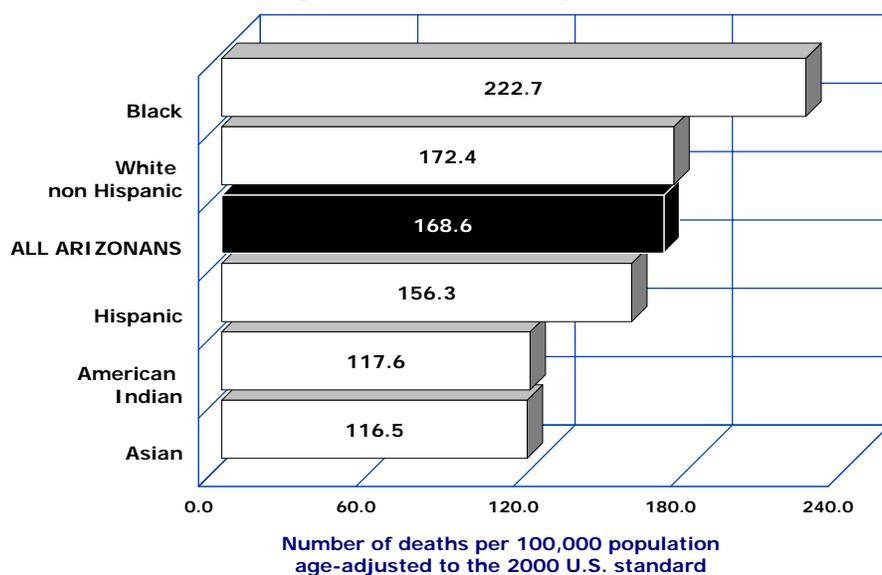
Figure 2B-4
Age-Adjusted Mortality Rates for Malignant Neoplasms
(cancer) by Gender and Year, Arizona, 1992-2002



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

The age-adjusted cancer mortality rate increased for Arizona males from 199.8 deaths per 100,000 males in 2001 to 209.1/100,000 in 2002. In contrast, the female cancer death rate decreased from 147.5/100,000 in 2001 to 139.1/100,000 in 2002. The gender gap in cancer mortality widened from 35.5 percent greater risk for males than females in 2001, to a 50 percent greater risk in 2002 (Figure 2B-4).

Figure 2B-5
Age-Adjusted Mortality Rates for Malignant Neoplasms
(cancer) by Race/Ethnic Group, Arizona, 2002



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

Arizona's Blacks were 1.9 times more likely to die from malignant neoplasms in 2002 than Asians, the group at the lowest risk of cancer death among ethnic groups (Figure 2B-5, Table 2B-4).

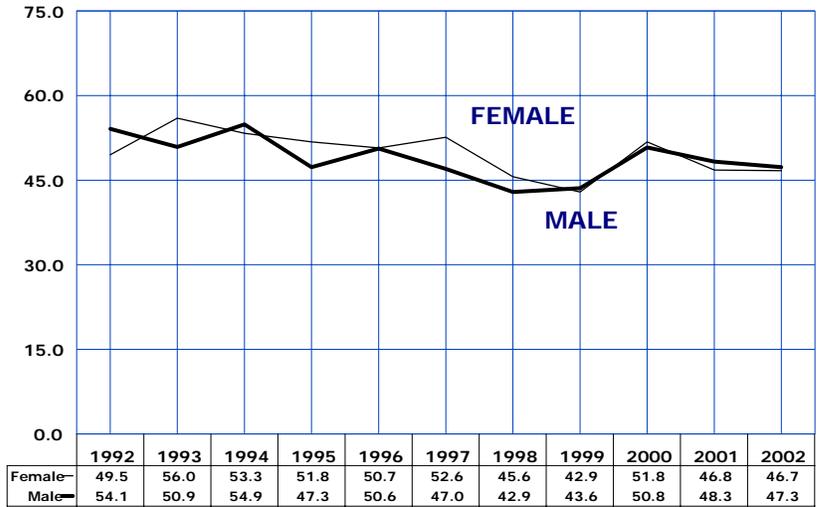
Asian females had the lowest overall cancer mortality rate (108.5/100,000) among the gender by race subgroups. American Indian females had the second lowest overall cancer mortality rate, but the highest death rate for cervical cancer among females (4.7/100,000; Table 2B-4).

Black males had the highest mortality rates for lung cancer and colorectal cancer among the gender by race subgroups, and the highest prostate mortality rate among males (Table 2B-4).

2B. LEADING CAUSES OF DEATH
Cerebrovascular disease

Figure 2B-6
Age-Adjusted Mortality Rates for Cerebrovascular Disease
by Gender and Year, Arizona, 1992-2002

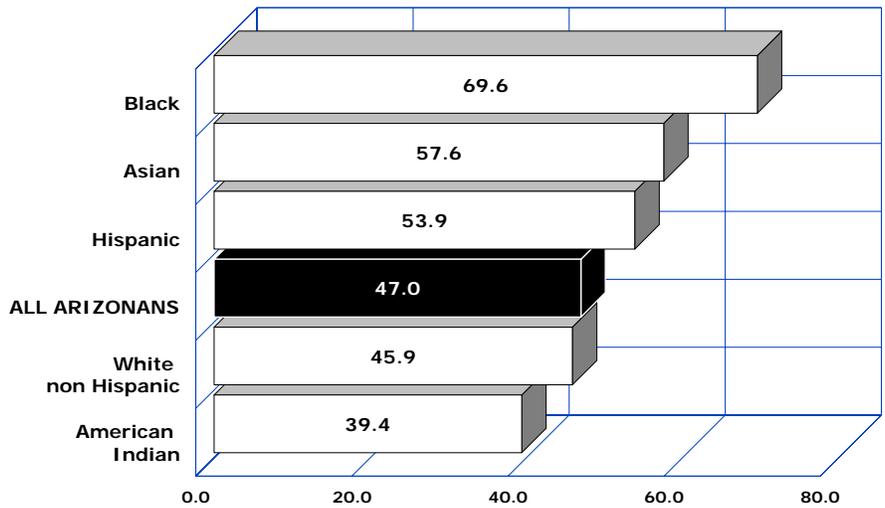
Cerebrovascular disease and diseases of the heart are two of the leading causes of death that share many risk factors such as hypertension, smoking, obesity and high levels of cholesterol. The 2002 male mortality risk for a stroke death (47.3/100,000) exceeded the female risk of 46.7/100,000 by a mere 1.3 percent (Figure 2B-6, Table 2B-2).



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

Figure 2B-7
Age-Adjusted Mortality Rates for Cerebrovascular
Disease by Race/Ethnic Group, Arizona, 2002

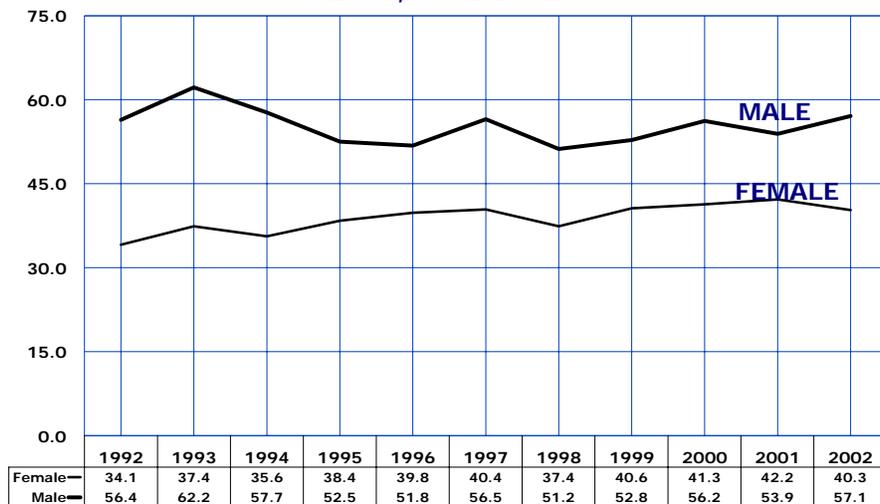
Compared to Arizona's rate, Blacks were 48.1 percent more likely to die from cerebrovascular disease in 2002 (Figure 2B-7, Table 2B-4). The 2002 mortality rate for cerebrovascular disease among American Indians (39.4/100,000) was the lowest among racial/ethnic groups.



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

2B. LEADING CAUSES OF DEATH
Chronic lower respiratory diseases

Figure 2B-8
Age-Adjusted Mortality Rates for Chronic Lower*
Respiratory Diseases by Gender and Year,
Arizona, 1992-2002



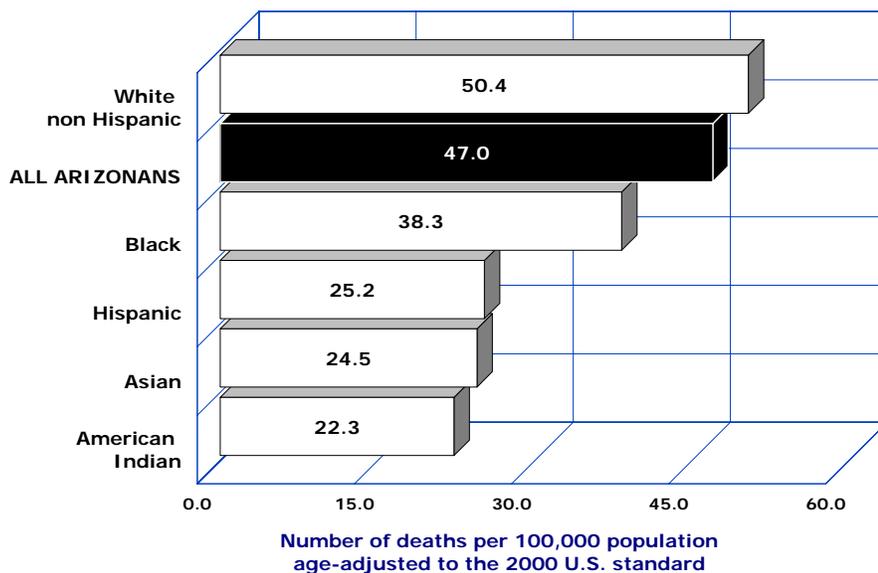
Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

* This ICD-10 title corresponds to Chronic Obstructive Pulmonary Disease (ICD-9 title).

The temporal changes from 2001 to 2002 in mortality from chronic lower respiratory diseases (CLRD) differed for the two genders, increasing by 5.9 percent for males and decreasing by 4.5 percent for females. Arizona males in 2002 were 41.7 percent more likely to die from CLRD than Arizona females (Figure 2B-8, Table 2B-2).

Rural females had the lowest mortality rate for CLRD (38.6/100,000) among the gender by region groups (Table 2B-5). Rural males were 59.3 percent more likely in 2002 to die from CLRD than rural females.

Figure 2B-9
Age-Adjusted Mortality Rates for Chronic Lower Respiratory
Diseases by Race/Ethnic Group, Arizona, 2002



Number of deaths per 100,000 population
age-adjusted to the 2000 U.S. standard

Death rates for emphysema, chronic bronchitis, asthma and other lower respiratory disorders were substantially higher among White non-Hispanics (50.4 deaths per 100,000) than they were among Blacks (38.3/100,000), Hispanics (25.2/100,000), Asians (24.5/100,000), and American Indians (22.3 deaths per 100,000) (Figure 2B-9, Table 2B-4).

2B. LEADING CAUSES OF DEATH
Accidents (unintentional injuries)

The mortality rate for unintentional injuries in accidents declined by 3 percent from 46.6 deaths per 100,000 population in 2001 to 45.2/100,000 in 2002. In 2002, male compared to female residents of Arizona were 2.2 times more likely to die from unintentional injury (Figure 2B-10, Table 2B-2).

American Indian males had the highest mortality rate for *motor vehicle accidents* (100.2/100,000) among the gender by race groups (Table 2B-4). In 2002, Black males had the highest mortality rate for *accidental poisoning* (24.8/100,000).

Figure 2B-10
Age-Adjusted Mortality Rates for Accidents (unintentional injuries) by Gender and Year, Arizona, 1992-2002

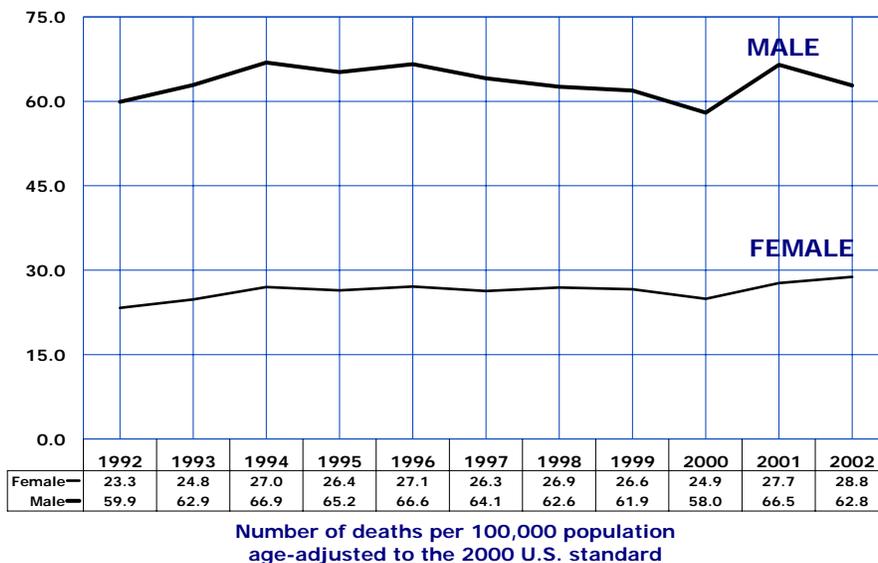
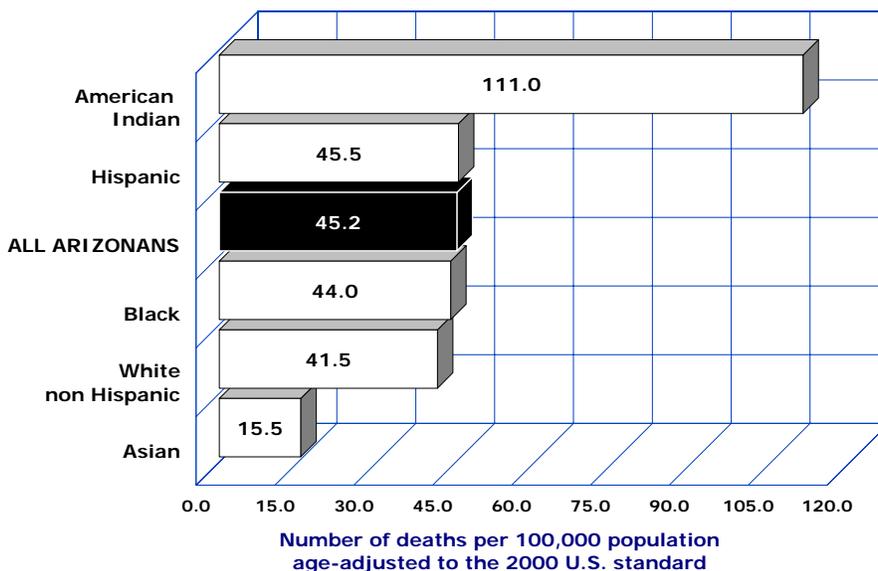


Figure 2B-11
Age-Adjusted Mortality Rates for Accidents (unintentional injuries) by Race/Ethnic Group, Arizona, 2002

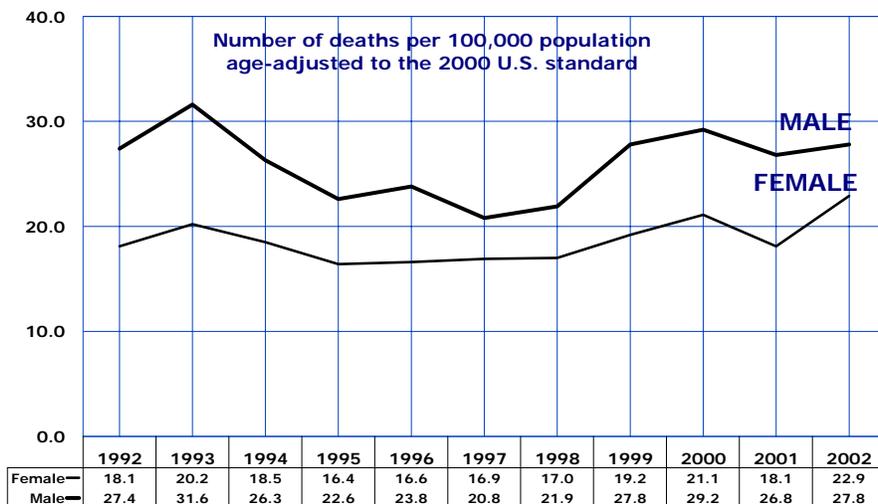


The American Indian death rate for unintentional injuries (111.0/100,000) was 7.2 times higher than the rate for Asians (15.5/100,000), the group at the lowest risk of unintentional injury death among racial/ethnic groups in the State (Figure 2B-11, Table 2B-4).

The age-adjusted mortality rates accidents varied in Arizona in 2002 from 32.6/100,000 in Santa Cruz County to 112.2/100,000 in Apache County (Table 5E-11, Figure 7B-10).

2B. LEADING CAUSES OF DEATH
Influenza and pneumonia

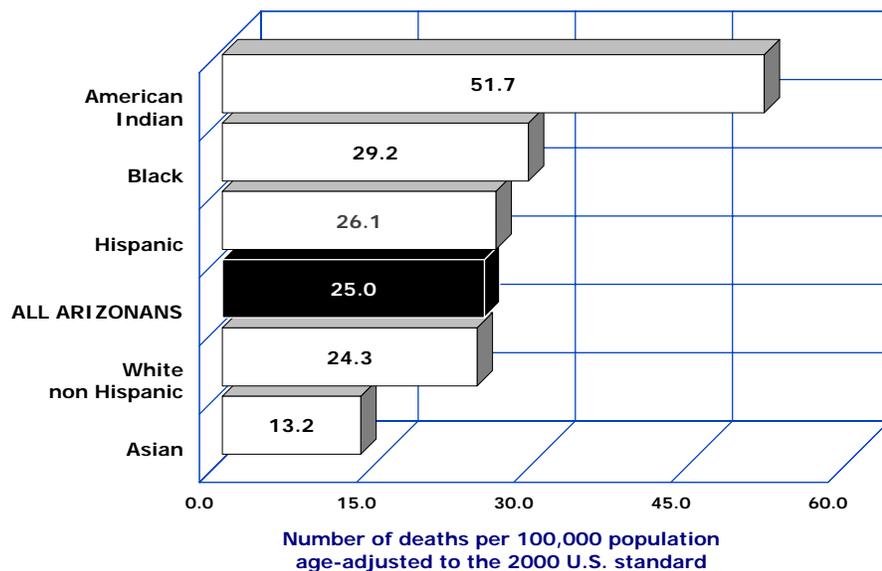
Figure 2B-12
Age-Adjusted Mortality Rates for Influenza and Pneumonia
by Gender and Year, Arizona, 1992-2002



Note: The rates for 1991-1999 are based on the number of deaths according to ICD-9. The rate for 2000 and 2001 are based on the number of deaths according to ICD-10. For comparability, the rates for 1991-1999 are adjusted using the preliminary comparability ratio of 0.6982 from NCHS. Comparability ratio of 1.0 indicates that the same number of deaths was assigned to a cause of death whether ICD-9 or ICD-10 was used.

The mortality rate for influenza and pneumonia increased by 14.2 percent from 21.9/100,000 in 2001 to 25.0/100,000 in 2002 (Table 2B-2). The worsening in survival chances from influenza and pneumonia was greater for females than males, and the influenza and pneumonia mortality disadvantage of Arizona males compared to females narrowed from 48.1 percent greater in 2001 to 21.4 percent greater in 2002 (Figure 2B-12, Table 2B-2).

Figure 2B-13
Age-Adjusted Mortality Rates for Influenza and Pneumonia
by Race/Ethnic Group, Arizona, 2002



The highest among ethnic groups mortality rates from influenza and pneumonia in 2002 were those of American Indians (51.7/100,000) compared to 29.2/100,000 among Blacks, 26.1/100,000 among Hispanics, 24.3/100,000 among White non-Hispanics, and 13.2/100,000 among Asians (Figure 2B-13, Table 2B-4).

Compared to the state death rate for influenza and pneumonia, Yavapai's County rate was 97.5 percent greater, Gila's County 28 percent greater and Mohave's County 24.6 percent greater (Table 5E-11, Figure 7B-19).

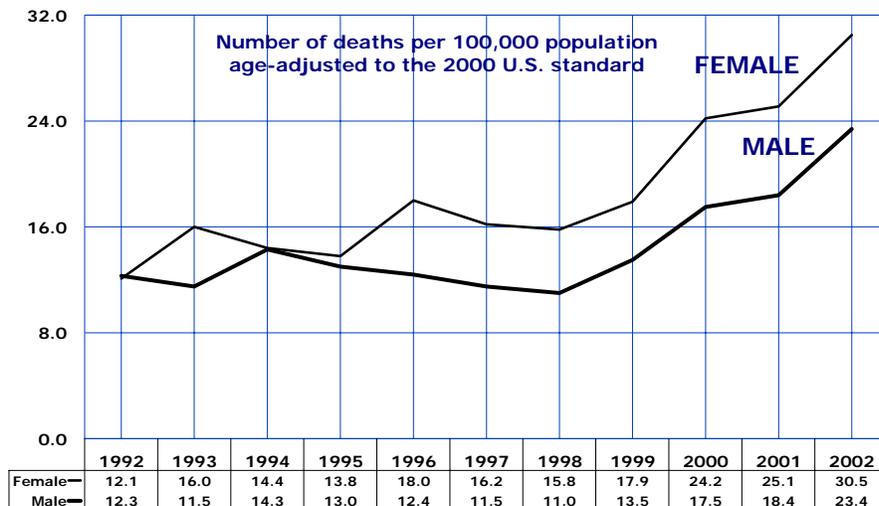
2B. LEADING CAUSES OF DEATH
Alzheimer's disease

The number of deaths from Alzheimer's disease in Arizona both in 2001 and 2002 made Alzheimer's disease the 6th leading cause of death for all age groups and 5th leading cause for persons 65 years of age or more (Figure 2B-1, Table 2B-1, Table 2C-27).

The comparability-modified age-adjusted mortality rate for Alzheimer's disease among females increased 2.5 times from 12.1/100,000 in 1992 to 30.5/100,000 in 2002 (Figure 2B-14). Among males, the comparability-modified age-adjusted mortality rate for Alzheimer's disease almost doubled (90.2 percent increase) during that time.

The age-adjusted death rate for Alzheimer's disease was 30.3 percent higher in 2002 for females than for males.

Figure 2B-14
Age-Adjusted Mortality Rates for Alzheimer's Disease
by Gender and Year, Arizona, 1992-2002

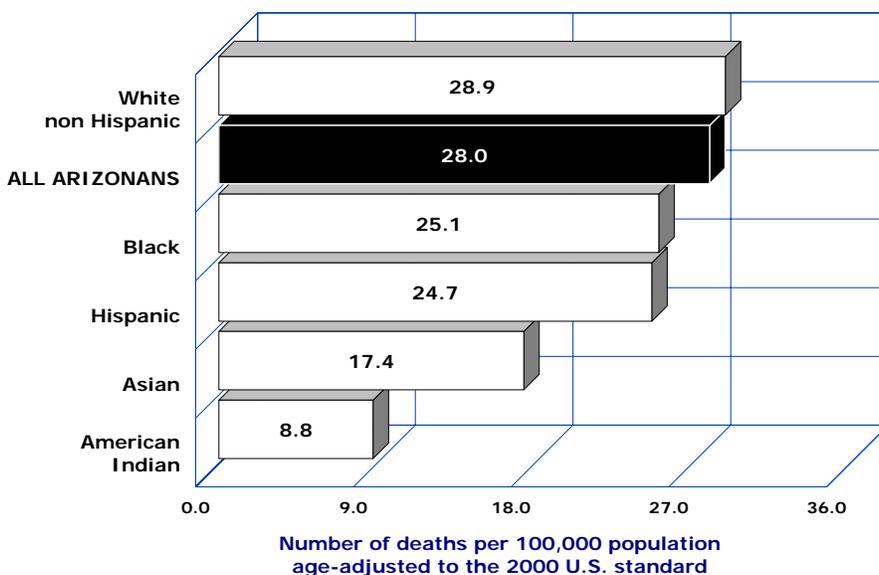


Note: The rates for 1991-1999 are comparability-modified.

The age-adjusted mortality rates for Alzheimer's disease in 2002 were substantially higher among White Non-Hispanic (28.9/100,000), Black (25.1/100,000) and Hispanic (24.7/100,000) residents of Arizona than they were among Asians (17.4/100,000) and American Indians (8.8/100,000) (Figure 2B-15, Table 2B-4).

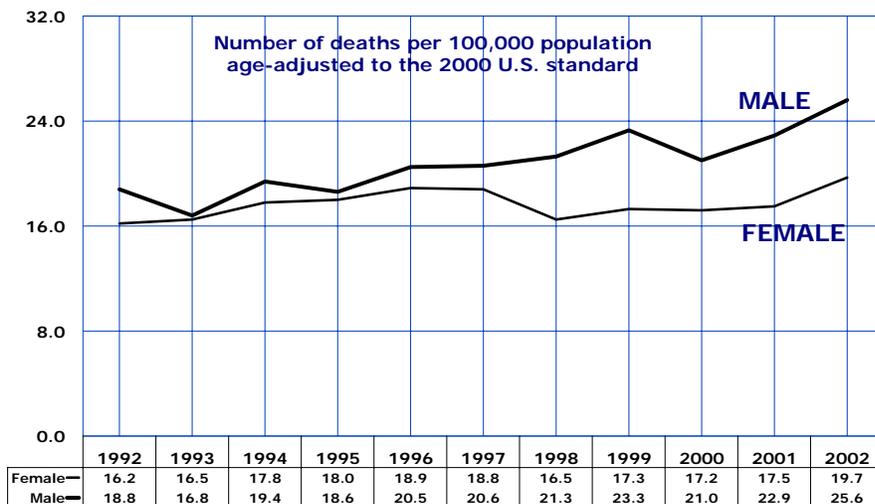
White non-Hispanic residents of Arizona disproportionately contributed to mortality from Alzheimer's disease. In 2002, White non-Hispanics accounted for 63.8 percent of the State's population, but 91.6 percent of all deaths from Alzheimer's disease (Table 2B-4).

Figure 2B-15
Age-Adjusted Mortality Rates for Alzheimer's Disease
by Race/Ethnic Group, Arizona, 2002



2B. LEADING CAUSES OF DEATH
Diabetes

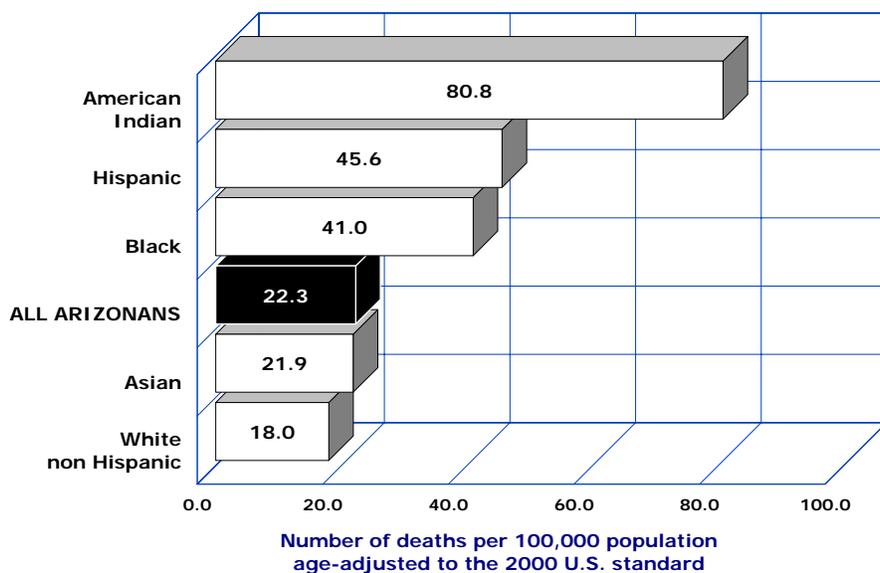
Figure 2B-16
Age-Adjusted Mortality Rates for Diabetes
by Gender and Year, Arizona, 1992-2002



The death rate for diabetes increased in Arizona for the second consecutive year from 19.0/100,000 in 2000 to 22.3/100,000 in 2002 (**Table 2B-2**). The increase from 2000 to 2002 in the death rate for diabetes was substantially greater for males (21.9 percent) than females (14.5 percent respectively) (**Figure 2B-16**).

In 2002, diabetes was approximately 2.2 as likely to be listed on the death certificates as a multiple cause of death (50.1/100,000, **Table 4F**) than as underlying cause (22.3/100,000, **Table 2B-2**). The rate of diabetes as a multiple cause of death includes all mentions of diabetes on the death certificate.

Figure 2B-17
Age-Adjusted Mortality Rates for Diabetes
by Race/Ethnic Group, Arizona, 2002



The age-adjusted mortality rates for diabetes among American Indians were 4.5 times higher than the rate for White non-Hispanics and 3.7 times as high as the diabetes death rates of Asians (**Figure 2B-17, Table 2B-4**).

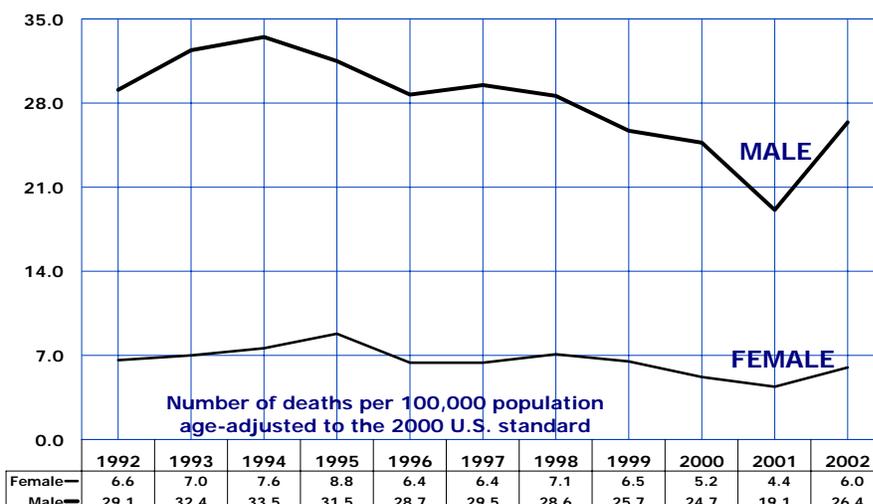
Among the 15 Arizona counties in 2002, Apache, La Paz, Navajo and Graham, counties had the highest mortality rates for diabetes (**Table 5E-11, Figure 7B-18**).

2B. LEADING CAUSES OF DEATH
Intentional self-harm (suicide)

Unprecedented decline in the Arizona male suicide mortality in 2001 quite likely reflects the imperfections of the computerized coding of this cause of death. It looks like approximately 100 firearm fatalities that would have been classified as suicide had the manual coding system been in place, were classified as accidents in 2001 (Table 2B-2, Table 2B-9).

The 2002 male mortality risk for intentional self-harm (26.4/100,000) exceeded 4.4 times the female risk of 6/100,000.

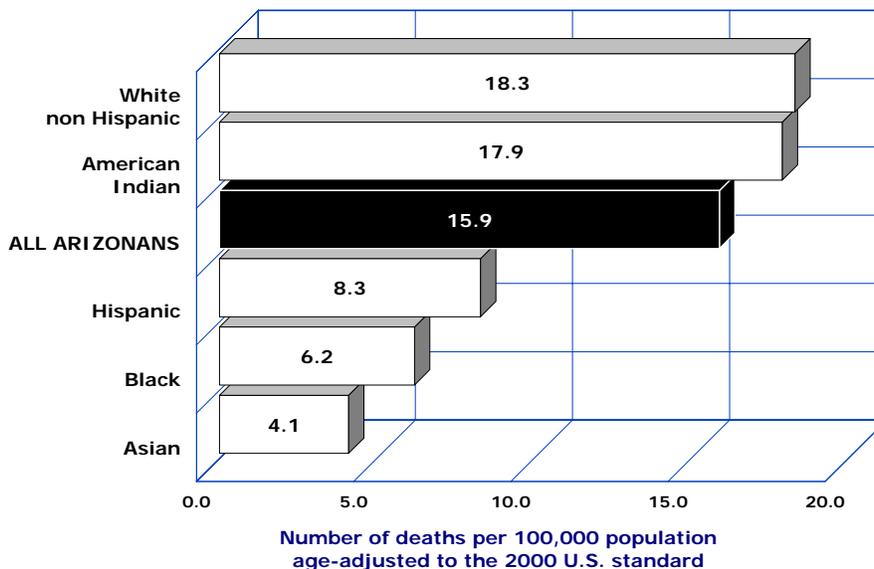
Figure 2B-18
Age-Adjusted Mortality Rates for Intentional Self-Harm (suicide) by Gender and Year, Arizona, 1992-2002



Suicide rates in 2002 were substantially higher among White non-Hispanics and American Indians (18.3/100,000 and 17.9/100,000, respectively) than they were among Hispanics (8.3/100,000), Blacks (6.2/100,000) and Asians (4.1/100,000) (Figure 2B-19, Table 2B-4).

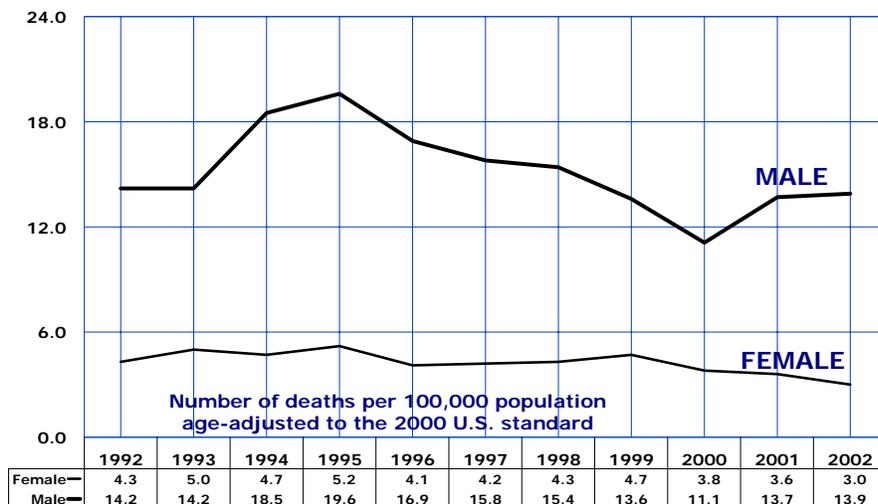
The age-adjusted mortality rates varied in Arizona in 2002 from zero (no suicides) in Greenlee County to 29 suicides per 100,000 residents of Mohave County (Table 5E-11, Figure 7B-15). Gila County ranked second highest in the State with the suicide mortality rate of 28/100,000.

Figure 2B-19
Age-Adjusted Mortality Rates for Intentional Self-Harm (suicide) by Race/Ethnic Group, Arizona, 2002



2B. LEADING CAUSES OF DEATH
Assault (homicide)

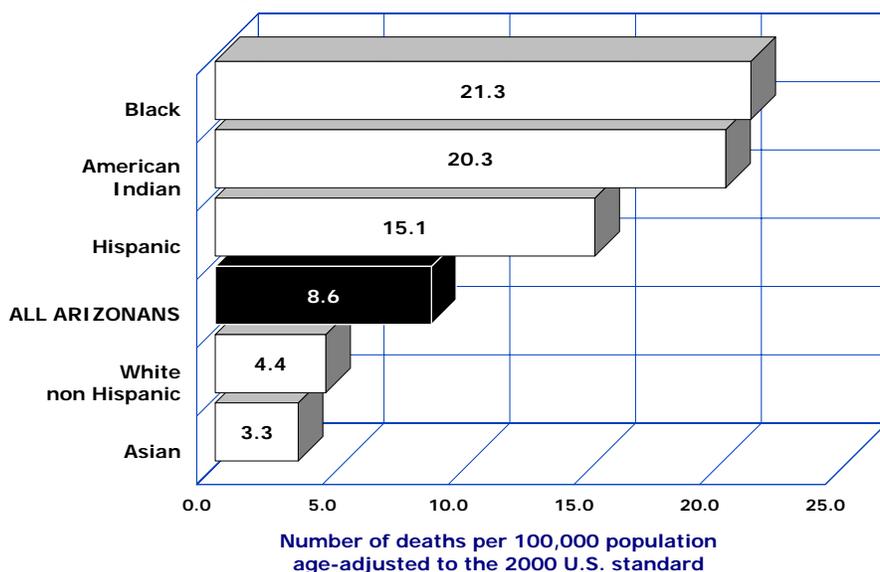
Figure 2B-20
Age-Adjusted Mortality Rates for Assault (homicide)
by Gender and Year, Arizona, 1992-2002



The number of 478 Arizonans who were murdered in 2002 was the second highest of the 1992-2002 period (**Table 2B-1**). However, the homicide rate declined slightly from 8.7/100,000 in 2001 to 8.6/100,000 in 2002 (**Table 2B-2**).

Among males, the age-adjusted mortality rate for assault increased for the 3rd consecutive year from 11.1/100,000 in 2000 to 13.9/100,000 in 2002. In contrast, the female rate for homicide dropped for the fourth consecutive year from 4.7/100,000 in 1999 to 3.0/100,000 in 2002 (**Figure 2B-20**).

Figure 2B-21
Age-Adjusted Mortality Rates for Assault (homicide)
by Race/Ethnic Group, Arizona, 2002



The 2002 homicide rates were substantially higher among Black, American Indian and Hispanic residents of the state compared to homicide rates among White non-Hispanics and Asians. Blacks were 6.5 times more likely, while American Indians 6.2 times and Hispanics 4.6 times more likely to die from assault than Asians (**Figure 2B-21, Table 2B-4**).

Among the 15 counties in 2001, Apache and Navajo counties had the two highest homicide death rates, while Santa Cruz and Mohave counties had the two lowest rates (**Table 5E-11, Figure 7B-16**).

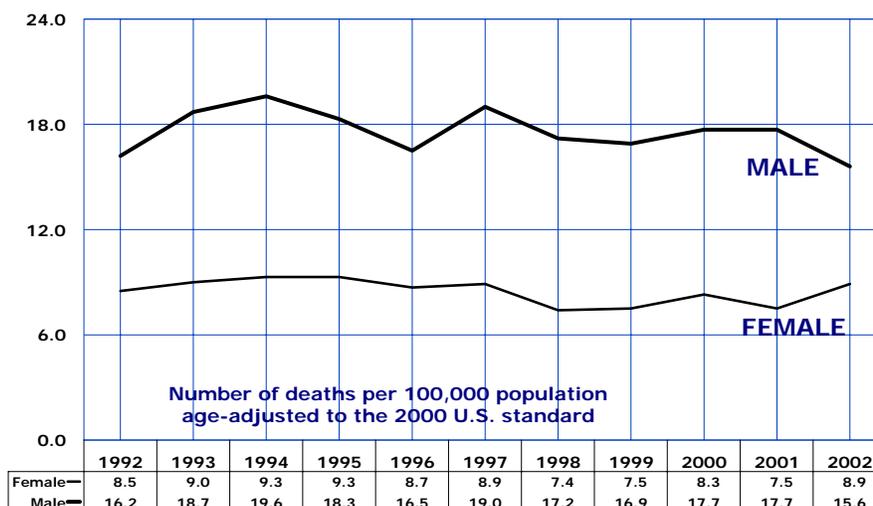
2B. LEADING CAUSES OF DEATH
Chronic liver disease and cirrhosis

Chronic liver disease and cirrhosis was the 10th leading cause of death in Arizona in 2002 (**Figure 2B-1, Table 2B-1**).

Arizona males were 1.75 times more likely to die in 2002 from chronic liver disease and cirrhosis than Arizona females (15.6/100,000 vs. 8.9/100,000) (**Table 2B-2**).

American Indian males had the highest mortality rate for chronic liver disease and cirrhosis (55.6/100,000) among the gender by race groups (**Table 2B-4**).

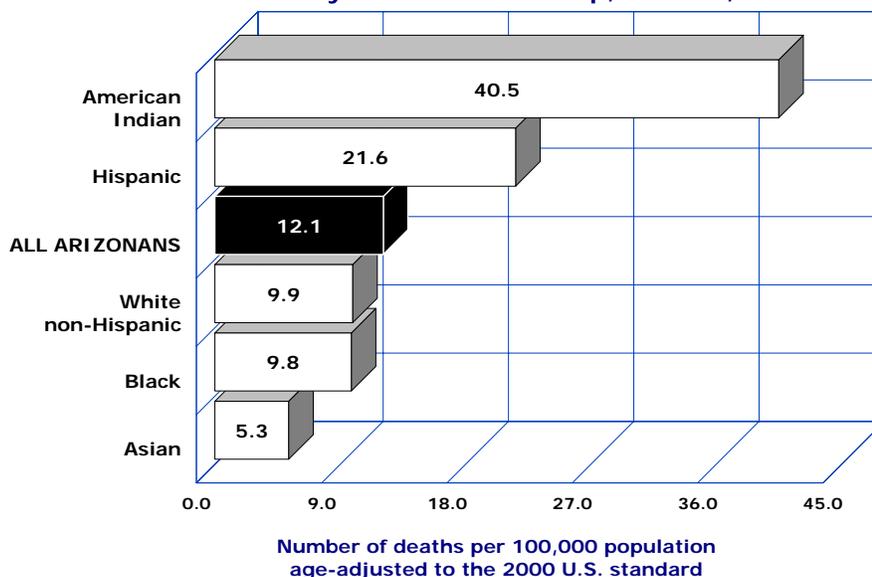
Figure 2B-22
Age-Adjusted Mortality Rates for Chronic Liver Disease and Cirrhosis by Gender and Year, Arizona, 1992-2002



The 2002 death rate for chronic liver disease and cirrhosis among American Indians (40.5/100,000) was 7.6 times greater than the rate among Asians (5.3/100,000) (**Table 2B-4**). The rate for Hispanics (21.6/100,000) was the second highest among racial/ethnic groups in the State.

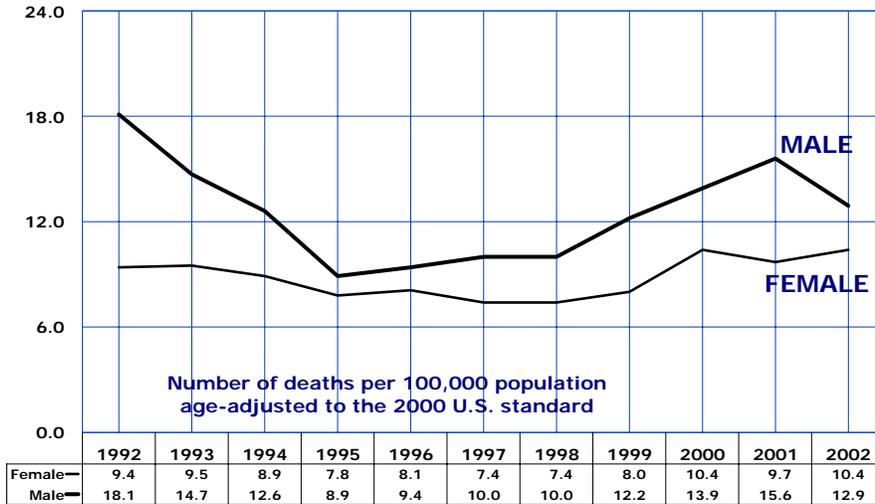
The 2002 mortality rates for chronic liver disease and cirrhosis in Navajo, Gila and Navajo counties exceeded the statewide rate by at least 36 percent (**Table 5E-11, Figure 7B-22**).

Figure 2B-23
Age-Adjusted Mortality Rates for Chronic Liver Disease and Cirrhosis by Race/Ethnic Group, Arizona, 2002



2B. LEADING CAUSES OF DEATH
Nephritis, nephrotic syndrome and nephrosis

Figure 2B-24
Age-Adjusted Mortality Rates for Nephritis, Nephrotic Syndrome and Nephrosis by Gender and Year, Arizona, 1992-2002

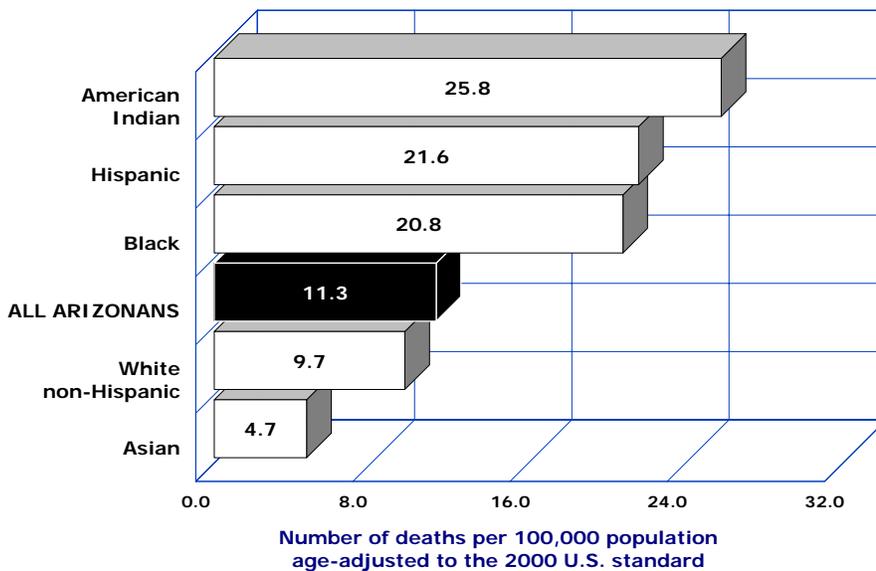


Note: the rates for 1991-1999 are comparability-modified.

Kidney disease (nephritis, nephrotic syndrome and nephrosis) was the 11th leading cause of death in Arizona in 2002 (Figure 2B-1).

The male mortality rate for kidney disease decreased from 15.6/100,000 in 2001 to 12.9/100,000 in 2002 (Figure 2B-24). In contrast, the female mortality rate increased from 9.7/100,000 in 2001 to 10.4/100,000 in 2002. In 2002, American Indian females had the highest mortality rate (27.8/100,000) for nephritis, nephrotic syndrome and nephrosis among the gender by race groups (Table 2B-4).

Figure 2B-25
Age-Adjusted Mortality Rates for Nephritis, Nephrotic Syndrome and Nephrosis by Race/Ethnic Group, Arizona, 2002



The 2002 nephritis death rates were substantially higher among American Indian (25.8/100,000), Hispanic (21.6/100,000), and Black (20.8/100,000) residents of the state compared to nephritis rates among White non-Hispanics (9.7/100,000) and Asians (4.7/100,000) (Figure 2B-25, Table 2B-4).