The causes of death for 2000 are classified by the Tenth Revision of the International Classification of Diseases (ICD-10), replacing the Ninth Revision (ICD-9) used in Arizona during 1979-1999. The group titles, such as cardiovascular diseases, infectious and parasitic diseases or other cardiovascular diseases are not ranked to determine the leading causes of death. Measures of comparison between ICD-9 and ICD-10 – the "comparability ratios" - for the causes of death shown in this report are provided in the *Technical Notes*. Comparability ratio of 1.0 indicates that the same number of deaths would be assigned to a cause-of-death when ICD-9 or ICD-10 was used. For selected four causes of death the numbers in parentheses in Table 2B-1 and Table 2B-2 present **comparability modified data**: the annual number of deaths for 1994-1999 that would have been classified as influenza and pneumonia, Alzheimer's disease, nephritis or septicemia, had the ICD-10 classification system and coding rules been in place.

The leading cause of death to Arizona residents in 2000 continued to be *heart disease*, which accounted for 10,430 or 25.9 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 22.4 percent of all deaths in 2000. The third leading cause of death, *cerebrovascular disease*, accounted for 2,603 or 6.5 percent of total deaths. Together, these three causes accounted for 54.8 percent of total deaths in 2000.

Deaths due to *chronic lower respiratory diseases (*a title change from ICD-9 title *chronic obstructive pulmonary disease)* ranked fourth in 2000, with 2,493 resident deaths reported. In 2000 chronic lower respiratory diseases accounted for 6.2 percent of all deaths.

Deaths due to *accidents* (*unintentional injuries)* were the fifth leading cause of death in 2000.

The causes ranked sixth through eleventh in 2000 were *influenza and pneumonia*, *Alzheimer's disease*, *diabetes, intentional self-harm (suicide), chronic liver disease and cirrhosis* and *nephritis, nephrotic syndrome and nephrosis (*or *kidney disease;* **Figure 2B-1**).

Homicide, the 12th leading cause, continued a downward trend observed since 1996 (**Table 2B-1**).

Human immunodeficiency virus (HIV) disease and *atherosclerosis* stayed off the list, while *Parkinson's disease* and *essential (primary) hypertension* debuted respectively as the 14th and the 15th leading causes of death in Arizona (**Table 2B-1**).

MORTALITY RATES FOR THE LEADING CAUSES OF DEATH

The age-adjusted mortality rates discussed in this section are based on a different standard population then in the previous reports. The new population standard for age-adjusting death rates uses the estimated year 2000 population distribution of the United States and, beginning with this report, replaces the former standard based on the 1940 population.

For most leading causes of death, age-adjusted death rates are better indicators than crude death rates. Therefore, all death rates presented in this section are age-adjusted. They were computed by the direct method, that is by applying the age-specific death rates to the U.S. standard population (relative age distribution of the 2000 projected population of the United States). Because mortality from most causes occurs predominately among the elderly, a population group with a larger proportion of older persons would have a higher mortality rate. The "age-adjustment" or age-standardization" removes the effects of the age differences among gender/ethnic groups by placing all of them in a

population with a standard age distribution. However, the age-adjusted mortality rates should be viewed as an index rather than as actual measures of mortality risk. Statistically, they are weighted averages of the age-specific death rates, where the weights represent the fixed population proportions by age (see *Terms Related to Mortality* in Technical Notes. The age-adjusted mortality rates are not shown for causes from which deaths occur primarily among infants (such as certain conditions originating in the perinatal period or congenital malformations).

POPULATION DENOMINATORS AND MORTALITY RATES

Rate is a measure of the frequency of some event (such as death) in relation to a unit of population during a specified time (such as year). Events in the numerator (i.e., the number of deaths) occur to individuals "at risk" in the denominator. Mortality rates express the likelihood (or risk) of death in the specified population during a particular time and are generally expressed as units of population in the denominator (per 1,000, per 100,000, etc.).

The trends in the number of deaths do not always parallel the mortality rate. In fact, the ever-increasing annual number of deaths may not be enough to offset the simultaneous growth of the population in the denominator and the mortality rate won't increase or may even decline (compare the numerators in Table 5E-1 with the crude death rates in Table 5E-4).

On the other hand, the rising mortality rate may reflect a decline in the number of persons in the denominator rather than an increase in the number of deaths. A comparison of the census results for Arizona for 2000 with the population projections used as denominators to calculate rates for 1999 shows that the numbers of White non-Hispanics, Blacks, American Indians and Asians were overestimated for 1999, while the number of Hispanics was underestimated by 22 percent:

Population group	1999 denominators (projections)	2000 denominators (census results)	Percent difference
Hispanic	1,060,197	1,295,617	22.2
White non-Hispanic	3,317,297	3,274,258	-1.3
American Indian	265,195	255,879	-3.5
Asian	105,535	98,969	-6.2
Black	176,128	158,873	-9.8
65-74 years old	367,933	363,841	-1.1
75-84 years old	241,605	235,473	-2.5
85+ years old	79,024	68,525	-13.3
All 65+	688,562	667,839	-3.0

Even if there was no increase in the number of deaths from 1999, the mortality rates for Blacks, Asians, American Indians and White non-Hispanics would be greater in 2000 then they were in 1999.

The distorting effect of "diminishing denominators" on trends in mortality rates is even more pronounced in case of the elderly 65 years and over. Compared to the 2000 census enumerations, their projected population numbers for 1998-1999 were overestimated. The 1.3 percent increase in the number of elderly deaths from 28,940 in 1999 to 29,323 in 2000 was insufficient to account for a 4.5 percent increase in the mortality rate of Arizona's elderly, from 4,203.4/100,000 in 1999 to 4,390.7/100,000 in 2000 (**Table 2C-24**). However, when this slight increase in the number of deaths is combined with a 3 percent decline in the denominator (from 688,562 used for 1999 to 667,839 used for 2000), it explains why the elderly mortality rate went up by this much.

Mortality among the elderly accounts for a substantial fraction (72.9 percent in 2000) of the total age-adjusted rate $(140.4+226.1+220.0)/804.4$:

Age group	2000 population	2000 deaths	Age-specific rate	2000 standard	Age-adjusted rate
A	B	C	D $(C/B)*100000$	E	F D*E
<1	77421	568	733.7	.013818	10.1
1-4	304965	112	36.7	.055317	2.0
5-14	768080	159	20.7	.145565	3.0
15-24	730582	670	91.7	.138646	12.7
65-74	742665	887	119.4	.135573	16.2
35-44	768804	1666	216.7	.162613	35.2
45-54	627904	2755	438.8	.134834	59.2
55-64	442372	4030	911.0	.087247	79.5
65-74	363841	7733	2125.4	.066037	140.4
75-84	235473	11871	5041.3	.044842	226.1
85+	68525	9719	14183.1	.015508	220.0
				TOTAL	**804.4**

Not surprisingly, the total age-adjusted mortality rates for Arizona for 1998 and 1999 were understated because the elderly population base used to calculate them was too large.

■ Diseases of the heart

The 2000 male mortality risk for a heart disease death (265.9/100,000) exceeded the female risk (166.7/100,000) by 59.5 percent (**Figure 2B-2**, **Table 2B-2**).

Black residents of Arizona were 2.2 times more likely to die from diseases of heart in 2000 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**).

■ Malignant neoplasms (cancer)

In 2000, cancer was a 40 percent greater risk for Arizona males (211/100,000) than females (150.7/100,000; **Figure 2B-4**). Arizona's Blacks were 2.1 times more likely to die from malignant neoplasms in 2000 than Asians, the group at the lowest risk of cancer death among ethnic groups (**Table 2B-4**).

Lung cancer accounted for 30 percent of total cancer mortality among males compared to 25 percent among females. *Breast cancer* accounted for 16.8 percent of all female cancer deaths in 2000. *Cancer of prostate* was responsible for 12.6 percent of all male cancer deaths. *Colorectal cancer* was the third leading cause of cancer mortality for both males and females (9.9 percent of all their cancer deaths).

Death rates for specific cancers vary considerably across ethnic groups (**Table 2B-4**). Compared with American Indian residents of Arizona, *lung cancer* death rates were 7.1 times higher among Blacks (68/100,000 vs. 9.6/100,000). The 2000 age-adjusted mortality rate for *breast cancer* among Black females (29.5/100,000) was 2.3 times greater than the *breast cancer* death rate among Asian females (12.8/100,000; **Table 2B-4**). The age-adjusted death rate for prostate cancer

among Black males (79.6/100,000) was 8.9 greater than the rate among Asian males (8.9/100,000).

■ Cerebrovascular diseases

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 2000 female mortality risk for a stroke death (53.1/100,000) exceeded the male risk (51.9/100,000) by 2.3 percent (**Figure 2B-6**, **Table 2B-2**). Compared to Arizona's rate, Blacks were 60 percent more likely to die from cerebrovascular disease in 2000 (**Figure 2B-7**, **Table 2B-4**). The 2000 mortality rate for cerebrovascular disease among Asians (46.1/100,000) was the lowest among racial/ethnic groups.

■ Chronic lower respiratory diseases (CLRD)

The comparability ratio for chronic lower respiratory diseases (CLRD) is 1.0478. The nearly 5-percent increase in allocation to this cause of death consists of deaths previously coded as pneumonia in ICD-9.

The temporal trends in the 1990-2000 period in CLRD death rates differed for the two genders, increasing by 16.4 percent for females and decreasing by 3.8 percent for males. Still, Arizona males in 2000 were 35.6 percent more likely to die from CLRD than Arizona females (**Figure 2B-8**, **Table 2B-2**). Death rates from emphysema, chronic bronchitis, asthma and other lower respiratory disorders were substantially higher among Whites non-Hispanic (52.7/100,000) than they were among Blacks (31.5), American Indians (21.9), Hispanics (25.7) and Asians (12.7/100,000) (**Figure 2B-9**, **Table 2B-4**).

■ Accidents (unintentional injuries)

The mortality rate for unintentional injuries in accidents declined by 6.8 percent from 44.4 deaths per 100,000 population in 1999 to 41.4/100,000 in 2000. In 2000, male compared to female residents of Arizona

were 2.3 times more likely to die from unintentional injury (**Figure 2B-10**, **Table 2B-2**).

The American Indian death rate for unintentional injuries (114.6/100,000) was 5.2 times higher than the rate for Asians (21.9/100,000) (**Figure 2B-11**, **Table 2B-4**).

■ Influenza and pneumonia

The comparability ratio for influenza and pneumonia is 0.6982, which indicates a substantial decrease in allocation of deaths to this category with the implementation of ICD-10. The deaths classified as pneumonia in ICD-9 are classified in ICD-10 to many other causes.

In 1999, there were 1,724 deaths classified as influenza and pneumonia using ICD-9. Without taking the ICD coding changes into account, it would appear that deaths from influenza and pneumonia decreased to 1,201 in 2000. However, because the coding rules changed between ICD-9 and ICD-10, we need to apply the comparability ratio. Applying the comparability ratio to the 1999 deaths yields 1,204 deaths that would have been classified as influenza and pneumonia deaths in 1999, had the ICD-10 classification system and coding rules been in place. The comparability modified number for 1999 (1,204 deaths) is only slightly higher than the actual number of 1,201 influenza and pneumonia deaths in 2000 (**Table 2B-1**).

Influenza and pneumonia mortality disadvantage of Arizona males compared to females narrowed from 44.9 percent greater in 1999 to 38.4 percent greater in 2000 (**Figure 2B-12, Table 2B-2**). The highest among ethnic groups mortality rates from influenza and pneumonia in 2000 were those of American Indians (48.2/100,000) compared to 30.3 among Hispanics, 26.9 among Blacks, 23.7 among White non-Hispanics, and 11.9 among Asians (**Figure 2B-13**,**Table 2B-5**).

■ Alzheimer's Disease

The number of deaths from Alzheimer's disease in Arizona in 2000 made Alzheimer's disease the 7th 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 ratio for Alzheimer's disease is 1.5536, which indicates a 55 percent increase in Alzheimer's disease deaths when classified by ICD-10. Nearly all of this increase comes from deaths classified in ICD-9 as Presenile dementia (290.1).

The comparability-modified age-adjusted mortality rate for Alzheimer's disease among females increased by 68.1 percent from 14.4/100,000 in 1994 to 24.2/100,000 in 2000 (**Figure 2B-14**). Among males, the comparability-modified age-adjusted mortality rate for Alzheimer's disease increased by 22.4 percent during that time.

The age-adjusted death rate for Alzheimer's disease was 38.3 percent higher in 2000 for females (24.2/100,000) than for males (17.5/100,000, **Figure 2B-14**).

■ Diabetes

The comparability ratio for diabetes mellitus is 1.0082, which indicates a less than 1 percent increase due to ICD-10. The death rate for diabetes declined in Arizona from 20.5/100,000 in 1999 to 19.6/100,000 in 2000 (**Table 2B-2**). The decrease from 1999 to 2000 in the death rate from diabetes was substantially greater for males (8.9 percent) than females (0.6 percent respectively) (**Figure 2B-16**).

The age-adjusted mortality rates for diabetes among American Indians were 5 times higher than the rate for White non-Hispanics and 3.9 times as high as the diabetes death rates of Asians (**Figure 2B-17**, **Table 2B-4**).

■ Intentional Self-Harm (suicide)

The comparability ratio for intentional self-harm (suicide) is 1.0. This means that the change from ICD-9 to ICD-10 did not substantially affect mortality patterns for this cause of death.

Between 1998 and 2000 the Arizona suicide mortality rate declined by 18.4 percent to 14.6 suicides per 100,000 persons, the lowest rate of the decade (**Table 2B-2**).

In the 1990-2000 period, no suicide death rate among Arizona's males was below 24/100,000 (**Figure 2B-18**, **Table 2B-2**). In contrast, none of the annual female death rates from suicide exceeded 8.9/100,000 during that period. Males relative to females in 2000 were 4.7 times more likely to kill themselves. Suicide rates in 2000 were substantially higher among White non Hispanics and American Indians (16.8/100,000 and 16.2/100,000, respectively) than they were among Hispanics (7.2/100,000), Blacks (6.5/100,000) and Asians (5.7/100,000) (**Figure 2B-19**, **Table 2B-4**).

■ Chronic liver disease and cirrhosis

The comparability ratio for chronic liver disease and cirrhosis is 1.0367, denoting a nearly 4 percent increase due to implementation of ICD-10. The majority of deaths added to Chronic liver disease and cirrhosis were coded in ICD-9 to Alcohol dependence syndrome and unspecified chronic hepatitis. Chronic liver disease and cirrhosis was the 10th leading cause of death in Arizona in 2000 (**Figure 2B-1**).

Arizona males were 2.1 times more likely to die in 2000 from chronic liver disease and cirrhosis than Arizona females (17.8/100,000 vs. 8.4/100,000) (**Table 2B-3**). The 2000 death rate for chronic liver disease and cirrhosis among American Indians (61.7/100,000) was 15 times greater than the rate among Asians (4.1/100,000) (**Table 2B-4**).

■ Nephritis, Nephrotic Syndrome and Nephrosis

Kidney disease (nephritis, nephrotic syndrome and nephrosis) was the 11th leading cause of death in Arizona in 2000 (**Figure 2B-1**).

Nephritis, nephritic syndrome and nephrosis has a comparability ratio of 1.2320. This 23-percent increase in this category is due primarily to changes in the classification of Renal failure. End-stage renal disease, which was classified as an unspecified disorder of the kidney in ICD-9 has been reclassified in ICD-10 as a subcategory of Renal failure, adding a substantial number of deaths to the Renal failure and nephritis, nephritic syndrome and nephrosis categories.

In 2000 the mortality rate for nephritis, nephritic syndrome and nephrosis among males (14.1/100,000) exceeded the female death rate by 31.8 percent (**Table 2B-2**).

The 2000 nephritis death rates were substantially higher among Black (28.1/100,000), American Indian (22.6/100,000) and Hispanic residents (22.3/100,000) of the state compared to nephritis rates among White non-Hispanics (10.4/100,000) and Asians (5.0/100,000) (**Table 2B-4**).

■ Assault (homicide)

Arizona experienced five consecutive annual increases in homicide mortality from 1990 to 1995 (**Table 2B-2**). From 1995 to 2000, the homicide mortality declined by 39.2 percent to a rate of 7.6/100,000. The change from ICD-9 to ICD-10 did not substantially affect mortality patterns for homicide.

The homicide death rate among Arizona females decreased from 4.8/100,000 in 1999 to 3.9/100,000 in 2000. The homicide death rate among Arizona males declined from 13.6 in 1999 to 11.1 in 2000 (**Figure 2B-20**, **Table 2B-2**).

The 2000 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 5.7 times more likely, while American Indians 4.6 times and Hispanics 3.7 times more likely to die from assault than White non-Hispanics whites (**Figure 2B-21**, **Table 2B-4**).