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 1994-2004) 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 1999-2004 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:

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported out-of-State deaths of AZ residents</td>
<td>1,608</td>
<td>1,431</td>
<td>1,569</td>
<td>792</td>
<td>844</td>
<td>1,009</td>
<td>678</td>
<td>640</td>
<td>714</td>
</tr>
</tbody>
</table>

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 1999-2004 were understated because the numerators used to calculate them were too small.

Another disturbing peculiarity of the mortality data collection process are records where cause of death is missing. The majority of those records are, again, for Arizonans who died outside Arizona in 2004. Unfortunately, missing cause of death accounted in 2004 for 118 records, more than cervical cancer or accidental drowning:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Missing cause of death</td>
<td>16</td>
<td>30</td>
<td>12</td>
<td>11</td>
<td>197</td>
<td>970</td>
<td>704</td>
<td>532</td>
<td>118</td>
</tr>
</tbody>
</table>

As a result, the cause-of-death-specific numbers and rates for 2000-2004 also have been 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.

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:

<table>
<thead>
<tr>
<th>Data year</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug-induced deaths</td>
<td>543</td>
<td>331</td>
<td>527</td>
<td>645</td>
<td>646</td>
<td>745</td>
</tr>
<tr>
<td>Suicide</td>
<td>773</td>
<td>737</td>
<td>600</td>
<td>855</td>
<td>807</td>
<td>854</td>
</tr>
<tr>
<td>Suicide by firearms</td>
<td>495</td>
<td>486</td>
<td>358</td>
<td>544</td>
<td>476</td>
<td>498</td>
</tr>
<tr>
<td>Accidental discharge of firearms</td>
<td>7</td>
<td>11</td>
<td>114</td>
<td>26</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>

Unprecedented decline in 2001 in the number of suicides and the equally unprecedented increase in the number of firearm deaths classified as accidental obviously are associated. 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 because the "manner of death" was not indicated and the automated coding system defaulted to accidental injury.

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

The leading cause of death to Arizona residents in 2004 continued to be heart disease, which accounted for 10,402 or 24.3 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 22.2 percent of all deaths in 2004. Deaths due to accidents (unintentional injuries) ranked third in 2004, with 2,641 resident deaths reported. The fourth leading cause of death, cerebrovascular disease, accounted for 2,412 or 5.6 percent of total deaths. Deaths due to chronic lower respiratory diseases (a title change from ICD-9 title chronic obstructive pulmonary disease) ranked fifth in 2004, with 2,392 resident deaths reported. In 2004, chronic lower respiratory diseases accounted for 5.6 percent of all deaths. Together, these five causes accounted for 64 percent of total deaths in 2004.

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.

The age-adjusted death rates declined from 2003 to 2004 for eight of the 12 leading causes of death. The mortality rates increased for the following four causes of death: unintentional injuries, diabetes, suicide and nephritis (kidney disease).

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* 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).
Heart disease continued to be the top cause of death for both males and females. In 2004, among the 10,402 deaths from heart disease, 5,543 were male (53.3 percent) and 4,859 were female (Table 2B-4). Both females and males experienced substantial declines in heart disease mortality rates from 1994 to 2004. Among males, the age-adjusted death rate for heart disease declined by 23.3 percent from 305.4 in 1994 to 234.2 in 2004 (Figure 2B-2). The rate for females declined by 25.2 percent from 198.6 in 1994 to 148.5 in 2004.

The 2004 male mortality risk of death from heart disease (234.2/100,000) exceeded the female risk (148.5/100,000) by 57.7 percent (Figure 2B-2, Table 2B-2).

Black residents of Arizona were 1.9 times more likely to die from diseases of heart in 2004 than Asians who were at the lowest risk of death from diseases of the heart among race/ethnic groups in the State (Figure 2B-3, Table 2B-4).

However, the age adjusted mortality rates for diseases of the heart continued a downward trend observed since 1980. The risk of death from diseases of heart for all Arizonans was 46.1 percent lower in 2004 than in 1980. The largest decrease reported of 49.5 percent occurred in the Asian population, the smallest decrease reported, 29.3 percent, occurred in the American Indian population (based on rates in Table 2B-3).
Cancer ranked as the 2\textsuperscript{nd} leading cause of death for both males and females. In 2004, among the 9,506 deaths from cancer, 5,107 were male (53.7 percent) and 4,399 were female. The age-adjusted cancer mortality rate decreased for Arizona males from 208.3 deaths per 100,000 males in 2003 to 201.2/100,000 in 2004. The female cancer death rate decreased from 141.3 per 100,000 in 2003 to 138.6/100,000 in 2004. The gender gap in cancer mortality slightly narrowed from 50 percent greater risk for males than females in 1994, to a 45 percent greater risk in 2004 (Figure 2B-4).

Arizona’s Blacks were 2 times more likely to die from malignant neoplasms in 2004 than Asians, the group at the lowest risk of cancer death among race/ethnic groups (Figure 2B-5, Table 2B-4).

Asian males had the lowest overall cancer mortality rate among gender by race subgroups (72.9 deaths per 100,000; Table 2B-4). In contrast, Asian females had the second highest female cancer mortality rate (165.2 per 100,000).

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).
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. In 2004, the number of deaths from cerebrovascular disease was greater among females (1,433) than males (979, Table 2B-4). However, the gender differential, i.e. the ratio of female to male mortality rates was miniscule. The 2004 female mortality risk for a stroke death (43.6/100,000) exceeded the male risk of 42.7/100,000 by a mere 2.1 percent (Figure 2B-6, Table 2B-2).

Compared to Arizona’s rate, Blacks were 64 percent more likely to die from cerebrovascular disease in 2004 (Figure 2B-7, Table 2B-4). The 2004 mortality rate for cerebrovascular disease among American Indians (27.5/100,000) was the lowest among race/ethnic groups.
In 2004, chronic lower respiratory diseases (bronchitis, emphysema, asthma) were the 5th leading cause of death among Arizona residents (Table 2B-1). From 2003 to 2004, the mortality rates for chronic lower respiratory diseases (CLRD) decreased for both genders (Figure 2B-8, Table 2B-2). Still, Arizona males in 2004 were 27.6 percent more likely to die from CLRD than Arizona females.

Rural females had the lowest mortality rate for CLRD (37.3/100,000) among the gender by region groups (Table 2B-5). Rural males, the group at the highest mortality risk for CLRD, were 36.7 percent more likely in 2004 to die from this cause than rural females.

Death rates for emphysema, chronic bronchitis, asthma and other lower respiratory disorders were substantially higher among White non-Hispanics (45.1 deaths per 100,000) than they were among Blacks (24.9/100,000), Hispanics (22.7/100,000), Asians (21.6/100,000) and American Indians (10.8/100,000) (Figure 2B-9, Table 2B-4).
The number of deaths from unintentional injuries in accidents increased by 40.6 percent from 1,879 in 1994 to 2,641 in 2004 (Table 2B-1). In 2004, accidents ranked third leading cause of death for males and sixth for females. The mortality rate for unintentional injuries in accidents increased by 10.1 percent among Arizona females from 28.8 deaths per 100,000 in 2003 to 31.7 in 2004 (Figure 2B-10). The mortality rate slightly declined for males from 61.6/100,000 in 2003 to 61.1/100,000 in 2004. Still, males compared to female residents of Arizona were 1.9 times more likely to die from unintentional injury (Figure 2B-10, Table 2B-2).

The American Indian death rate for unintentional injuries (103.9/100,000) was 4.9 times higher than the rate for Asians (21.2/100,000), the group at the lowest risk of unintentional injury death among race/ethnic groups in the State (Figure 2B-11, Table 2B-4).

In 2004, Apache and Navajo counties had the two highest age-adjusted mortality rates for unintentional injuries (Table 5E-11).
2B. LEADING CAUSES OF DEATH

Influenza and pneumonia

In 2004, influenza and pneumonia ranked 8th leading cause of death for both males and females. The mortality rate for influenza and pneumonia decreased for the second consecutive year for females from 22.9 deaths per 100,000 in 2002 to 16.3 deaths in 2004 (Figure 2B-12, Table 2B-2). The mortality rate for influenza and pneumonia also decreased for males from 29.8 deaths per 100,000 in 2003 to 25.7/100,000 in 2004.

In 2004, Arizona males were 57.7 percent more likely to die from influenza and pneumonia than females.

The highest among ethnic groups mortality rates from influenza and pneumonia in 2004 were those of American Indians (32.7/100,000) compared to 20.7/100,000 among Hispanics, 19.4/100,000 among White non-Hispanics, 12.0/100,000 among Blacks, and 10.5/100,000 among Asians (Figure 2B-13, Table 2B-4).

Compared to the state death rate for influenza and pneumonia, Apache's County rate was 2.1 times greater, and Graham's County 2 times greater (Table 5E-11, Figure 7B-19).
2B. LEADING CAUSES OF DEATH

Alzheimer’s disease

Based on the number of deaths in 2004, Alzheimer’s disease was the 5th leading cause of death for females and 9th leading cause for males (Table 2B-4).

The age-adjusted mortality rate for Alzheimer’s disease among females decreased by 4.7 percent from 35.9/100,000 in 2003 to 34.2/100,000 in 2004 (Figure 2B-14). Among males, the age-adjusted mortality rate for Alzheimer’s disease decreased by less than one percent during that time.

The age-adjusted death rate for Alzheimer’s disease was 29.5 percent higher in 2004 for females than for males.

The age-adjusted mortality rates for Alzheimer’s disease in 2004 were substantially higher among Black (42.8 deaths per 100,000) and White non-Hispanic (32.0 deaths per 100,000) residents of Arizona than they were among Hispanics (26.6/100,000), Asians (17.1/100,000) and American Indians (8.0/100,000) (Figure 2B-15, Table 2B-4).

White non-Hispanic residents of Arizona disproportionately contributed to mortality from Alzheimer’s disease. In 2004, White non-Hispanics accounted for 64.9 percent (Table 10C-1) of the State’s population, but 91.3 percent of all deaths from Alzheimer’s disease (1,527 out of 1,672; Table 2B-4).
In 2004, diabetes was the 7th leading cause of death for both males and females. The temporal changes from 2003 to 2004 in mortality from diabetes differed for the two genders, increasing by 5.1 percent for females and decreasing by 0.8 percent for males (Figure 2B-16).

In 2004, diabetes was approximately 2.2 as likely to be listed on the death certificates as a multiple cause of death (46.5/100,000, Table 6A-6) than as underlying cause (20.7/100,000, Table 2B-2). The rate of diabetes as a multiple cause of death includes all mentions of diabetes on the death certificate.

The age-adjusted mortality rate for diabetes among American Indians was 3.5 times higher than the rate for White non-Hispanics (Figure 2B-17, Table 2B-4). The latter was the lowest rate among race/ethnic groups in the State.

Among the 15 Arizona counties in 2004, Apache, and Navajo counties had the highest mortality rates for diabetes (Table 5E-11).
In 2004, suicide was the 6th leading cause of death among males. It was not ranked among the top ten causes of mortality for females. The age-adjusted suicide rate increased for females by 8.6 percent from 5.8 suicides per 100,000 in 2003 to 6.3 suicides per 100,000 in 2004. The 2004 male mortality risk for intentional self-harm (24.1/100,000) changed very little from the 2003 rate of 24.0 suicides per 100,000 males.

In 2004, suicide posed a 3.8 times greater mortality risk for males (24.1/100,000) than females (6.3/100,000).

Suicide rates in 2004 were substantially higher among American Indians and White non-Hispanics (17.0/100,000 and 16.6/100,000, respectively) than they were among Blacks (12.1 suicides per 100,000), Hispanics (9.8/100,000) and Asians (4.0/100,000) (Figure 2B-19, Table 2B-4).

The age-adjusted mortality rates varied in Arizona in 2004 from 5.2 suicides per 100,000 residents of Santa Cruz County to 37.3 suicides per 100,000 residents of La Paz County (Table 5E-11). The suicides rates in Cochise, Coconino, Gila, Mohave, Navajo and Yavapai counties exceeded the statewide average by at least 25 percent (based on rates in Table 5E-11).
In 2004, assault (homicide) was the 12th leading cause of death in the State (Table 2B-1). The number of 486 Arizonans who were murdered in 2004 was the second highest of the 1994-2004 period (Table 2B-1).

However, the homicide rate declined by 19.4 percent for females from 3.6/100,000 in 2003 to 2.9/100,000 in 2004. In contrast, the homicide rate increased by 3.9 percent for males from 12.8 deaths per 100,000 in 2003 to 13.3 deaths per 100,000 in 2004 (Table 2B-2 Figure 2B-20).

The 2004 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 4.6 times more likely, while American Indians 3.1 times and Hispanics 2.8 times more likely to die from assault than White non-Hispanics (Figure 2B-21, Table 2B-4).

Among the 15 counties in 2004, Navajo, Gila and Coconino counties had the three highest homicide death rates, while there were no homicides among residents of Graham, Greenlee and La Paz counties (Table 5E-11).
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 2004 (Figure 2B-1, Table 2B-1). It ranked ninth for males but it was not among the top ten causes of female mortality.

Arizona males were 2.3 times more likely to die in 2004 from chronic liver disease and cirrhosis than Arizona females (15.6 deaths per 100,000 vs. 6.9 deaths per 100,000) (Figure 2B-22, Table 2B-2).

In 2004, La Paz, Graham, Greenlee, Gila and Apache counties had the highest rates for chronic liver disease and cirrhosis (Table 5E-11).

The 2004 death rate for chronic liver disease and cirrhosis among American Indians (51.0/100,000) was 13.4 times greater than the rate among Asians (3.8/100,000) (Table 2B-4, Figure 2B-23). The rate for Hispanics (18.6 death per 100,000 was the second highest among racial/ethnic groups in the State.

In contrast, the rate of 6.7 deaths per 100,000 Black or African American residents of Arizona was the second lowest among the groups (Figure 2B-23).
Kidney disease (nephritis, nephrotic syndrome and nephrosis) was the 11th leading cause of death in Arizona in 2004 (Figure 2B-1). Kidney disease ranked ninth for females, but it was not ranked among the 10 leading causes for males.

The male mortality rate for kidney disease increased by 11.7 percent from 12.0/100,000 in 2003 to 13.4/100,000 in 2004 (Figure 2B-24). The female mortality rate increased by 6.8 percent from 8.8/100,000 in 2003 to 9.4/100,000 in 2004.

The 2004 nephritis death rates were substantially higher among American Indian (30.2 per 100,000), Black (26.6 per 100,000), Hispanic (21.5 per 100,000), and Asian (16.0 per 100,000) residents of the State compared to nephritis rates among White non-Hispanics (8.9/100,000) (Figure 2B-25, Table 2B-4).

Asian females had the highest mortality rate (32.0/100,000) for nephritis, nephrotic syndrome and nephrosis among the gender by race groups (Table 2B-4).