



# External Causes of Death in Indiana: A Description of Accidents, Suicides, and Homicides<sup>1</sup>

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<sup>1</sup>The sources for this analysis are The National Center for Health Statistics (NCHS), Centers for Disease Control WISQARS and WONDERS data. See Appendix A, Data and Methods, for details.





## The Center for Urban Policy and the Environment

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*Note: This technical report is the first of a series of reports and issue briefs on the external causes of death in Indiana. The present report contains detailed information about the external deaths of Hoosiers—the accidents, suicides, and homicides of Indiana's residents from 1981-2004. Basic demographic descriptions of the age, gender, and race patterns of those who die from external causes of death are presented. Future issue briefs will focus on the interaction effects of race, age, and gender to describe those groups with the most elevated risks of various forms of accidents as well as suicide and homicide (e.g., the motor vehicle accident rates of young, white males versus young, black males) and issue briefs focusing on a 20+ year analysis of gun deaths in Indiana and child deaths in Indiana.*



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Are Hoosiers more or less likely to die in car accidents or fires than citizens across the United States? Is the Indiana suicide rate increasing or decreasing? Who is most likely to die in motor vehicle crashes, overdoses/poisonings, or accidental falls? Are certain groups more likely to kill themselves than others? Who are our homicide victims? This analysis describes the levels of accidents, suicides, and homicides—collectively known as external causes of death—in Indiana from 1981-2004 and compares those findings to the United States overall. The five most common forms of accidents are discussed, along with the demographic characteristics of victims. The focus of this report is to begin a surveillance program—the continuing and systematic collection of data—for external causes of death in Indiana and to identify demographic risk groups. This study also allows for an assessment of the real risks of external deaths.

### **Unintentional injury deaths**

By 2004, accidents accounted for approximately 2,500 Hoosier deaths per year, with most of these occurring on highways or in homes. The number of Indiana accidental deaths has slowly increased since the data series began in 1981. There were 2,336 accidental Indiana deaths in 1981, and the accidental death rate was 42.6. As of 2004, approximately 40 of every 100,000 Hoosiers die of accidental causes each year (compared to about 39 accidental deaths for every 100,000 U.S. citizens) and these rates are increasing and equivalent to accident rates not seen since the late 1980s. Indiana's 2004 accident rate of 40 ranks 29th in the overall state fatal accident rankings.

Major differences exist in the risk of accidents for different groups by age, gender, and race. The accident rate of 21 per 100,000 for the youngest Hoosiers (age

0-4) is much higher than the rate of 14 for the U.S. age group of 0-4. Accident rates for Hoosiers age 15-19 (37) and 20-24 (46) also significantly exceed those rates for the 15-19 (33) and 20-24 (41) U.S. overall rates. The accident rates for Indiana residents in all age groups from age 45 to 69 are *lower* than national rates. The Indiana male accident rate (55) is more than two times the rate of Indiana females (26). During 1981-1998, the accident rates for the nation's blacks were significantly higher than that for Indiana blacks. Over time the two rates have converged, due mostly to a gradual decline in accidental death rates for U.S. blacks.

### ***Death by motor vehicle accidents***

Motor vehicle/traffic accidents are the most common types of accidents in Indiana, accounting for 987 deaths in 2004. As of 2004 in Indiana, the risk of fatal motor vehicle crashes is highest for the age categories 20-24, 75-79, and 15-19. Both nationally and in Indiana, elderly age categories now have fatal motor vehicle accident rates similar to those of teenagers and young adults. There are dramatic gender differences in the likelihood of dying in a motor vehicle accident. Male rates have been more than two times the rates for females over much of the time series but were three times higher when the series began in 1981—so the gender ratio has narrowed somewhat over time. Motor vehicle accident deaths are more similar by race than by gender.

### ***Death by poisoning and overdose***

In Indiana and the United States, accidental overdoses have been increasing dramatically. There were only 56 such deaths in Indiana in 1984 with an accidental poison/overdose rate of 1.0 per 100,000. By 2004, the number of these deaths had climbed to 344 at a rate of almost 6. Looking back to 1981



and throughout the 1980s, Hoosiers most likely to die from accidental poisonings and overdoses were the elderly, particularly those Hoosiers over 80 years of age. Accidental overdoses/poisonings for other younger age groups was much more likely to be a result of narcotics overdoses. However, the age groups most likely to die from accidental overdose/poisoning since 2002 have changed dramatically and now include those Hoosiers ages 20-54. The rate of increase in fatal accidental overdoses/poisonings has been more dramatic for Indiana males than females. Historically, accidental overdose/poisoning deaths for blacks in Indiana have almost always been above the rate for whites. But since 2002, black rates of accidental overdose/poisoning deaths have declined below the rate of whites.

### ***Death by falling***

The rate of accidental fall deaths has increased dramatically in the United States since 1999, rising to the highest ever recorded rate for the nation by 2004 (6). Indiana fatal fall rates also rose during the 1990s and have stayed above 4 since 1999. Falls are by far the leading cause of accidental deaths (42 percent) for those 65 and over, and this is the only adult category for which motor vehicle deaths are not the primary source of accidental deaths. The Indiana 2004 fall death rate for those 85 and over is an alarming 91 for every 100,000 persons (and has been higher in previous years), by far the highest risk for any age group. The national fall death rate for those over age 85 is even higher at 143 for every 100,000 Americans. Fall deaths have increased for both males and females at the national level, and for males only in Indiana. The Indiana and U.S. white rate of fall deaths are about two times that for blacks. Indiana's black residents have reduced their rates of accidental deaths as a result of fewer overdoses/poisonings and falls.

### ***Death by fire injury and burns***

In Indiana, the fire/burn death rate is approximately half of what it was 20 years ago, although unfortunately the Indiana rate surpassed the national rate and has stayed above the U.S. rate since 1998. Death by fire/burns predominantly affects the very young and the very old. The age groups with the highest risk of death (per 100,000) by fire/burns in 2004 were 85+ (9), 80-84 (4), and 0-4 (4). Fire/burn rates are higher for both Indiana males and females as compared to their national counterparts. Although fire/burn deaths have declined for both blacks and whites, nationally and in Indiana, the decline has been more substantial for blacks than whites.

### ***Death by drowning***

Historically, drownings were less likely to occur in Indiana than in the United States as a whole, but due to more significant declines in U.S. drowning rates since 1981, the two rates nearly converged as of 2004, both at just over 1 per 100,000. In Indiana, the very young (age 0-4) experienced high rates of drownings. Infants (0-1) not only drown in lakes, ponds, and swimming pools, but also bathtubs. By 2004, Indiana age groups with the highest drowning rates were 85+ (3) and 0-4 (2). In 2004, males accounted for 78 percent of fatal unintentional drowning in the United States, and 84 percent in Indiana. Nationally, blacks have always had higher death by drowning rates than whites, but over the years there has been a convergence in black/white drowning rates. A similar pattern exists in Indiana, with blacks in previous years having rates twice those of Indiana whites, but more recently converging.

### ***Accidental gun deaths***

Although accidental gun deaths are not in the top five most likely accidents, there is



always a concern about guns. It is possible that the public overestimates the likelihood of gun accidents compared to the other accident types. The national accidental gun death rate has continuously declined since 1981, whereas the Indiana rate experienced substantial variation, exceeding national rates in many years and only recently declining and converging with national rates. The number of accidental gun deaths in Indiana peaked in 1993 (52 deaths), declining dramatically since then to 14 accidental gun deaths in 2004.

## Suicides

Indiana suicide rates over the time period 1981-2004 typically run slightly higher than the national average. Suicides in Indiana have ranged from a low rate of 10 per 100,000 persons in 1999 to a peak of 13 in 1987, and currently are at a rate of approximately 11. National suicide rates have ranged from a low rate of 10.4 in 2000, to a high of 13 in 1986, and by 2004 were at 10.9. There are significant gender, age, and race differences in suicide. The suicide rate for some Hoosier age groups is two times the average. As of 2004, suicide rates are highest for the Indiana age group 40-44 (20) and those over 85 (20). Teenage (ages 13-19) suicide rates in Indiana from 1990-2004 ranged from a high of 12 in 1991 to 5 in 2003, an all-time low for this age group. Unfortunately, 2004 saw a significant increase in the rate of Indiana teenage suicides reaching the rate of 7—a 50 percent increase in one year. Males accounted for approximately 80 percent of the 704 Indiana suicide deaths in 2004. Indiana rates mirror similar national gender trends in suicide, although Indiana male suicide rates have remained above U.S. rates since 1989. Although blacks are underrepresented as suicide victims in Indiana—they constitute 9 percent of the population and 6 percent of

suicides—their rates of suicide are higher than the overall U.S. black suicide rate.

## Homicides

All ages combined, homicide is not in the top ten leading causes of death in Indiana or across the United States. However, it is one of the top ten leading causes of death for several Indiana age categories. Homicide ranks as the third leading cause of death for ages 1-4, seventh for ages 5-9, and fourth for 25-34 year-olds. By 2004, the highest at-risk groups in Indiana for homicide were the age categories 20-24 followed by 25-29 year-olds. The same age categories are most at-risk nationally. Indiana males, like U.S. males, have homicide rates that are 3.5 times higher than Indiana females. Significant race differences for homicide also exist nationally and in Indiana. These differences are more extreme in Indiana where by 2004, the homicide rate for blacks (30 per 100,000) was more than *ten times higher* than the rate for whites (3). Nationally, homicide rates are five times higher for blacks (20) than for whites (4). Homicide is the leading cause of death in Indiana for black males, ages 15-34 and these homicides are much more likely than other homicides to involve a firearm.

## Preventive measures

This research illustrates there are a number of high risk age, race, and gender groups for various accidents, suicides, and homicides. These findings should enable policy-makers to refine their target groups for accident, suicide, and homicide prevention. *Universal preventive measures* are used effectively to reduce some types of external deaths. Examples in traffic safety include laws that reduce speed and require seatbelts or helmets. *Selective preventive measures* focus more on groups with elevated risks of various forms of external death.



Examples here would include restrictions for teenage driving or elderly whose homes may be in need of stair railings. Finally, *indicated preventive measures* target those *persons* whose risk is elevated—homicide and assault victims and family members who may want to retaliate, those with previous suicide attempts, individuals with previous drinking and driving offenses or excessive speeding, and elderly who have had previous falls in the home.

More generally, alcohol treatment programs will have direct and indirect impacts on Indiana's external death rates because alcohol and drug use play significant roles in accidents, suicides, and homicides. One study found that 32 percent of falls, 42 percent of fatal fires/burns, 34 percent of fatal drownings, and 29 percent of fatal overdoses/poisonings involved victim alcohol use. In Indiana, alcohol is a factor in anywhere from 10 to 40 percent of fatal motor vehicle crashes, depending on the type of vehicle.

There are effective preventive measures for various external causes of death. Motor vehicle fatalities have been reduced through the use of air bags, collapsible steering columns, padded dashboards, and other safety improvements. Other universal strategies include tougher driving under the influence (DUI) laws and lowered blood alcohol content (BAC) tolerance for drivers. For poisoning and drug overdoses, preventive measures include stricter access to medications, especially narcotics. Fatal falls occur mostly among the elderly, so the installation of stair railings and banisters—including railings throughout single-story houses—and better lighting may help prevent some

fatal falls. Intervention targeted at elders who have fallen previously might be most effective. Fatal fires/burns often occur in residences without (or without functional) smoke detectors. In addition to smoke and heat detection alarms, family plans for evacuation in the event of a fire could save lives. Drownings can be prevented by implementing strategies that include secured/alarmed swimming pools, learning to swim, learning CPR, the supervision of infants when they bathe, and the use of life vests on boats and boaters.

There are numerous suicide prevention strategies. These include school and community-based programs targeted at reducing alcohol and substance abuse, wider access to mental health and alcohol and substance abuse treatment, counseling and other health and social services for the homeless, faith-based programs to reach out to isolated elders, support for victims of domestic violence, better primary care screening of depression in the elderly, more effective pain treatment, and pharmaceutical maintenance for those suffering from psychiatric disorders.

Finally, homicide prevention requires programs focused on specific groups. Homicide is ten times more likely for blacks in Indiana and black homicide rates in Indiana exceed national homicide rates for blacks. A race comparison finds that for Indiana blacks the most common form of external death in 2004 was homicide—accounting for 44 percent of all external deaths. Clearly, homicide and violence prevention monies should be carefully targeted at the places and people who need them the most.





# THE SCALE OF EXTERNAL DEATHS: INDIANA AND THE UNITED STATES

The same public health perspective that has been used to improve water quality, childhood immunizations, and food inspection can be used to prevent deaths and injuries as a result of accidents, suicides, and homicides (Mercy & Hammond, 1999). This approach begins with a definition of the problem and scientific surveillance of the problem to identify populations at risk—the task of this report. Once the problem and risk groups have been described, the process can progress towards the identification of other risk factors and the development of interventions including training and public awareness (Mercy & Hammond, 1999). It is essential that we identify those Indiana groups with elevated risks of dying in certain types of accidents, or as a result of suicide or homicide. These efforts will create information that can be used to design more effective prevention and intervention policies to reduce violent and accidental deaths.

Are Hoosiers more or less likely to die in car accidents or fires than citizens across the United States? What about our suicide rate—is it increasing, decreasing? Are certain groups much more likely to kill themselves than others? Who are our homicide victims? The present study describes the levels of accidents, suicides, and homicides in Indiana from 1981-2004 and compares those findings to overall U.S. findings. Accidents are discussed based on the five most common forms of accidents as well as demographic characteristics of victims, suicides are described by method and by the demographics of victims, and we describe the demographic characteristics of homicide victims as well as discuss how all of these external causes of death have changed over time.

Recent newspaper headlines noted the current increase in the accidental death

rate in the United States, reversing a trend that saw fairly steady overall declines in accident rates over the last couple of decades. Most of the increase is a result of accidental poisonings and overdoses (e.g., illegal drug overdoses or prescription medication overdoses) as well as accidental deaths due to falls among the elderly. In addition, there has been a dramatic increase in U.S. motorcycle deaths—primarily because of deaths of older motorcycle operators (those 45 and older). These findings, as estimated by the National Safety Council, point to the need for closer analysis of accidental deaths as well as the other categories of external causes of death—suicide and homicide (Johnson, 2007).

Of the 54,211 deaths in Indiana in 2004, 3,523 are attributable to accidents, suicides, or homicides. For the most part of the last two decades, the percent of all deaths attributed to accidents, suicides, and homicides (known as external causes of death) has declined both in the United States and in Indiana. In 1981, external deaths accounted for 7.7 percent of all U.S. deaths and 7 percent of all Indiana deaths, declining to 6.3 and 6.7 percent for Indiana and the United States, respectively, by 2004. This was primarily attributable to declines in motor vehicle accidents (and declines in some other types of accidents), some declines in homicide (for the United States) but relatively little overall change in suicide rates.

Accidental deaths (also known as unintentional injury deaths) are the fifth leading cause of death for Indiana residents and the United States as a whole. But the risk of accidental death is much higher for several Indiana age groups. Accidental death is the fourth leading cause of death for Hoosiers under



1 year of age and it is the leading cause of death for the age groups 1-4, 5-9, 10-14, 15-24, and 25-34. Accidental deaths are the third leading cause of death for those Hoosiers ages 35-44 and 45-54. Finally, accidents rank sixth for those ages 55-64 and ninth for those Indiana residents ages 65 and over.<sup>2</sup>

In addition to the 30,000 completed suicides in the United States each year, there are another 650,000 suicide attempts.<sup>3</sup> The costs of untreated depression include lost productivity and wages, absenteeism for school and work, and sometimes suicide. Approximately two-thirds of the nation's suicides occur to those who are still part of the workforce, and the cost of just these suicides has been estimated at more than \$12 billion.<sup>4</sup>

Homicide, as the fifteenth leading cause of death in the United States, also takes a significant emotional and financial toll.<sup>5</sup> Estimates suggest that each homicide may cost a community more than \$626,000 (Claxton, 2006). Extrapolating to Indiana, this cost will exceed \$20 million each year (not including the costs of incarcerating offenders in prisons). These costs include medical and trauma care, autopsies, funeral costs, public assistance for survivors, missing person searches, worker's compensation, legal costs, police investigations (including very expensive forensics and expert testimony), and trials. According to an investigative report on the costs of homicide in Tennessee, costs to a state for the incarceration of homicide offenders can be as much as \$74 million a year.

In addition to the obvious loss of loved ones, there are tremendous economic costs associated with accidental deaths. These costs include lost wages and

other benefits, medical costs, possible employer's uninsured costs, public and private insurance, police and legal costs, and property damage. Research suggests that the costs to society for each traffic fatality exceeds \$1,000,000, while accidents at home can cost society as much as \$780,000 and work-related deaths as much as \$980,000.<sup>6</sup> The emotional and financial toll of preventable accidental deaths is enormous and, according to the National Safety Council, the economic costs of fatal (as well as non-fatal) injuries in the United States amounted to \$625 *billion*. Distributed across America's households, these costs would amount to \$5,500 per household.<sup>7</sup> Likewise there are extraordinary personal and societal costs for suicides and homicides.

Suicide is now the 11th leading cause of death in the United States, but for many groups, the risk is much higher.<sup>8</sup> Although suicide is not one of the ten leading causes of death in Indiana as of 2004, an analysis of specific age groups finds suicide a top ten cause of death in several age categories. Suicide is absent from the top ten causes of death list for ages 0-9 but shows up markedly as the third leading cause of death for those Hoosiers ages 10-24. Suicide is the second leading cause of death for those ages 25-34, the fourth leading cause of death for those 35-44, the sixth leading cause for those 45-54, and the tenth leading cause for those 55-64.<sup>9</sup>

This study allows us to get a sense of the real risks of external deaths. It is likely that people are more fearful about being murdered by a stranger than they are about dying in a motor vehicle accident, although the likelihood of dying in a motor vehicle accident is much greater than the risk of homicide. This research allows us to put the risks of homicide within the context of other types of violent

<sup>2</sup>WISQARS 10 Leading Causes of Death, Indiana, 2004, All Races, Both Sexes.

<sup>3</sup>National Strategy for Suicide Prevention: Goals and Objectives for Action. U.S. Department of Health and Human Services. Other estimates suggest 811,000 attempts each year (American Association of Suicidology).

<sup>4</sup>The costs of suicide. Retrieved March 7, 2007, from [www.valueoptions.com/suicide\\_prev/html%20pages/costs.htm](http://www.valueoptions.com/suicide_prev/html%20pages/costs.htm)

<sup>5</sup>Homicide ranking from WISQARS for 2004.

<sup>6</sup>Estimating the costs of unintentional injuries, 2005. The National Safety Council. Retrieved June 20, 2007, from [www.nsc.org/lrs/statinfo/estcost.htm](http://www.nsc.org/lrs/statinfo/estcost.htm)

<sup>7</sup>National Safety Council. June 7, 2007.

<sup>8</sup>American Association of Suicidology. U.S.A. Suicide: 2004 Official Final Data. December 15, 2006. Prepared by John L. McIntosh.

<sup>9</sup>WISQARS 10 Leading Causes of Death, Indiana, 2004, All Races, Both Sexes.



deaths and consider a rational distribution of resources to prevent all types of external deaths. In addition to presenting Indiana external cause of death demographic trends and comparing those trends to U.S. patterns, we also present a discussion of possible intervention strategies given the current state of external deaths in Indiana.

This project uses causes of death information from death certificates. This

information is collated by the Centers for Disease Control and Prevention (CDC). Causes of death classification in the United States underwent significant change in 1999 as the Ninth Revision of the International Classification of Diseases (ICD-9) was modified. Deaths from 1999-present were categorized using the Tenth Revision of the International Classification of Diseases (ICD-10). Deaths in 1998 and prior years used ICD-9.<sup>10</sup>

<sup>10</sup>Due to changes in the ways in which some deaths may be coded, readers should interpret the 1981-2004 external death data series as two series, one from 1981-1998 and the other from 1999 to present. As you will see, in many cases, trends remained the same when the codes were modified. But, in the event that change occurs from 1998-1999 it could be attributed to changes in the coding of deaths as opposed to any real change. Although this paper graphs the time series as one series, most interpretation analyzes change occurring within the 1981-1998 time period and notes the trends occurring from 1999-2004. Indiana trends as well as some age, gender, and race trends often appear to be more unstable than U.S. trends—this is due to a smaller number of events—rates based on 20 or fewer deaths are unstable rates and should be interpreted with caution. Rather than focus on the highs and lows of Indiana rates, the reader should look to see if the trend line is similar to national patterns.

# EXTERNAL CAUSES OF DEATH

As illustrated by Figure 1, the most common forms of external deaths are accidents, followed by suicides, and homicides which occur at about half the rate of suicides.<sup>11</sup> By 2004, the external death rate in Indiana was approximately 56 deaths for every 100,000 Indiana residents. Of those deaths, approximately 2,500 are from accidents, 700 are suicides, and 330 are homicides. Over the first 18-year span of the data series (1981-1998), Figure 1 illustrates that Indiana accidents declined, and that suicides and homicides remained fairly stable. Since 1999, the overall fatal accident rate in Indiana declined slightly and then increased, the Indiana suicide rate increased slightly and then started to decline again by 2003, and the Indiana homicide rate increased by 2001 and then declined again by 2004.<sup>12</sup>

Figure 1 also includes the rates for external causes of death for the United States and allows for comparison to Indiana. As illustrated in Figure 1, Indiana and U.S. accident rates follow a similar trajectory; although more recently Indiana accident rates have slightly exceeded U.S. rates in some years but are near convergence. In 2004, approximately 40 of every 100,000

Hoosiers died of accidental causes (and a rate of approximately 39 accidental deaths for every 100,000 U.S. citizens), and these rates are increasing and equivalent to accident rates in the late 1980s.

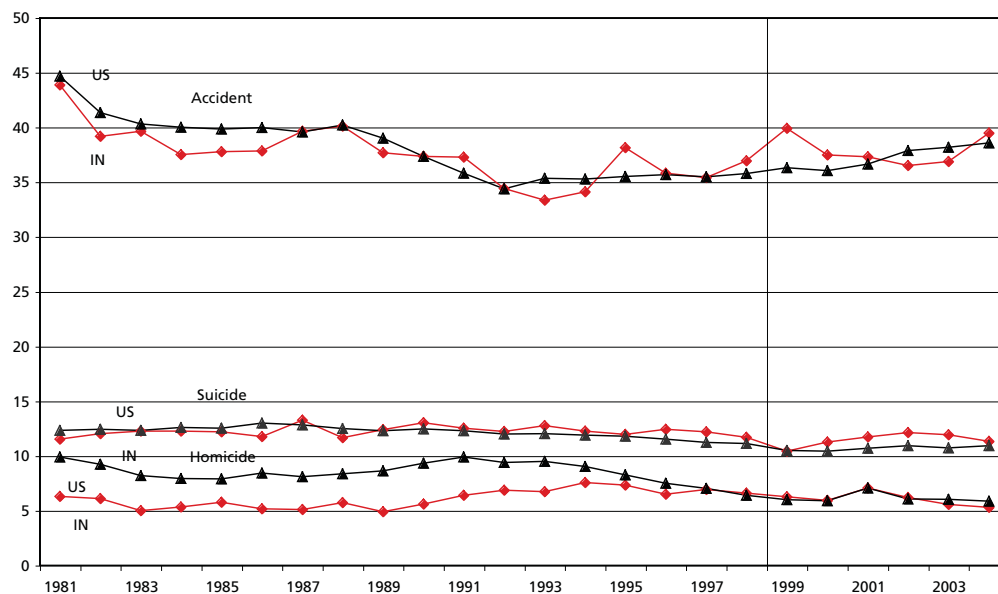
Indiana suicide rates have exceeded U.S. rates since 2000. The national and Indiana overall suicide rate has remained fairly stable over the last 20+ years, however, the rate for some demographic groups has increased dramatically.

The homicide rate for Indiana historically was significantly below the national average but the Indiana homicide rate has now converged with the U.S. rate, albeit at a relatively low rate for the time period of study.

## Overall accident patterns and trends

While the vast majority of people in the United States and Indiana die from *natural causes* such as cardiovascular disease (heart attack and stroke) and cancer, accidental deaths can strike any age group. Noting the recent increases in the rates of some types of accidental deaths, further inspection is warranted.

**Figure 1.** External causes of death rates (age-adjusted), Indiana and United States, 1981-2004



<sup>11</sup>All rates used in this study are age-adjusted, unless otherwise noted, including national data, and all rates presented are per 100,000 population.

<sup>12</sup>The line appearing in all graphs at 1999 is meant to remind the reader to view these charts as two separate time series due to changes in the ways deaths were categorized in 1999.



Approximately 115,000 persons in the United States and 2,500 Hoosiers die of accidents each year.<sup>13</sup> Most accidental deaths do not occur in the workplace. Estimates from the Centers for Disease Control (CDC) suggest that approximately 5.5 percent of accidental deaths are work-related and these deaths are somewhat different than overall accidental deaths. Workplace accidental deaths can include traffic accidents and highway incidents (e.g., road workers struck by motorists) and falls but are also more likely than non work-related accidental deaths to be the result of being caught in machinery or being hit by an object. Males account for 93 percent of all workplace accidental deaths with a rate 12 times that for females. The rates of accidental workplace deaths have declined since 1992. Homicide in the workplace accounts for the third most likely workplace death for males and the second most likely workplace death for females (Centers for Disease Control, 2007).

A comparison to other states finds that Indiana's 2004 overall accident rate of 39.5 ranks 29th in the overall fatal accident rankings. The states with the highest accidents rates are New Mexico, Mississippi, West Virginia, Alaska, and Kentucky. Those states with the lowest overall accidents rates are Massachusetts, New York, Rhode Island, New Jersey, and Maryland.

### *Accident patterns by age*

Major differences exist in the risk of accidents for different age groups. According to the most recent report of the Indiana State Child Fatality Review Team, Indiana leads the nation in preventable deaths of children less than one year of age and ranks third in the nation for preventable deaths of children ages 0-4

years of age.<sup>14</sup> Child abuse can obviously result in homicides but child neglect can manifest itself in any number of forms such as drownings, fires, vehicular deaths, choking, and sleeping-related deaths.

For infants under the age of 1, accidents are the fourth leading cause of death. The most common (79 percent for Indiana and 69 percent for the United States) type of accident for this age group is suffocation and most of these deaths are suffocations and stranglings that are related to a child's sleeping arrangements. These death counts do not include the third leading cause of death for infants in the U.S. and Indiana—Sudden Infant Death Syndrome (SIDS). SIDS is a stand-alone cause of death category and only applies to infants ages 0-1.

In 2004, for those Indiana children ages 1-4, accidents are the leading cause of death but the type of accident is not suffocation, but rather, motor vehicle accidents (33 percent), followed by fires/burns (29 percent). The most common national deaths for this age group are motor vehicle accidents and drownings. Children in Indiana and the United States, ages 5-9, also have accidents as their leading cause of death and more than half of the accidents are motor vehicle accidents, followed by fire/burn. Children ages 10-14 also are most likely to die in an accident. Their accidents are most likely motor vehicle accidents (63 percent), followed by a nearly equal likelihood of all sorts of other accident types.

Looking at the 2004 data for the age group 15-24, the top three causes of death are not natural causes, but rather, external causes of death—accidents, homicides, and suicides (for 15-19 year-olds there are more suicides than homicides, and the reverse is

<sup>13</sup>Based on 2004 deaths.

<sup>14</sup>Indiana State Child Review Team Report for SFY 2005. Substantiated Abuse and Neglect Cases. Dr. Antoinette Laskey, Chair.





true for 20-24 year-olds). The fatal accidents for this group are overwhelmingly motor vehicle (73 percent) followed by overdoses/poisonings (12 percent). The actual type of fatal accidental poisonings was either an unspecified drug overdose (58 percent) or a narcotics overdose (40 percent). Accidental deaths for 25-34 year-olds in Indiana are the leading cause of death, and more than half of fatal accidents for this group are motor vehicle accidents (54 percent) followed by accidental overdoses/poisonings (24 percent) and then a nearly equal proportion of many different types of accidents. The accidental overdoses/poisonings for this group were most likely a result of an overdose of “unspecified” drug (60 percent) followed by overdoses of narcotics (33 percent) (national data are much more specific about the type of drug involved and it is overwhelmingly some form of narcotic). The dramatic increase in fatal accidental overdoses/poisonings in Indiana is a function of drug overdosing, primarily on narcotics.

Accidental deaths rank third for Hoosiers ages 35-44. Like the previous age groups of 15-24 and 25-34, the accidents for those ages 35-44 are primarily motor vehicle accidents (43 percent) and overdoses/poisonings (32 percent). Again, the poisonings are drug overdoses, but for Indiana, the type of drug most commonly involved is unspecified (62 percent) followed by narcotics/hallucinogens (29 percent).<sup>15</sup> Accidents also rank as the third leading cause of death for Indiana residents ages 45-54. These deaths are overwhelmingly motor vehicle deaths (42 percent) and overdoses/poisonings (31 percent) and the primary source of these overdoses/poisonings was an unspecified drug. Nationally, the most likely substance for most age groups was narcotics followed by unspecified.

Hoosiers ages 55-64 are less likely to die of accidents than some of the younger cohorts—accidents rank as the sixth leading cause of death for this age category. These accidents are primarily motor vehicle (46 percent) and overdose/poisoning (11 percent) related. More than the younger age groups, the accidents for this group become more diverse and include falls, fires, drownings, machinery, animal attacks, freezing to death, and being struck by an object.

The top ten causes of death for those 65 and older are similar enough to group them—although details about trends within the five-year age groups will be discussed below. Accidents rank as the ninth leading cause of death for this age group. In Indiana, the most common reason for these accidents (31 percent), was unspecified so we literally have no information about the nature of these accidents. Nationally, accidental deaths for this group had only 5.5 percent unspecified. Again this points to a need for greater detail and specificity on Indiana death certificates. After the unspecified category in Indiana, the next most likely source of an accidental death for those 65 and over is a fall (28 percent), followed by a motor vehicle accident (21 percent). An investigation of the source of the falls (e.g., stairs, snow, slips or trips) finds that most of the falls were unspecified, followed by falls on the same level (slips, trips, or missteps), and then falls involving stairs.

Based on some distinct differences in rates of accidents within the categories used to determine leading causes of death, it is necessary to take a more detailed look at the rates for specific age groups and how they have changed over time. There is clearly an elevated risk for accidental deaths for Indiana’s oldest citizens and

<sup>15</sup>Since the vast majority of accidental overdose deaths would be considered “sudden, unexpected deaths” and would mandate an autopsy in Indiana, it is surprising that basic toxicological information does not appear as part of the death certificate. However, if death certificates are done far in advance of toxicological findings from a coroner and the death certificate information is not updated, this may explain part of the lack of specificity regarding the substances Hoosiers use to kill themselves and ingest causing accidental overdose deaths.



youngest citizens as compared to those across the United States.

Overall fatal accident rates of 21 for the youngest Hoosiers (age 0-4) are much higher than the rate of 14 for the U.S. age group of 0-4. Accident rates for those Hoosiers ages 15-19 (37) and 20-24 (46) also significantly exceed those rates for the 15-19 (33) and 20-24 (41) U.S. overall rates. Conversely, the accident rates for Indiana residents in all age groups from age 45 to 69 are lower than national rates. The trend reverses again and finds elderly Indiana residents (70-74, 75-79, 80-84, and 85+) with much higher accident rates than those of their national counterparts.<sup>16</sup>

Figure 2 presents the fatal accident rates for the three most fatal accident-prone groups in Indiana as of 2004 and shows their trajectories across the time series. These are also the age groups with the highest fatal accident rates for the entire United States. However, the overall accidental death rate (consisting mostly of falls but also to some extent traffic

accidents, see discussion below) for Indiana residents in the 85+ age category is much higher than the national rate (329 vs. 286 in 2004). Fatal accident rates for the other high-risk age categories are similar to national rates, although still somewhat higher than national rates.

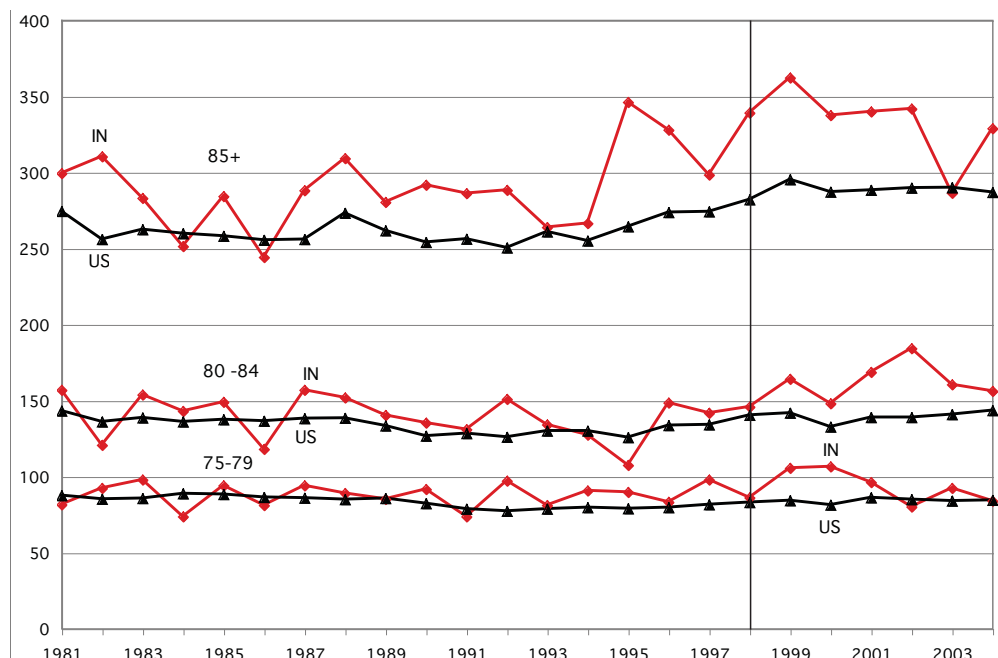
### *Accidents and gender*

Figure 3 illustrates that the Indiana male accident rate (55) is more than two times the rate of Indiana females (26), and these gender ratios are also very similar to national rates.

### *Accidents and race<sup>17</sup>*

The accidental death rates for blacks in Indiana appears to be much more unstable than the rates for U.S. blacks, but this is a function of small numbers (less than 20 deaths in a specific category) so the assessment of black accidents should focus on the trend of the line (see Figure 4). For most of the first part of the data series (1981-1998) the accident rates for the

**Figure 2.** Fatal accident rates (crude, not age-adjusted) for the three age groups: Indiana and United States, 1981-2004

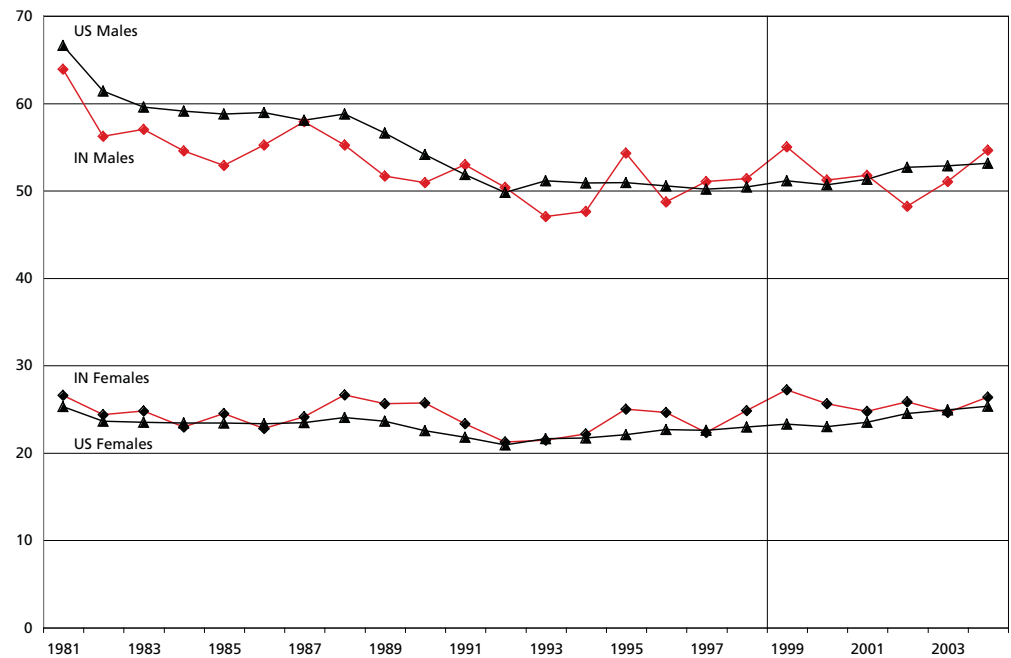


<sup>16</sup>These trends reference 2003 and 2004 data.

<sup>17</sup>Other groups included in the data (American Indian/Alaskan Native, Asian/Pacific Islander, and Other) were not included in this analysis by race.



**Figure 3. Fatal accident rates (age-adjusted) by gender, Indiana and the United States, 1981-2004**



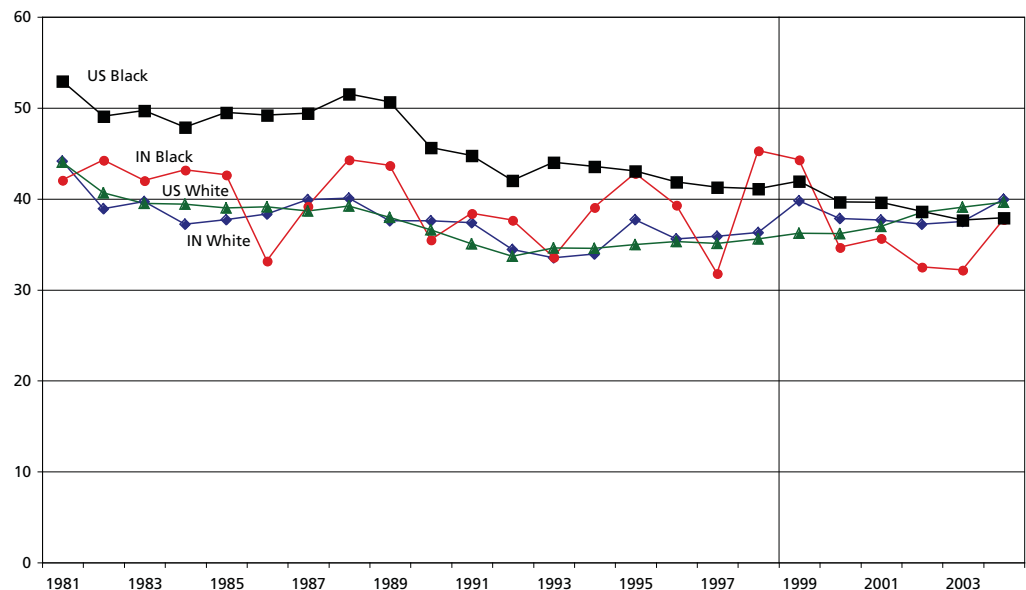
nation's blacks were significantly higher than that for Indiana blacks. Over time, the two rates have converged, due mostly to a gradual decline in accidental death rates for U.S. blacks.

Figure 4 also shows that the accidental death rate for Indiana blacks sometimes exceeds and other times falls below that of the rate for Indiana whites. For the first

part of the data series (1981-1999), Indiana black accidental death rates were higher than that for whites in 14 of the 19 years. More recently, since 2000, accidental death rates for Indiana blacks have fallen below and stayed below those for Indiana whites.

A comparison of Indiana whites and U.S. whites finds that the two trajectories have always been very similar but have

**Figure 4. Accident rates (age-adjusted) by race, Indiana and United States, 1981-2004**







also both increased from the low rates of the early 1990s. These findings support the recent findings of an uptick in the risk of fatal accidents for Americans, although the U.S. black rate continues to decline.

### *Accidents by type*

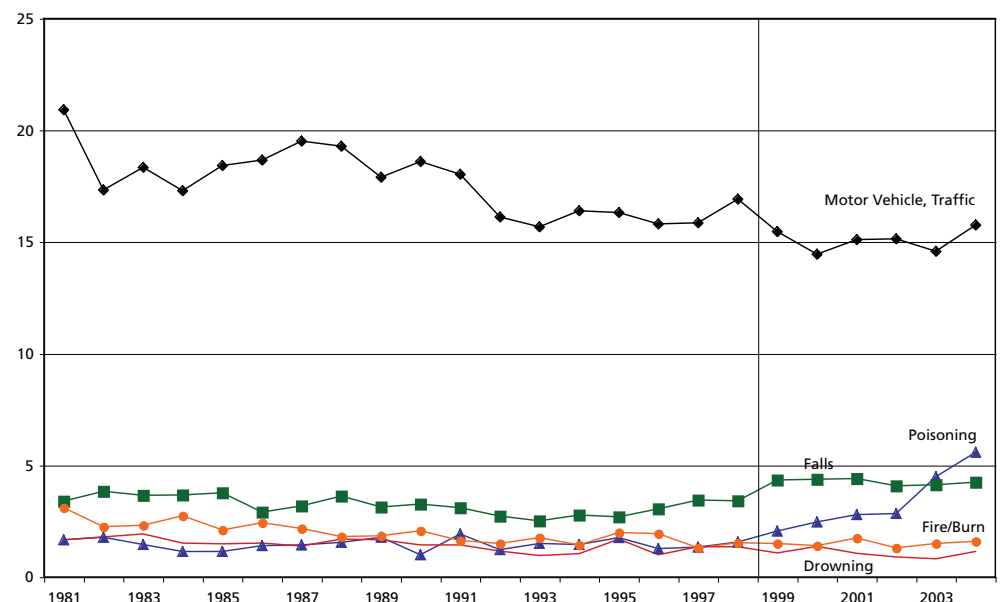
In 2004, accidents accounted for approximately 2,500 Hoosier deaths with highways and houses as the most dangerous locations. As a proportion of all external deaths, accidents account for 71 percent of all external deaths and the remaining 29 percent are suicides and homicides. As illustrated by Figure 5, by far, the most common type of accident in Indiana, accounting for 987 deaths in 2004, are motor vehicle/traffic accidents. Hoosiers currently die in motor vehicle accidents at a rate of nearly 16 per 100,000 residents per year. The rate has been decreasing since 1981 but relatively stable over the last six years and similar to national rates.

Motor vehicle deaths are followed by accidental poisonings and overdoses (344 deaths in 2004). The rate of accidental overdoses and poisonings was almost 6

per 100,000 in 2004, and had been increasing each year since 1996, though still below the national rate of 7. The third most common form of accidental deaths in Indiana are falls. In 2004, there were 272 fatal falls in Indiana with a rate of 4 per 100,000, which has been relatively stable since 1999, and is still below the national rate of 6. Next are accidental deaths due to fire/burns and in 2004, 101 Hoosiers died from fire/burns. The rate of fire death in Indiana was nearly 2 per 100,000 in 2004, and had been relatively stable since 1988 but still higher than national fire and burn death rates. The fifth category of accidental deaths is drowning. In 2004, there were 72 drownings at a rate of 1.2 per 100,000 in Indiana and 1.1 nationally.

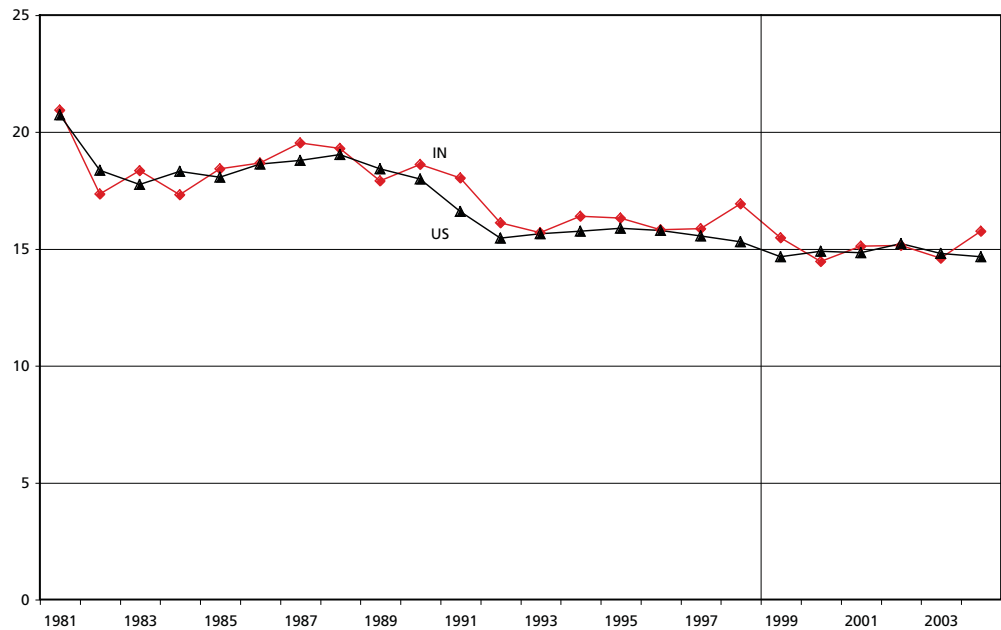
The likelihood order for type of accident is similar for national trends (although occasionally accidental deaths by fire and drownings reverse positions as fourth or fifth most likely). Other much less common forms of accidents (in descending rank order of occurrence) include choking/inhalation deaths, being struck by an object, accidental firearm deaths, and being caught in machinery.

**Figure 5.** Fatal accident rates (age-adjusted) by accident type, Indiana, 1981-2004





**Figure 6.** Motor vehicle traffic accident death rates (age-adjusted), Indiana and United States, 1981-2004



As noted by other researchers, the ICD codes do not allow for a category that would capture all medical mistakes (Vigilant & Williamson, 2003). Medical errors, assuming they are unintentional, could be argued to belong in the accidental death categories. If the medical error deaths were included, estimated to be as low as 44,000 a year and as high as 195,000 per year, they would greatly exceed all external death categories combined and these medical errors cost society as much as \$6 billion each year (Vigilant & Williamson, 2003; Institute of Medicine, 2000; Medical News Today, 2004).<sup>18</sup>

### *Motor vehicle deaths by age*

Motor vehicle fatalities are the most common source of external deaths. As shown in Figure 6, the motor vehicle accidental death rate in Indiana peaked in 1981 at 20 per 100,000 persons (as did the national rate), declined to 14.5 by 2000 (2004 was the lowest rate for national motor vehicle accidental deaths) and was at nearly 16 in 2004. The national rate has decreased

each year since 2002 while the Indiana rate rose between 2003 (14.6) and 2004 (15.8).

National findings consistently show that the risk of motor vehicle crashes (fatal and non-fatal) is highest for teenage drivers. The risk of crash is higher for those ages 16-19 than for any other group.<sup>19</sup> However, although teens may be the likeliest group to be involved in accidents, the 2004 motor vehicle death rate in Indiana is highest for the age groups 20-24 and 75-79 (with rates of 31 and 30, respectively) with the third most likely age group to die from a traffic accident being 15-19, followed by 85+ and 80-84 year-olds (see Figure 7). By 2004, the rate for the age group 75-79 equaled the risk of teenagers and young adults and the 2004 rate remains high for the groups 80-84 years of age and 85+ (23 and 25). As one might expect, given a crash, the elderly are more likely to die from their injuries than are younger drivers, even though the elderly are more likely to be wearing a seatbelt.<sup>20</sup> Motor vehicle traffic deaths are lowest for 5-9 and 0-4 year-olds (3 and 4, respectively).

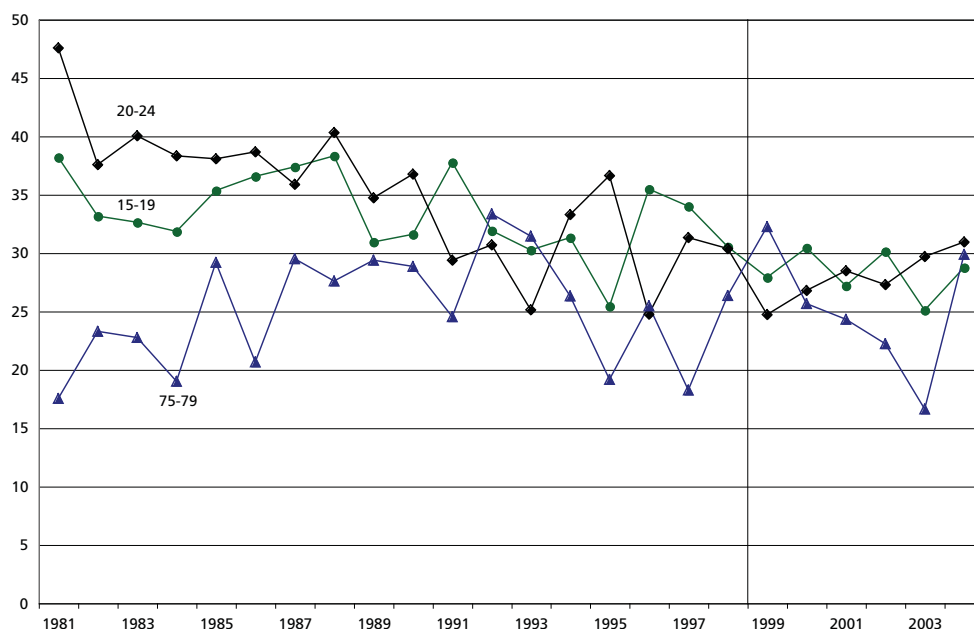
<sup>18</sup>In Hospital Deaths from Medical Errors at 195,000 per year USA. Retrieved January 21, 2007, from [www.medicalnewstoday.com](http://www.medicalnewstoday.com) and To err is human: Building a safer health system. Retrieved January 25, 2007, from National Academy Press, [http://books.nap.edu/catalog.php?record\\_id=9728#toc](http://books.nap.edu/catalog.php?record_id=9728#toc)

<sup>19</sup>Teen drivers: Fact sheet. Centers for Disease Control. Accessed June 22, 2007, at [www.cdc.gov/ncipc/factsheets/teenmv.htm](http://www.cdc.gov/ncipc/factsheets/teenmv.htm)

<sup>20</sup>Older adult drivers: Fact sheet. Centers for Disease Control. Accessed June 22, 2007, at [www.cdc.gov/ncipc/factsheets/older.htm](http://www.cdc.gov/ncipc/factsheets/older.htm)



**Figure 7.** Motor vehicle traffic accident death rates (crude, not age-adjusted) for top three age groups, Indiana, 1981-2004



Motor vehicle traffic death rates fluctuate significantly from year to year. The same Indiana high-risk age categories, 20-24 and 15-19, are the same high-risk categories across the United States.

One argument made regarding the increase in the accident rates pointed to an increase in the likelihood of motorcycle accidents, particularly among those over age 45 (Johnson, 2007). An analysis of the percentage of motor vehicle accidents that involved a motorcycle for Indiana residents in 2004 as compared to 1999 (the only comparison available in WISQARS as 1998 and earlier are ICD-9 codes) does find a dramatic difference in the likelihood that someone ages 45-54 dies in a motorcycle-related crash. For those Hoosiers ages 45-54, in 1999, nearly 9 percent of all fatal motor vehicle accidents involved a motorcycle fatality. By 2004, 16 percent of all motor vehicle fatalities were motorcycle deaths for this same age group. Looking at the same trend for those Hoosiers 55-64 finds that in 1999, 4 percent of all motor vehicle deaths

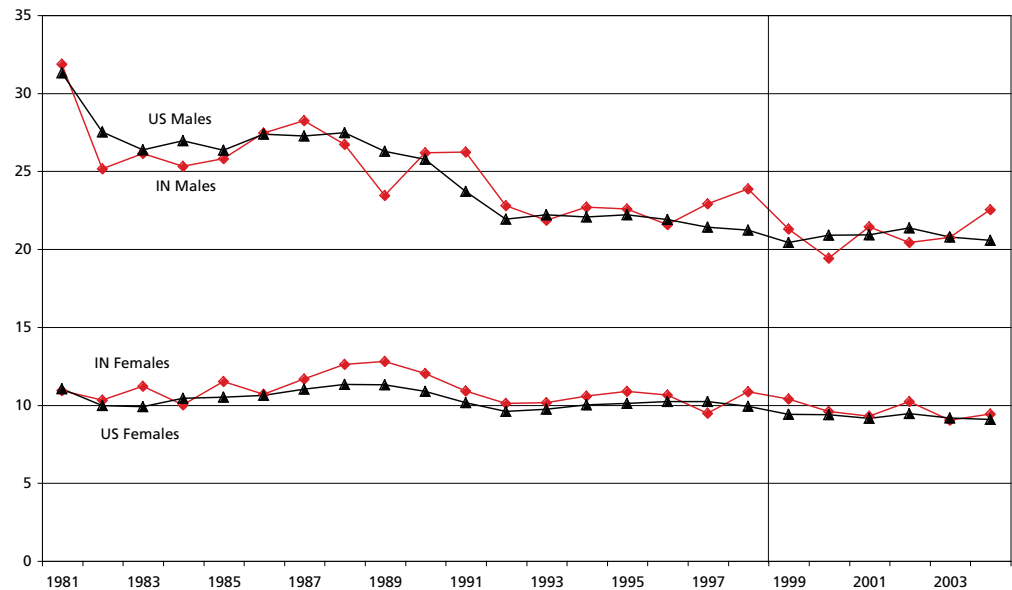
involved motorcycles and by 2004, 8 percent of all motor vehicle deaths were motorcycle-related deaths. The WISQARS data do show us that indeed, motorcycle accidents as a proportion of total accidents are becoming more common and are disproportionately affecting those age 45 and over.

#### *Motor vehicle deaths by gender*

Figure 8 illustrates the dramatic gender differences in the likelihood of dying in a motor vehicle accident. Male rates have been more than two times the rates for females over much of the time series but were three times higher when the series began in 1981—so the gender ratio has narrowed somewhat over time. As illustrated by Figure 8, the declines in motor vehicle accident deaths since 1981 have primarily been for males. Since 1999, male rates have fluctuated by one or two points (except in 2003) while female rates have remained fairly stable. The motor vehicle death rate for Indiana males surpassed that of the national rate in 2004.



**Figure 8.** Motor vehicle traffic accident death rates (age-adjusted) by gender, Indiana and United States, 1981-2004



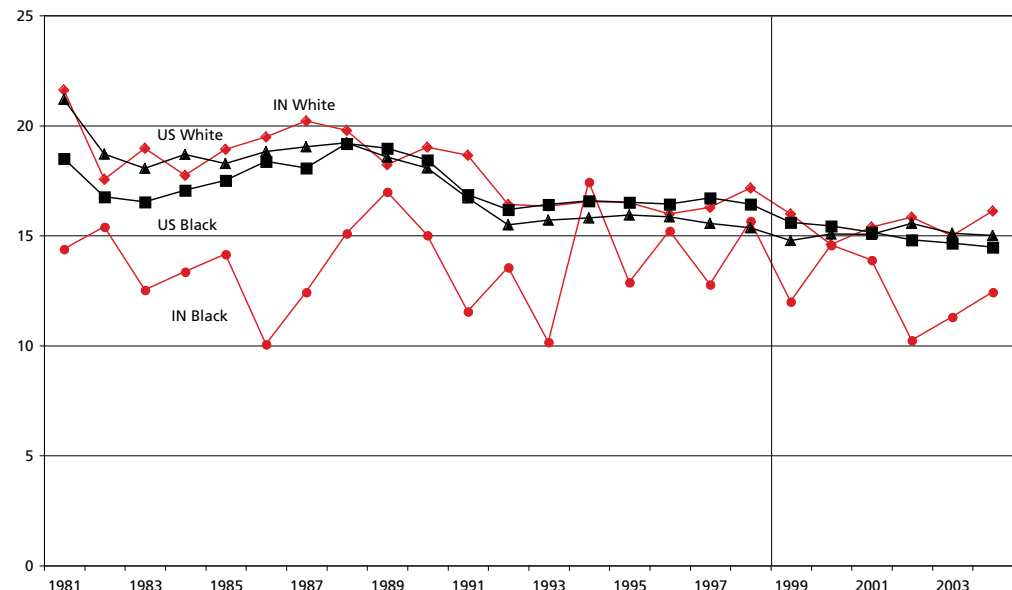
There are a number of different databases that collect information on motor vehicle crashes and fatalities and due to different definitions, recordkeeping, etc., the actual counts of the number of accidental deaths varies from source to source. According to the Indiana State Police Vehicle Crash Records System (VCRS), there were 947 traffic deaths in 2004 in Indiana and (where gender was known and entered into

VCRS) 648 (68 percent) were male and 296 (31 percent) were female.<sup>21</sup>

#### *Motor vehicle deaths by race*

Motor vehicle deaths are more similar by race than by gender. For Indiana, white rates exceeded those for blacks except in 1994, when motor vehicle death rates for blacks in Indiana slightly exceeded those for whites (17.4 vs. 16.5). As illustrated by Figure 9, motor vehicle accident death

**Figure 9.** Motor vehicle traffic death rates (age-adjusted) by race, Indiana and United States, 1981-2004



<sup>21</sup>The death certificate based WISQARS data used in this study found 987 for 2004 as compared to 947 from the VCRS. Part of the discrepancy may be that if someone is injured in a motor vehicle crash and dies after 31 days, the cause of death for the VCRS database would not be coded as a motor vehicle death.



rates for both blacks and whites in Indiana increased in 2004. National race trends have been much more similar than Indiana and much more stable in year-to-year fluctuations.

Motor vehicle crash reports do not gather information on the race of those involved. The only motor vehicle crash records that include the race of victims are those that result in death and are coded by cause of death. Whether or not the motor vehicle fatality race patterns reflect overall motor vehicle crash patterns is unknown.

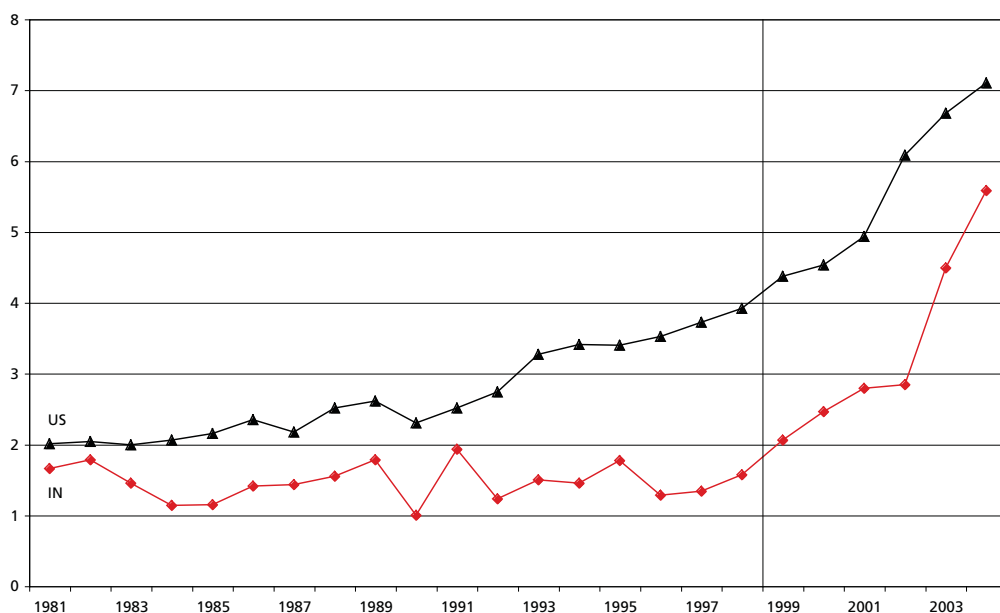
#### *Accidental deaths by overdoses and poisonings*

Accidental overdoses/poisonings are typically the second most common form of accidental death (although this varies by some age, race, and gender combinations). Poisoning/overdose deaths are a diverse category and can include exposure to toxic chemicals such as carbon monoxide or cleaning fluids and prescription drug overdoses, but usually

involve illegal substance overdoses. In Indiana and the United States, accidental overdoses have been increasing dramatically. There were only 56 such deaths in Indiana in 1984 with an accidental poisoning/overdose rate of 1 per 100,000. By 2004, the number of these deaths had climbed to 344 at a rate of almost 6.

As illustrated by Figure 10, Indiana overdose/poisoning death rates have always been below the national rate, but both rates have followed a similar trajectory of dramatic increase. This alarming trend needs further disaggregation to identify which demographic groups are experiencing this increase and specifically what substances are involved. National overdose/poisoning facts from CDC findings in 2003 found that the most likely (94 percent) source of unintentional overdoses/poisonings in the United States was drug overdoses (primarily opioid pain medications, cocaine, and heroin).<sup>22</sup> See Appendix B for all causes of death that are used by the CDC to create the poisoning/overdose category.

**Figure 10.** Accidental overdose/poisoning deaths rates (age-adjusted), Indiana and United States, 1981-2004



<sup>22</sup>Poisoning in the United States: Fact sheet. Centers for Disease Control. Accessed March 7, 2007, at [www.cdc.gov/ncipc/factsheets/poisoning.htm](http://www.cdc.gov/ncipc/factsheets/poisoning.htm)



### *Accidental deaths by overdoses/poisonings by age*

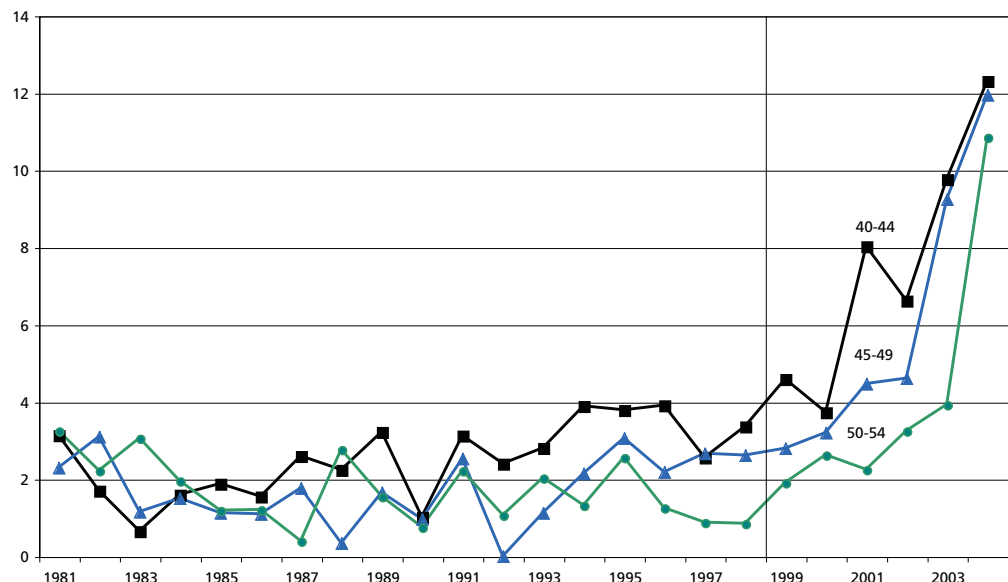
Looking back to 1981 and throughout the 1980s, those Hoosiers most likely to die from accidental poisonings and overdoses were the elderly, particularly those Hoosiers over age 80. As of 2004, the source of these overdoses/poisonings for those persons 65 and over (the only level of age aggregation available for detailed death codes) is primarily unspecified drug overdoses, followed by exposure to toxic gases. Accidental overdoses/poisonings for other younger age groups was much more likely to be a result of narcotics overdoses. This may also be the case for the elderly, but since the specific drug that causes the overdoses has not been categorized on the death certificate, we cannot be sure.

While the rates for the elderly age groups remain higher than most other age categories, the age groups most likely to die from accidental overdose/poisoning since 2002 have changed dramatically and now include Hoosiers ages 20-54. As of 2004, the accidental overdose/poisoning rate for 40-

44 year-olds was an alarming 12 (the highest rate ever recorded for any group for any year in the series), and followed closely by those age categories of 45-49, 50-54, 35-39, 30-34, 25-29, and 20-24; all of these age groups have overdose/poisoning rates ranging from just under 7 to just over 12. Rates for most other age groups are well below this level. There appears to be very low levels (and in many years none at all) of child poisonings/overdoses of any kinds (ages 0-14).

As illustrated by Figure 11, at least part of the dramatic increase in overdose/poisoning deaths has been significant increases in the rate of poisoning for age groups who previously were not high risk but now are. As noted in the previous section describing the leading causes of death by age, the source of these overdoses/poisonings for most categories except the elderly category was either an unspecified drug overdose or an overdose of narcotics. No greater detail about the actual narcotic is available but given the extensive recent media coverage of Oxycontin addiction and deaths, this may be the source of many of these accidental overdoses/poisonings.<sup>23</sup> This

**Figure 11.** Accidental overdose/poisoning death rates (crude, not age-adjusted) for top three age groups: Indiana, 1981-2004



<sup>23</sup>For example, Associated Press Financial Wire, May 10, 2007, and Business Insurance, May 21, 2007.



category—accidental overdoses/poisonings—may also include some suicide overdoses that were ruled as accidents, particularly since many of the age, race, and gender patterns observed for suicides also exist for accidental overdoses.

While national overdose/poisoning deaths are also on the increase, they historically were not concentrated in the elderly groups and were always dominated by the age categories ranging from 20-54 years of age. Current national rates for three age groups, 45-49, 40-44, and 35-49 range from 17 to 13, and exceed the highest level for any Indiana age category. In sum, what was always the case for the United States overall—accidental overdose/poisoning deaths clustered in middle-age categories—has now become the case for Indiana.

#### *Accidental deaths by overdoses/poisonings by gender*

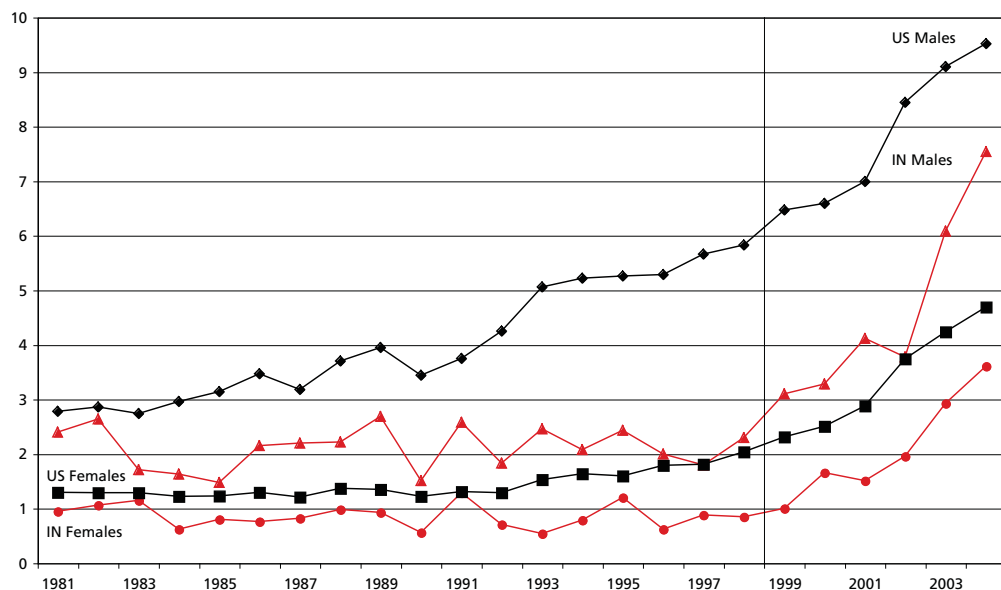
Regarding gender, the rate of increase in fatal accidental overdoses/poisonings has been more dramatic for Indiana males than females. As shown in Figure 12, male rates have typically been twice that of females and, over time, the gender ratio

has increased. As of 2004, male accidental overdoses/poisoning rates had climbed to 7.5 per 100,000 in Indiana (still below the national rate of 10) and female rates are 3.6, less than half that of the male rates.

#### *Accidental deaths by overdoses/poisonings by race*

In the midst of the overall increases in the rate of accidental overdose/poisoning deaths in Indiana, there has been a significant change in the race distribution of these deaths (see Figure 13). Historically, accidental overdose/poisoning deaths for blacks in Indiana have almost always been above the rate for whites. But since 2002, black rates of accidental overdose/poisoning deaths have fallen below the rate of whites. So, although the rate for both groups increased rather dramatically from 2002-2004, the race effects have reversed. The same trend—white accidental overdose/poisoning rates surpassing blacks—also occurred at the national level. In 2004, the primary source of white accidental overdose deaths is unspecified drugs or medicines (62 percent), followed by narcotics or hallucinogens (26 percent),

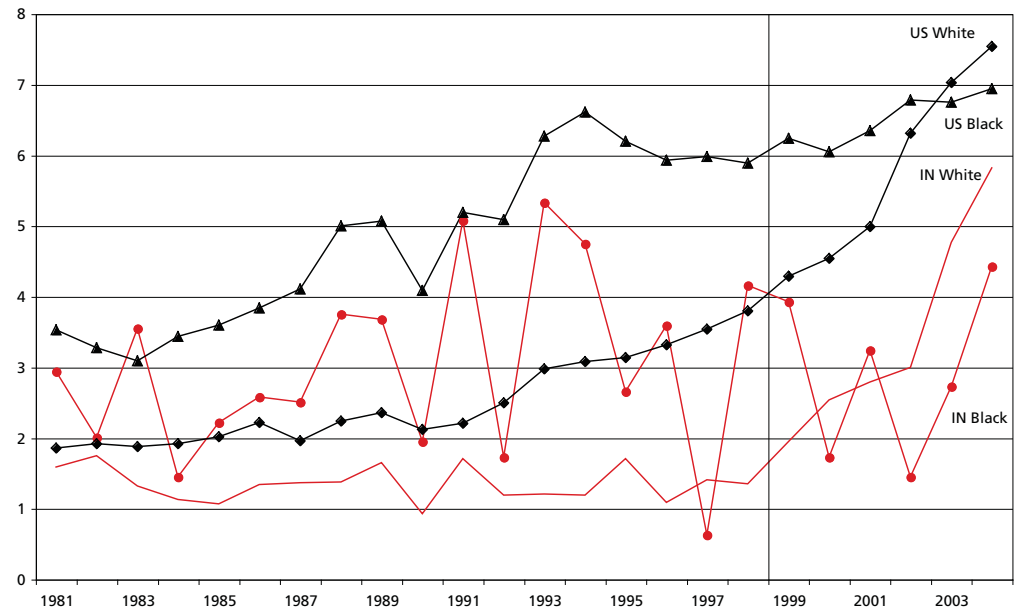
**Figure 12.** Accidental overdose/poisoning deaths rates (age-adjusted) by gender, Indiana and United States, 1981-2004







**Figure 13.** Accidental overdose/poisoning death rates (age-adjusted) by race, Indiana and the United States, 1981-2004



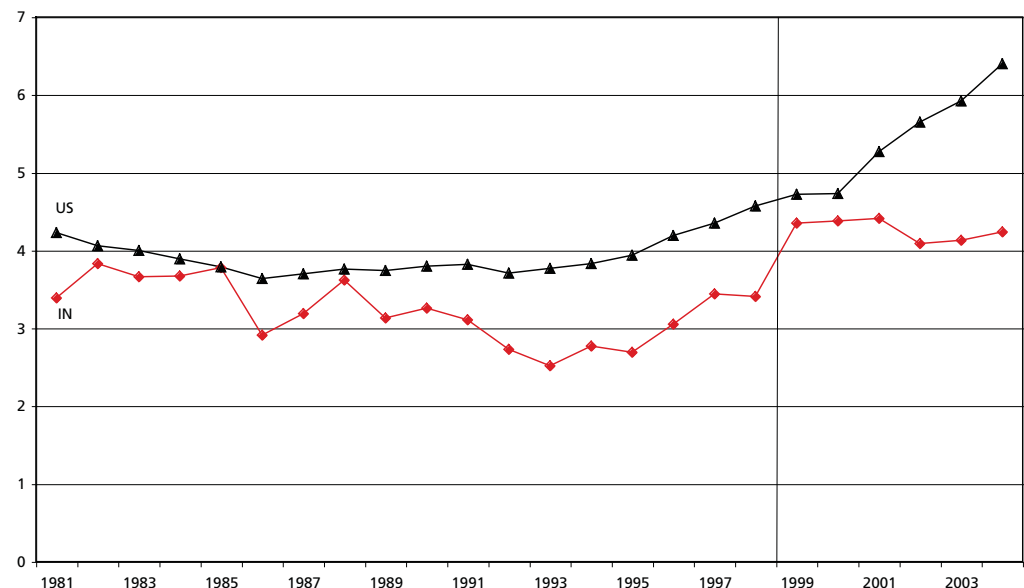
whereas nearly the opposite is the case for blacks, as 59 percent of black accidental overdoses involve narcotics or hallucinogens and 22 percent are due to unspecified drugs or medicines.

### Fall deaths

Falls can include falling down stairs, falling off beds or other furniture, falling from ladders, falling due to stumbling, falling from trees or cliffs, and falling on

ice or snow (see Appendix B for all fall codes). The rate of accidental fall deaths has increased dramatically in the United States since 1999, rising to the highest ever recorded rate for the nation by 2004 (6 per 100,000). Indiana fatal fall rates also rose during the 1990s and have stayed above 4 since 1999. As of 2004, the fall death rate in Indiana was below national fall death rates (4 vs. 6), as illustrated by Figure 14, but both are at relatively high levels.

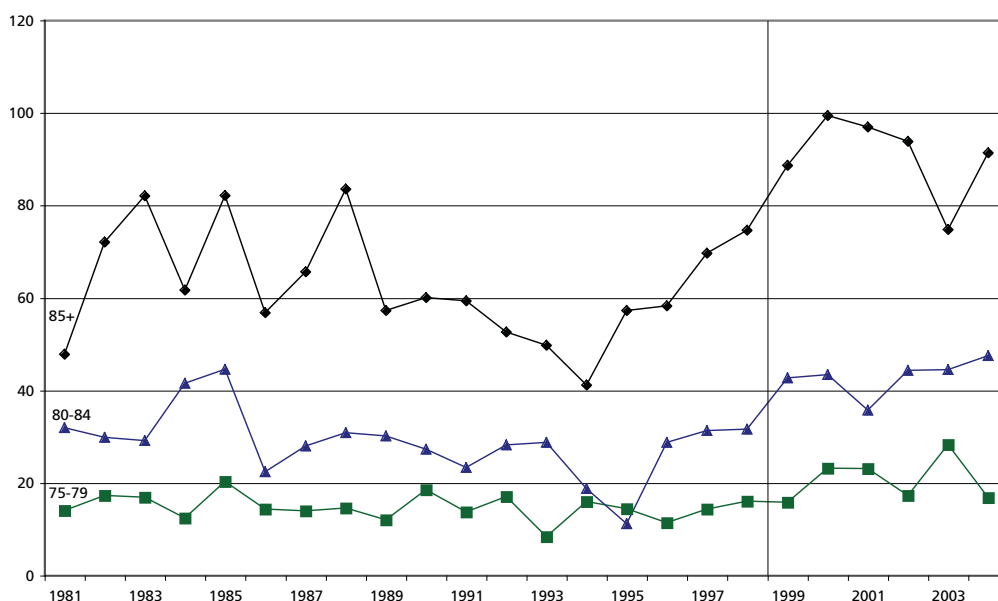
**Figure 14.** Accidental fall deaths rates (age-adjusted), Indiana and the United States, 1981-2004







**Figure 15.** Accidental fall death rates (crude, not age-adjusted) for top three age groups: Indiana, 1981-2004



### *Fall deaths by age*

Expectedly, it is our elderly that are dying from falls, and falls are actually the leading cause of accidental deaths among the elderly.<sup>24</sup> Not only do the elderly fall more often (due to frailty, dizziness, weakness, and confusion), they are more likely to die from their falls (Rubenstein, Josephson, & Robbins, 1994). Falls are by far the leading cause of accidental deaths (42 percent) for those 65 and over, and this is the only adult category for which motor vehicle deaths are not the primary source of accidental deaths.

The Indiana 2004 fall death rate for those 85 and over is very high at 91 for every 100,000 persons (and has been even higher in previous years), by far the highest risk for any age group. While not as high, the fall death rates are also high for any of the age categories over the age of 65. These rates are even higher for these elderly age groups at the national level (143 per 100,000). Fall death rates for those 44 years of age and under are very low and have remained so for the entire data period.

Figure 15 illustrates the highest risk age groups for falls in Indiana as well as the trend towards increases for those oldest

three age groups.

As our population ages, we should expect that without intervention strategies, these sorts of deaths will become more likely. Research suggests that approximately one-third of older adults will fall in their homes each year and the likelihood of falling in an institution (e.g., nursing home, senior care facility) is three times the rate for those who live in their own homes (Rubenstein et al., 1994). This finding questions the argument that elderly persons are safer in nursing home and care facilities than in their own homes, at least as far as deadly falls are concerned.

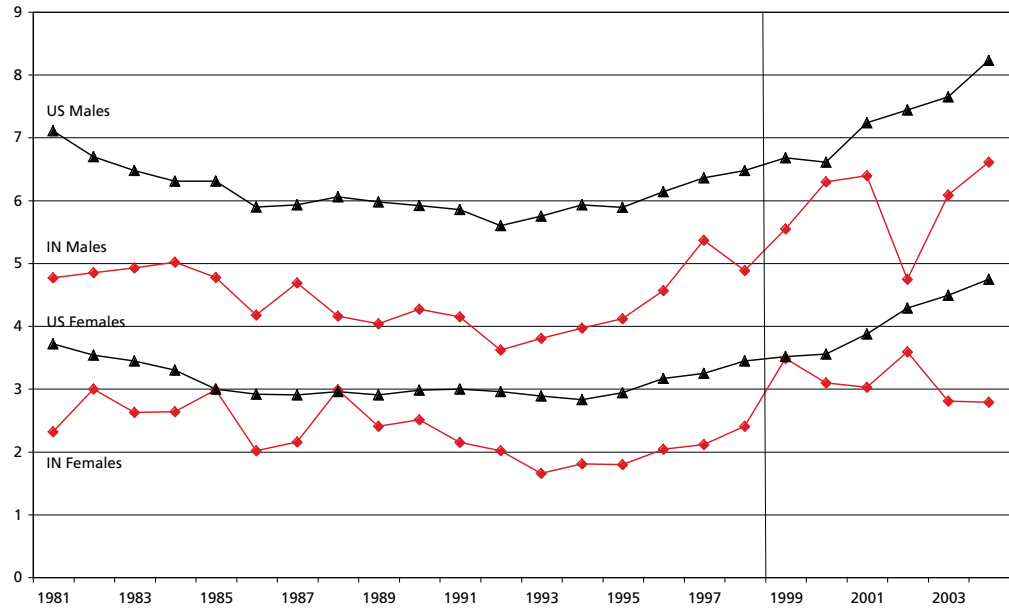
### *Fall deaths by gender*

Fall deaths have increased for both males and females at the national level, and for males only in Indiana. The increases have been more dramatic for males and the gender difference is now more pronounced than it has been at any time in the last 20 years. Indiana fall death rates have always been below national rates and more so for Indiana males than Indiana females as is illustrated by Figure 16. The CDC notes that even though women are more likely to

<sup>24</sup>Falls among older adults: An overview. Accessed June 22, 2007, at [www.cdc.gov/ncipc/factsheets/adultfalls.htm](http://www.cdc.gov/ncipc/factsheets/adultfalls.htm)



**Figure 16.** Accidental fall deaths rates (age-adjusted) by gender, Indiana and United States, 1981-2004



have nonfatal fall injuries and the rate of fall-related fractures is two times as high for women, men are actually more likely to die from a fall.<sup>25</sup> As noted previously, the source of these falls in Indiana is either unspecified or a result of falling on the same level (e.g., tripping or slipping).

#### *Fall deaths by race*

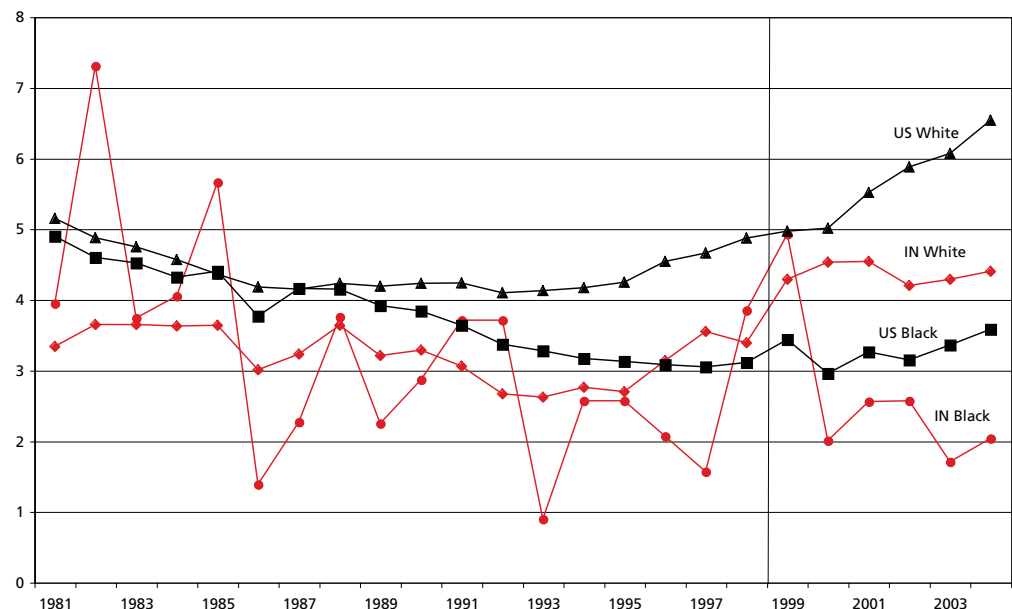
Like the race trends observed for accidental overdose/poisoning deaths,

blacks had similar but sometimes higher rates of fall deaths than whites when the data series began in 1981. As of 2004, Figure 17 shows that both the Indiana and U.S. white rate of fall deaths are about two times that for blacks.

#### *Fire and burn-related accidental deaths*

Unlike trends for some other types of accidents, fire and burn-related accidents have significantly decreased since 1981

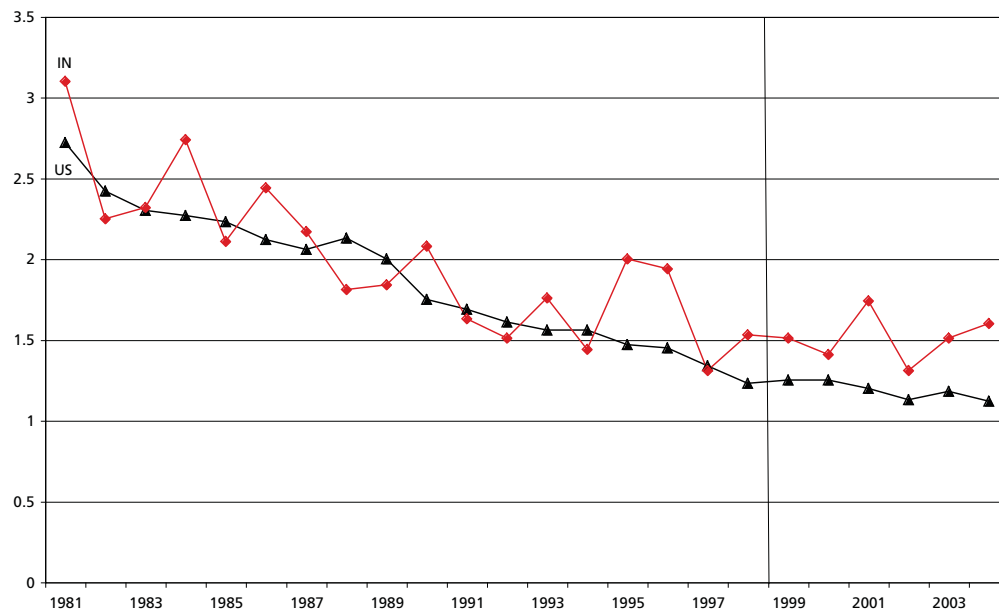
**Figure 17.** Accidental fall death rates (age-adjusted) by race: Indiana and United States, 1981-2004



<sup>25</sup>Falls among older adults, op. cit.



**Figure 18.** Fire/burn accident death rates (age-adjusted), Indiana and United States, 1981-2004



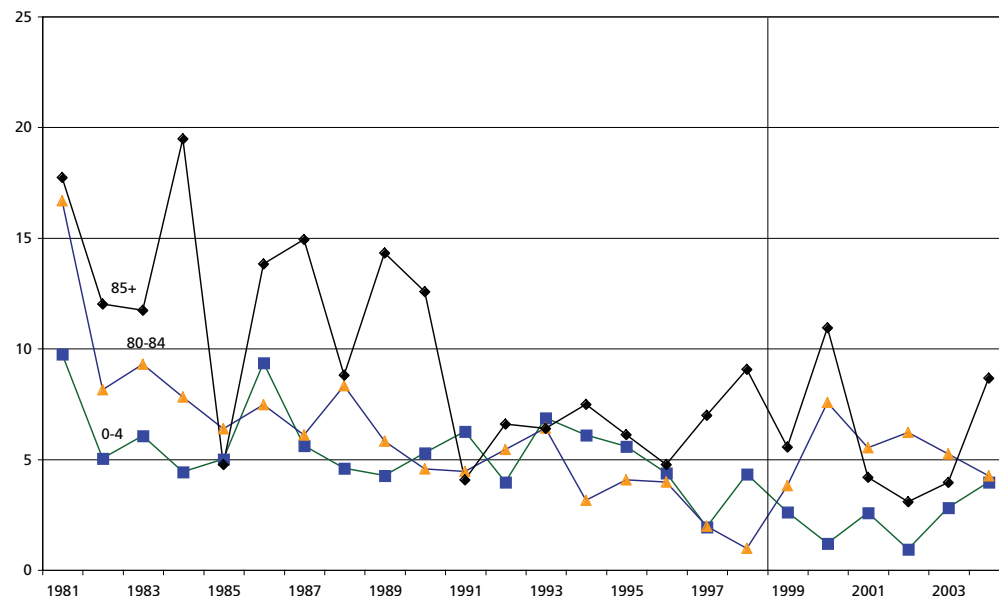
(see Figure 18). In Indiana, the fire/burn death rate is approximately half of what it was over 20 years ago, although unfortunately the Indiana rate surpassed the national rate and has stayed above the U.S. rate since 1998. Nationally, typically three-fourths of fire deaths occur at home and most victims die from smoke inhalation and not burns. There were 396,000 home fires in the United States in 2005 (the primary cause of residential fires

was cooking and the primary source of fire-related death was smoking).<sup>26</sup> For Indiana, for all age categories, fire deaths are almost always residential.

#### *Fire and burn deaths by age*

Death by fire/burns predominantly affects the very young and the very old. The age groups with the highest risk of death by fire/burns in 2004 were 85+ (9), 80-84 (4),

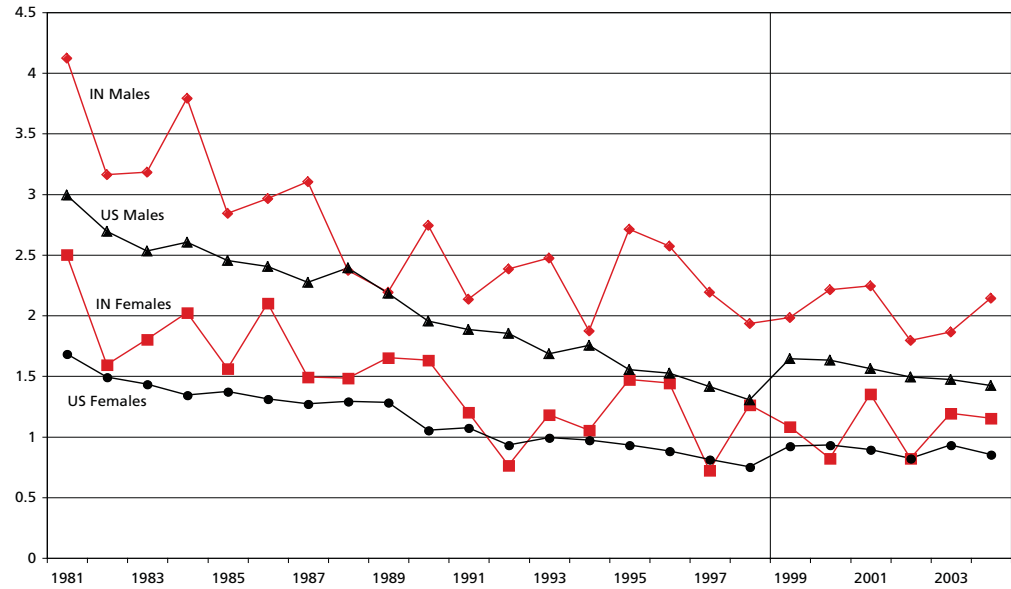
**Figure 19.** Fire/burn accident deaths rates (crude, not age-adjusted) for top three age groups, Indiana, 1981-2004



<sup>26</sup>Fire deaths and injuries: Fact sheet. Accessed March 7, 2007, at [www.cdc.gov/ncipc/factsheets/fire.htm](http://www.cdc.gov/ncipc/factsheets/fire.htm)



**Figure 20. Fire/burn deaths rates (age-adjusted) by gender, Indiana and United States, 1981-2004**



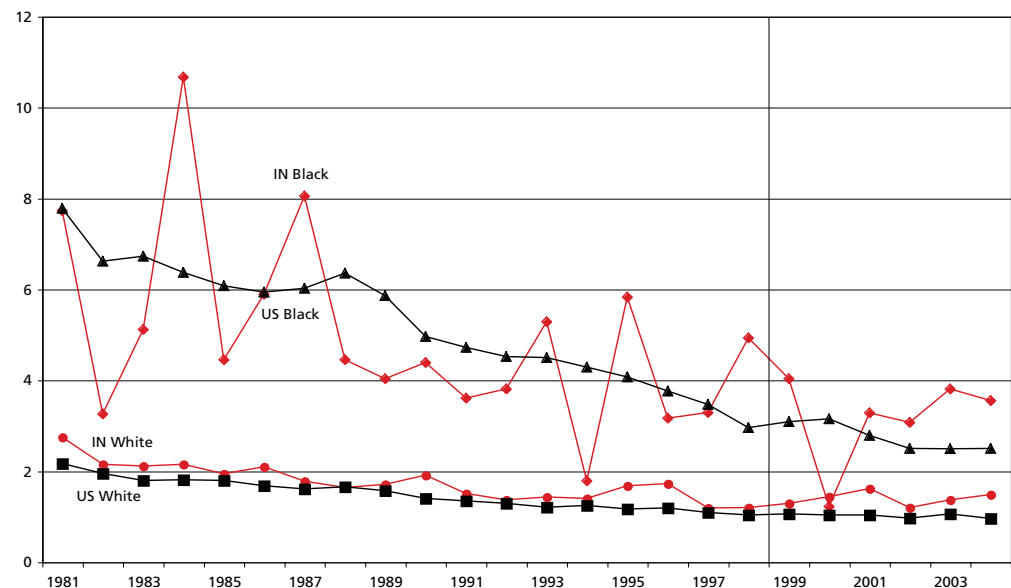
0-4 (4), 65-69 (2), and 55-59 (2). Figure 19 illustrates the trends for the three age groups with the highest rates over the entire time series. An inspection of Figure 19 shows that across that time, fire has always claimed the youngest and oldest. Much of the overall decline in fire/burn deaths has been a reduction in elderly deaths which in the early 1980s were as high as 19 per 100,000. Fire deaths also declined for the 0-4 age category over the entire time period, but not as dramatically as for the elderly population. National

fire/burn age trends show that the same age groups have the highest risks but the decline has been steady for all age groups.

#### *Fire and burn deaths by gender*

Fire/burn deaths by gender are more similar than for many other types of accidents. As illustrated by Figure 20, fire/burn rates are higher for both Indiana males and females as compared to their national counterparts. The declines in fire/burn deaths appear to have happened for both

**Figure 21. Fire/burn deaths rates (age-adjusted) by race, Indiana and United States, 1981-2004**





males and females, at nearly the same rate.

### *Fire and burn deaths by race*

Although fire/burn deaths have declined for both blacks and whites, nationally and in Indiana, Figure 21 shows that the national decline has been more substantial for blacks than whites. In Indiana, the black rate of accidental fire death had converged with the white rate by 2000 but the black rate has since increased and by 2004, exceeds the white rate.

### *Drownings*

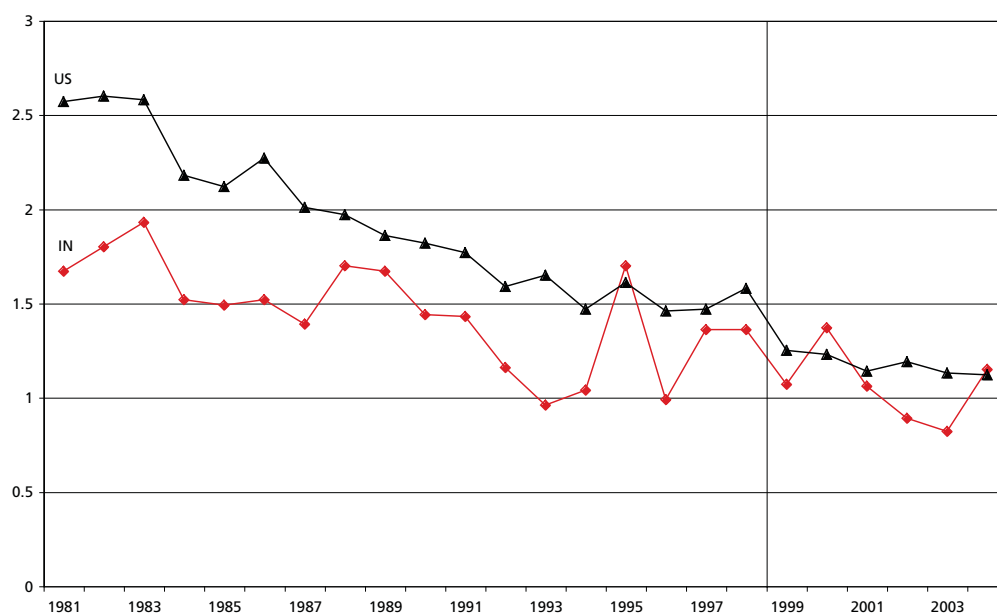
As illustrated by Figure 22, drownings are another type of accident showing decline over the past 20 years, although there was an increase in the number and rate of drownings in Indiana in 2004 as compared to 2003 (72 drownings versus 51 in 2003). This is still a significant improvement over the numbers and rates of drowning seen in Indiana in the 1980s and 1990s in which both decades, at some point, saw drowning numbers at 100 or more and rates as high as 2 per 100,000, as compared to the current rate of 1. Historically, drownings were less likely to occur in Indiana than they were in

the United States as a whole, but over time the two rates converged and as of 2004 are nearly identical (1.16 for Indiana, 1.12 for the United States). This convergence can be explained by fairly significant, stable declines for U.S. drownings and a recent increase in Indiana.

### *Drownings by age*

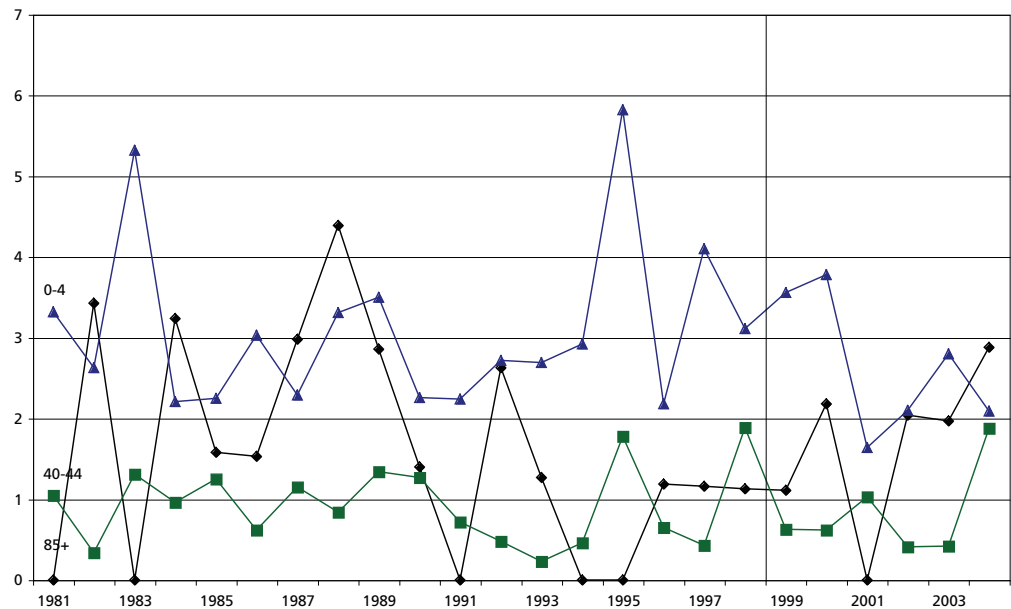
Although in Indiana in 2004, the 85 and over age group had a slightly higher rate of accidental drownings (and we should consider the possibility that some of these may be suicides), historically in Indiana, it was the very young, those age 0-4, that experienced the highest rates of drownings. Infants (0-1) not only drown in lakes, ponds, and swimming pools, but because of their age, they are also vulnerable to bathtub-related drownings. A 1995 study of where children drown found that 55 percent of infant drownings were in bathtubs (this is supported by Indiana trends from 1999-2004 as 60 percent of drownings of those infants under 1 were bathtub drownings and another 20 percent were not specified but could have been bathtub drownings). For

**Figure 22.** Accidental drowning death rates (age-adjusted), Indiana and United States, 1981-2004





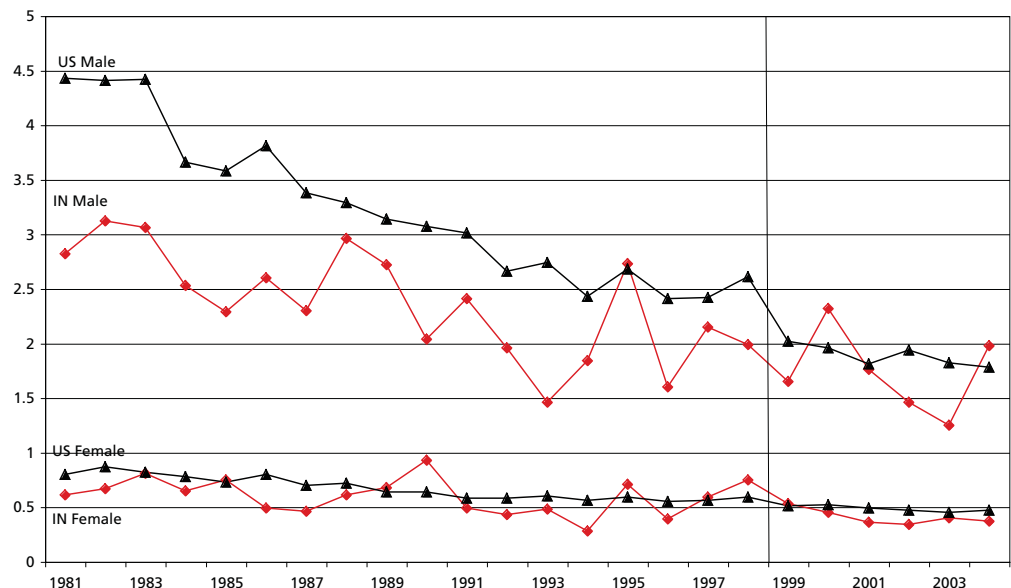
**Figure 23.** Accidental drowning death rates (crude, not age-adjusted) for top three age groups, Indiana, 1981-2004



those children ages 1-4, the biggest risk of drownings was in artificial pools followed by 26 percent in freshwater bodies. Older children (5-19) were most likely to drown in freshwater (e.g., lakes, ponds, retaining ponds) (Brenner, Trumble, Smith, Kessler, & Overpeck, 2001). Again, the patterns found in the 1995 research were supported by Indiana and national trends.

As noted in Figure 23, drowning rates for the very young in Indiana have declined since the rates seen during the mid-1990s but are still higher than those for any other age group (with the exception of the 85+ category in 2004). As of 2004, the age groups in Indiana with the highest drowning rates are 85+ (3 per 100,000), 0-4 (2), and 40-44 (2). Drowning is an accident type that takes victims

**Figure 24.** Accidental drowning death rates (age-adjusted) by gender, Indiana and United States, 1981-2004





from across the age span, although the location of the drownings differ. The rank order for the United States as of 2004 is 0-4 (2), 85+ (2), and 80-84 (1).

National drowning trends also find that the very youngest are the most likely to drown at even greater rates than in Indiana, but the drowning of elderly is actually a greater risk in Indiana. Throughout the United States and Indiana we have seen drowning rates decline dramatically for most age groups, but declines for elderly age groups have been less pronounced.

#### *Drownings by gender*

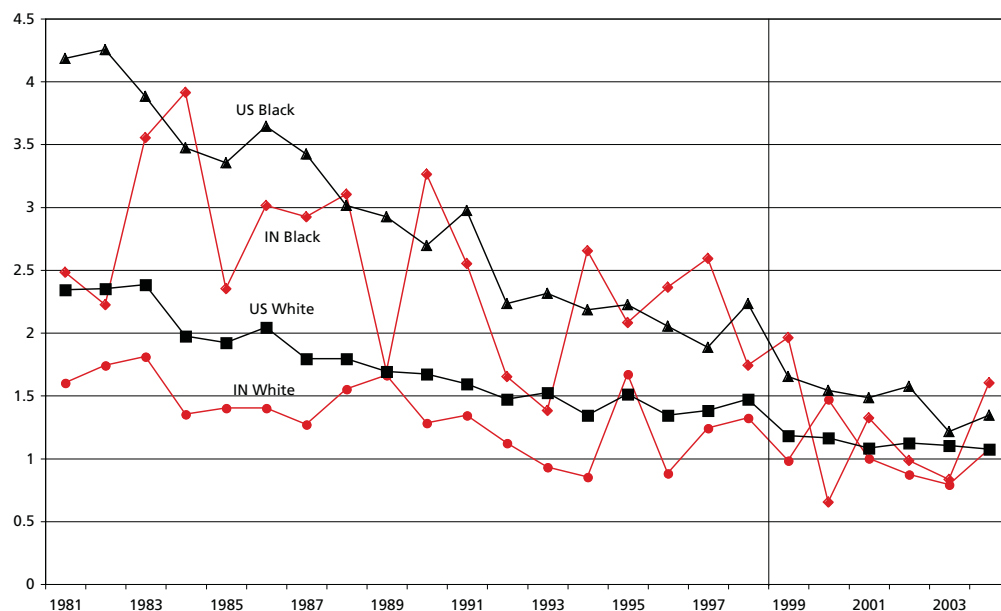
According to the CDC, as of 2004, males accounted for 78 percent of fatal unintentional drownings in the United States and as illustrated by Figure 24, this gender ratio is even more pronounced in Indiana.<sup>27</sup> In Indiana, males accounted for 84 percent of all drowning victims in 2004. As shown by Figure 24, although early in the time series, Indiana males drowned less frequently than U.S. males as a group, by 1995 the two rates converged and as of

2004 are still very similar. This convergence is due to stable and more substantial declines for U.S. male drownings and smaller declines for Indiana male drownings. Drowning rates for Indiana females have been much more similar to those of U.S. females across the time series.

#### *Drownings by race*

Figure 25 illustrates that nationally, blacks have always had higher death by drowning rates than whites but over the years there has been a convergence in these rates for blacks and whites. At the beginning of the series, nationally, blacks were nearly twice as likely to drown as whites. By 2004, U.S. blacks had a drowning rate of 1.3 and whites, 1.1. Although Figure 25 is less clear for the race patterns for Indiana (due to instability in black rates as a result of relatively small numbers) nearly the same pattern exists in Indiana—with blacks in previous years having rates as much as twice those of Indiana whites and more recently converging. Both in Indiana and nationally, drowning reductions are

**Figure 25.** Accidental drowning death rates (age-adjusted) by race, Indiana and United States, 1981-2004



<sup>27</sup>Water-related injuries: Fact sheet. Centers for Disease Control, NCIPC. Retrieved June 22, 2007, from [www.cdc.gov/ncipc/factsheets/drown.htm](http://www.cdc.gov/ncipc/factsheets/drown.htm)



happening to blacks, and much less so to whites. Future research will analyze specifically which age and gender groups of blacks have experienced this significant decline.

### *Accidental gun deaths*

Although accidental gun deaths are not in the top five most likely accidents and typically come somewhere after choking and inhalation deaths and struck by an object/machinery deaths, there is always a tremendous amount of concern about guns. Obviously one accidental gun death is one too many but it is possible that the public overestimates the likelihood of a gun accident as compared to the many other types of accidents.

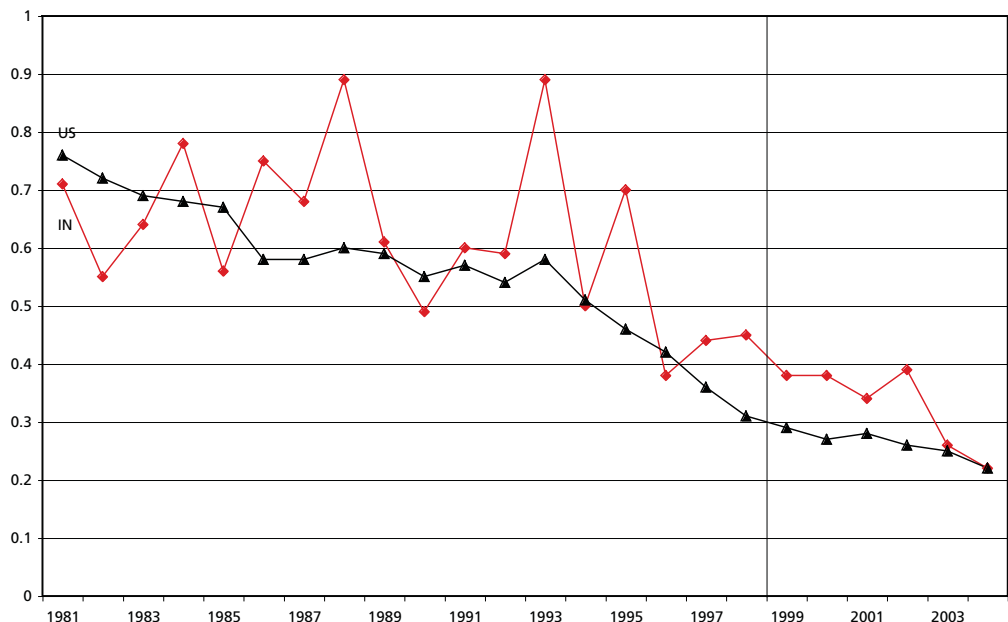
Accidental deaths by guns have significantly declined across the nation as a whole; there were 649 fatal gun accidents in the United States in 2004, just less than one-third of the number in 1981 (1,871). In Indiana, as illustrated by Figure 26, the accidental gun death rate for Hoosiers has been much more unstable (again, largely as a function of small base

numbers) since 1981. The national accidental gun death rate has continuously and significantly declined since 1981, whereas the Indiana rate has experienced substantial spikes (again, in part at least to the numerators), exceeding national rates in many years and only recently declining and converging with national rates. Although less consistently, the end result is the same in Indiana as for the nation—a dramatic decline in the number and rate of fatal gun accidents. The number of accidental gun deaths peaked in Indiana in 1993 with 52 deaths and has declined dramatically since 1993 with 14 accidental gun deaths in Indiana in 2004 (a rate of less than 1 (.22) per 100,000 Hoosiers). Accidental gun deaths account for only 2 percent of all gun deaths in Indiana.<sup>28</sup>

### **Overall suicide patterns and trends**

Suicides in Indiana have ranged from a low rate of 10 per 100,000 persons (in 1999) to a peak of 13 per 100,000 (in 1987), and in 2004 a rate of approximately 11. Indiana

**Figure 26.** Firearm accident death rates (age-adjusted), Indiana and United States, 1981-2004



<sup>28</sup>A future research brief on gun violence and death in Indiana as compared to national trends is forthcoming. This brief will note the significant age, race, and gender interactions for gun suicides, homicides, and accidents.





suicide rates over the time period 1981-2003 typically run slightly higher than the national average. As shown in Figure 27, the decline in the suicide rate began for both Indiana and the United States before the changes occurred to the codes used for causes of death; however, a significant decline did occur in Indiana from 1998 to 1999 and should be interpreted with caution. Beginning in 2000, the suicide rate in Indiana began to increase through 2002, followed by a slight downturn that has continued through 2004. National suicide rates have held steadier with a smaller trend upwards.

There are, however, significant gender, age, and race differences in suicide (both nationally and in Indiana).

### *Suicide by age as a leading cause of death*

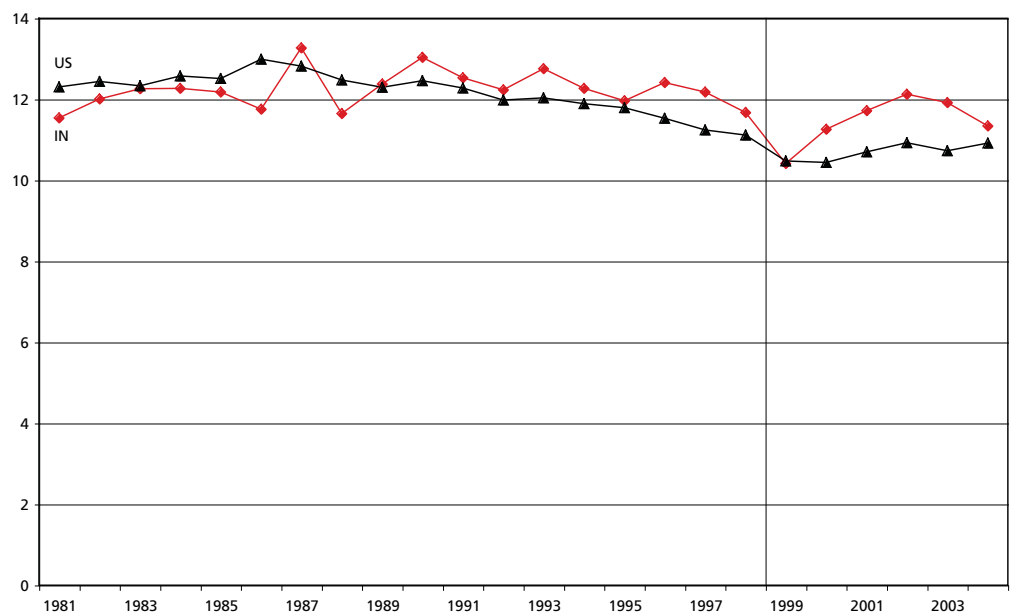
Suicide ranks as one of the ten leading causes of death for some age groups in Indiana. Fortunately, there are no Indiana statistics for suicides in children younger than 10. But, children ages 10-14 have suicide as their third leading cause of

death. The suicides of these children (and they are rare—there were 9 suicides for this group in Indiana in 2004) are primarily committed by suffocation/hanging, likewise for this age group nationally.

Looking at the trends for the age group 15-24 (collapsed into one group because most of the patterns are similar for 15-19 and 20-24 age groups), the top three causes of death are the external causes—accidents first, homicides second, and suicides third (the order of homicide and suicide reverses for the 15-19 year-olds). The suicides for this group are primarily gun (46 percent) followed by hanging/suffocation (41 percent).

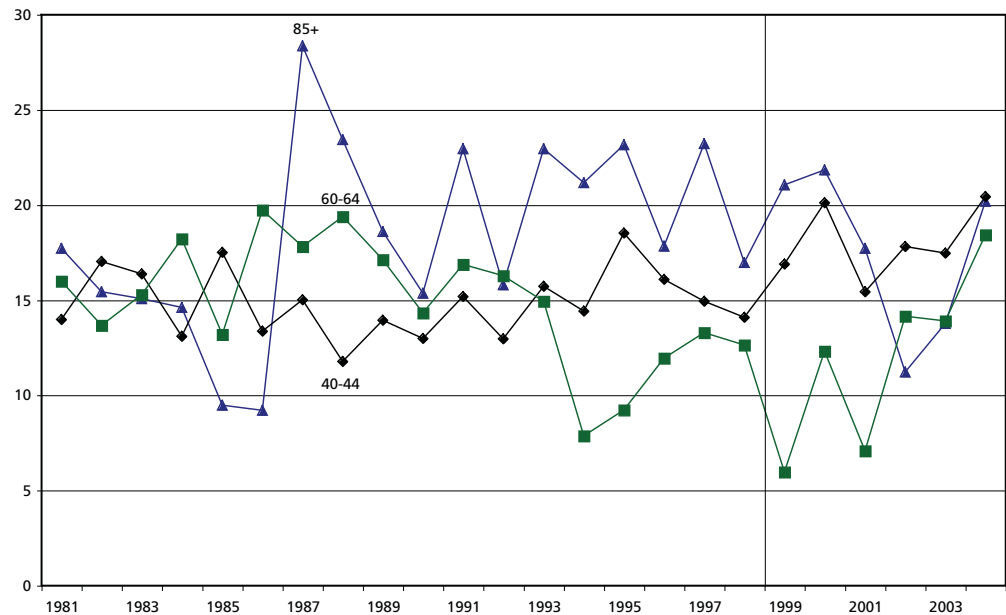
Suicide as a cause of death for Hoosiers ages 25-34 and 35-44 ranks as the second and fourth leading cause of death, respectively. The most likely method for both age groups was gun, followed by suffocation/hanging. (The second most common suicide method for other adult age groups was poison.) An observation of the suicide by poison and accidental overdoses/poisonings for many age groups finds them to be nearly identical in

**Figure 27.** Suicide rates (age-adjusted), Indiana and United States, 1981-2004





**Figure 28.** Suicide rates (crude, not age-adjusted) for the three highest age groups, Indiana, 1981-2004



terms of the likelihood of drugs and even the likelihood specifically of narcotics.

Suicide ranks as the sixth leading cause of death for those ages 45-64 and the primary method is again, firearms for those 45-54 (55 percent) and 55-64 (58 percent) and overdoses/poisonings (30 percent for those 45-54 and 20 percent for those 55-64). The poisonings include drug overdoses and gases. Hanging/suffocation is the third most common method for this age group, becoming more common for the older age category of 55-64. Suicide does not rank as one of the ten leading causes of deaths for those in the age categories 65 and over in Indiana—not because the rate of suicide is low for this age group, but, because of their age, many other natural causes are even more likely.

### *Suicide by age: An analysis of rates*

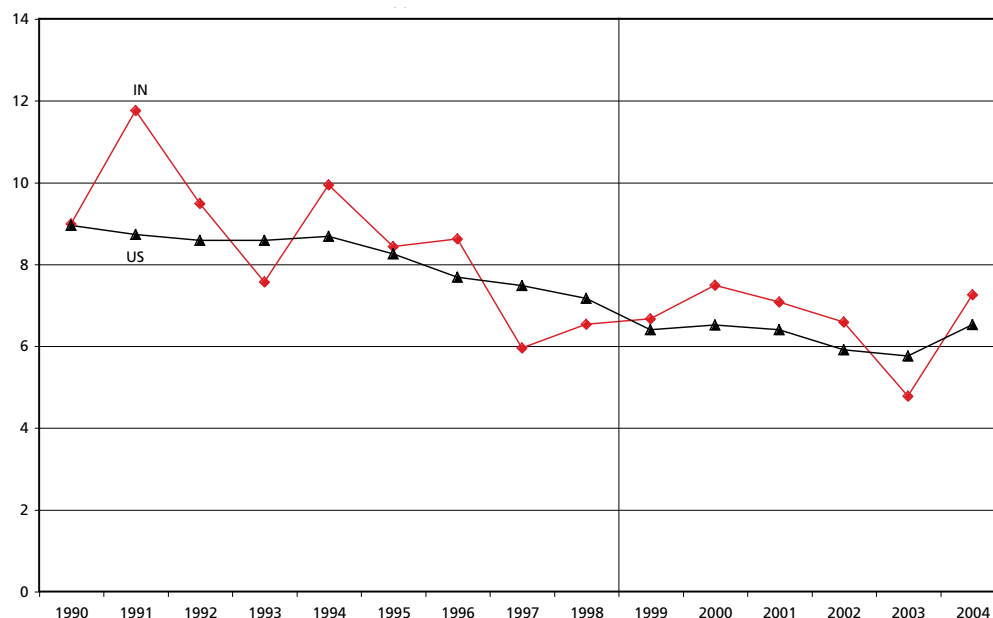
Suicide variation as presented as a leading cause of death warrants more detailed analysis of the patterns within some of the leading causes broad age categories because the most pronounced

demographic variation in suicide rates occurs for age. Although the overall suicide rate is approximately 11 per 100,000 Hoosiers, the suicide rate for some age groups is two times the average. As shown in Figure 28, in 2004, overall suicide rates are highest for the Indiana age groups 40-44 (20), 85 and over (20), and 60-64 (18). Fortunately, there are very few suicides in the age group 14 and under, but the age category of 15-19 had a suicide rate of 8.

Unfortunately, there are varying definitions of teenage in the literature so comparisons can be difficult. Using the standard age categories for causes of death and population distributions (from the Census Bureau) we find that 15-19 year-olds in Indiana represent 7.5 percent of our total population and they account for 5 percent of all suicides, so technically, they are underrepresented as suicide victims regarding their proportion of the population. Using a broader definition of teenager (ages 13-19), Figure 29 illustrates that teenage suicides from 1990-2004 in Indiana have ranged from a high rate of



**Figure 29.** Suicide rates (crude, not age-adjusted) among teenagers (13-19), Indiana and U.S., 1990-2004



nearly 12 in 1991, generally declining with a few spikes until 1997, increasing again each year thereafter through 2000 and declining to an all-time low for this age group, just under 5, by 2003.

Unfortunately, 2004 saw a significant increase in the rate of Indiana teenage suicides, just over 7—an increase of over 50 percent in one year. A recent study by the Indiana Youth Institute found that suicide has now surpassed homicide as the second leading cause of death for teenagers ages 15-19 (Indiana Youth Institute, 2007). Thus, the three top causes of death for Indiana teens are the three external causes of death categories—accidents, suicide, and homicide. National teenage suicide rates increased 9 percent from 2003 to 2004, not nearly the increase of the Indiana rate.

Beginning with the age category 20-24 and continuing through the category of 65-69, each age category accounts for more suicides than their proportion of the population would predict. While there is a decline in suicides for the 70-79 age category and there are fewer suicides

for this group than would be predicted by their population, the suicides of those 80 and over far outweigh their proportion of the population with those rates two times as high as the population statistics would predict. Those Hoosiers age 80 and over reflect 1.5 percent of our population but account for 3 percent of all suicides. No other age group comes close to exceeding their population representation at this level.<sup>29</sup> The current highest suicide rates for U.S. citizens overall are for the age categories of 45-49, 80-84, 85+, 50-54, and 75-79.

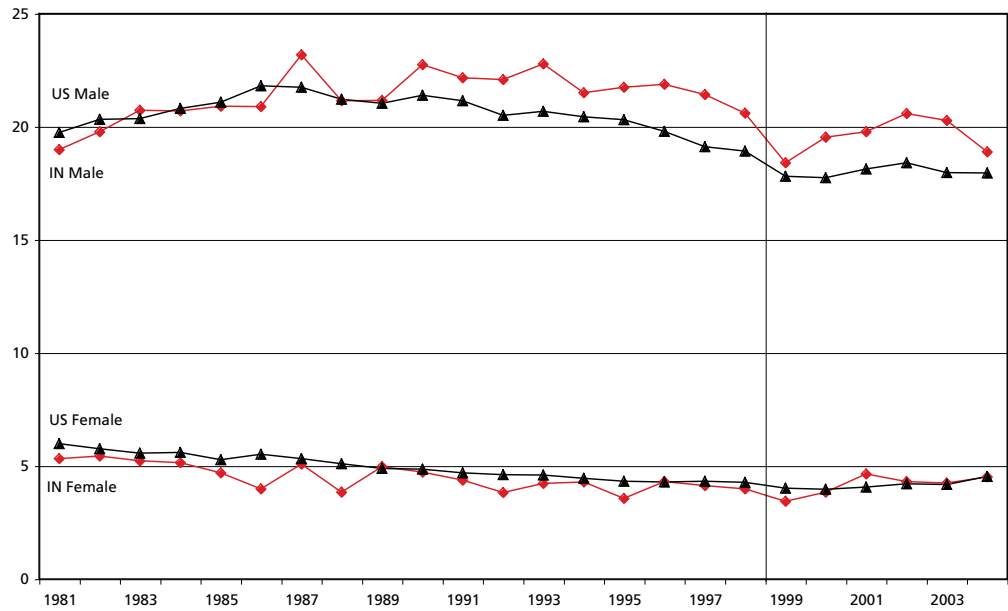
### *Suicides by gender*

Of the 704 Indiana suicides in 2004, males accounted for approximately 80 percent of these deaths. Suicide rates for Indiana males are currently four times the rate of female suicides. The Indiana male suicide rate is currently 18 (2004) and for females the rate is approximately 5 per 100,000 Indiana females. Females constituted as much as 24 percent of the Indiana suicides in 1982 and were as low as 15 percent of all suicides in 1995. Some predicted that

<sup>29</sup>Indiana age distribution statistics retrieved May 30, 2007, from [www.factfinder.census.gov](http://www.factfinder.census.gov) and reflect 2000 Census data.



**Figure 30.** Suicide rates (age-adjusted) by gender, Indiana and United States, 1981-2004



greater social equality for women might mean a greater participation by women in crime, including lethal violence, homicide, and suicide—it has not been the case that women have gained in their proportion of suicide over time (nor homicide as we will see below).

As noted by Figure 30, the Indiana rates mirror similar national gender trends in suicide, although Indiana male suicide rates have remained above U.S.

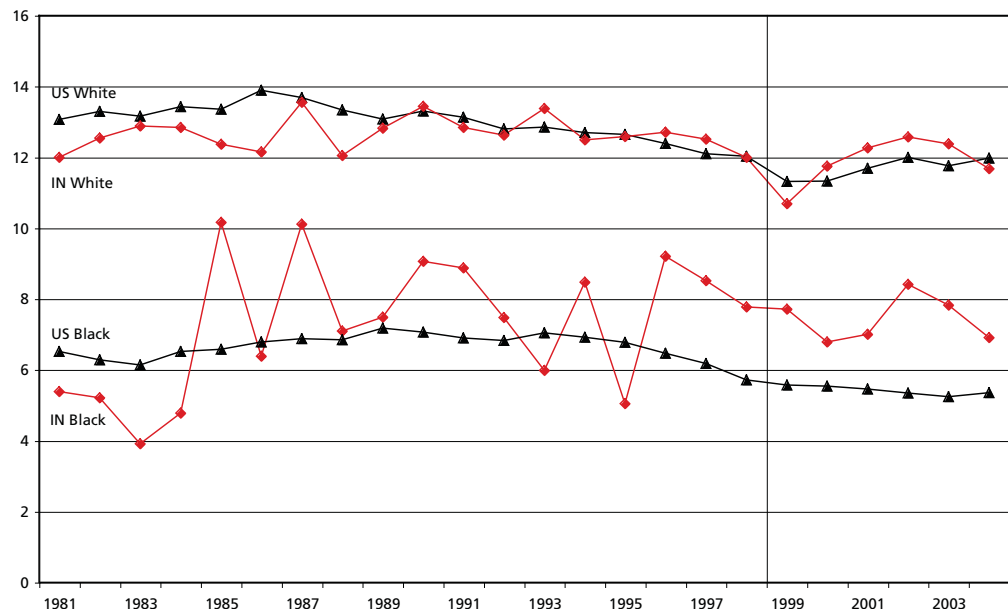
rates since 1989.

### *Suicides by race*

Nationally, whites constitute 80 percent of the population and blacks, 13 percent. In Indiana, whites constitute 89 percent of the population and blacks 9 percent.<sup>30</sup>

Nationally, whites are overrepresented as suicide victims as they account for 90 percent of all suicides. However, in Indiana, whites account for 93 percent of

**Figure 31.** Suicide rates (age-adjusted) by race, Indiana and United States, 1981-2004



<sup>30</sup>Race statistics reflect 2000 Census data. Retrieved March 5, 2007, from [www.quickfacts.census.gov/qfd/states](http://www.quickfacts.census.gov/qfd/states)



suicides, a trend relatively stable since 1981 and moderately higher than the Indiana race population distribution. As illustrated by Figure 31, the suicide rate for blacks in Indiana exceeds the national black suicide rate. Although blacks are underrepresented as suicide victims in Indiana (they constitute 9 percent of the population and 6 percent of suicides), their rates of suicide are significantly higher than the overall U.S. black suicide rate.<sup>31</sup> Further exploration (e.g., which black age groups and/or gender are contributing to this pattern) of this finding will be conducted in the forthcoming issue brief focusing specifically on race.

### *Suicides by method*

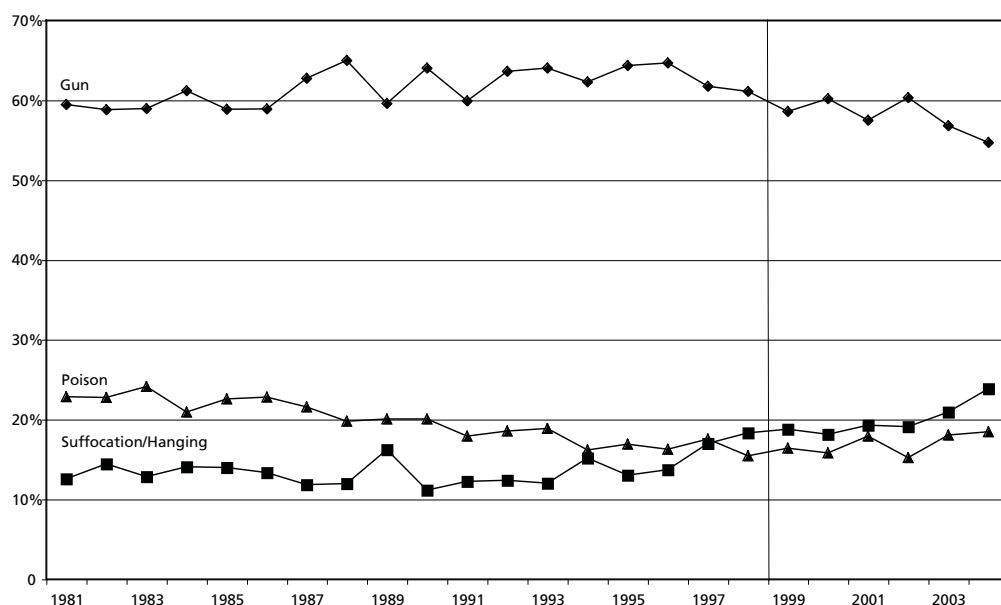
As of 2004, guns are the method of choice for approximately 52 percent of persons in the United States and 55 percent in Indiana. This reflects a significant trend towards a smaller proportion of those who commit suicide using a firearm. In years past as many as 61 percent of all U.S. suicides (1990, 1993) were committed with a firearm, and as many as 65 percent of Hoosier suicides (1988, 1996) were committed with a

firearm. As illustrated by Figure 32, poison/overdosing as a suicide method has declined in Indiana since 1981 but has increased recently. The likelihood that someone in Indiana chooses suffocation/hanging as their suicide method has increased from 13 percent in 1981 to 24 percent by 2004. Ninety-seven percent of all Indiana suicides are committed by guns, hanging, or overdosing.

The primary source of the 639 gun deaths in Indiana in 2004 was suicide (385 gun suicides), followed by homicide (224 gun suicides) and very distantly, gun accidents (14 gun accidents). So, although suicide rates in Indiana are fairly stable over the past few years, the proportion of those suicides that are committed with a gun is declining.

Comparisons of the 2004 overall Indiana suicide rate of 11 to those of other states finds that Indiana ranks 33rd out of 50. The states with the highest suicide rates include Alaska (24), Montana (19), Nevada (19), New Mexico (19), and Wyoming (17). Those states with the lowest suicide rates include Rhode Island (8), New Jersey (7), Massachusetts (7),

**Figure 32. Suicide rates (percent of suicides) by method, Indiana, 1981-2004**



<sup>31</sup>A future research brief providing a detailed analysis of homicides, suicides, and accidents by race is forthcoming.

<sup>32</sup>American Association of Suicidology. U.S.A Suicide: 2004 Official Final Data. December 15, 2006. Prepared by John L. McIntosh.



New York (6), and the District of Columbia (6).<sup>32</sup>

## Overall homicide patterns and trends

Historically, the homicide rate in Indiana has been below the U.S. rate. However, as illustrated by Figure 33, the Indiana homicide rate has nearly converged with national rates and as of 2004, with 332 homicides, the Indiana homicide rate is 5.3, and the national rate is 5.9. While U.S. homicide rates have declined dramatically (peaking at just under 10 in 1981 and 1991 and declining to 6 by 2004), Figure 33 shows that the convergence with Indiana homicide rates is due to much smaller declines in Indiana homicides when the rates peaked at 7.5 in 1994.<sup>33</sup>

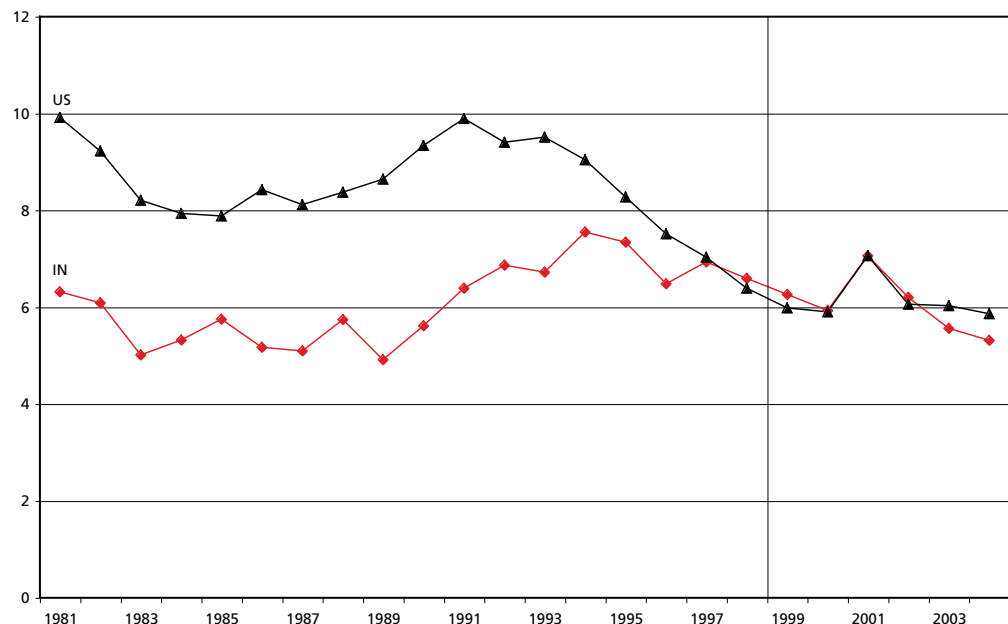
### Homicide by age

All ages combined, homicide is not in the top ten leading causes of death in Indiana or across the United States (homicide was in the top ten national causes of death when rates were peaking in the early 1980s and 1990s). However, it is one of the top ten leading causes of death for several

Indiana age categories. Homicide does not officially rank as one of the ten leading causes of death for infants in Indiana, but some research suggests that there are likely hidden homicides for infants (0-1) in the unintentional injury category (Overpeck, Brenner, Trumble, Smith, MacDorman, & Berendes, 1999). These homicides may be coded as accidents, unknown cause of death, or even SIDS deaths. Recent research has pointed to the likely significant annual number of homicides that are misidentified as natural deaths (Quinet, 2007 forthcoming).

Homicide ranks as the third leading cause of death for ages 1-4 and analysis of the specifics of the method of homicide for the 12 deaths in 2004 finds the most common source to be unspecified (42 percent). One can speculate that some of these cases are shaken baby syndrome or some other hidden form of injury and these results are not available until after a death certificate is issued. Unlike other external death categories where there is greater specificity of the type of homicide, this pattern of a lack of specificity is also a national trend. The second most likely

**Figure 33.** Homicide rates (age-adjusted), Indiana and United States, 1981-2004



<sup>33</sup>Homicide data from the Centers for Disease Control (CDC) use a medical definition of homicide and thus includes homicides that result from terrorism (e.g., September 11, 2001). Other sources of homicide data (e.g., FBI Uniform Crime Reports) use a legal definition of homicide and omit homicides due to acts of terrorism. Please use caution when comparing rates of homicide using medical versus legal definitions of homicide.



source of homicide for toddlers is *other* (8 percent). Thus, we can say relatively little about the exact method of the homicides in this age group, at least from death certificates.

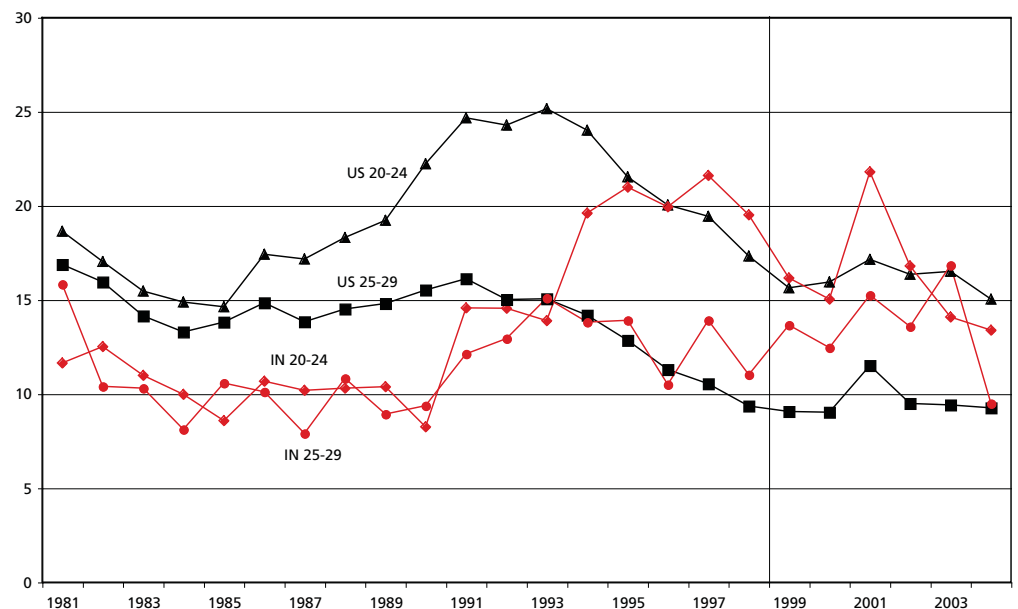
Homicide is the seventh leading cause of death for ages 5-9. It should be noted that there were only 2 homicides for this group in 2004. One was the result of a fire and the other was unspecified. Homicide becomes more common for those ages 10-14 and is the fourth leading cause of death. Of the 8 homicides in 2004 for this group, 6 were a result of gun homicides and 2 were suffocation/stranglings.

As noted previously, the external death categories are very dominant as causes of death for the age category 15-24. Accidents were first, homicides second, and suicides third as the leading causes of death. These homicides (90 in 2004) were, overwhelmingly, more than any other age group, likely to be firearm homicides (89 percent) following a similar finding for the United States (81 percent). The remaining methods varied and included knives, blunt objects, other, overdose/poisoning, and suffocation.

Homicides for 25-34 year-olds are the fourth leading cause of death. Again, although not quite as pronounced, most of these homicides (77 in 2004) were gun homicides (Indiana 79 percent, United States 78 percent). The other primary category was unspecified (10 percent). For 35-44 year-olds, homicide drops to the sixth leading cause of death. These 55 homicide deaths in 2004 were primarily gun homicides (66 percent). Next most likely for this age group was homicide by cut/pierce, typically knives. Homicide is not one of the ten leading causes of death for Hoosiers ages 45 and over.

The leading causes of death paint one picture of the occurrence of homicide but an analysis of homicide rates for narrower age categories can shed additional light on those most at-risk. Figure 34 shows that the homicide risk is much higher for some age categories than others. In Indiana as of 2004, the most at-risk groups for homicide are the age categories 20-24 followed by 25-29 year-olds. The same age categories are most at-risk nationally. By far, the most at-risk homicide victimization age

**Figure 34.** Homicide rates (crude, not age-adjusted) by two highest age groups, Indiana and United States, 1981-2004







categories are those encompassing 15-34 years of age. Comparatively, the lowest risk age category is 5-9 years of age. Sadly, the homicide risk for all children is not as low. Indiana's youngest children, ages 0-4, have a homicide rate of nearly 5, higher than any age category over 50 years of age. The Indiana infant homicide rate of 4.7 can be compared to the significantly lower national rate for this age group of 3.5.<sup>34</sup>

### *Homicide by gender*

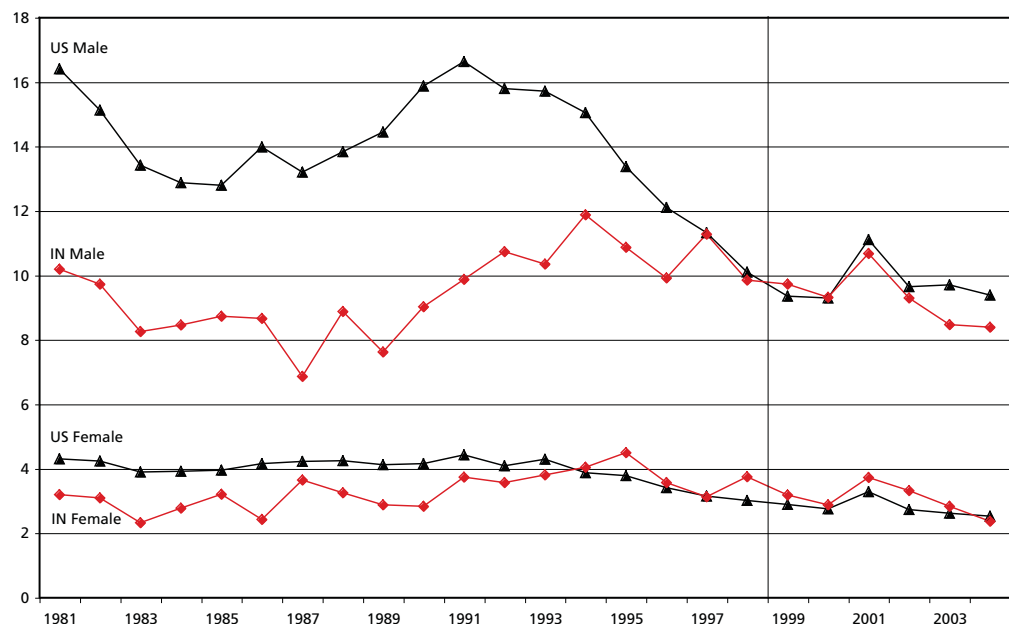
Figure 35 shows that Indiana males, like U.S. males, have homicide rates that are 3.5 times higher than Indiana females. Figure 35 also illustrates that male rates peaked nationally about 1991 and peaked somewhat later, in 1994, in Indiana. It is fairly typical that Indiana lags behind the nation in overall homicide trends. Research suggests that the steep declines in male homicide deaths were primarily a result of declines in gun homicides for the age group 15-24 and mostly for minority males (Fox, Levin, & Quinet, 2007). Homicide rates for other groups remained much more stable throughout the peak years and

consequently did not see the rapid declines of recent years.

### *Homicide by race*

Significant race differences for homicide also exist, both nationally and in Indiana. These differences are even more extreme in Indiana when by 2004, the homicide rate for blacks (30 homicides per 100,000) was more than *ten times higher* than the rate for whites (3). Nationally, homicide rates are five times higher for blacks (20) than for whites (4). Figure 36 illustrates the gap between Indiana blacks and whites and shows that the homicide rate for Indiana blacks is now significantly higher than for U.S. blacks.<sup>35</sup> Homicide is the leading cause of death in Indiana for black males, ages 15-34 and these homicides are much more likely than other homicides to involve a firearm. Firearms are the method of homicide in 93 percent of black male homicide deaths ages 15-24 in Indiana (and 93 percent nationally) and 88 percent of homicide deaths for those Indiana black males ages 25-34 (84 percent nationally).

**Figure 35.** Homicides rates (age-adjusted) by gender, Indiana and United States, 1981-2004



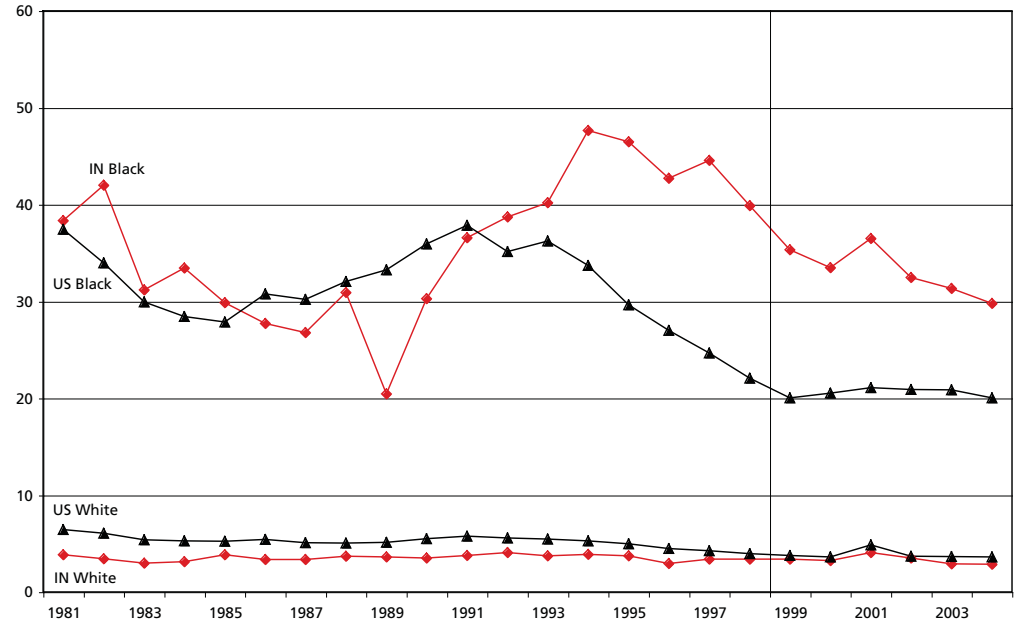
<sup>34</sup>Interaction effects (e.g., age by race) will be explored further in a forthcoming research brief.

<sup>35</sup>These significant race patterns will be explored further in a forthcoming research brief.





**Figure 36. Homicide rates (age-adjusted) by rates, Indiana and United States, 1981-2004**

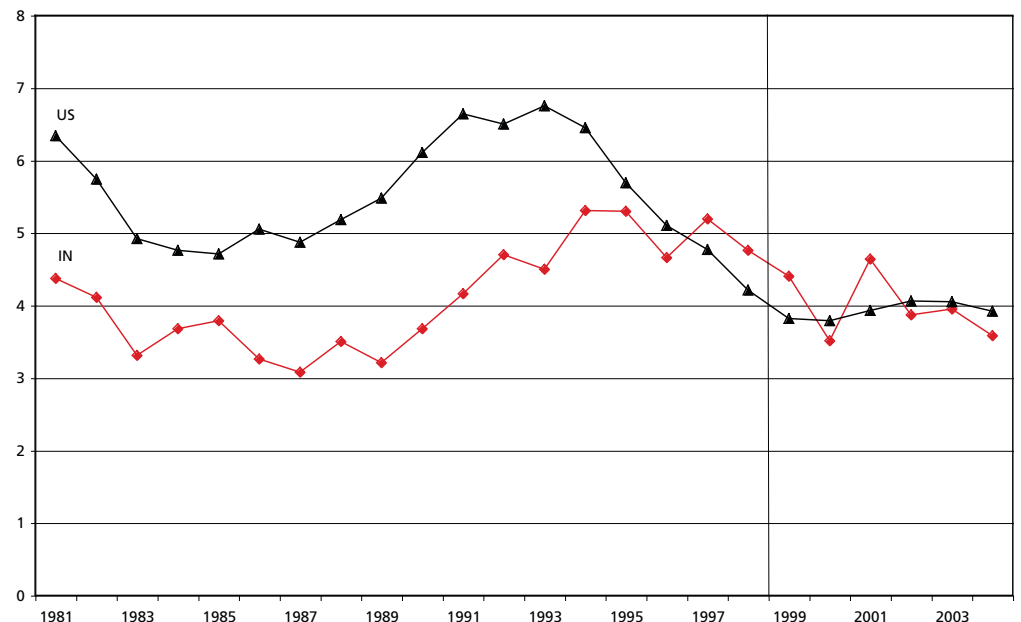


The declines in the numbers and rates of homicides both nationally and in Indiana are due primarily to declines in gun homicides. In 2004, 224 Hoosiers were killed in firearm homicides, a significant decline since the peak 1995 number of 323. Guns were the weapon in 67 percent of all Indiana homicides.

As of 2004, Indiana's homicide rate (5) ranked 25th out of all 50 states and the

District of Columbia. States with the highest homicide rates include Louisiana (13), Maryland (10), Mississippi (10), New Mexico (9), and Arizona (9).<sup>36</sup> States with the lowest homicide rates are Utah (2), North Dakota (2), New Hampshire (2), Vermont (2), and Maine (2). As of 2004, Indiana's neighboring states have homicide rates that are sometimes higher and sometimes lower than Indiana. Illinois (7), Michigan (7), and Kentucky (5)

**Figure 37. Homicide death rates (age-adjusted) by firearm, Indiana and United States, 1981-2004**



<sup>36</sup>The District of Columbia actually tops the list with a homicide rate of 31/100,000. Louisiana rates are expected to increase dramatically as a result of extraordinarily high homicide rates in New Orleans after Hurricane Katrina in 2005.



# INTERVENTION AND PREVENTION OF EXTERNAL CAUSES OF DEATH

all had higher homicide rates than Indiana, and Ohio (5) ranked just below Indiana in the 26th slot.

Blanket strategies that target *everyone* in a population—known as universal preventive measures—have been used to effectively reduce some types of accidents, suicides and homicides (Mercy & Hammond, 1999). Examples of these strategies are found in traffic safety and include laws that reduce speed and require seatbelts and helmets. These universal measures would not be targeted at high risk groups or individuals. Other strategies—selective preventive measures—are more focused on groups who have an elevated risk of various accidents, suicides, and homicides. Examples of these sorts of strategies would include restrictions for teenage driving and installing stair railings in the homes of elderly persons. Finally, indicated preventive measures target those *persons* whose risk is elevated—homicide and assault victims and family members who may want to retaliate, those with previous suicide attempts, individuals with previous drinking and driving offenses or excessive speeding, elderly who have had previous falls in the home, etc. (Gordon, 1983).

The section below discusses additional examples of types of preventive measures for accidents, suicides, and homicides.

## *Accidents and alcohol*

Alcohol and drug use plays a significant role in accidents, suicides, and homicides. According to the Center for Urban Policy and the Environment, in Indiana, alcohol is a factor in approximately 30 percent of all crashes and 39 percent of fatal motor vehicle

crashes (Nunn, 2007). In addition to driving impairment, alcohol is also related to all of the other types of most frequent accidents. One study found that 32 percent of falls, 42 percent of fatal fires/burns, 34 percent of fatal drownings, and 29 percent of fatal overdoses/poisonings involved victim alcohol use (Gordon, Smith, Branas, & Miller, 1999). These are underestimates as they involve only estimates of alcohol use (not drugs) and only for the victim (they would not include an intoxicated driver who survived a crash they caused, an intoxicated homicide offender, or an intoxicated smoker who starts but survives a fire that claims other victims).

Research has clearly linked the role of alcohol in fatal injuries (Chen, Baker, & Li, 2005). All types of fatal injuries are associated with even moderate drinking (defined as 12 or more drinks per year) including motor vehicle injuries, falls, overdoses/poisonings, drownings, and fire. The findings of increased risk of fatal accidents when alcohol is involved was strongest for drowning (Chen et al., 2005). Researchers from Johns Hopkins also recently reported an increase in the risk of fatal fall, motor vehicle crashes, and suicides for elderly who have a history of alcohol consumption. Alcohol use was associated with as much as a 70 percent increase in risk (Sorock, Chen, Gonzalgo, & Parker, 2006).

## *Other accident prevention strategies*

Motor vehicle fatalities can be reduced (and have been) through the use of air bags, collapsible steering columns, padded dashboards, and other vehicle safety improvements. Other universal strategies include tougher Driving Under the Influence (DUI) laws and lowered



Blood Alcohol Content (BAC) tolerance for drivers. More targeted strategies limit the number of hours delivery and truck drivers can drive.

Poisonings are largely a result of overdoses of narcotics and other unspecified drugs in Indiana so obviously drug use plays a significant role in overdoses, but as noted above, those who overdose were also likely to be under the influence of alcohol (Chen et al., 2005). Prevention measures would include stricter access to medications, especially narcotics as they are the primary identifiable overdose substance in Indiana. Parents and other family members should restrict access to their medications so that teens or other family members do not take them recreationally. Some unknown amount of accidental overdoses/poisonings may not be accidents at all; they may have been suicides.

Fatal falls occur mostly among the elderly. The installation of stair railings and banisters and better lighting may help to prevent some of these fatal accidents, although, those fatal falls with any detail from the death certificates showed that the falls were occurring on the same level (not on stairs) so hand railings throughout houses may help to prevent these falls. Intervention targeted at those elders who have fallen previously would be most effective.

Since many deadly falls occur in nursing homes and are actually more likely in places that use physical restraints, less use of physical restraints in nursing homes could lower fatal fall rates. We should also encourage the use of motion sensitive detection devices to alert staff or others to elderly persons' actions; these could be used institutionally as well as at home (some elderly do have devices

that they wear that allow them to summon help). Some very preliminary research also suggests the possible use of protective hip pads.<sup>37</sup>

Fatal fires/burns often occur in residences without smoke detectors, or at least without functional smoke detectors. In addition to smoke and heat detection alarms, family plans for evacuation in the event of a fire could save lives. Smoking also increases the likelihood of a fire in the home and persons who smoke while under the influence of drugs or alcohol are more likely to mismanage their cigarettes and increase the likelihood of a fire.

Drownings can be prevented by implementing several, sometimes age-specific strategies including secured/alarmed swimming pools, learning to swim, learning CPR, the supervision of infants when they bathe, and the use of life vests on boats and boaters. Younger children as well as teens and young adults often drown in freshwater sources and these places cannot be secured like the family pool. Prevention of these drownings will require more parental supervision, mandatory swimming lessons, and education about the risks. Obviously the use of alcohol on boats and while swimming is a bad idea.

Encouraging Hoosiers to think about their home as a place to increase safety could reduce tragic accidents.

### ***Suicide prevention***

These findings suggest several suicide (and attempted suicide) prevention strategies, many of which are already being implemented across Indiana. These strategies should include school and community-based programs targeted at reducing alcohol and substance abuse

<sup>37</sup>Falls, poisonings pose major threats at home, published online October 2, 2002, accessed June 4, 2007, at [www.webmd.com/healthy-aging/news/20021002/home-injuries-rising-often-deadly](http://www.webmd.com/healthy-aging/news/20021002/home-injuries-rising-often-deadly)



(known risk factors for suicide), greater access to mental health and alcohol and substance abuse treatment, counseling and other health and social services for the homeless, faith-based programs to reach out to isolated elders, support for victims of domestic violence, better primary care screening of depression in the elderly, more effective pain treatment, and pharmaceutical maintenance for those suffering from psychiatric disorders (Knox, Conwell, & Caine, 2004).

Research finds alcohol use to be a factor in at least 23 percent of suicides (Smith et al., 1999). Others have found similar rates of intoxication (drugs and alcohol) for suicide victims but also note that toxicology screens are performed on less than half of all suicide deaths (Shen, Hackworth, McCabe, Lovett, Aumage, O'Neil, & Bull, 2006). Alcohol use was associated with increased risk of *all forms/methods of suicide*.

Targeting high-risk groups such as the elderly, adolescents who may have other risk factors, prisoners (both in institutions and on parole), and the homeless will be a more effective and efficient use of anti-suicide and other anti-violence resources. Several researchers have also found that programs aimed at reducing homicidal violence may also reduce suicide (Knox et al., 2004, and National Strategy for Suicide Prevention).

A number of very active suicide and violence prevention programs are underway in Indiana and given the elevated suicide rate in Indiana, these programs as well as new programs should be as much, if not more (given the number of deaths), a priority for funding as programs to combat homicide.

### ***Homicide prevention***

Research suggests that states with lower murder rates also have lower rates of many other causes of death (e.g., heart disease, cancer, accidents, infant mortality, motor vehicle accidents) and higher levels of many quality of life indicators (education, literacy, school attendance, voting). States with low murder rates also have lower rates of most other serious crimes, lower rates of imprisonment, lower teenage pregnancy rates, fewer bankruptcies, and lower smoking rates (Frymier & Roaden, 2005). Clearly, many of the conditions that are associated with higher homicide rates are also related to other causes of death and overall quality of life.

We know that drugs and alcohol play a role both in homicide offending and victimization. One study found 32 percent of homicide victims under the influence of alcohol (this study did not focus on offender intoxication) (Smith et al, 1999). But there is other extensive research in criminal justice on the likelihood of drug or alcohol use and offending. Alcohol is involved in as many as two-thirds of assaults and homicides (including both offender and victim) (Greenfield, 1998).

A number of innovative programs to combat homicide exist in Indiana and across the United States. The recent upswing in homicide rates suggests a greater focus is warranted. But this should not be a blanket focus. Each jurisdiction should disaggregate their homicides to determine what type of homicides are being committed—gang, domestic, felony, unknown? All of these will necessitate different strategies.

Finally, as illustrated in the present research, death by homicide is ten times more likely for blacks in Indiana and black homicide rates in Indiana exceed



national homicide rates for blacks.

Homicide and violence prevention monies should be carefully targeted at the places and people who need them the most.

Accident, suicide, and homicide rates are largely dependent on age, race, and gender with categorical variation between

external death types. Some specific age groups within race categories have extraordinarily high levels of homicide. Other race and age categories have highest rates of suicide, and certain types of accidents happen to different age, race, and gender categories. Clearly compassion drives our prevention and



# RANKING THE EXTERNAL CAUSES OF DEATH FOR HOOSIERS: BY AGE, GENDER, AND RACE

What is the ranking of the specific external causes of death for the various age categories? Table 1 presents the rank order risk of the various accident categories, suicide, and homicide. Clearly the rank order varies significantly by age. For those ages 0-4 and 70+, the most likely external cause of death is the accidental death category of other. This category is very diverse and includes very different accidents depending on age, but includes choking, freezing to death, bee stings, animal attacks, and electrocution. Homicides, motor vehicle traffic, and fire deaths are the next most likely external causes of death for those 0-4. After the 0-4 age category, the most common form of external deaths for most age categories from 5-69 is motor vehicle accidents but in some cases, the deaths due to motor vehicle accidents are equaled or exceeded by suicide deaths. Homicide ranks as second or third for those ages 0-34. An inspection of Table 1 illustrates that there are very different prevention needs for the elderly (e.g., falls and the miscellaneous other category), middle-age Hoosiers (motor vehicle deaths, suicides, and homicides)

and the very young (other accidents, homicides, and motor vehicle deaths).

Likewise the ranking of risk varies by gender and race. Table 2 shows that in 2004, the most likely causes of external death for Indiana males (all ages and races combined) are motor vehicle fatalities, suicides, and other types of accidents. For Indiana females, the rank order of likelihood is other accidents, motor vehicle fatalities, and suicide. For both males and females, drowning was the least common of the eight categories of external death.

A race comparison finds that for Indiana blacks the most common form of external death in 2004 was homicide—accounting for 44 percent of all external deaths. Homicide accounted for only 5 percent of white external deaths. Motor vehicle fatalities claim 17 percent of black external deaths and 30 percent of white external deaths. Suicide accounts for 21 percent of white external deaths and 10 percent of black external deaths. The least likely category of black external death was falls, for whites it was accidental deaths due to drowning.

**Table 1.** External cause of death ranking by age, Indiana, 2004

Cause of Death	00-04	05-09	10-14	15-19	20-29	30-39	40-49	50-59	60-69	70-79	85+	Total
Accident - Motor vehicle	17.1%	48.0%	43.9%	55.9%	39.0%	27.4%	23.8%	30.2%	25.8%	29.4%	9.3%	28.0%
Accident - Overdose/Poisoning	0.0%	0.0%	3.5%	5.7%	10.6%	16.7%	19.1%	16.4%	1.6%	1.5%	1.1%	9.8%
Accident - Fall	2.7%	4.0%	3.5%	1.7%	0.9%	0.9%	2.5%	4.0%	9.3%	18.0%	26.5%	7.7%
Accident - Fire/burn	15.3%	24.0%	3.5%	0.4%	2.5%	2.6%	2.0%	3.4%	2.8%	1.1%	2.5%	2.9%
Accident - Drowning	8.1%	8.0%	3.5%	3.1%	2.3%	1.1%	2.2%	1.6%	2.4%	1.8%	0.7%	2.0%
Accident - Other	38.7%	8.0%	12.3%	4.4%	6.5%	8.8%	11.1%	15.1%	22.6%	34.2%	52.4%	20.2%
Suicide Injury	0.0%	0.0%	15.8%	16.2%	20.5%	28.9%	29.1%	22.5%	31.0%	11.0%	7.0%	20.0%
Homicide Injury	18.0%	8.0%	14.0%	12.7%	17.7%	13.7%	10.1%	6.6%	4.4%	2.9%	0.5%	9.4%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

- Notes:
1. Total includes accidents (ICD-10 Codes: V01-X59, Y40-Y86, Y88), homicides (ICD-10 Codes: X85-Y09, Y87.1, \*U01-\*U02), and suicides (ICD-10 Codes: X60-X84, Y87.0, \*U03).
  2. "Other" consists of all external accidental causes of death other than the five listed and was derived by subtracting the sum of the five specific accidental causes of death from all accidents.
  3. One homicide death is excluded because the age group was "unknown."





While Tables 1 and 2 allow us to see the divergent age, gender, and race external death patterns, we do not know what types of interaction effects may be hidden. For example, exactly which age and gender categories account for most black suicides? Which age and gender categories account for most white accidental overdose deaths? These interaction effects will be the focus of a forthcoming research brief.

### *Implications*

The present research has illustrated that there are a number of high risk age, race, and gender groups for various types of accidents as well as suicide and homicide. These findings should enable practitioners and policymakers to further refine their target groups for accident, suicide, and homicide prevention. The surveillance of external causes of death in Indiana will allow for an evaluation of the efficacy of existing programs and a more thoughtful approach to the development of new programs. Programs that achieve a synergy and prevent more than one type of accident or prevent both homicide and suicide and programs that target the most high-risk groups will

constitute the most efficient use of increasingly limited resources.

One obvious policy implication generated by the present study is the need for greater detail on Indiana's death certificates. Across many of the categories we see a lack of specificity regarding the exact substance in overdoses (both accidental and intentional), the exact nature of falls, and even the exact circumstances surrounding drowning. The heavy Indiana reliance on the unspecified category in some cause of death types leaves a void for policymakers who hope to intervene regarding specific substances and situations.

Future research should further specify the exact race, age, and gender interaction groups most at risk for dying of external causes of death in Indiana. In addition, research that focuses on child deaths and gun deaths will shed additional light on the exact nature of these deaths as well as the appropriate intervention and prevention strategies. The Indiana Criminal Justice Institute appears to be the key state agency for looking not only at effective criminal justice issues, but more broadly, looking at a larger public safety view of death and violence in Indiana.

**Table 2.** External cause of death ranking by gender and race, Indiana, 2004

Cause of Death	Male	Female	Total	Black	White	Other	Total
Accident - Motor vehicle	28.7%	26.6%	28.0%	17.4%	29.3%	38.2%	28.0%
Accident - Overdose/Poisoning	9.7%	9.8%	9.8%	5.5%	10.4%	2.9%	9.8%
Accident - Fall	6.8%	9.8%	7.7%	2.0%	8.5%	2.9%	7.7%
Accident - Fire/burn	2.6%	3.3%	2.9%	3.8%	2.7%	5.9%	2.9%
Accident - Drowning	2.5%	1.1%	2.0%	2.5%	1.9%	5.9%	2.0%
Accident - Other	15.3%	30.4%	20.2%	15.1%	21.0%	8.8%	20.2%
Suicide Injury	23.6%	12.4%	20.0%	9.8%	21.1%	35.3%	20.0%
Homicide Injury	10.8%	6.6%	9.4%	43.8%	5.1%	0.0%	9.4%
<b>Total</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

- Notes: 1. Total includes accidents (ICD-10 Codes: V01-X59, Y40-Y86, Y88), homicides (ICD-10 Codes: X85-Y09, Y87.1, \*U01-\*U02), and suicides (ICD-10 Codes: X60-X84, Y87.0, \*U03).
2. "Other" consists of all external accidental causes of death other than the five listed and was derived by subtracting the sum of the five specific accidental causes of death from all accidents.





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## **APPENDIX A: DATA AND METHODS FOR EXTERNAL CAUSES OF DEATH IN INDIANA**

Mortality data are retrieved from the Center for Disease Control and Prevention's (CDC) Web-based Injury Statistics and Query and Reporting System (WISQARS). This database provides detail on fatal (and non-fatal) injuries including accidents, suicides and homicides. These data are created using the National Center for Health Statistics (NCHS) reports from death certificates for all 50 states and the District of Columbia. For years 1998 and prior, this system used the Ninth Revision of the International Classification of Disease (ICD-9) and from 1999 through 2004, the Tenth Revision of the International Classification of Diseases (ICD-10) was used. In some cases, causes of death were expanded to include more categories so types of deaths that previously may have been grouped are now separated. Based on the level of change from ICD-9 to ICD-10, the National Center for Health Statistics advises caution when conducting trend analysis for years prior to 1999 and the years 1999 and after. Changes observed from 1998 to 1999 in the data could be due to the changing classifications of the causes of death.

As noted, all rates presented above are age-adjusted. This is necessary because certain age groups have a higher propensity for dying from certain types of deaths. Through age-adjusting, according to the CDC, it is possible "to compare injury rates without concern that

differences are because of differences in the age distributions between different populations or for the same population over time."<sup>39</sup> In calculating age-adjusted rates, it is necessary to select a standard population distribution to use for adjusting. Here, the 2000 standard population was used for all rates because it is now considered the default distribution to which to adjust. And, using a single standard population is the recommended practice if comparisons are going to be made across years. However, readers should be reminded again that using this single standard population does not overcome the comparability issues presented by the change in classification of diseases from 1998 to 1999. That is, caution should still be used when comparing pre 1999 rates with post 1998 rates.

There is always a possibility of error when determining the cause of death. These misclassified deaths can include medical murders (committed by hospital staff) that are believed to be natural deaths, homicides of infants that are believed to be SIDS deaths, suicide by vehicle crash that are thought to be accidents, suicides and homicides that are thought to be accidents, suicides coded as accidents to avoid stigma for the family and the deceased. Recent cases have pointed to the need for better training of Indiana's coroners and an expansion of death investigations.

<sup>39</sup>CDC, WISQARS. Retrieved July 3, 2007, from [http://www.cdc.gov/ncipc/wisqars/fatal/help/definitions.htm#age\\_adjusting](http://www.cdc.gov/ncipc/wisqars/fatal/help/definitions.htm#age_adjusting)



**APPENDIX B:  
INTERNATIONAL  
CLASSIFICATION OF  
DISEASE TENTH  
REVISION (ICD-10)  
CODES FOR  
ACCIDENTS, SUICIDES,  
AND HOMICIDES**

**MOTOR VEHICLE TRAFFIC**

V02	Pedestrian injured in collision with two- or three-wheeled motor vehicle
V03	Pedestrian injured in collision with car, pickup truck, or van
V04	Pedestrian injured in collision with heavy transport vehicle or bus
V09.2	Pedestrian injured in traffic accident involving other and unspecified motor vehicles
V12	Pedal cyclist injured in collision with two- or three-wheeled motor vehicle
V13	Pedal cyclist injured in collision with car, pickup truck, or van
V14	Pedal cyclist injured in collision with heavy transport vehicle or bus
V19.4	Driver injured in collision with other and unspecified motor vehicles in traffic accident
V19.5	Passenger injured in collision with other and unspecified motor vehicles in traffic accident
V19.6	Unspecified pedal cyclist injured in collision with other and unspecified motor vehicles in traffic accident
V20	Motorcycle rider injured in collision with pedestrian or animal
V21	Motorcycle rider injured in collision with pedal cycle
V22	Motorcycle rider injured in collision with two- or three-wheeled motor vehicle
V23	Motorcycle rider injured in collision with car, pickup truck, or van
V24	Motorcycle rider injured in collision with heavy transport vehicle or bus
V25	Motorcycle rider injured in collision with railway train or railway vehicle
V25.9	Unspecified motorcycle rider injured in traffic accident
V26	Motorcycle rider injured in collision with other nonmotor vehicle
V27	Motorcycle rider injured in collision with fixed or stationary object
V28	Motorcycle rider injured in noncollision transport accident
V29.4	Driver injured in collision with other and unspecified motor vehicles in traffic accident
V29.5	Passenger injured in collision with other and unspecified motor vehicles in traffic accident
V29.6	Unspecified motorcycle rider injured in collision with other and unspecified motor vehicles in traffic accident
V29.8	Motorcycle rider [any] injured in other specified transport accidents
V29.9	Motorcycle rider [any] injured in unspecified traffic accident
V30	Occupant of three-wheeled motor vehicle injured in collision with pedestrian or animal
V31	Occupant of three-wheeled motor vehicle injured in collision with pedal cycle
V32	Occupant of three-wheeled motor vehicle injured in collision with two- or three-wheeled motor vehicle
V33	Occupant of three-wheeled motor vehicle injured in collision with car, pickup truck, or van
V34	Occupant of three-wheeled motor vehicle injured in collision with heavy transport vehicle or bus
V35	Occupant of three-wheeled motor vehicle injured in collision with railway train or railway vehicle
V36	Occupant of three-wheeled motor vehicle injured in collision with other nonmotor vehicle
V37	Occupant of three-wheeled motor vehicle injured in collision with fixed or stationary object
V38	Occupant of three-wheeled motor vehicle injured in noncollision transport accident
V39.4	Driver injured in collision with other and unspecified motor vehicles in traffic accident
V39.5	Passenger injured in collision with other and unspecified motor vehicles in traffic accident
V39.6	Unspecified occupant of three-wheeled motor vehicle injured in collision with other and unspecified motor vehicles in traffic accident
V39.8	Occupant [any] of three-wheeled motor vehicle injured in other specified transport accidents
V39.9	Occupant [any] of three-wheeled motor vehicle injured in unspecified traffic accident
V40	Car occupant injured in collision with pedestrian or animal
V41	Car occupant injured in collision with pedal cycle
V42	Car occupant injured in collision with two- or three-wheeled motor vehicle
V43	Car occupant injured in collision with car, pickup truck, or van



V44	Car occupant injured in collision with heavy transport vehicle or bus
V45	Car occupant injured in collision with railway train or railway vehicle
V46	Car occupant injured in collision with other nonmotor vehicle
V47	Car occupant injured in collision with fixed or stationary object
V48	Car occupant injured in noncollision transport accident
V49	Car occupant injured in other and unspecified transport accidents
V50	Occupant of pickup truck or van injured in collision with pedestrian or animal
V51	Occupant of pickup truck or van injured in collision with pedal cycle
V52	Occupant of pickup truck or van injured in collision with two- or three-wheeled motor vehicle
V53	Occupant of pickup truck or van injured in collision with car, pickup truck, or van
V54	Occupant of pickup truck or van injured in collision with heavy transport vehicle or bus
V55	Occupant of pickup truck or van injured in collision with railway train or railway vehicle
V56	Occupant of pickup truck or van injured in collision with other nonmotor vehicle
V57	Occupant of pickup truck or van injured in collision with fixed or stationary object
V58	Occupant of pickup truck or van injured in noncollision transport accident
V59	Occupant of pickup truck or van injured in other and unspecified transport accidents
V60	Occupant of heavy transport vehicle injured in collision with pedestrian or animal
V61	Occupant of heavy transport vehicle injured in collision with pedal cycle
V62	Occupant of heavy transport vehicle injured in collision with two- or three-wheeled motor vehicle
V63	Occupant of heavy transport vehicle injured in collision with car, pickup truck, or van
V64	Occupant of heavy transport vehicle injured in collision with heavy transport vehicle or bus
V65	Occupant of heavy transport vehicle injured in collision with railway train or railway vehicle
V66	Occupant of heavy transport vehicle injured in collision with other nonmotor vehicle
V67	Occupant of heavy transport vehicle injured in collision with fixed or stationary object
V68	Occupant of heavy transport vehicle injured in noncollision transport accident
V69	Occupant of heavy transport vehicle injured in other and unspecified transport accidents
V70	Bus occupant injured in collision with pedestrian or animal
V71	Bus occupant injured in collision with pedal cycle
V72	Bus occupant injured in collision with two- or three-wheeled motor vehicle
V73	Bus occupant injured in collision with car, pickup truck, or van
V74	Bus occupant injured in collision with heavy transport vehicle or bus
V75	Bus occupant injured in collision with railway train or railway vehicle
V76	Bus occupant injured in collision with other nonmotor vehicle
V77	Bus occupant injured in collision with fixed or stationary object
V78	Bus occupant injured in noncollision transport accident
V79	Bus occupant injured in other and unspecified transport accidents
V81.1	Occupant of railway train or railway vehicle injured in collision with motor vehicle in traffic accident
V82	Occupant of streetcar injured in transport accident
V83	Occupant of special vehicle mainly used on industrial premises injured in transport accident
V84	Occupant of special vehicle mainly used in agriculture injured in transport accident
V85	Occupant of special construction vehicle injured in transport accident
V86	Occupant of special all-terrain or other motor vehicle designed primarily for off-road use, injured in transport accident
V87	Traffic accident of specified type but victim's mode of transport unknown
V89.2	Person injured in unspecified motor-vehicle accident, traffic



Most motor vehicle/traffic accident categories include additional detail (as relevant to the category): driver injured in nontraffic accident, passenger injured in nontraffic accident, person on outside of vehicle injured in nontraffic accident, unspecified occupant injured in nontraffic accident, driver injured in traffic accident, passenger injured in traffic accident, person on outside of vehicle injured in traffic accident, unspecified occupant injured in traffic accident

#### **FALLS W00-W19**

- W00 Fall on same level involving ice and snow
- W01 Fall on same level from slipping, tripping, and stumbling
- W02 Fall involving ice skates, skis, roller skates, or skateboards
- W03 Other fall on same level due to collision with, or pushing by, another person
- W04 Fall while being carried or supported by other persons
- W05 Fall involving wheelchair
- W06 Fall involving bed
- W07 Fall involving chair
- W08 Fall involving other furniture
- W09 Fall involving playground equipment
- W10 Fall on and from stairs and steps
- W11 Fall on and from ladder
- W12 Fall on and from scaffolding
- W13 Fall from, out of, or through building or structure
- W14 Fall from tree
- W15 Fall from cliff
- W16 Diving or jumping into water causing injury other than drowning or submersion
- W17 Other fall from one level to another
- W18 Other fall on same level
- W19 Unspecified fall

#### **DROWNING W65-W74**

- W65 Drowning and submersion while in bathtub
- W66 Drowning and submersion following fall into bathtub
- W67 Drowning and submersion while in swimming pool
- W68 Drowning and submersion following fall into swimming pool
- W69 Drowning and submersion while in natural water
- W70 Drowning and submersion following fall into natural water
- W73 Other specified drowning and submersion
- W74 Unspecified drowning and submersion

#### **FIRE/BURN X00-X19**

- X01 Exposure to uncontrolled fire, not in building or structure
- X02 Exposure to controlled fire in building or structure
- X03 Exposure to controlled fire, not in building or structure
- X04 Exposure to ignition of highly flammable material
- X05 Exposure to ignition or melting of nightwear
- X06 Exposure to ignition or melting of other clothing and apparel
- X08 Exposure to other specified smoke, fire, and flames
- X09 Exposure to unspecified smoke, fire, and flames
- X10 Contact with hot drinks, food, fats, and cooking oils
- X11 Contact with hot tap water
- X12 Contact with other hot fluids
- X13 Contact with steam and hot vapors



- X14 Contact with hot air and gases
- X15 Contact with hot household appliances
- X16 Contact with hot heating appliances, radiators, and pipes
- X17 Contact with hot engines, machinery, and tools
- X18 Contact with other hot metals
- X19 Contact with other and unspecified heat and hot substances

#### **POISON X40-49, W32-34**

- X40 Accidental overdose/poisoning by and exposure to nonopioid analgesics, antipyretics, and antirheumatics
- X41 Accidental overdose/poisoning by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism, and psychotropic drugs, not elsewhere classified
- X42 Accidental overdose/poisoning by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified
- X43 Accidental overdoses/poisoning by and exposure to other drugs acting on the autonomic nervous system
- X44 Accidental overdose/poisoning by and exposure to other and unspecified drugs, medicaments, and biological substances
- X45 Accidental overdose/poisoning by and exposure to alcohol
- X46 Accidental overdose/poisoning by and exposure to organic solvents and halogenated hydrocarbons and their vapors
- X47 Accidental overdose/poisoning by and exposure to other gases and vapors
- X48 Accidental overdose/poisoning by and exposure to pesticides
- X49 Accidental overdose/poisoning by and exposure to other and unspecified chemicals and noxious substances

#### **ACCIDENTAL FIREARMS W32-W34**

- W32 Handgun discharge
- W33 Rifle, shotgun, and larger firearm discharge
- W34 Discharge from other and unspecified firearms

#### **SUICIDE X60-X84, Y87, U03**

- X60 Intentional self-poisoning (suicide) by and exposure to nonopioid analgesics, antipyretics, and antirheumatics
- X61 Intentional self-poisoning (suicide) by and exposure to antiepileptic, sedative-hypnotic, antiparkinsonism, and psychotropic drugs, not elsewhere classified
- X62 Intentional self-poisoning (suicide) by and exposure to narcotics and psychodysleptics [hallucinogens], not elsewhere classified
- X63 Intentional self-poisoning (suicide) by and exposure to other drugs acting on the autonomic nervous system
- X64 Intentional self-poisoning (suicide) by and exposure to other and unspecified drugs, medicaments, and biological substances
- X65 Intentional self-poisoning (suicide) by and exposure to alcohol
- X66 Intentional self-poisoning (suicide) by and exposure to organic solvents and halogenated hydrocarbons and their vapors
- X67 Intentional self-poisoning (suicide) by and exposure to other gases and vapors
- X68 Intentional self-poisoning (suicide) by and exposure to pesticides
- X69 Intentional self-poisoning (suicide) by and exposure to other and unspecified chemicals and noxious substances
- X70 Intentional self harm (suicide) by hanging, strangulation, and suffocation
- X71 Intentional self harm (suicide) by drowning and submersion
- X72 Intentional self harm (suicide) by handgun discharge
- X73 Intentional self harm (suicide) by rifle, shotgun, and larger firearm discharge





X74 Intentional self harm (suicide) by other and unspecified firearm discharge  
X75 Intentional self harm (suicide) by explosive material  
X76 Intentional self harm (suicide) by smoke, fire, and flames  
X77 Intentional self harm (suicide) by steam, hot vapors, and hot objects  
X78 Intentional self harm (suicide) by sharp object  
X79 Intentional self harm (suicide) by blunt object  
X80 Intentional self harm (suicide) by jumping from a high place  
X81 Intentional self harm (suicide) by jumping or lying before moving object  
X82 Intentional self harm (suicide) by crashing of motor vehicle  
X83 Intentional self harm (suicide) by other specified means  
X84 Intentional self harm (suicide) by unspecified means  
Y87 Sequelae of intentional self harm, assault, and events of undetermined intent  
U03 Terrorism (suicide)

**HOMICIDE X85-X99, Y00-Y08,Y87.1,U01,U02**

X85 Assault (homicide) by drugs, medicaments, and biological substances  
X86 Assault (homicide) by corrosive substance  
X87 Assault (homicide) by pesticides  
X88 Assault (homicide) by gases and vapors  
X89 Assault (homicide) by other specified chemicals and noxious substances  
X90 Assault (homicide) by unspecified chemical or noxious substance  
X91 Assault (homicide) by hanging, strangulation, and suffocation  
X92 Assault (homicide) by drowning and submersion  
X93 Assault (homicide) by handgun discharge  
X94 Assault (homicide) by rifle, shotgun, and larger firearm discharge  
X95 Assault (homicide) by other and unspecified firearm discharge  
X96 Assault (homicide) by explosive material  
X97 Assault (homicide) by smoke, fire, and flames  
X98 Assault (homicide) by steam, hot vapors, and hot objects  
X99 Assault (homicide) by sharp object  
Y00 Assault (homicide) by blunt object  
Y01 Assault (homicide) by pushing from high place  
Y02 Assault (homicide) by pushing or placing victim before moving object  
Y03 Assault (homicide) by crashing of motor vehicle  
Y04 Assault (homicide) by bodily force  
Y05 Sexual assault (homicide) by bodily force  
Y06 Neglect and abandonment  
Y07 Other maltreatment syndromes  
Y08 Assault (homicide) by other specified means  
Y09 Assault (homicide) by unspecified means  
Y87.1 Sequelae of assault  
U01 Terrorism (homicide)  
U02 Sequelae of terrorism