*Figure 1-A Components of Total Economic Costs*

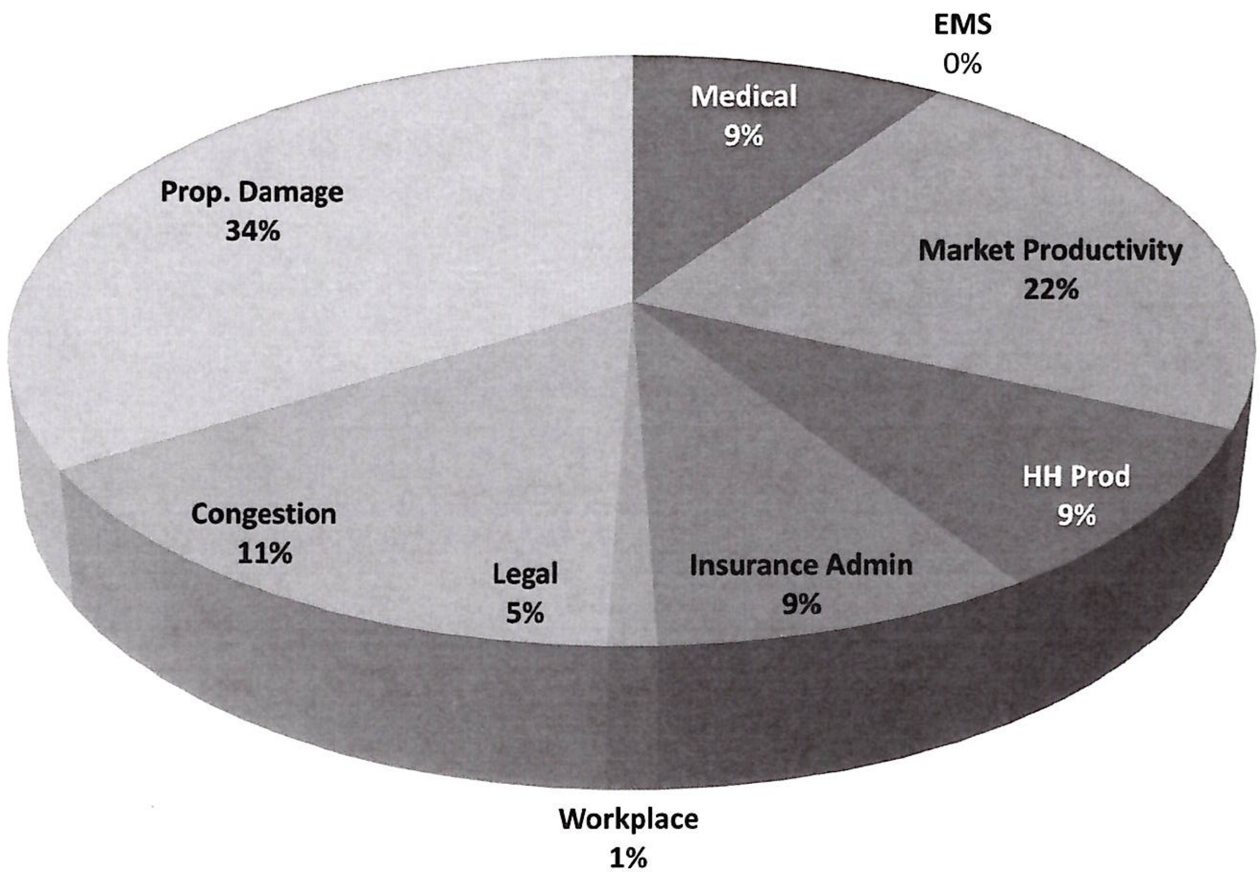


*Figure 1-B Source of Payment for Motor Vehicle Crash Costs*

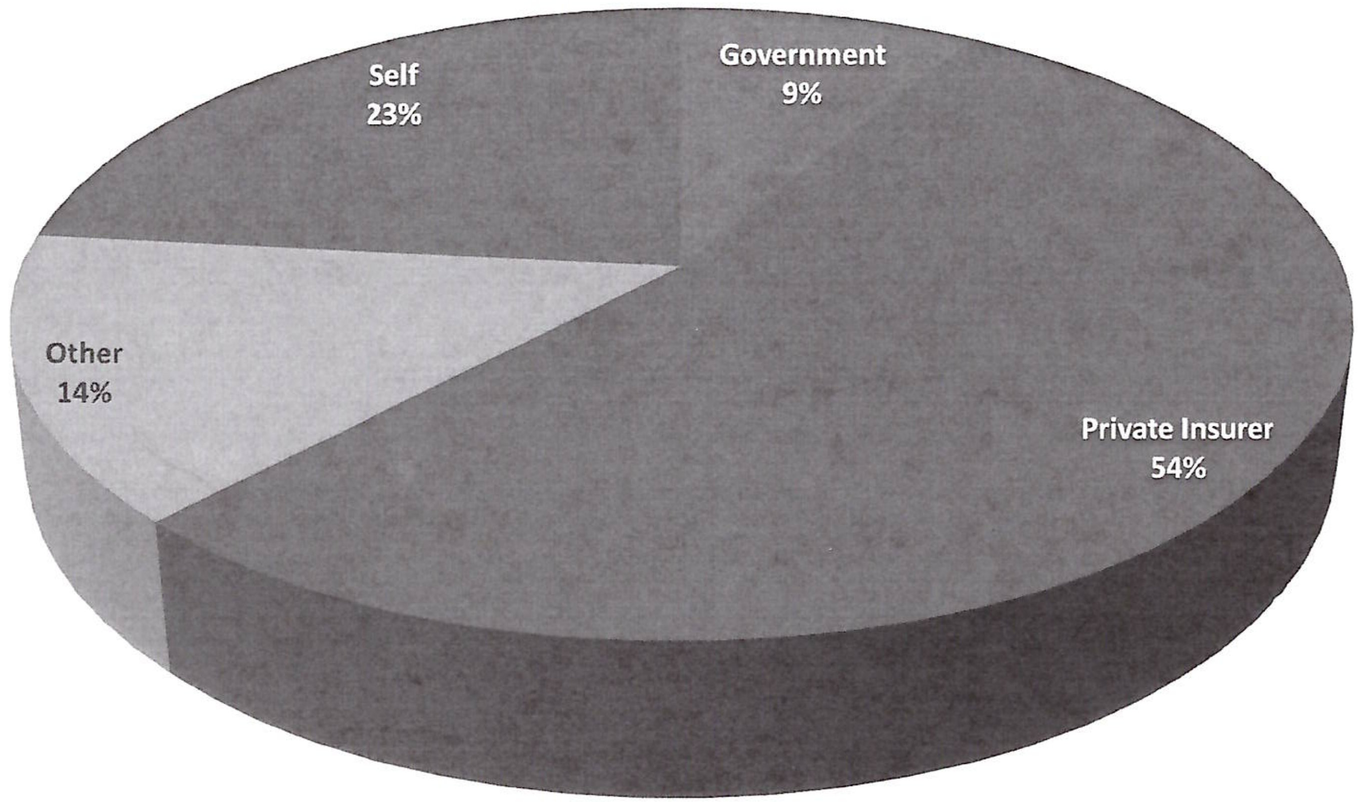
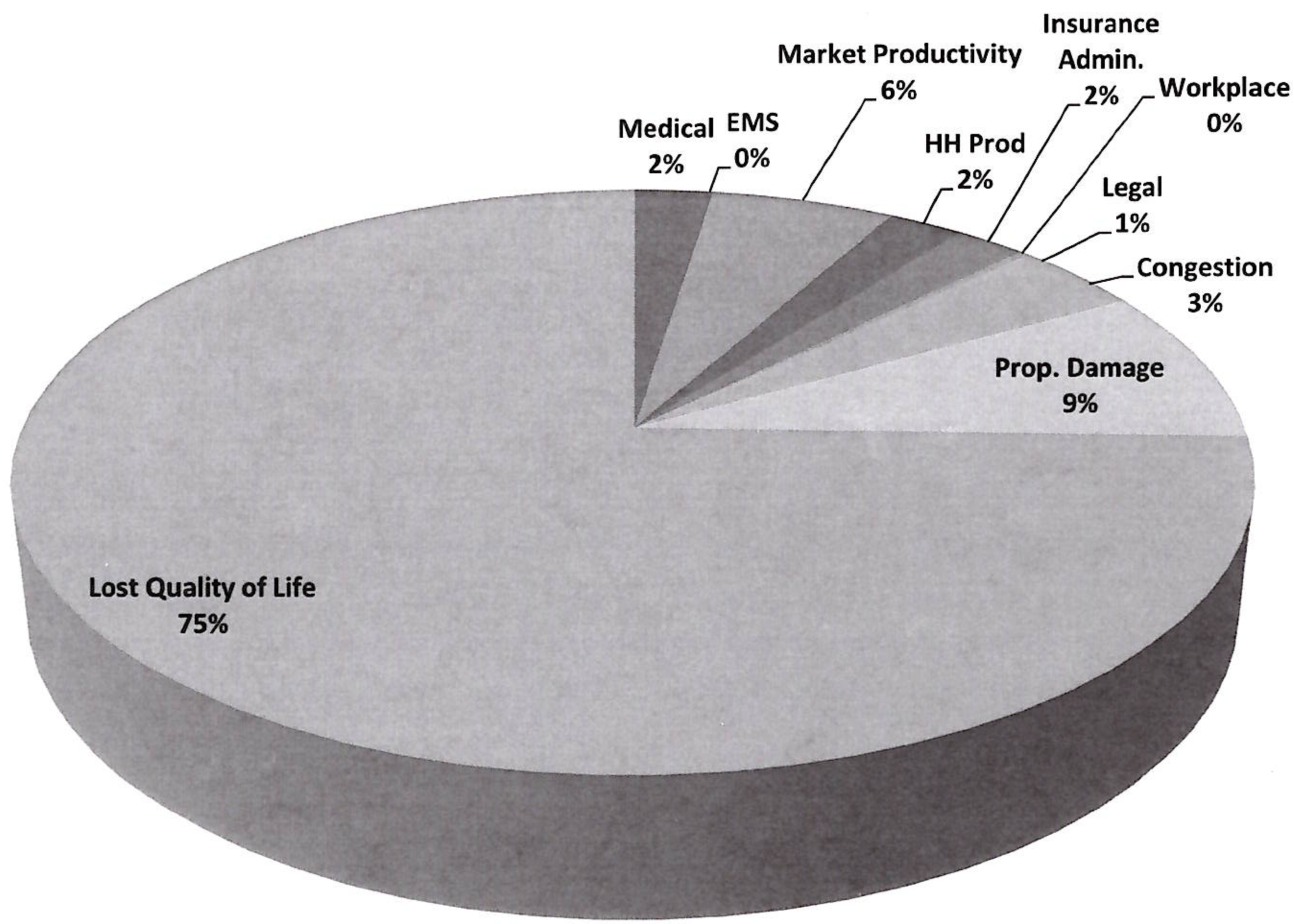


*Figure 1-D Components of Comprehensive Costs*



will ultimately represent only vehicles damaged in PDO crashes. However, of the 8.3 million vehicles that were damaged in PDO crashes, some portion were incorrectly identified as PDOs. We thus applied the revised all cases translator for MAIS0 cases to this total to adjust for incorrect police reports. This reduces the total to 93 percent of initial reported PDOs or 7,773,120 vehicles in police-reported crashes.

Reporting a crash to police does not assure that a PCR will actually be filed. Individual police jurisdictions typically have reporting thresholds, especially for crashes that only involve property damage. A person may report a crash, but if police determine that the crash does not meet the damage threshold, police may not file a crash report. Reporting thresholds vary by State and sometimes by jurisdiction. Table 2-7 lists damage reporting thresholds by State.

*Table 2-7 State PDO Reporting Thresholds*

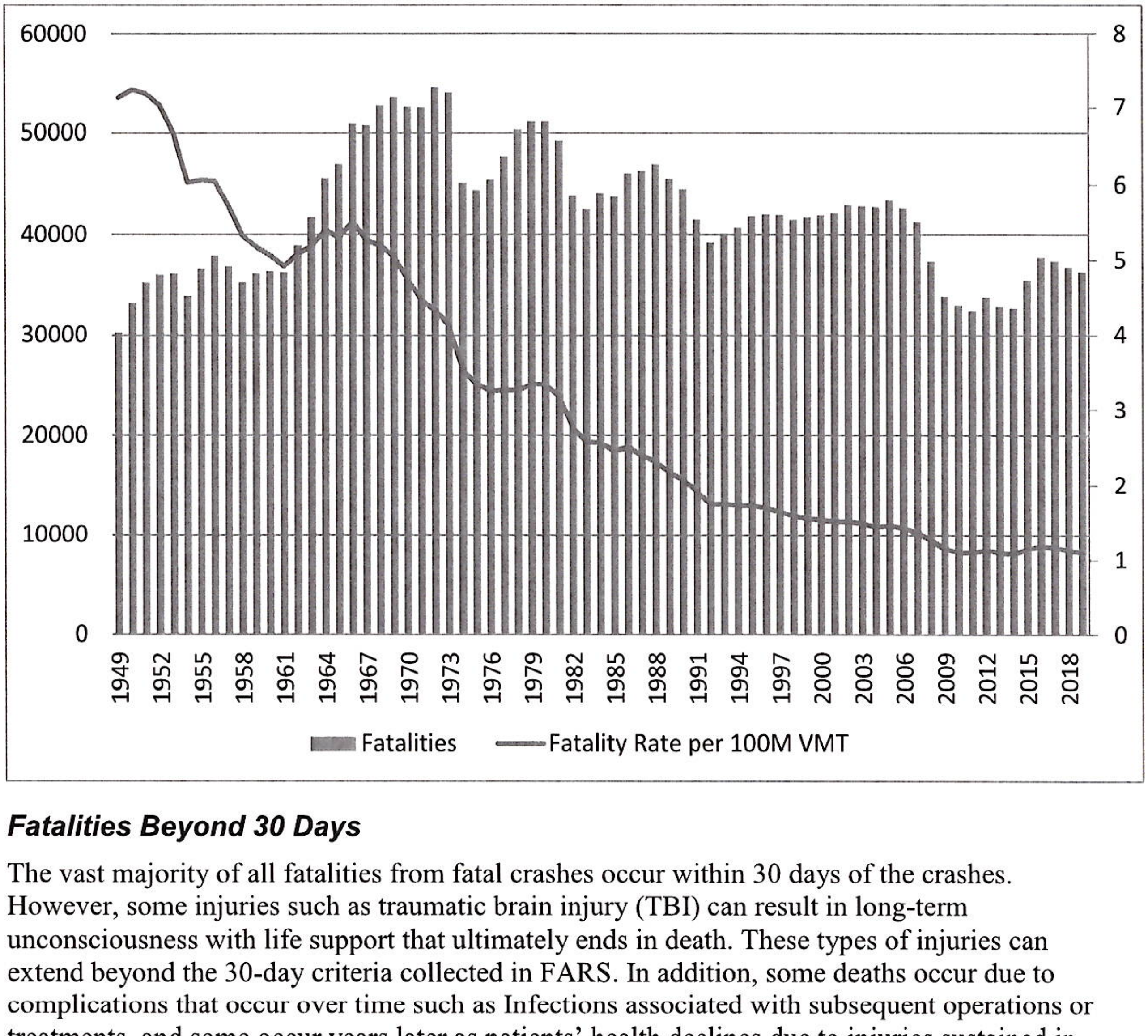
| State | PDO Reporting Thresholds | | State | PDO Reporting Thresholds |
|---|---|---|---|---|
| Alabama | $500 | | Missouri | $500 |
| Alaska | $2,000 | | Montana | $1,000 |
| Arizona | $300 | | Nebraska | $1,000 |
| Arkansas | $1,000 | | Nevada | $750 |
| California | $1,000 | | New Hampshire | $1,000 |
| Colorado | Not Required | | New Jersey | $500 |
| Connecticut | $1,000 | | New Mexico | $500 |
| Delaware | $500 | | New York | $1,500 |
| D.C. | Not Required | | North Carolina | $1,000 |
| Florida | $500 | | North Dakota | $1,000 |
| Georgia | $500 | | Ohio | $1,000 |
| Hawaii | $3,000 | | Oklahoma | $500 |
| Idaho | $1,500 | | Oregon | $2,500 |
| Illinois | $1,500 | | Pennsylvania | Towed Vehicle |
| Indiana | Not Required | | Rhode Island | $1,000 |
| Iowa | $1,500 | | South Carolina | $1,000 |
| Kansas | $1,000 | | South Dakota | $1,000 |
| Kentucky | $500 | | Tennessee | $1,500 |
| Louisiana | $500 | | Texas | $1,000 |
| Maine | $1,000 | | Utah | $2,500 |
| Maryland | Not Required | | Vermont | $3,000 |
| Massachusetts | $1,000 | | Virginia | $1,500 |
| Michigan | $1,000 | | Washington | $1,000 |
| Minnesota | $1,000 | | West Virginia | $1,000 |
| Mississippi | $500 | | Wisconsin | $1,000 |
| | | | Wyoming | $1,000 |

*Source: State DOTs*

*Table 2-1 Fatalities and Fatality Rates, 1949-2019*

| Year | Fatalities | Fatality Rate per 100M VMT | | Year | Fatalities | Fatality Rate per 100M VMT |
|---|---|---|---|---|---|---|
| 1949 | 30,246 | 7.13 | | 1985 | 43,825 | 2.47 |
| 1950 | 33,186 | 7.24 | | 1986 | 46,087 | 2.51 |
| 1951 | 35,309 | 7.19 | | 1987 | 46,390 | 2.41 |
| 1952 | 36,088 | 7.03 | | 1988 | 47,087 | 2.32 |
| 1953 | 36,190 | 6.65 | | 1989 | 45,582 | 2.17 |
| 1954 | 33,890 | 6.03 | | 1990 | 44,599 | 2.08 |
| 1955 | 36,688 | 6.06 | | 1991 | 41,508 | 1.91 |
| 1956 | 37,965 | 6.05 | | 1992 | 39,250 | 1.75 |
| 1957 | 36,932 | 5.71 | | 1993 | 40,150 | 1.75 |
| 1958 | 35,331 | 5.32 | | 1994 | 40,716 | 1.73 |
| 1959 | 36,223 | 5.17 | | 1995 | 41,817 | 1.73 |
| 1960 | 36,399 | 5.06 | | 1996 | 42,065 | 1.69 |
| 1961 | 36,285 | 4.92 | | 1997 | 42,013 | 1.64 |
| 1962 | 38,980 | 5.08 | | 1998 | 41,501 | 1.58 |
| 1963 | 41,723 | 5.18 | | 1999 | 41,717 | 1.55 |
| 1964 | 45,645 | 5.39 | | 2000 | 41,945 | 1.53 |
| 1965 | 47,089 | 5.30 | | 2001 | 42,196 | 1.51 |
| 1966 | 50,894 | 5.50 | | 2002 | 43,005 | 1.51 |
| 1967 | 50,724 | 5.26 | | 2003 | 42,884 | 1.48 |
| 1968 | 52,725 | 5.19 | | 2004 | 42,836 | 1.44 |
| 1969 | 53,543 | 5.04 | | 2005 | 43,510 | 1.46 |
| 1970 | 52,627 | 4.74 | | 2006 | 42,708 | 1.42 |
| 1971 | 52,542 | 4.46 | | 2007 | 41,259 | 1.36 |
| 1972 | 54,589 | 4.33 | | 2008 | 37,423 | 1.26 |
| 1973 | 54,052 | 4.12 | | 2009 | 33,883 | 1.15 |
| 1974 | 45,196 | 3.53 | | 2010 | 32,999 | 1.11 |
| 1975 | 44,525 | 3.35 | | 2011 | 32,479 | 1.10 |
| 1976 | 45,523 | 3.25 | | 2012 | 33,782 | 1.14 |
| 1977 | 47,878 | 3.26 | | 2013 | 32,893 | 1.10 |
| 1978 | 50,331 | 3.26 | | 2014 | 32,744 | 1.08 |
| 1979 | 51,093 | 3.34 | | 2015 | 35,484 | 1.15 |
| 1980 | 51,091 | 3.35 | | 2016 | 37,806 | 1.19 |
| 1981 | 49,301 | 3.17 | | 2017 | 37,473 | 1.17 |
| 1982 | 43,945 | 2.76 | | 2018 | 36,835 | 1.13 |
| 1983 | 42,589 | 2.58 | | 2019 | 36,355 | 1.11 |
| 1984 | 44,257 | 2.57 | | | | |

*Figure 2-A Fatalities and Fatality Rates, by Year*




### ***Fatalities Beyond 30 Days***

The vast majority of all fatalities from fatal crashes occur within 30 days of the crashes. However, some injuries such as traumatic brain injury (TBI) can result in long-term unconsciousness with life support that ultimately ends in death. These types of injuries can extend beyond the 30-day criteria collected in FARS. In addition, some deaths occur due to complications that occur over time such as Infections associated with subsequent operations or treatments, and some occur years later as patients' health declines due to injuries sustained in crashes.

Vital Statistics Multiple Cause of Death (MCOD) data are compiled by the National Center for Health Statistics (NCHS), which is part of the Centers for Disease Control and Prevention (CDC). They are the U.S. Government's official counts of deaths in the United States. The file captures all death certificates for deaths in the United States during the year, including both the certificate as written by the death registrars and edited by the State, as well as a second version of causation that NCHS creates by editing to uniformity and reorganizing from the State submissions. Each death in the file records a cause. For disease, the cause is a diagnosis, but for injury, it is an external cause that identifies mechanism and intent (e.g., accidental death of a pedestrian hit by a motor vehicle on a public road). At least during 2015 to 2019, MCOD did not

*Table 6-1 Estimated 2019 Economic Costs Due to Motor Vehicle Crashes by State*

| State | (Millions 2019 $) | % Total | Cost Per Capita | % Per Capita Personal Income |
|---|---|---|---|---|
| ALABAMA | $6,437 | 1.9% | $1,313 | 3.0% |
| ALASKA | $627 | 0.2% | $856 | 1.4% |
| ARIZONA | $5,946 | 1.7% | $817 | 1.8% |
| ARKANSAS | $3,142 | 0.9% | $1,041 | 2.3% |
| CALIFORNIA | $29,098 | 8.6% | $736 | 1.1% |
| COLORADO | $6,028 | 1.8% | $1,047 | 1.7% |
| CONNECTICUT | $6,104 | 1.8% | $1,712 | 2.3% |
| DELAWARE | $1,478 | 0.4% | $1,518 | 2.8% |
| DIST. OF COL. | $832 | 0.2% | $1,178 | 1.5% |
| FLORIDA | $20,019 | 5.9% | $932 | 1.8% |
| GEORGIA | $18,697 | 5.5% | $1,761 | 3.6% |
| HAWAII | $580 | 0.2% | $410 | 0.7% |
| IDAHO | $1,355 | 0.4% | $758 | 1.7% |
| ILLINOIS | $13,977 | 4.1% | $1,103 | 1.9% |
| INDIANA | $8,540 | 2.5% | $1,269 | 2.6% |
| IOWA | $2,794 | 0.8% | $885 | 1.8% |
| KANSAS | $2,984 | 0.9% | $1,024 | 1.9% |
| KENTUCKY | $6,157 | 1.8% | $1,378 | 3.1% |
| LOUISIANA | $6,570 | 1.9% | $1,413 | 3.0% |
| MAINE | $1,876 | 0.6% | $1,396 | 2.8% |
| MARYLAND | $5,910 | 1.7% | $977 | 1.6% |
| MASSACHUSETTS | $7,389 | 2.2% | $1,072 | 1.5% |
| MICHIGAN | $12,305 | 3.6% | $1,232 | 2.5% |
| MINNESOTA | $3,803 | 1.1% | $674 | 1.2% |
| MISSISSIPPI | $2,533 | 0.7% | $851 | 2.2% |
| MISSOURI | $6,778 | 2.0% | $1,104 | 2.3% |
| MONTANA | $1,095 | 0.3% | $1,024 | 2.0% |
| NEBRASKA | $1,726 | 0.5% | $892 | 1.7% |
| NEVADA | $2,645 | 0.8% | $859 | 1.7% |
| NEW HAMPSHIRE | $1,664 | 0.5% | $1,223 | 1.9% |
| NEW JERSEY | $14,008 | 4.1% | $1,577 | 2.3% |
| NEW MEXICO | $2,173 | 0.6% | $1,036 | 2.4% |
| NEW YORK | $23,616 | 6.9% | $1,214 | 1.7% |

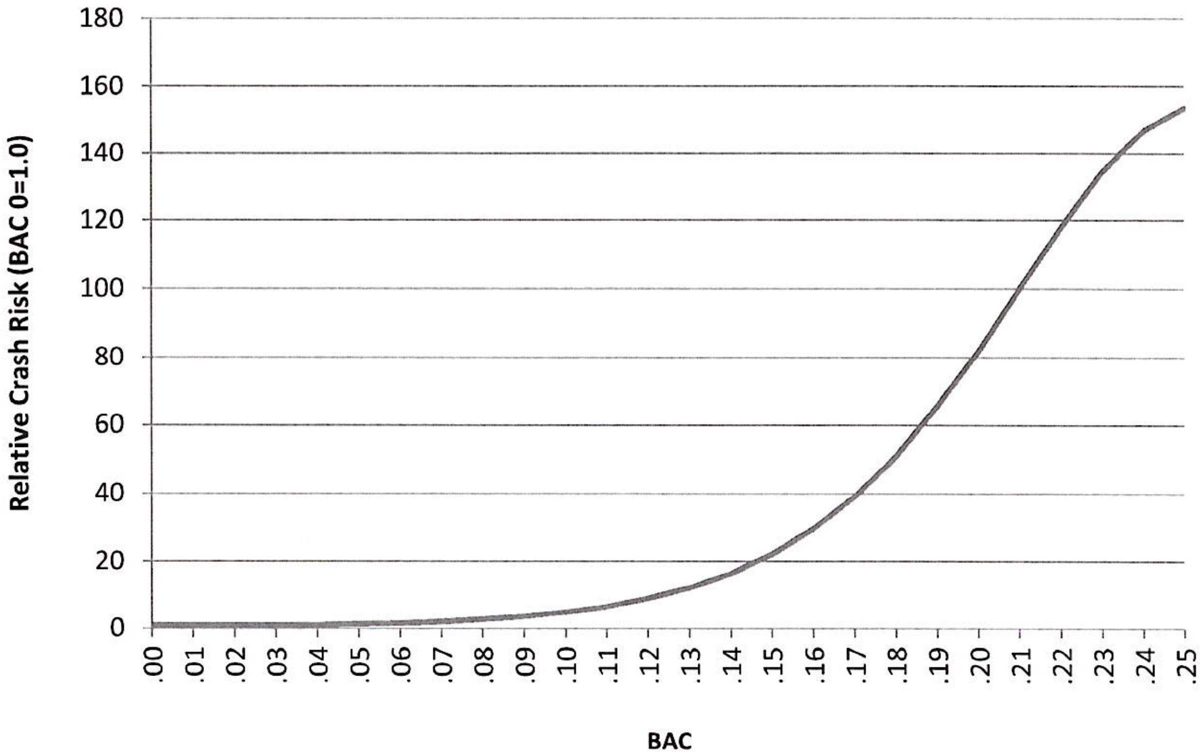
| State | (Millions 2019 $) | % Total | Cost Per Capita | % Per Capita Personal Income |
|---|---|---|---|---|
| NORTH CAROLINA | $12,039 | 3.5% | $1,148 | 2.4% |
| NORTH DAKOTA | $735 | 0.2% | $965 | 1.7% |
| OHIO | $12,108 | 3.6% | $1,036 | 2.1% |
| OKLAHOMA | $3,420 | 1.0% | $864 | 1.8% |
| OREGON | $2,822 | 0.8% | $669 | 1.3% |
| PENNSYLVANIA | $6,663 | 2.0% | $520 | 0.9% |
| RHODE ISLAND | $2,105 | 0.6% | $1,987 | 3.5% |
| SOUTH CAROLINA | $6,269 | 1.8% | $1,218 | 2.7% |
| SOUTH DAKOTA | $941 | 0.3% | $1,063 | 1.9% |
| TENNESSEE | $10,050 | 3.0% | $1,472 | 3.0% |
| TEXAS | $28,939 | 8.5% | $998 | 1.9% |
| UTAH | $2,803 | 0.8% | $874 | 1.8% |
| VERMONT | $625 | 0.2% | $1,001 | 1.8% |
| VIRGINIA | $6,455 | 1.9% | $756 | 1.3% |
| WASHINGTON | $6,337 | 1.9% | $832 | 1.3% |
| WEST VIRGINIA | $1,460 | 0.4% | $815 | 1.9% |
| WISCONSIN | $6,310 | 1.9% | $1,084 | 2.0% |
| WYOMING | $844 | 0.2% | $1,457 | 2.4% |
| Total | $339,809 | 100.0% | $1,035 | 1.8% |

*Table 7-1 Alcohol-Involved Traffic Fatalities, Highest BAC in Crash*

| Year | Total | | BAC=.00 | | BAC=.01-.07 | | BAC=.08+ | | BAC=.01+ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number | % | Number | % | Number | % | Number | % | Number | % |
| **1982** | 43,945 | 100% | 17,773 | 40% | 2,927 | 7% | 23,246 | 53% | 26,173 | 60% |
| **1983** | 42,589 | 100% | 17,955 | 42% | 2,594 | 6% | 22,041 | 52% | 24,635 | 58% |
| **1984** | 44,257 | 100% | 19,496 | 44% | 3,046 | 7% | 21,715 | 49% | 24,762 | 56% |
| **1985** | 43,825 | 100% | 20,659 | 47% | 3,081 | 7% | 20,086 | 46% | 23,167 | 53% |
| **1986** | 46,087 | 100% | 21,070 | 46% | 3,546 | 8% | 21,471 | 47% | 25,017 | 54% |
| **1987** | 46,390 | 100% | 22,297 | 48% | 3,398 | 7% | 20,696 | 45% | 24,094 | 52% |
| **1988** | 47,087 | 100% | 23,254 | 49% | 3,234 | 7% | 20,599 | 44% | 23,833 | 51% |
| **1989** | 45,582 | 100% | 23,159 | 51% | 2,893 | 6% | 19,531 | 43% | 22,424 | 49% |
| **1990** | 44,599 | 100% | 22,012 | 49% | 2,980 | 7% | 19,607 | 44% | 22,587 | 51% |
| **1991** | 41,508 | 100% | 21,349 | 51% | 2,560 | 6% | 17,599 | 42% | 20,159 | 49% |
| **1992** | 39,250 | 100% | 20,960 | 53% | 2,443 | 6% | 15,847 | 40% | 18,290 | 47% |
| **1993** | 40,150 | 100% | 22,242 | 55% | 2,361 | 6% | 15,547 | 39% | 17,908 | 45% |
| **1994** | 40,716 | 100% | 23,409 | 57% | 2,322 | 6% | 14,985 | 37% | 17,308 | 43% |
| **1995** | 41,817 | 100% | 24,085 | 58% | 2,490 | 6% | 15,242 | 36% | 17,732 | 42% |
| **1996** | 42,065 | 100% | 24,316 | 58% | 2,486 | 6% | 15,263 | 36% | 17,749 | 42% |
| **1997** | 42,013 | 100% | 25,302 | 60% | 2,290 | 5% | 14,421 | 34% | 16,711 | 40% |
| **1998** | 41,501 | 100% | 24,828 | 60% | 2,465 | 6% | 14,207 | 34% | 16,673 | 40% |
| **1999** | 41,717 | 100% | 25,145 | 60% | 2,321 | 6% | 14,250 | 34% | 16,572 | 40% |
| **2000** | 41,945 | 100% | 24,565 | 59% | 2,511 | 6% | 14,870 | 35% | 17,380 | 41% |
| **2001** | 42,196 | 100% | 24,796 | 59% | 2,542 | 6% | 14,858 | 35% | 17,400 | 41% |
| **2002** | 43,005 | 100% | 25,481 | 59% | 2,432 | 6% | 15,093 | 35% | 17,524 | 41% |
| **2003** | 42,884 | 100% | 25,779 | 60% | 2,427 | 6% | 14,678 | 34% | 17,105 | 40% |
| **2004** | 42,836 | 100% | 25,918 | 61% | 2,325 | 5% | 14,593 | 34% | 16,919 | 39% |
| **2005** | 43,510 | 100% | 25,920 | 60% | 2,489 | 6% | 15,102 | 35% | 17,590 | 40% |
| **2006** | 42,708 | 100% | 24,970 | 58% | 2,594 | 6% | 15,144 | 35% | 17,738 | 42% |
| **2007** | 41,259 | 100% | 24,101 | 58% | 2,554 | 6% | 14,603 | 35% | 17,158 | 42% |
| **2008** | 37,423 | 100% | 21,974 | 59% | 2,191 | 6% | 13,258 | 35% | 15,449 | 41% |
| **2009** | 33,883 | 100% | 19,704 | 58% | 2,031 | 6% | 12,149 | 36% | 14,179 | 42% |
| **2010** | 32,999 | 100% | 19,676 | 60% | 1,861 | 6% | 11,462 | 35% | 13,323 | 40% |
| **2011** | 32,367 | 100% | 19,212 | 59% | 1,758 | 5% | 11,397 | 35% | 13,155 | 41% |
| **2012** | 33,782 | 100% | 19,903 | 59% | 1,920 | 6% | 11,960 | 35% | 13,879 | 41% |
| **2013** | 32,893 | 100% | 19,325 | 59% | 1,938 | 6% | 11,631 | 35% | 13,569 | 41% |
| **2014** | 32,744 | 100% | 19,356 | 59% | 1,873 | 6% | 11,515 | 35% | 13,388 | 41% |
| **2015** | 35,484 | 100% | 21,360 | 60% | 2,044 | 6% | 12,081 | 34% | 14,125 | 40% |
| **2016** | 37,806 | 100% | 22,820 | 60% | 2,113 | 6% | 12,872 | 34% | 14,986 | 40% |
| **2017** | 37,473 | 100% | 22,764 | 61% | 2,046 | 5% | 12,663 | 34% | 14,709 | 39% |
| **2018** | 36,835 | 100% | 22,251 | 60% | 2,035 | 6% | 12,549 | 34% | 14,584 | 40% |
| **2019** | 36,355 | 100% | 22,192 | 61% | 2,054 | 6% | 12,109 | 33% | 14,163 | 39% |

Alcohol use by drivers is the focus of most behavioral programs and State laws. Drivers are involved in the vast majority of alcohol-involved traffic crashes, but a significant number of crashes occur where pedestrians or bicyclist alcohol use was indicated, while driver alcohol use over 2,800 crashes and nearly 15,000 drivers in Long Beach, California, and Fort Lauderdale, Florida, were sampled to determine the relative risk of crashes at different BACs. Logistic regression techniques were used to create a relative risk model that indicated a notable dose-response relationship beginning at .04 BAC and increasing exponentially at >=.10 g/dL BAC. The results of this model are summarized in Figure 7-B below.

*Figure 7-B Relative Risk of Crash by Blood Alcohol Concentration*




Source: Blomberg et al., 2005

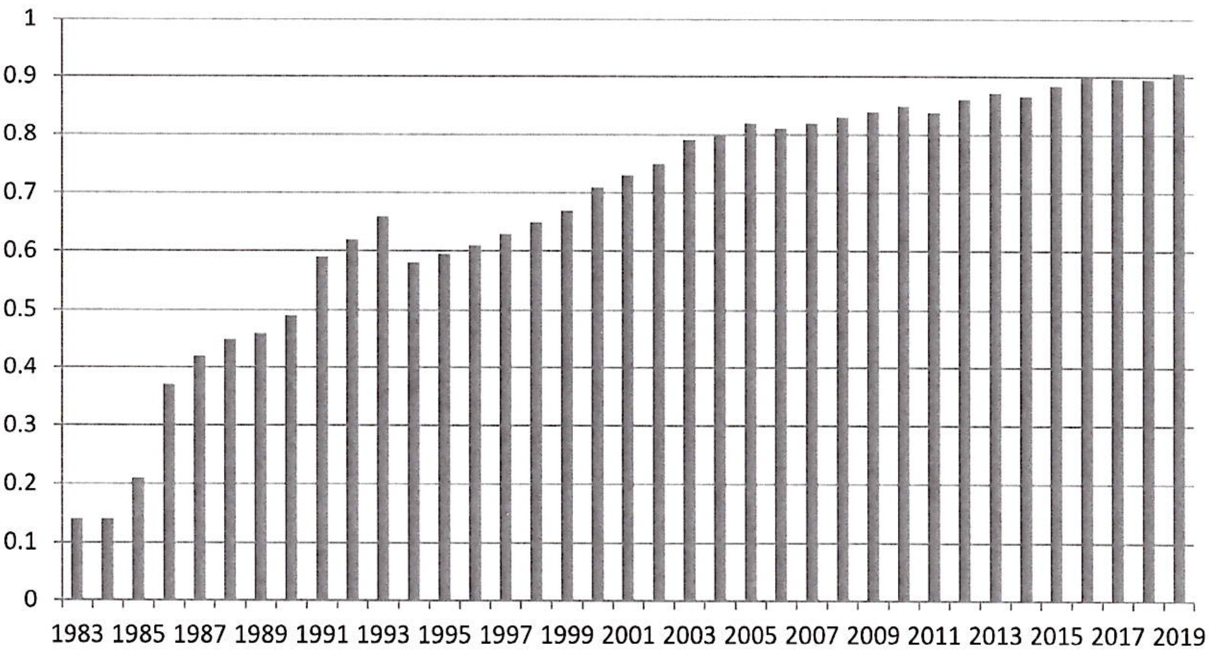
(2005) study based solely on voluntary participants. However, Blomberg's group identified a significant number of cases where the drivers either refused to participate (7% of all crash-involved drivers), or left the scene entirely (hit-and-run or HR – 12% of all drivers). For the refusals, Lacey et al. based BAC estimates on passive alcohol sensors (PAS) for participants who refused to complete the study protocol. Forty-five percent of participants who refused had PAS scores >=3 (which indicated the potential for impairment), whereas only 10 percent of participants who completed the study protocol had such scores. Lacey et al. used these results to estimate the BACs of the refusal cases. For HR cases, the researchers based BAC on measured BACs taken for drivers who were apprehended by the police within 2 hours of the crash. Not surprisingly, they found that HR drivers had BACs that were very high. Hit-and-run drivers were especially important because they made up a sizeable portion of drivers involved in crashes in both studies, and because their results were much higher than other cases. In the Lacey et al. study about 63 percent of HR drivers had BACs of .08+, while only about 10 percent of other drivers had BACs this high. So, nearly 20 percent of all cases either refused or were HR, and these cases were the ones most likely to have high BACs. This indicates that results based on voluntary compliance alone will significantly undercount high BACs. For this reason, we based our estimates on the Blomberg et al. study.

*Table 9-5 Distraction Categories*

| In Vehicle Controls, Non-Cell Phone: | Other Driver Distraction, Non-Cell Phone |
|---|---|
| Adjusting/monitoring radio | Reading |
| Adjusting/monitoring climate control | Writing |
| Adjusting/monitoring other devices integral to vehicle | Tablet device, operating |
| Inserting/retrieving CD (or similar) | Tablet device, viewing |
| | Eating without utensils |
| | Eating with utensils |
| **Cell Phone Use:** | Drinking from open container |
| Cell phone, talking/listening, hand-held | Drinking with lid, no straw |
| Cell phone, texting | Drinking with lid and straw |
| Cell phone, dialing hand-held | Drinking with straw no lid |
| Cell phone, dialing hand-held using quick keys | Make up |
| Cell phone, locating/reaching/answering | Combing/brushing/fixing hair |
| Cell phone, browsing | Brushing teeth |
| Cell phone, dialing hands-free using voice-activated software | Biting nails/cuticles |
| Cell phone, holding | Shaving |
| Cell phone, other | Other personal hygiene |
| | Removing/adjusting clothing |
| | Removing/adjusting jewelry |
| **Interaction With Others:** | Removing/inserting/ adjusting contact lenses or glasses |
| Child in rear seat - interaction | Reaching for cigar/cigarette |
| Passenger in adjacent seat - interaction | Reaching for food-related or drink-related item |
| Passenger in rear seat - interaction | Reaching for object, other (leave a note) |
| Child in adjacent seat - interaction | Reaching for personal body-related item |
| Insect in vehicle | Dancing |
| Pet in vehicle | Looking at an object external to the vehicle |
| | Looking at pedestrian |
| | Looking at animal |
| | Looking at previous crash or incident |
| | Distracted by construction |
| | Other external distraction |
| | Talking/singing, audience unknown |
| | Moving object in vehicle |
| | Lighting cigar/cigarette |
| | Smoking cigar/cigarette |
| | Extinguishing cigar/cigarette |
| | Object dropped by driver |
| | Object in vehicle, other |
| | Other known secondary task |
| | Other non-specific internal eye glance |
| | Tablet device, other |
| | Unknown |
| | Unknown type (secondary task present) |

1993. Similar impacts occurred in Louisiana where usage rose 18 points, in Georgia where usage rose 17 points, in Maryland where usage rose 13 points, and in the District of Columbia where usage rose 24 points when they combined a new primary enforcement law with penalty points. Overall, States with primary belt use laws have an average belt use rate that is 12 percentage points higher than States with only secondary enforcement (Pickrell & Ye, 2012). Figure 10-A illustrates the nationwide trend in seat belt use rates from 1983 through 2019.

*Figure 10-A Observed Daytime Seat Belt Use Rate*




By combining seat belt use rates with effectiveness rates and national injury counts, an estimate can be made of the impact of seat belts on fatality and casualty rates. The basic methods for these calculations are well documented (Partyka & Womble, 1989; Blincoe, 1994; Wang & Blincoe, 2001; Wang & Blincoe, 2003; Glassbrenner & Starnes, 2009). The effect of increases in seat belt use on fatalities is curvilinear, i.e., the more the observed usage rate in the general population approaches 100 percent, the more lives are saved for each incremental point increase. This occurs because those who are most resistant to buckling up tend to be in high-risk groups such as impaired drivers or people who are risk takers in general. These people are more likely to be involved in serious crashes and are thus more likely to actually benefit from wearing their belts. Belt use by people involved in potentially fatal crashes ("restraint) use in potentially fatal crashes," UPFC) tends to be lower than observed use for these same reasons. Figure 10-B illustrates the relationship between use in potentially fatal crashes as well as lives saved and increasing rates of observed seat belt usage.