

# Motor Vehicle Crashes

**Definition:** All unintentional motor vehicle-related deaths and hospitalizations on and off public roads, including those involving drivers, passengers, pedestrians, motorcyclists, and bicyclists. Motor vehicle hospitalizations for years 1989–2005 and deaths for years 1980–1998 include all records with an ICD 9 code including E810–E825. Deaths for 1999–2005 include those with an ICD 10 code of V02–V04, V09.0, V09.2, V12–V14, V19.0–V19.2, V19.4–V19.6, V20–V79, V80.3–V80.5, V81.0–V81.1, V82.0–V82.1, V83–V86, V87.0–V87.8, V88.0–V88.8, V89.0, or V89.2.

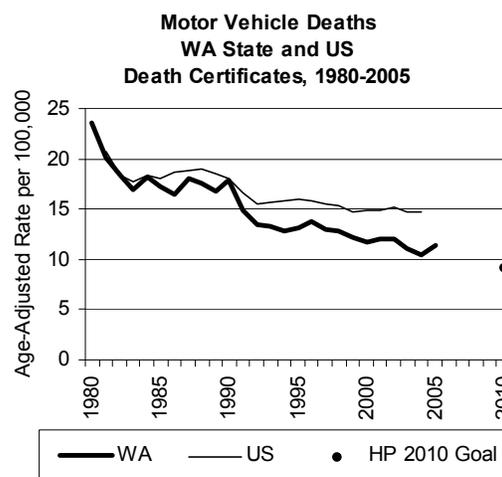
## Summary

Washington State experienced 721 motor vehicle-related deaths on and off public roads in 2005 ([age-adjusted](#) death rate: 12 per 100,000). While motor vehicle-related death rates have fallen since 1980, deaths due to motor vehicle crashes are the leading cause of unintentional death among Washington residents ages 1–44. The most common factors in Washington’s fatal crashes are alcohol and/or other drug impairment, speeding, inattention, and failure to yield. Not speeding or driving impaired and using age-appropriate restraints could greatly reduce the risk of motor vehicle-related deaths.

## Time Trends

Since the late 1980s, motor vehicle (MV) death rates in Washington have been lower than national rates. Beginning in the early 1990s, MV deaths leveled off nationally, while Washington’s rates continued to decline. In 2004, the most recent year of national death data, the age-adjusted national MV death rate was 15 per 100,000 compared to 10 per 100,000 in Washington. The state’s death rate per 100 million vehicle miles of travel (VMT) in 2005 was 1.2. Small and consistent declines have occurred since 1995, when the death rate per 100 million VMT was 1.3.<sup>1</sup>

In Washington, age-adjusted MV death rates declined rapidly from 1980–1982 and then leveled off before beginning to decline more slowly from 1993–2005.



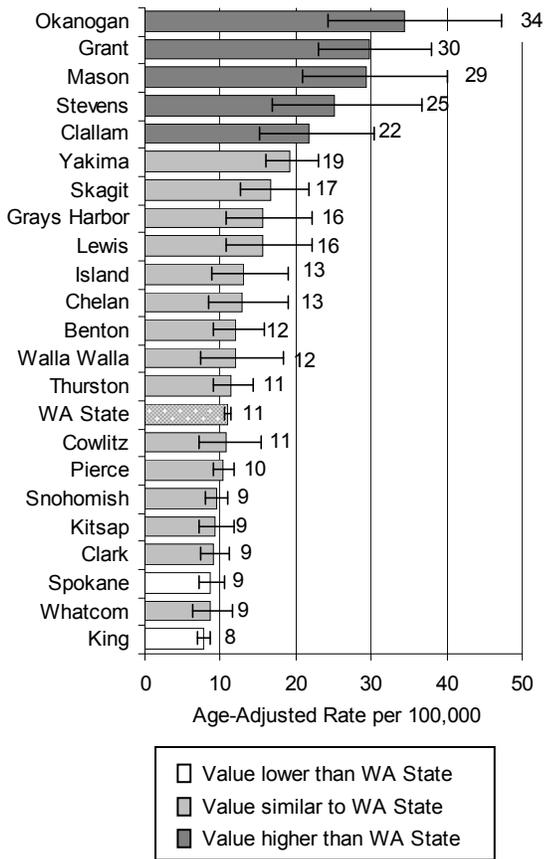
## Year 2010 Goals

The national *Healthy People 2010* goal is to reduce MV deaths to an age-adjusted rate of no more than 9.2 per 100,000. In 2005, Washington had a MV death rate of 11.5 per 100,000. Recent progress must continue if Washington is to meet the national target.

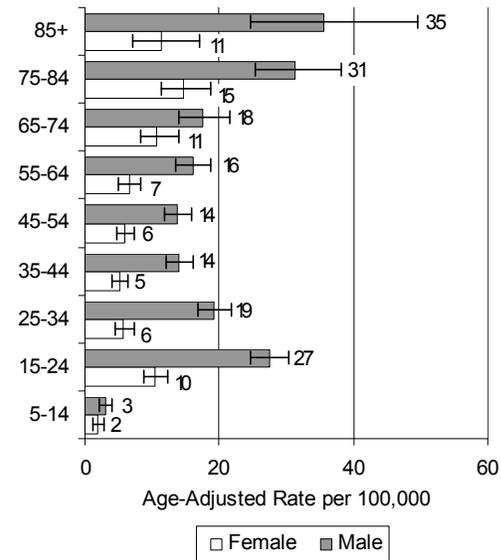
## Geographic Variation

In 17 Washington counties, [fewer than 20](#) residents died of MV crashes during 2003–2005. Death rates for these counties fluctuate even when combining three years; the following chart does not include them. Five of the 22 counties with 20 or more deaths in 2003–2005 had age-adjusted MV death rates higher than the state rate. They were Okanogan, Grant, Mason, Stevens, and Clallam counties. Two counties, Spokane and King, had MV death rates lower than the state rate. This pattern is consistent with data showing relatively more MV deaths among residents of rural areas.<sup>1</sup> Additional county information on MV deaths is available at [http://www.doh.wa.gov/hsqa/emstrauma/injury/data\\_tables/](http://www.doh.wa.gov/hsqa/emstrauma/injury/data_tables/).

**Motor Vehicle Deaths  
County Data  
Death Certificates, 2003-2005**



**Motor Vehicle Deaths  
Age and Gender  
Death Certificates, 2003-2005**



**Race and Hispanic Origin**

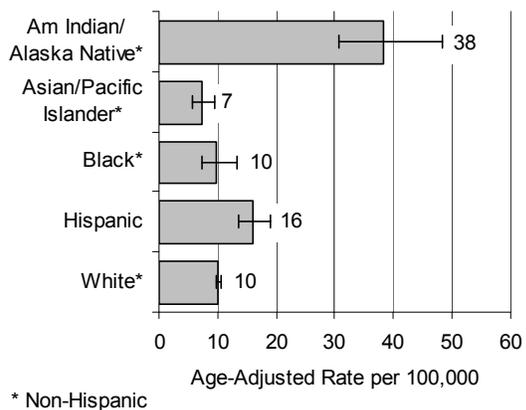
In Washington for 2003–2005, age-adjusted MV death rates were highest among American Indians and Alaska Natives. People of Hispanic origin also had relatively high rates. Nationally, after adjusting for vehicle miles traveled and educational level, blacks and Hispanic men, but not women, had the highest MV death rates.<sup>3</sup>

**Age and Gender**

During 2003–2005, 71% of Washington residents who died in MV crashes were males. The highest death rates were among younger males ages 15–24 and older men ages 75 and older. Children younger than five years old had fewer than 20 deaths, and the following chart does not include them.

In crashes of the same severity, older drivers are more likely to die compared to younger drivers. The prevalence of medical impairments increases with age, strength of bones, and internal organs decreases, which may increase susceptibility to injury and death.<sup>2</sup>

**Motor Vehicle Deaths  
Race and Hispanic Origin  
Death Certificates, 2003-2005**



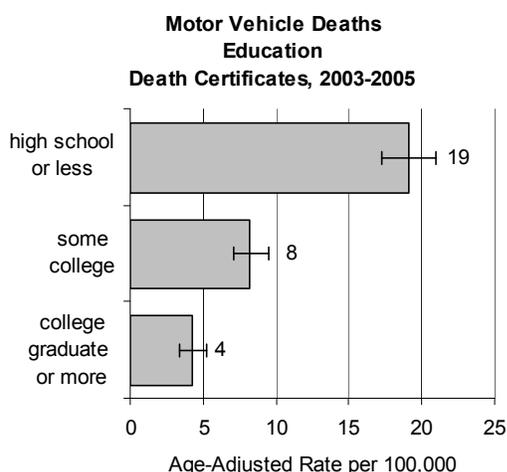
\* Non-Hispanic

**Income and Education**

In Washington in 2003–2005, age-adjusted MV traffic death rates ranged from a low of 4 per 100,000 for those with at least four years of college to 19 per 100,000 for those with a high school

education or less. There are no direct measures of the relationship between income and MV deaths for Washington. But in 2000–2002 combined, the age-adjusted death rate from MV crashes increased as the percent of the population in poverty increased.<sup>4</sup> Part of the relationship between the degree of poverty and MV crash death rates might be due to relatively more poverty in rural Washington<sup>5</sup> and inability to buy a newer, safer vehicle. In both Washington and nationally, MV crash death rates are higher among people living in rural places compared to those living in urban areas.<sup>1,6</sup>

Nationally, people who complete college use seatbelts more often than those with less education. There is no relationship between seatbelt use and income.<sup>7</sup> Research has not determined the relative importance of race, Hispanic origin, rural residence, poverty, and education in MV deaths.



### Other Measures of Impact and Burden

**Hospitalization.** MV crashes can be fatal but more often result in nonfatal injuries. Many of these require hospitalization and can result in lifetime disability. In 2005, there were 3,891 nonfatal MV-related hospitalizations in Washington. Nonfatal injury hospitalizations are more than five times more common than fatalities.

**Cost.** In 2005, the total economic cost of MV crashes in Washington State was more than \$5.6 billion.<sup>1</sup> Nationally, MV injuries account for 22% of all injury-related costs. The lifetime cost of nonfatal MV injuries that occurred in 2000 in

the United States was projected to be \$89 billion.<sup>8</sup>

**Pedestrians and bicyclists.** In Washington in 2005, 76 pedestrians and 15 bicyclists died after crashing with a MV. People 55 years and older had the highest rate of pedestrian fatalities. People 15–34 years old had the highest bicycle crash fatality rate.

### Risk and Protective Factors

The Washington Traffic Safety Commission's Strategic Highway Safety Plan,<sup>1</sup> approved by Governor Gregoire on February 27, 2007, will guide traffic safety work for several years. The plan has four levels of priority, with several topics in each level. Since most MV crashes are related to human behavior (rather than the roadway or vehicle design), these priorities focus on human behavior. The plan's priorities guide the order of the following risk factors.

**Driving while impaired.** Impairment and speed are factors in most fatal crashes in Washington. From 2001–2005, 3,140 people died on Washington's roads. Among these fatalities, impaired driving claimed 1,472 lives (47% of the MV crash deaths).

In 2005, 41% of all MV fatalities involved people who were driving under the influence (DUI).<sup>1</sup> But from 1995–2005, the number of DUI deaths fell by 12%. About 50% of toxicology screens show both alcohol and other drugs involved in and contributing to the crash.<sup>9</sup>

Estimates from the [Healthy Youth Survey](#) show that Washington 10<sup>th</sup> graders who reported driving after they had been drinking alcohol decreased from 10% ( $\pm 1\%$ ) in 1992 to 8% ( $\pm 1\%$ ) in 2006. Similarly, 10<sup>th</sup> graders who report riding in a vehicle driven by someone who had been drinking alcohol declined from 29% ( $\pm 2\%$ ) in 1992 to 25% ( $\pm 2\%$ ) in 2006.

**Speeding and other driving violations.** From 2001–2005, speeding claimed 1,195 lives in Washington (38% of MV crash deaths). Drivers 16–20 years old were more likely than drivers 21 and older to speed, overcorrect, drive in a reckless or negligent manner, drive inattentively or distractedly, disobey signs, signals, or officers, and pass improperly.<sup>10</sup>

**Occupant protection.** Proper use of seatbelts reduces MV deaths by up to 60%.<sup>11</sup> In 2006, although 96% of drivers wore seatbelts, rates were lower on city streets (91%) and county roads (93%) than on interstate highways (98%).<sup>12</sup> Of those who died in a crash from 1996–2005, 36% of drinking drivers used seatbelts compared to 63% of sober drivers.<sup>13</sup>

Two and three year-olds restrained in a child car seat in the rear seat of a vehicle had an 82% lower risk for injury than children who rode in lap-shoulder belts.<sup>14</sup>

In Washington in 2000, 92% of children younger than nine rode with some type of restraint system. About half of the children were not using appropriate restraints for their age and size, however.<sup>14</sup>

**Young drivers.** Fifteen to twenty year-old Washington drivers have the highest fatality crash rate: 4.4 fatal crashes per 10,000 licensed drivers. From 1993–2005, this age group had the highest number of fatalities and had the state's highest fatality rate at 22.4 per 100,000. Since the Washington State Intermediate Driver License law took effect on July 1, 2001, there has been a 41% drop in the number of fatal and disabling injuries among 16 and 17 year-old new drivers.<sup>10</sup>

**Motorcycles.** Motorcycles are the most dangerous type of motor vehicle. They are involved in fatal crashes at a rate of 35 per 100 million miles of travel, compared to a rate of 2 per 100 million miles of travel for passenger cars.<sup>15</sup> Washington passed an all-age motorcycle helmet law in 1990. In Washington from 1990–1999, the motorcycle death rate was <1 per 100,000 compared to 2 per 100,000 from 1980–1989. But from 2000 to 2005, fatalities doubled from 37 to 71.<sup>1</sup> The increase is due mostly to motorcycle driver behavior: lane change errors, speeding, alcohol impairment, and inattention. Most are single vehicle crashes, usually with the motorcycle leaving the roadway, and most fatalities are among male riders ages 40 and older. Helmet use in Washington has remained relatively constant.

Nationally, motorcycle deaths increased from 1997–2003. Seventy-eight percent of the increase is due to deaths on newly purchased motorcycles (less than four years old).<sup>16</sup>

**Roadway and vehicle design.** Roadway and motor vehicle design are important contributors to the decline in MV deaths and injuries. Roadway designs to reduce traffic hazards include barriers to separate traffic on two lane roads, breakaway light and sign poles, left turn lanes, traffic lights and roundabouts, and shoulder and center lane rumble strips to wake drowsy drivers. Passive risk-reducing features such as airbags and antilock brakes are important advancements in “crashworthiness.”

**Rural geography.** From 1993–2005, data from the Washington Fatal Analysis Reporting System showed that 61% of traffic fatalities occurred on rural roads; 39% occurred on urban roads. Rural roads also accounted for 64% of drinking driver fatalities and 62% of speed-involved fatalities.<sup>1</sup> Drivers in rural areas of Washington are less likely to wear their seatbelts, even after controlling for age and income.<sup>5</sup>

## **Intervention Strategies**

Washington's progress in reducing MV death rates reflects many efforts including implementing a statewide trauma system, reducing impaired driving, increasing use of occupant protection devices, and improving the safety of roadways and vehicles. Continuation of these efforts will likely decrease MV deaths further.

**Reducing impaired driving.** To reduce impaired driving, the Task Force on Community Preventive Services recommends lowering the legal blood alcohol concentration (BAC) limit for adult drivers to .08%, maintaining the minimum legal drinking age at 21 years, and using sobriety checkpoints. Washington already has set .08% as the legal BAC limit, and 21 is the legal drinking age nationwide. Sobriety checkpoints in Washington are illegal, and implementation would require legal changes. In 2006, a report to the Washington Traffic Safety Commission recommended this change.<sup>17</sup>

Brief alcohol and other drug interventions that counsel injured drinkers in emergency departments and primary care settings might reduce future injuries. Evaluation of the effects of this approach will require larger studies.<sup>18</sup>

The *Community Guide to Preventive Services* concluded that there was insufficient evidence to determine the effectiveness of designating a non-drinking driver to reduce impaired driving.<sup>19</sup> One study found giving rides home to bar patrons in older luxury vehicles at a cost of \$10–\$15 led to a 17% reduction in alcohol-related crashes among 21–34 year-olds in the first year.<sup>20</sup> An ongoing study in Seattle will determine whether promoting a taxi stand to bar patrons reduces alcohol-related crashes among 21–34 year-olds.

**Reducing speeding.** The use of speeding detection devices might reduce road traffic injuries and deaths. The review of studies using these devices found positive effects, but all of the studies had weak designs. Higher quality studies are needed.<sup>21</sup> The Washington Traffic Safety Commission supports the increased use of photo radar at intersections

known for red-light violations and areas known for high speeds. Traffic “calming” in towns and cities also might reduce the number of road traffic injuries and deaths.<sup>22</sup> Traffic calming includes integration of roundabouts, neighborhood speed bumps, road surface treatment, and specific road designs to discourage speeding.

**Seatbelt use.** Seatbelt use increased substantially from 36% in 1986 to 96% in 2006.<sup>12</sup> Laws, policies, and programs implemented since 1986 appear to have helped. A major change is the primary enforcement seatbelt law, enacted in June 2002, which allows law enforcement to stop and cite drivers if they or passengers are not wearing seatbelts. Seatbelt enforcement is also a core mission of the Washington State Patrol, and Washington participates in the national Click It or Ticket program.

**Increasing the use of child passenger restraints.** Effective June 1, 2007, Washington’s child passenger restraint law<sup>23</sup> has required all children to ride in a child restraint system correct for their age and height until age eight. Children younger than 13 years old are to ride in the vehicle’s back seat, if it is practical to do so. This includes inside the cab of pickup trucks.

To increase the use of child safety restraints among children under five years old, the Task Force on Community Preventive Services recommends laws requiring the use of child safety seats, community-wide information and enforcement, and education programs combined with distribution of child safety seats or incentives for purchasing a seat.<sup>24</sup> Since Washington already has a child passenger safety law, state efforts will focus on combining education with incentives and enforcement.

**Young drivers.** State intermediate driver license (IDL) laws, which gradually move teen drivers to full licensure, are effective in reducing fatal crash rates. The greatest benefit seems to be with laws that include nighttime driving restriction, limits on the number of teenage passengers who can ride with a teen with an IDL, consistent enforcement of the law, parent support for the law, and at least 50 hours of driving with a licensed adult driver prior to getting the IDL.<sup>25</sup> Washington’s IDL program includes all of these elements to some degree. Washington could strengthen the law by adopting recommendations of a report commissioned by the Joint Transportation Legislative Committee in 2006.<sup>25</sup>

**Older drivers.** From 2004–2030, the number of people ages 65 and older in the United States is expected to double.<sup>26</sup> This means there will be more older drivers. While older drivers are not involved in as many crashes as younger people, and these crashes are less likely to result in fatalities, the rate of crash involvement increases from 65 years of age. Currently, there are no evidenced-based or promising intervention strategies that reduce the risk of MV crash deaths or injuries among older drivers. There is a need to develop and evaluate interventions to reduce the risk of injury among older drivers through such methods as improved screening for vision and cognitive processing.

**See Related Chapter:** [Washington’s Trauma System](#)

**Data Sources** (For additional detail, see [Appendix B.](#))

Washington State Death Certificate Data: Washington State Department of Health, Vital Registration System Annual Statistical Files, Deaths 1980-2005, released December 2006.

Washington Hospitalization Data: Dataset compiled by the Washington State Department of Health Center for Health Statistics from the Washington Comprehensive Hospitalization Abstract System, Oregon Hospital Discharge data, and Veterans Hospital Administration datasets, December 2006.

National motor vehicle traffic death data: National Center for Health Statistics. Available on the Web-based Injury Statistics Query and Reporting System website at <http://www.cdc.gov/ncipc/wisqars/>.

Risk and protective factor data: Washington Traffic Safety Commission.

Washington Healthy Youth Survey: Office of Superintendent of Public Instruction, Washington State departments of Health, Social and Health Services, and Community, Trade, and Economic Development, the Family Policy Council, and RMC Research, 2006.

#### **Technical Notes**

Classification and coding of data on Washington death records follow the National Center for Health Statistics (NCHS) guidelines as defined in *Vital Statistics Instruction Manuals* parts 1–20. These guidelines are described in more detail in [Appendix B, Primary Data Sources](#). Primary data indicators were selected to match *Healthy People 2010* goals, which in this case is an age-adjusted MV death rate per 100,000. The Washington Traffic Safety Commission reports on MV deaths based on definitions set by the National Highways Traffic Safety Administration (NHTSA). The commission reports motor vehicle death rates per 100 million vehicle miles of travel. NHTSA definition limits motor vehicle deaths to those that occur on public roads: interstates, state and county highways and roads, and city streets, while NCHS guidelines also

include motor vehicle deaths that occur off public roads, such as off-road crashes.

### For More Information

Department of Health Injury and Violence Prevention Program, (360) 236-2855.

<http://www.doh.wa.gov/hsqa/emstrauma/injury/>

Harborview Injury Prevention and Research Center:  
<http://www.HIPRC.org>

National Highway Transportation Safety Administration: <http://www.nhtsa.dot.gov>

Washington State Safety Restraint Coalition:  
<http://www.1800bucklup.org>

Washington Traffic Safety Commission:  
<http://www.wtsc.wa.gov>

### Endnotes

<sup>1</sup> Washington Traffic Safety Commission. (2007) *Washington State Highway Safety Performance Plan: Target Zero*. Olympia, WA: Washington Traffic Safety Commission. Retrieved May 23, 2007 from <http://www.wsdot.wa.gov/NR/rdonlyres/BC9C8BDB-A735-4948-850A-47B72696E4D9/0/SHSP.pdf>.

<sup>2</sup> Braver, E. R., & Trempel, R. E. (2004). Are older drivers actually at higher risk of involvement in collisions resulting in deaths or non-fatal injuries among their passengers and other road users? *Injury Prevention, 10*, 27-32.

<sup>3</sup> Braver, E. R. (2003). Race, Hispanic origin, and socioeconomic status in relation to motor vehicle occupant death rates and risk factors among adults. *Accident Analysis and Prevention, 25*, 355-364.

<sup>4</sup> Washington State Department of Health. (2004). Motor vehicle chapter, *The Health of Washington State 2004 Supplement*. Olympia, WA. Retrieved January 2, 2007 from <http://www.doh.wa.gov/HWS/HWS2004supp.htm>

<sup>5</sup> Bensley, L., Court, B., West, N., & Simmons, K. W. (2006, October). *Examining possible BRFSS indicators of rural health*. Presented at the Washington State Joint Conference on Health, Yakima, Washington.

<sup>6</sup> National Highway Traffic Safety Administration. (2007, January). Traffic Safety Facts 2005. [www-nrd.nhtsa.dot.gov/Pubs/TSF2005.PDF](http://www-nrd.nhtsa.dot.gov/Pubs/TSF2005.PDF).

<sup>7</sup> National Highway Traffic Safety Administration, Office of Research and Traffic Records. (2004, September). *2003 Motor Vehicle Occupant Safety Survey*, Volume 2, Seatbelt Report. Retrieved November 14, 2006 from <http://www.nhtsa.dot.gov/people/injury/research/2003MVOSS-Survey-Vol2/index.htm>.

<sup>8</sup> Finkelstein, E., Corso, P., Miller, T., & Associates. (2006). *The Incidence and Economic Burden of Injuries in the United States*. New York, NY: Oxford University Press.

<sup>9</sup> Logan, B. (2006, December 12). *Update on Drugged Driving*. Impaired Driver Conference.

<sup>10</sup> Washington Traffic Safety Commission. (2000, October). *The Crash Involvement of Young Novice Drivers: The problem and a solution*. Olympia, WA: Washington Traffic Safety Commission.

<sup>11</sup> Kahane, C. J. (2000). *Fatality Reduction by Safety Belts for Front-Seat Occupants of Cars and Light Trucks*. Report Number DOT HS 809 199. Washington, DC: National Highway Transportation Safety Administration.

<sup>12</sup> Washington Traffic Safety Commission. (2007). *Seatbelt use rates in Washington State, 2006*. Olympia, WA.

<sup>13</sup> Washington Traffic Safety Commission, unpublished.

<sup>14</sup> Washington Traffic Safety Commission. (2001). *2000 Survey of Passenger Restraint Use Among Children*. Olympia, WA: Washington Traffic Safety Commission.

<sup>15</sup> Paulozzi, L. J., & Patel, R. (2004). Trends in motorcycle fatalities associated with alcohol-impaired driving—United States, 1983—2003. *Morbidity and Mortality Weekly Report, 53*(47), 1103-1106.

<sup>16</sup> Paulozzi, L. J. (2005). The role of sales of new motorcycles in a recent increase in motorcycle mortality rates. *Journal of Safety Research, 36*(4), 361-364.

<sup>17</sup> Van Wagenen, R. C. (2006, October). *Washington Impaired Driver Laws: Complexities and Challenges*. Olympia, WA: Washington Traffic Safety Commission. Retrieved December 13, 2006 from <http://www.wtsc.wa.gov/DUI%20reports/DUI%20%20REPORT%20for%20WTSC%20Oct%20%202006.doc>.

<sup>18</sup> Dinh-Zarr, T., Goss, C., Heitman, E., Roberts, I., & DiGuiseppi, C. (2004). Interventions for preventing injuries in problem drinkers. *Cochrane Database of Systematic Reviews*, Issue 3. Art. No.: CD001857.

<sup>19</sup> Ditter, S. M., Elder, R. W., Shults, R. A., Sleet, D. A., Compton, R., Nichols, J. L., & Task Force on Community Preventive Services. (2005, June). Effectiveness of designated driver programs for reducing alcohol-impaired driving: a systematic review. *American Journal of Preventive Medicine, 28*(5 Suppl), 280-287.

<sup>20</sup> Rothschild, M. L., Mastin, B., & Miller, T. W. (2006, November). Reducing alcohol-impaired driving crashes through the use of social marketing. *Accident Analysis & Prevention, 38*(6), 1218-1230.

<sup>21</sup> Wilson, C., Willis, C., Hendrikz, J. K., & Bellamy, N. (2006 April). Speed enforcement detection devices for preventing road traffic injuries. *Cochrane Database of Systematic Reviews, 2*, CD004607.

<sup>22</sup> Bunn, F., Collier, T., Frost, C., Ker, K., Roberts, I., & Wentz, R. (2003). Area-wide traffic calming for preventing traffic related injuries. *Cochrane Database of Systematic Reviews, 1*, CD003110.

<sup>23</sup> RCW 46.61.687. Retrieved on February 27, 2007 from <http://apps.leg.wa.gov/RCW/default.aspx?cite=46.61.687>.

<sup>24</sup> Zaza, S., Sleet, D. A., Thompson, R. S., Sosin, D. M., Bolen, J. C., & Task Force on Community Preventive Services. (2001, November). Reviews of evidence regarding interventions to increase use of child safety seats. *American Journal of Preventive Medicine, 21*(4 Suppl), 31-47.

<sup>25</sup> Ewing, R., & Associates. (2006, November). *Teenage Driving Study, Executive Summary*. Commissioned by Washington State Legislature Joint Transportation Committee.

<sup>26</sup> Administration on Aging, U.S. Department of Health and Human Services. (2006). *A profile of Older Americans: 2005*. Retrieved on February 9, 2007 from <http://www.aoa.gov/PROF/Statistics/profile/2005/2005profile.pdf>.