Chapter **5**

Safety

Highway Safety

This section describes the safety of the Nation's highway system. It looks at fatalities and injuries on highway functional systems, across vehicle types, and among different segments of the population. It also examines the causes and costs of fatal crashes.

Three operating administrations within the DOT have responsibility for addressing highway safety. The Federal Highway Administration (FHWA) focuses on infrastructure safety design and operations. The National Highway Traffic Safety Administration (NHTSA) has responsibility for overseeing vehicle safety standards and administering driver behavior programs. The Federal Motor Carrier Safety Administration (FMCSA) has the mission to reduce crashes, injuries, and fatalities involving large trucks and buses.

Statistics in this section are primarily drawn from the Fatality Analysis Reporting System (FARS). The FARS is maintained by NHTSA, which has a cooperative agreement with an agency in each State to provide information on all qualifying crashes in that State. Police accident reports, death certificates, and other documents provide data that are tabulated daily and included in the FARS. The statistics represent a "snapshot in time" during the preparation of this report, which is why they may not precisely correspond to reports completed during the same year. Information was compiled during the summer of 2008.

NHTSA publishes an annual Traffic Safety Facts report that comprehensively describes safety characteristics on the highway transportation network.

Overall Fatalities and Injuries

Exhibit 5-1 describes the considerable improvement in highway safety since Federal legislation first addressed the issue in 1966. That year, the fatality rate was 5.50 per 100 million VMT. By 2006, the fatality rate had declined to 1.41 per 100 million VMT. This sharp decline in the fatality rate occurred even as the number of licensed drivers nearly doubled.

The overall number of traffic deaths also decreased between 1966 and 2006. In 1966, there were 50,894 traffic deaths. Fatalities reached their highest point in 1972 (54,589), then declined sharply following the implementation of a national speed limit, reaching their lowest point in 1992 (39,250). Since 1992, there has been more limited progress in reducing the number of fatalities. The number of fatalities generally increased year-to-year from 1992 to 2006, when 42,642 Americans lost their lives in crashes. *Exhibit 5-2* and *Exhibit 5-3* compare the number of fatalities with fatality rates between 1980 and 2006.

The overall number of traffic-related injuries also decreased between 1988 and 2006, from 3,416,000 to 2,575,000. Injuries increased between 1992 and 1996, but have steadily declined since then. In 1988, the injury rate was 169 per 100 million VMT; by 2006, the number had dropped to 85 per 100 million VMT.

Fatalities by Functional Class

Exhibit 5-4 and *Exhibit 5-5* show the number of fatalities and fatality rates by rural and urban functional system between 1997 and 2006. These exhibits show the distinction between fatalities and fatality rate; fatality rate expresses fatalities in terms of VMT, so an increase in the overall number of fatalities does not necessarily translate into an increase in the fatality rate.
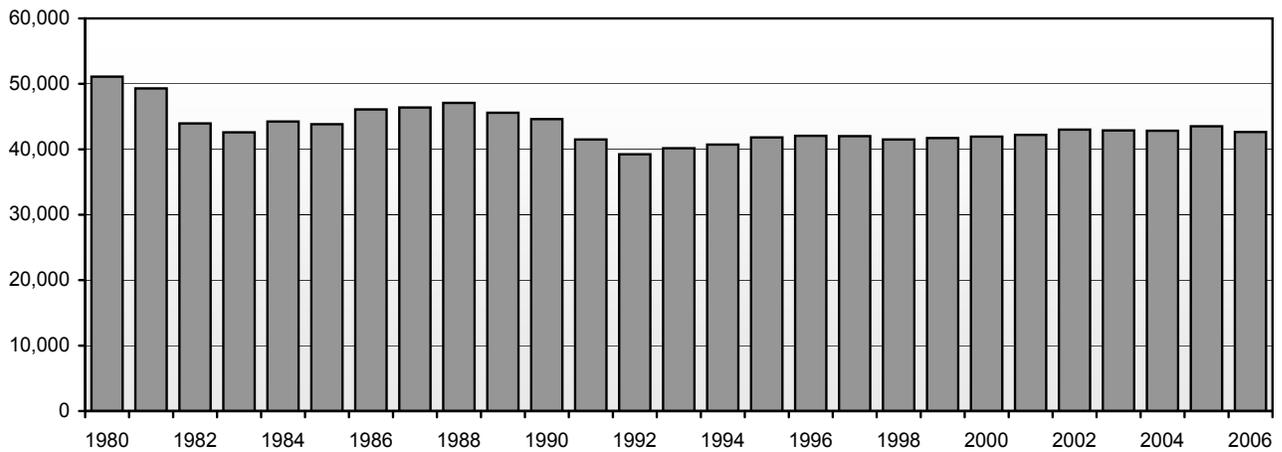
Exhibit 5-1

Summary of Fatality and Injury Rates, 1966–2006

| Year	Fatalities	Resident Population (Thousands)	Fatality Rate per 100,000 Population	Licensed Drivers (Thousands)	Fatality Rate per 100 Million VMT	Injured	Injury Rate per 100,000 Population	Injury Rate per 100 Million VMT
1966	50,894	196,560	25.89	100,998	5.50			
1968	52,725	200,706	26.27	105,410	5.20			
1970	52,627	205,052	25.67	111,543	4.74			
1972	54,589	209,896	26.01	118,414	4.30			
1974	45,196	213,854	21.13	125,427	3.50			
1976	45,523	218,035	20.88	134,036	3.25			
1978	50,331	222,585	22.61	140,844	3.26			
1980	51,091	227,225	22.48	145,295	3.35			
1982	43,945	231,664	18.97	150,234	1.76			
1984	44,257	235,825	18.77	155,424	2.57			
1986	46,087	240,133	19.19	159,486	2.51			
1988	47,087	244,499	19.26	162,854	2.32	3,416,000	1,397	169
1990	44,599	249,439	17.88	167,015	2.08	3,231,000	1,295	151
1992	39,250	254,995	15.39	173,125	1.75	3,070,000	1,204	137
1994	40,716	260,327	15.64	175,403	1.73	3,266,000	1,255	139
1996	42,065	265,229	15.86	179,539	1.69	3,483,000	1,313	140
1998	41,501	270,248	15.36	184,980	1.58	3,192,000	1,181	121
2000	41,945	282,192	14.86	190,625	1.53	3,189,000	1,130	116
2002	43,005	288,126	14.93	194,602	1.51	2,926,000	1,015	102
2004	42,836	293,638	14.59	198,889	1.44	2,788,000	950	94
2006	42,642	299,398	14.24	202,810	1.41	2,575,000	860	85

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Exhibit 5-2

Fatalities, 1980–2006

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Exhibit 5-3

Fatality Rate, 1980–2006
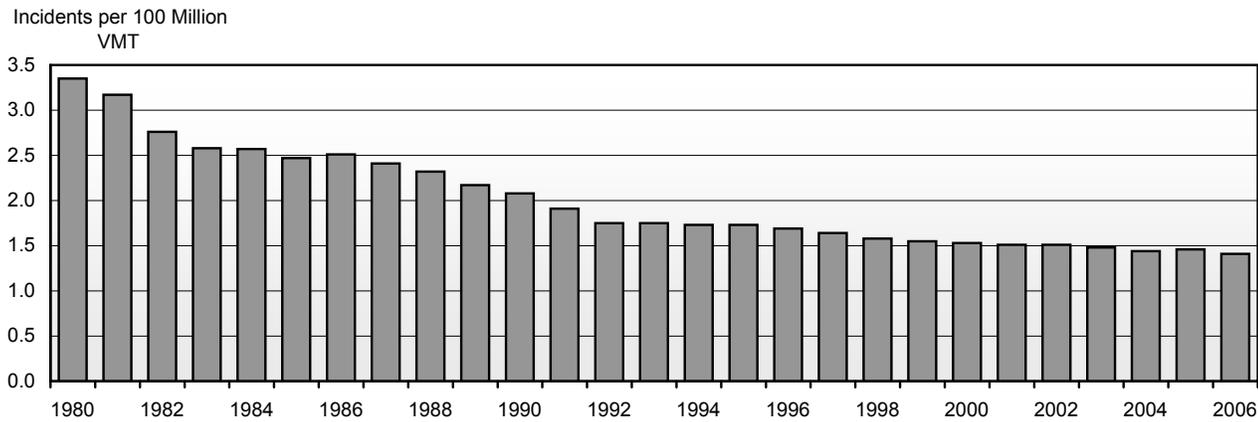
Incidents per 100 Million VMT

Exhibit 5-4

Fatalities by Functional System, 1997–2006

Functional System	1997	2000	2002	2004	2005	2006
Rural Areas (under 5,000 in population)						
Interstate	3,040	3,254	3,298	3,227	3,248	2,870
Other Principal Arterial	5,394	4,917	4,894	5,167	4,821	4,491
Minor Arterial	4,284	4,090	4,467	5,043	4,483	4,277
Major Collector	5,920	5,501	6,014	5,568	5,757	5,628
Minor Collector	1,723	1,808	2,003	1,787	1,635	1,614
Local	4,450	4,414	5,059	4,162	4,443	4,219
Unknown Rural	324	854	161	225	200	240
Subtotal Rural Areas	**25,135**	**24,838**	**25,896**	**25,179**	**24,587**	**23,339**
Urban Areas (5,000 or more in population)						
Interstate	2,292	2,419	2,482	2,602	2,734	2,619
Other Freeway and Expressway	1,296	1,364	1,506	1,673	1,735	1,653
Other Principal Arterial	5,420	4,948	5,124	4,847	5,364	5,299
Minor Arterial	3,523	3,211	3,218	3,573	3,836	3,720
Collector	1,163	1,001	1,151	1,385	1,426	1,478
Local	3,064	2,912	3,497	3,290	3,458	3,540
Unknown Urban	71	258	35	211	74	50
Subtotal Urban Areas	**16,829**	**16,113**	**17,013**	**17,581**	**18,627**	**18,359**
Unknown Rural or Urban	49	994	96	76	296	944
Total Highway Fatalities	**42,013**	**41,945**	**43,005**	**42,836**	**43,510**	**42,642**

As shown in *Exhibit 5-4*, the absolute number of fatalities grew slightly between 1997 and 2006, from 42,013 to 42,642 deaths. During this period, the number of fatalities on urban roads grew from 16,829 to 18,359 (about 43 percent of total fatalities). At the same time, the number of fatalities on rural roads decreased from 25,135 to 23,339 (about 57 percent of all fatalities). The fatality rate, however, decreased on both urban and rural roads, due to a significant increase in VMT, as well as to the other crash factors discussed later in this chapter.

Exhibit 5-5 shows the decrease in fatality rate on every urban and rural functional system between 1997 and 2006. Urban Interstate highways were the safest functional system, with a fatality rate of 0.55 per 100 million

VMT in 2006. Minor arterials, however, recorded the sharpest decline in fatality rates. The fatality rate for minor arterials in 2006 was 21.7 percent lower than in 1997.

Exhibit 5-5

Fatality Rates by Functional System, 1997–2006 (per 100 Million VMT)

Functional System	1997	2000	2002	2004	2005	2006
Rural Areas (under 5,000 in population)						
Interstate	1.27	1.21	1.18	1.21	1.27	1.11
Other Principal Arterial	2.36	1.98	1.90	2.15	2.07	1.94
Minor Arterial	2.62	2.38	2.53	2.99	2.74	2.63
Major Collector	2.93	2.62	2.82	2.78	2.99	2.91
Minor Collector	3.29	3.14	3.26	2.97	2.80	2.78
Local	3.94	3.47	3.67	3.15	3.45	3.17
Subtotal Rural	**2.52**	**2.29**	**2.30**	**2.36**	**2.38**	**2.25**
Urban Areas (5,000 or more in population)						
Interstate	0.63	0.61	0.61	0.57	0.58	0.55
Other Freeway and Expressway	0.81	0.77	0.79	0.80	0.81	0.76
Other Principal Arterial	0.91	0.81	0.79	0.79	0.83	0.80
Minor Arterial	1.80	1.53	1.51	1.33	1.44	1.41
Collector	0.89	0.74	0.81	0.85	0.84	0.85
Local	1.43	1.24	1.46	1.28	1.31	1.33
Subtotal Urban	**1.08**	**0.97**	**0.98**	**0.93**	**0.95**	**0.93**
Total Highway Fatality Rate	**1.64**	**1.53**	**1.51**	**1.44**	**1.46**	**1.41**

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Q&A

What steps are being taken to improve safety on the Nation's rural roads?

In February 2008, the U.S. Department of Transportation announced a Rural Safety Initiative that targets resources to reduce the number of crashes on the Nation's rural roads. The Rural Safety Initiative has five key areas.

First, the initiative focuses on **safe driving**. The National Highway Traffic Safety Administration (NHTSA) will fund four demonstration projects in rural communities to either improve safety belt use or increase the deployment of ignition interlocks to combat drunk driving by repeat offenders. NHTSA has published guidelines on sobriety checkpoints, and is developing performance standards to protect occupants during rollover crashes. The Federal Motor Carrier Safety Administration, meanwhile, is working with States to improve the safety of commercial vehicles on rural roadways and include a component on rural commercial vehicle safety in each State's annual Commercial Vehicle Safety Plan.

Second, the initiative aims to **create better roads**. Among other activities, this Department goal is encouraging States to tap the underutilized High Risk Rural Road program. The Department will also use $9.2 million in FY 2008 funding for the Delta Region Transportation Development Program for innovative safety measures in the Delta region.

Third, the initiative aims to **develop smarter roads**. The Department will continue to advance critical research that can help States and localities design smarter highways. As an example, the Research and Innovative Technology Administration will target $6 million in Intelligent Transportation Systems (ITS) funding toward rural road safety.

Fourth, the initiative aims to **better train emergency responders**. In 2008, for instance, NHTSA will initiate a grant program that better clarifies data sent from a cell phone and determines the location of a caller. NHTSA is also developing National Trauma Field Triage Protocols so that emergency personnel can better transport seriously injured patients to trauma centers.

Finally, the Department will **improve outreach and partnerships** to rural transportation stakeholders.

The fatality rate decreased by 10.7 percent on rural roads between 1997 and 2006. The fatality rate decreased sharply on urban minor arterials, although rural minor arterials was the one segment of the rural functional system in which the fatality rate rose between 1997 and 2006, from 2.62 to 2.63 deaths per 100 million VMT.

Despite the overall decrease in fatality rate on both urban and rural functional systems, rural roads are far more dangerous than their urban counterparts. The fatality rate for rural functional systems was 141.9 percent higher in 2006 than on urban functional systems, with lower-level local roads having the highest fatality rate of any functional system. There are a number of factors that collectively result in this rural road safety challenge. These may include limited right-of-way, which can result in greater curvature and obstacles close to the roadway, and higher levels of speeding on non-separated roadways.

There were a total of 5,973,000 crashes reported in 2006. Only a small percentage of these crashes, 0.6 percent, were severe enough to result in a fatality, while 70.1 percent of these crashes resulted in property damage only, as shown in *Exhibit 5-6*.

Exhibit 5-6

Crashes by Severity, 1997–2006

| | Crash Severity | | | | | | | |
| | Fatal | | Injury | | Property Damage Only | | Total Crashes | |
Year	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1997	37,324	0.6	2,149,000	32.4	4,438,000	67.0	4,438,000	100.0
1998	37,107	0.6	2,029,000	32.0	4,269,000	67.4	6,335,000	100.0
1999	37,140	0.6	2,054,000	32.7	4,188,000	66.7	6,279,000	100.0
2000	37,526	0.6	2,070,000	32.4	4,286,000	67.0	6,394,000	100.0
2001	37,862	0.6	2,003,000	31.7	4,282,000	67.7	6,323,000	100.0
2002	38,491	0.6	1,929,000	30.5	4,348,000	68.8	4,349,000	100.0
2003	38,477	0.6	1,925,000	30.4	4,365,000	69.0	6,328,000	100.0
2004	38,444	0.6	1,862,000	30.1	4,281,000	69.3	6,181,000	100.0
2005	39,252	0.6	1,816,000	29.5	4,304,000	69.9	6,159,000	100.0
2006	38,588	0.6	1,746,000	29.2	4,189,000	70.1	5,973,000	100.0

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Highway Fatalities by Major Crash Type or Contributing Factors

When a crash occurs, it is generally the result of numerous contributing factors. Combinations of driver, roadway, and vehicle factors all have an impact on the safety of the Nation's highway system.

The FHWA is focused on reducing four types of roadway-related crashes: roadway departures, intersections, pedestrian-related crashes, and speeding. *Exhibit 5-7* shows data for these crash types between 1997 and 2006. These categories are not mutually exclusive; the fatalities shown in *Exhibit 5-7* can involve a combination of factors—intersection and pedestrian-related, for example—so that some fatalities will appear in more than one category.

Exhibit 5-7

Highway Fatalities* by Crash Type, 1997–2006

	1997	2000	2002	2004	2005	2006
Roadway Departures	22,741	23,046	25,412	25,805	25,477	24,806
Intersection-Related	9,093	8,689	9,273	9,273	9,238	8,797
Pedestrian-Related	5,321	4,763	4,851	4,675	4,892	4,784
Speeding-Related	13,188	12,552	13,799	13,291	13,583	13,543

*Some fatalities may overlap; for example, some intersection-related fatalities may involve pedestrians.

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Roadway Departures

In 2006, there were 24,806 fatalities related to a vehicle leaving its lane and crashing. In some cases, the vehicle crossed the centerline and struck another vehicle, hitting it head-on or sideswiping it. In other cases, the vehicle left the roadway and struck one or more man-made or natural objects, such as utility poles, embankments, guardrails, trees, or parked vehicles.

Roadway departures occur because of human factors, roadway design factors, or environmental factors. Human factors include driving while intoxicated, driver fatigue, and drowsiness; and these factors can contribute to roadway departures. It is widely recognized that drunk drivers can create hazardous driving conditions. Surprisingly, a drowsy driver can be as dangerous as a drunk driver. In other cases, drivers are inattentive, careless, or distracted, drifting out of the lane and off the road. Visibility also is an issue. The majority of roadway departure crashes happen at night.

About two-thirds of roadway departure fatalities occur on rural roads. Rural highways are often not as well-lit as urban roadways or could include design factors such as narrow travel lanes, sharp roadway curvatures, or unimproved shoulders. Environmental factors including inclement weather such as fog, snow, smoke, or dust storms can also decrease the visibility of pavement markings or roadway curvature. In these conditions, or a combination of these conditions, run-off-road crashes can increase.

Of the 24,806 roadway departure fatalities that occurred in 2006, about 43.1 percent involved the rollover of a passenger vehicle. As shown in *Exhibit 5-8*, the total number of passenger vehicle occupant fatalities in rollovers has steadily increased, from 9,527 in 1997 to 10,698 in 2006 (a rise of about 12.3 percent). While the number of occupant fatalities in rollovers among passenger cars decreased slightly, from 4,765 in 1997 to 4,352 in 2006 (a 8.7 percent decrease),

Exhibit 5-8

Comparison of Number of Fatalities and Fatality Rates for Vehicles Involved in Rollover Crashes, 1997 and 2006

	Fatalities	Registered Passenger Vehicles	Fatality Rate per 100,000 Registered Vehicles
1997			
Passenger Cars	4,765	124,672,920	3.82
Light Pickup Trucks	2,479	34,314,455	7.22
Light Utility Trucks	1,489	14,531,850	10.25
Vans	768	16,159,473	4.75
Other Light Trucks	26	2,281,692	1.14
Total	**9,527**	**191,960,390**	**4.96**
2006			
Passenger Cars	4,352	136,866,137	3.18
Light Pickup Trucks	2,840	40,678,320	6.98
Light Utility Trucks	2,888	37,168,577	7.77
Vans	604	19,491,830	3.10
Other Light Trucks	14	890,532	1.57
Total	**10,698**	**235,095,396**	**4.55**
Percent Change	**12.3%**	**22.5%**	

Source: Fatality Analysis Reporting System/
National Center for Statistics and Analysis, NHTSA.

the number of occupant fatalities in rollovers among light (sport) utility trucks nearly doubled, growing from 1,489 in 1997 to 2,888 in 2006 (an increase of 93.9 percent). The number of occupant fatalities in rollovers among pickup trucks for the same period increased by 12.7 percent (from 2,479 in 1997 to 2,840 in 2006). Among vans, fatalities related to rollover crashes decreased by 21.3 percent (from 768 in 1997 to 604 in 2006).

Among the vehicles that rolled over, the occupant fatality rates for light (sport) utility trucks were the highest, followed by the rates for light pickup trucks, vans, and passenger cars. In 2006, in fatal crashes where a rollover occurred, the occupant fatality rate per 100,000 registered vehicles for light trucks was 7.77, 6.98 for light pickup trucks, 3.10 for vans, and 3.18 for passenger cars.

Intersections

Of the 42,642 fatalities that occurred in 2006, about 21 percent—8,797—were related to intersections. FARS contains information on the functional system where 8,580 of these fatalities occurred, of which 39.7 percent occurred at rural intersections and 60.3 percent at urban intersections, as shown in *Exhibit 5-9*.

Intersection incidents account for more than 45 percent of all reported crashes and approximately 50 percent of all injuries. Older drivers and pedestrians are particularly at risk at intersections; half of the fatal crashes for drivers aged 80 or older and about one-third of the pedestrian deaths among people aged 70 or older occurred at intersections.

There are over three million intersections in the United States, including both signalized and non-signalized (e.g., those controlled by stop or yield signs) and many factors may contribute to unsafe conditions at these areas. Road designs may be inadequate for current traffic levels or traffic signals may not be optimally programmed. There may also be insufficient law enforcement, prompting some drivers to ignore red lights. Approximately one-third of signalized intersection fatalities involve red-light running.

Exhibit 5-9

Intersection-Related Fatalities by Functional System, 2006

	Fatalities	
	Count	Percent of Total
Rural Areas (under 5,000 in population)		
Principal Arterials	1,007	11.7%
Minor Arterials	739	8.6%
Collectors (Major and Minor)	1,047	12.2%
Locals	614	7.2%
Subtotal Rural Areas	**3,407**	**39.7%**
Urban Areas (5,000 or more in population)		
Principal Arterials	2,367	27.6%
Minor Arterials	1,336	15.6%
Collectors (Major and Minor)	447	5.2%
Locals	1,023	11.9%
Subtotal Urban Areas	**5,173**	**60.3%**
Total Highway Fatalities*	**8,580**	**100.0%**

* Total excludes 217 intersection-related fatalities not identified by functional class.

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

How are Federal, State, and local transportation agencies working to improve intersection safety?

Q&A

Some engineering improvements can greatly improve intersection safety. Signal visibility is important, and many States and localities are increasing the size of signal displays to increase the line of sight for drivers. Rumble strips and "signal ahead" signs can also make drivers aware of an upcoming intersection. In many places, transportation officials are also modifying traditional intersections or eliminating the need to stop by installing flashing signals or converting intersections to roundabouts.

Education and law enforcement are also very important. Red light cameras are used in many cities, including Baltimore, Chicago, Denver, New York, Phoenix, San Diego, and San Francisco.

Pedestrians and Other Nonmotorists

Exhibit 5-10 displays nonmotorist fatalities that occurred between 1997 and 2006. For the purposes of this report, the term "nonmotorist" refers to fatalities and crashes that involve pedestrians, pedalcyclists, and other nonmotorists, such as skateboarders and roller skaters.

The number of nonmotorist fatalities decreased from 6,288 in 1997 to 5,740 in 2006, an 8.7 percent decrease. However, this may be because people are walking less than they used to—not because conditions are safer for pedestrians. The number of pedestrians and pedalcyclists killed has decreased over the past decade, while the number of other nonmotorists killed has increased. Still, in 2006, 83.3 percent of all nonmotorist fatalities were pedestrians. About 13.4 percent were pedalcyclists, and the remaining 3.2 percent were other nonoccupants.

Overall, the fatality rate for pedestrians was 1.6 per 100,000 population in 2006. Most pedestrian crashes occurred in 2006 in urban areas (about 74 percent). They also tend to occur at nonintersection locations (about 79 percent), during normal weather conditions (about 90 percent), and at night (roughly 79 percent).

Of the traffic crashes that resulted in pedestrian fatalities in 2006, 49 percent were alcohol-related; in other words, either the driver or the pedestrian had consumed alcohol. In 6 percent of the crashes that occurred, both driver and pedestrian had a blood alcohol concentration (BAC) of 0.08 or higher.

Exhibit 5-10

Pedestrian and Other Nonmotorist Traffic Fatalities, 1997–2006

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Pedestrians	5,321	5,228	4,939	4,763	4,901	4,851	4,774	4,675	4,892	4,784
Pedalcyclists	814	760	754	693	732	665	629	727	786	773
Other	153	131	149	141	123	114	140	130	186	183
Total	**6,288**	**6,119**	**5,842**	**5,597**	**5,756**	**5,630**	**5,543**	**5,532**	**5,864**	**5,740**

Source: Fatality Analysis Reporting System / National Center for Statistics and Analysis, NHTSA.

Speeding

Speeding is one of the most prevalent factors contributing to traffic crashes. In 2006, the National Highway Traffic Safety Administration estimates that 13,543 lives were lost in speeding-related crashes. The estimated annual economic costs of speeding-related crashes exceeded $40.4 billion in 2000. This included $10.3 billion in fatalities, $13.3 billion in injuries, and $3.8 billion in property damage.

Young males are the most likely drivers to be involved in fatal speeding-related crashes. The relative proportion of speeding-related crashes to all crashes decreases with increasing driver age. For example, in 2006, 39 percent of male drivers between the ages of 15 and 20 who were involved in fatal crashes were speeding at the time of the crash, while the comparable figure for male drivers between the ages of 35 and 44 was only 21 percent.

In 2006, 41 percent of the drivers with a BAC of 0.08 or higher involved in fatal crashes were speeding, compared with only 15 percent of drivers in fatal crashes who had not consumed alcohol. Speeding was a factor in 37 percent of fatal crashes in work zones and nearly 60 percent of roadway departure crashes on curves.

Many speeding-related crashes also occur during bad weather. Speeding was a factor in 33 percent of all crashes that occurred on wet roads in 2006. Speeding was a factor in 55 percent of the fatal crashes that occurred when there was snow or slush on the road and in 59 percent of those that occurred on icy roads.

Although much of the public concern about speed-related crashes focuses on high-speed roadways, speeding is a safety concern on all roads. In 2006, about 87 percent of speed-related fatalities occurred on roads that were not Interstate highways.

Alcohol

Alcohol-impaired driving is a serious public safety problem in the United States. In 2006, 17,602 Americans were killed in alcohol-related crashes on the Nation's highways. The National Highway Traffic Safety Administration estimates that alcohol was involved in 41 percent of fatal crashes and 9 percent of all crashes in 2006.

Exhibit 5-11 shows the number of fatalities attributable to alcohol between 1997 and 2006. There has been no consistent trend in the number of alcohol-related fatalities over the past decade. Alcohol-related fatalities declined between 1997 and 1999, increased between 1999 and 2002, declined between 2002 and 2004, and have increased since then.

In 2006, there were 13,582 fatalities in which either the driver or motorcycle operator was legally intoxicated—in other words, the operator had a BAC of 0.08 or higher. Of these fatalities, 5,319—about 39 percent—were among people between the ages of 21 and 34 years old; this was the largest of the six age groups surveyed by the NHTSA. Between 2005 and 2006, for this age demographic, the number of fatalities involved in crashes where the operator was legally intoxicated grew by about 1 percent. Using this standard, the group aged 16 to 20 was the only other age group to experience an increase in fatalities, where the number of fatalities grew by about 4 percent—from 1,586 to 1,648 deaths. Underage drinking and driving continues to be a major problem, despite years of education and law enforcement programs.

Exhibit 5-11									
Alcohol-Related Fatalities, 1997–2006									
1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
16,711	16,673	16,572	17,380	17,400	17,524	17,105	16,919	17,590	17,602

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Unbelted Occupants

Safety belt use is one of the most significant factors in determining the severity of a motor vehicle crash. According to NHTSA's National Occupant Protection Use Survey, the national seat belt use rate was 81 percent in 2006. This means that about 55 million people do not use seat belts all of the time when driving or riding in motor vehicles. These results were obtained by observing traffic on roads at selected observation points.

In 2006, 30,521 occupants of passenger vehicles were killed in motor vehicle traffic crashes—72 percent of the 42,642 traffic fatalities reported for the year. Of the 28,141 passenger vehicle occupant fatalities for which restraint use was known, an estimated 15,523 (or 55 percent) were unrestrained.

In 1984, the U.S. Department of Transportation promulgated rules that phased in automatic occupant-protection systems for all automobiles. This rulemaking prompted many States to enact seat belt use laws of varying degrees. To date, 26 States and the District of Columbia have seat belt use laws that provide for primary enforcement, enabling police officers to stop vehicles and write citations whenever they observe violations of the seat belt law. Twenty-three States have laws that specify secondary enforcement (allowing

officers to write a citation only after a vehicle is stopped for some other traffic infraction). One State, New Hampshire, has no adult seat belt use law.

Crashes by Vehicle Type

Exhibit 5-12 shows the breakdown of occupant fatalities by vehicle type from 1997 to 2006. The number of occupant fatalities that involved passenger cars decreased from 22,199 in 1997 to 17,800 in 2006, while occupant fatalities involving light and large trucks, motorcycles, and other vehicles all increased during this period.

The number of occupant fatalities in light trucks increased sharply between 1997 and 2006. Fatalities in these vehicles increased from 10,249 in 1997 to 12,722 in 2006, or an increase of 24.1 percent. There were 856,896 light truck occupants injured in 2006, up from 754,820 in 1997.

The number of occupant fatalities in large trucks increased 11.3 percent, from 723 in 1997 to 805 in 2006. There were 22,815 large truck occupants injured in 2006. However, the number of all other vehicle occupants killed in crashes involving a large truck decreased by 10.8 percent, from 4,223 in 1997 to 3,766 in 2006. Occupants of large trucks are less than 2 percent of all highway fatalities, but others killed in crashes involving large trucks are 10 percent of all highway fatalities.

The most significant increase in fatalities among vehicle types involved those who ride motorcycles. The number of motorcyclists who died in crashes increased 127.3 percent between 1997 and 2006, from 2,116 to 4,810.

Exhibit 5-12

Fatalities for Vehicle Occupants by Type of Vehicle, 1997–2006

Type of Vehicle	1997	2000	2002	2004	2005	2006
Motorists						
Passenger Cars	22,199	20,699	20,569	19,192	18,512	17,800
Light Trucks	10,249	11,528	12,273	12,674	13,040	12,722
Large Trucks	723	754	689	766	804	805
Motorcycles	2,116	2,897	3,270	4,028	4,576	4,810
Buses	18	22	45	42	58	27
Other and Unknown Vehicles	420	448	529	602	656	738
Nonmotorists						
Pedestrians	5,321	4,763	4,851	4,675	4,892	4,784
Pedalcyclists	814	693	665	727	786	773
Other and Unknown	153	141	114	130	186	183
Total	**42,013**	**41,945**	**43,005**	**42,836**	**43,510**	**42,642**

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Motorcycle crashes are frequently speed-related. Speed is two times more likely to be a factor in fatal motorcycle crashes than in passenger car or light truck crashes. Studies also have shown that alcohol is more likely to be a factor in motorcycle crashes than in passenger car or light truck crashes.

Exhibit 5-13 describes the breakdown of occupant injuries between 1997 and 2006. The number of injuries decreased for passenger cars, buses, light and large trucks during that period, but sharply increased among motorcycle riders. During this same period, the number of motorcyclists injured increased by 59.9 percent, from 52,574 to 87,652.

Exhibit 5-13

Injuries for Vehicle Occupants by Type of Vehicle, 1997–2006

Type of Vehicle	1997	2000	2002	2004	2005	2006
Motorists						
Passenger Cars	2,340,612	2,051,609	1,804,788	1,642,549	1,573,396	1,474,536
Light Trucks	754,820	886,566	879,338	900,171	872,137	856,896
Large Trucks	30,913	30,832	26,242	27,287	27,284	22,815
Motorcycles	52,574	57,723	64,713	76,379	87,335	87,652
Buses	16,887	17,769	18,819	16,410	11,133	9,839
Other and Unknown Vehicles	5,602	10,120	6,187	7,262	9,832	10,843
Nonmotorists						
Pedestrians	77,000	78,000	71,000	68,000	64,000	61,000
Pedalcyclists	58,000	51,000	48,000	41,000	45,000	44,000
Other and Unknown Vehicles	11,000	5,000	7,000	9,000	8,000	7,000
Total	**3,347,408**	**3,188,619**	**2,926,087**	**2,788,058**	**2,698,117**	**2,574,581**

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.
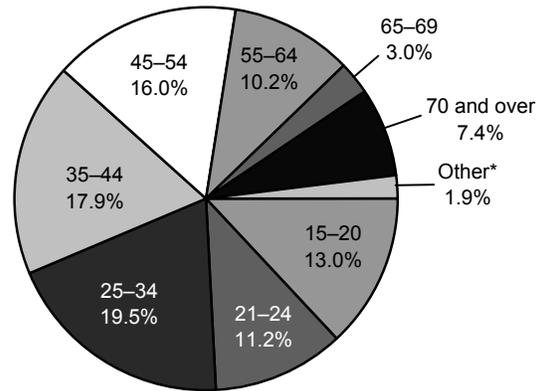
Crashes by Age Group

Another important way of examining highway crashes is by demographic segment. *Exhibit 5-14* shows the breakdown of drivers, by age, involved in fatal crashes in 2006. In recent years, much attention has been focused on the safety of drivers at either extreme of the age spectrum.

Americans between the ages of 15 and 20 constituted 6.4 percent of the total population of licensed drivers in 2006, but about 13 percent of all those involved in fatal crashes. In 2006, 3,490 drivers 15 to 20 years old were killed in crashes, while an additional 272,000 were injured. Motor vehicle crashes are the leading cause of death for young Americans and, as previously discussed, underage drinking is a major factor.

Exhibit 5-14

Age of Drivers Involved in Fatal Crashes, 2006

45–54 16.0%
55–64 10.2%
65–69 3.0%
70 and over 7.4%
Other* 1.9%
35–44 17.9%
15–20 13.0%
25–34 19.5%
21–24 11.2%

*Other includes drivers under age 15 and those whose age could not be determined from the accident data reported.

Source: Fatality Analysis Reporting System/National Center for Statistics and Analysis, NHTSA.

Meanwhile, the number of older drivers continues to rise. Between 1996 and 2006, the total number of licensed drivers increased by 13 percent, but the number of drivers aged 65 and older grew by 18 percent. Older Americans, however, are among the safest drivers. About 10.4 percent of all fatal crashes involved drivers aged 65 and older. Older drivers tend to be more experienced, and they are also less likely to be intoxicated while driving.

Q&A

Why could older drivers be among the safest drivers, as measured by the age of drivers involved in fatal crashes?

There are many factors. Older drivers tend to have the most experience in operating a vehicle, and they avoid conditions that compromise a vehicle's safety. Older drivers tend to take shorter trips, and many avoid driving during bad weather and at night. In 2006, for example, about 81 percent of traffic fatalities involving older drivers occurred during the daytime. Older drivers involved in fatal crashes also have the lowest proportion of intoxication of all adult drivers. In 2006, only 6 percent of drivers aged 65 and older involved in fatal crashes had a blood alcohol content (BAC) of 0.08 or higher.

Transit Safety

Transit operators report safety information to the National Transit Database (NTD) for three major categories: incidents, injuries, and fatalities. Safety information presented in this chapter is for directly operated and purchased transportation services. As safety information for both types of services is now presented, the absolute number of reported incidents and injuries has increased

In 2002, the FTA Office of Safety revised the definitions of an "incident" and an "injury." Given that there is no "statistical bridge" across the change in definitions that occurred between 2001 and 2002, this chapter provides only injury and incident data from 2002 onward. Data on injuries and incidents prior to 2002, which are not comparable with the new data, are available in the 2004 C&P Report.

An incident is recorded by a transit agency for a variety of events occurring on transit property or vehicles, involving transit vehicles, or to persons using the transit system. Included among these is any event that results in significant property damage, one or more reported injuries, one or more reported fatalities, or some combination thereof. Since 2002, the definition of "significant property damage" has been total property damage in excess of $7,500; prior to 2002, the definition was property damage in excess of $1,000. This increase in the property damage threshold has greatly reduced the number of reported incidents.

What sort of events result in a recorded transit incident? Q&A

A transit agency records an incident for any event occurring on transit property, onboard or involving transit vehicles, or to persons using the transit system that results in one of the following:
- One or more confirmed fatalities within 30 days of the incident
- One or more injuries requiring immediate transportation away from the scene for medical attention
- Total property damage to transit property or private property in excess of $7,500
- An evacuation for life safety reasons
- A mainline derailment (i.e., occurring on a revenue service line, regardless of whether the vehicle was in service or out-of-service)
- A fire

Additionally, an incident is recorded by a transit agency whenever one of the following security situations occurs on transit property, onboard or involving transit vehicles, or to persons using the transit system:
- A robbery, burglary, or theft
- A rape
- A suicide or attempted suicide
- An aggravated assault
- An arrest or citation, such as for trespassing, vandalism, fare evasion, or an assault
- A bomb threat
- A bombing
- A release of chemical, biological, nuclear, or radiological materials
- A cybersecurity incident
- A hijacking
- A nonviolent civil disturbance that results in the disruption of transit service
- A sabotage

In 2002, the definition of an injury was switched from a claims basis to a verifiable basis, leading to a reduction in reported injuries. Since 2002, an injury has been reported only when a person has been immediately transported away from the scene of a transit incident for medical care. Prior to 2002, all injuries for which claims were made were reported by transit agencies to the NTD. Since any event producing a reported injury is also reported as an incident, the definitional change for an injury also reduced the number of reported incidents.

The definition of a fatality was not revised in 2002. A fatality is reported for any death occurring within 30 days of a transit incident which is confirmed to be a result of that incident. Although suicides are reported as transit incidents, they are not included in the data on transit fatalities. Fatality data are provided from 1997 through 2006.

Injuries and fatalities include those suffered by riders, as well as those suffered by pedestrians, bicyclists, and people in other vehicles. Injuries and fatalities may occur while traveling on transit, as well as while boarding, alighting, or waiting for transit vehicles to arrive. An injury or fatality may also occur while not using transit, such as in the cases of being struck by a transit vehicle, or in the case of a collision in a transit station parking lot.

Exhibit 5-15 shows annual fatalities for transit services in both absolute numbers and adjusted according to the number of passenger miles traveled (PMT) in each year for 1997 to 2006. Between 1997 and 2006, total fatalities fluctuated between a high of 260 in 1998 and a low of 213 in 2006. There were 214 fatalities in 2005 and 213 in 2006. When adjusted for passenger use, the fatality rate per PMT has decreased over this time period, falling from 0.66 fatalities per 100 million PMT in 1997, to 0.51 per 100 million PMT in 2005, and to 0.49 fatalities per 100 million PMT in 2006.

Exhibit 5-16 provides total incidents and injuries in both absolute terms and per 100 million PMT. Incidents and injuries both increased from 2004 to 2006, falling slightly from 2004 to 2005 before rising again in 2006. Adjusted for passenger use, incidents per 100 million PMT increased and injuries per 100 million PMT decreased during this time period.

Exhibit 5-17 shows fatality rates per 100 million PMT for motor bus, heavy rail, commuter rail, light rail, and demand response, the five largest transit modes in terms of PMT. Together, these modes accounted for approximately 97 percent of total PMT in 2006. (Absolute fatalities are not comparable across modes because of the

Exhibit 5-15

Annual Transit Fatalities, 1997–2006

Year	Total	Per 100 Million PMT
1997	244	0.66
1998	260	0.67
1999	255	0.64
2000	245	0.59
2001	236	0.55
2002	249	0.59
2003	224	0.55
2004	217	0.52
2005	214	0.51
2006	213	0.49

Source: National Transit Database—Transit Safety and Security Statistics and Analysis Reporting.

Exhibit 5-16

Annual Incidents and Injuries, 2004–2006

	Incidents		Injuries	
Year	Total	Per 100 Million PMT	Total	Per 100 Million PMT
2004	24,031	58.00	20,439	49.33
2005	23,578	56.71	19,201	46.18
2006	25,572	59.07	20,857	48.17

Source: National Transit Database—Transit Safety and Security Statistics and Analysis Reporting.

Exhibit 5-17

Annual Transit Fatalities by Mode, 1997–2006 (Per 100 Million PMT)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Motor Bus	0.66	0.73	0.59	0.57	0.54	0.45	0.62	0.46	0.46	0.59
Heavy Rail	0.34	0.25	0.36	0.30	0.24	0.47	0.25	0.34	0.22	0.13
Commuter Rail	1.07	1.01	0.94	0.74	0.87	1.03	0.70	0.80	0.90	0.73
Light Rail	0.29	1.34	1.09	1.64	1.13	0.70	0.89	1.09	1.03	0.72
Demand Response	6.85	4.78	7.20	7.98	3.79	2.99	4.97	2.66	5.28	5.61

Source: National Transit Database—Transit Safety and Security Statistics and Analysis Reporting.

wide range of passenger miles traveled on each mode and are therefore not provided.) This information is presented in *Exhibit 5-18* for all these modes except demand response. Fatalities per 100 million PMT for demand response are excluded from the graph due to their volatility.

Rail transit vehicles that travel on separate fixed guideways have historically had fewer fatalities relative to use than rail transit vehicles that share their guideway with nontransit vehicles. Motor buses, which travel at slower speeds, have also had a relatively low number of fatalities per 100 million PMT. Between 1997 and 2006, with the exception of 1997, heavy rail and motor bus had the fewest fatalities per 100 million PMT among the five largest modes. In 2006, heavy rail had 0.13 fatalities per 100 million PMT and motor bus had 0.59 fatalities per 100 million PMT; heavy rail fatalities per 100 million PMT were above those for motor bus between 1990 and 1996, but decreased significantly over these years. Commuter rail, which has frequent grade crossings with roads and shares track with freight rail vehicles, had more fatalities per 100 million PMT than heavy rail for each year from 1997 to 2006. Light rail had the highest number of fatalities per 100 million PMT among the rail modes in 7 of the 10 years from 1997 to 2006; light rail guideway is often at grade level and has minimal barriers between streets and sidewalks.

Exhibit 5-18
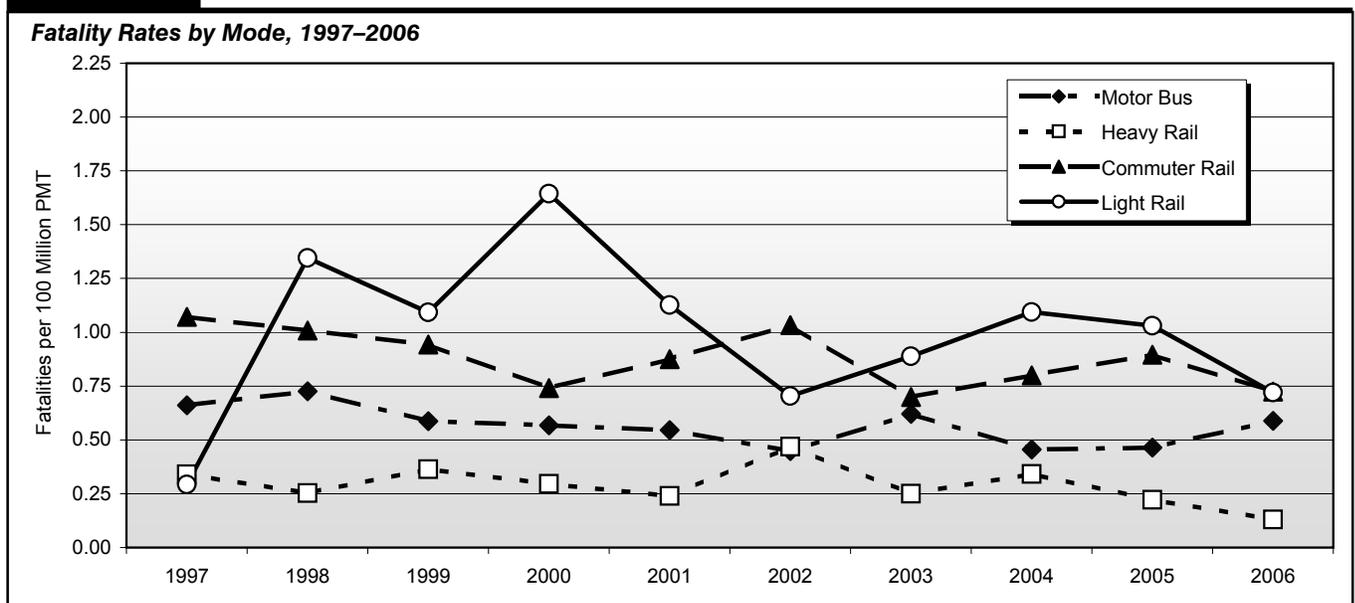
Fatality Rates by Mode, 1997–2006

Source: National Transit Database—Transit Safety and Security Statistics and Analysis Reporting.

The number of fatalities per 100 million PMT on demand response systems fluctuated considerably between 1997 and 2006, ranging from 2.66 fatalities per 100 million PMT in 2004 to 7.98 in 2000. Demand response accounts for less than 1 percent of PMT; therefore, the underlying absolute number of demand response fatalities is very low, which accounts for the high degree of volatility in these numbers.

Exhibit 5-19 provides data on injuries and incidents per 100 million PMT for transportation services on the five largest modes from 2004 to 2006. In 2006, commuter rail, which provides longer trips than other modes, had 18.84 incidents per 100 million PMT and 16.50 injuries per 100 million PMT. Heavy rail had 42.24 incidents and 32.41 injuries per 100 million PMT, light rail had 61.62 incidents and 35.76 injuries per 100 million PMT, and motor buses had 78.71 incidents and 70.84 injuries per 100 million PMT. Demand response had the highest number of incidents and injuries per 100 million PMT from 2004 to 2006. Incidents on demand response systems increased from 895.24 per 100 million PMT in 2004 to 1298.07 per 100 million PMT in 2006, and injuries increased from 448.50 per 100 million PMT to 729.47 per 100 million PMT.

Exhibit 5-19

Transit Incidents and Injuries by Mode, 2004–2006

	2004	2005	2006
Incidents per 100 Million PMT			
Motor Bus	77.31	74.31	78.71
Heavy Rail	44.57	39.79	42.24
Commuter Rail	20.13	21.51	18.84
Light Rail	63.15	67.37	61.62
Demand Response	895.24	1010.24	1298.07
Injuries per 100 Million PMT			
Motor Bus	75.56	70.08	70.84
Heavy Rail	32.88	26.17	32.41
Commuter Rail	16.84	21.05	16.50
Light Rail	41.84	36.59	35.76
Demand Response	448.50	506.00	729.47

Source: National Transit Database—Transit Safety and Security Statistics and Analysis Reporting.

Exhibit 5-20 shows the number of fatalities per 100 incidents for each of the five largest transit modes from 2004 to 2006. This metric does not represent the percentage of incidents that are fatal, as some incidents result in multiple fatalities. The metric does, however, show the likelihood that fatality will result from an incident. Although commuter rail has a very low number of incidents per PMT, commuter rail incidents are far more likely to result in a fatality than incidents occurring on any other mode. Motor buses, on the other hand, have a high number of incidents per PMT, but a lower chance of having an incident result in a fatality than almost any other mode. While light rail and motor bus have similar numbers of incidents per PMT, an incident on light rail is one and a half to three times more likely to produce a fatality than an incident on a motor bus.

Exhibit 5-20

Fatalities per 100 Incidents by Mode, 2004–2006

	2004	2005	2006
Motor Bus	0.59	0.62	0.75
Heavy Rail	0.77	0.56	0.31
Commuter Rail	3.98	4.16	3.85
Light Rail	1.73	1.53	1.17
Demand Response	0.30	0.52	0.43

Source: National Transit Database—Transit Safety and Security Statistics and Analysis Reporting.

Comparison

Exhibit 5-21 compares the key highway and transit statistics discussed in this chapter with the values shown in the last version of the C&P report. The first data column contains the values reported in the 2006 C&P Report, which were based on 2004 data. Where the 2004 data have been revised, updated values are shown in the second column. The third column contains comparable values based on 2006 data.

Exhibit 5-21

Comparison of Safety Statistics With Those in the 2006 C&P Report

	2004 Data		2006 Data
	2006 C&P Report	Revised	2006 Data
Highway Safety			
Number of Fatalities	42,636	42,836	42,642
Fatality Rate per 100,000 People	14.52	14.59	14.24
Fatality Rate per 100 Million VMT	1.4	1.44	1.41
Number of Injuries	2,788,000		2,575,000
Injury Rate per 100,000 People	950		860
Injury Rate per 100 Million VMT	94		85
Transit Safety			
Number of Fatalities	248	217	213
Fatalities per 100 Million PMT	0.55	0.52	0.49
Number of Injuries	18,982	20,439	20,857
Injuries per 100 Million PMT	42	49.33	48.17
Number of Incidents	20,939	24,031	25,572
Incidents per 100 Million PMT	46	58	59.07

Highway fatalities decreased by 0.45 percent between 2004 and 2006, from 42,836 to 42,642. Although the number of fatalities has fallen sharply since 1966, the year when Federal legislation first addressed highway safety, there has been more limited progress in reducing the number of fatalities since 1992.

In 2006, the fatality rate per 100,000 people was 14.24, down from the 2004 fatality rate of 14.59. The fatality rate per 100 million vehicle miles traveled (VMT) declined from 1.44 in 2004 to 1.41 in 2006.

What information is available for highway fatalities and injuries in 2007?

Q&A

The information presented in the highway section of this chapter was drawn primarily from the Fatality Analysis Reporting System (FARS), which contains data on fatal traffic crashes in the 50 States, the District of Columbia, and Puerto Rico. Information in the FARS is updated periodically as submitted by the States, the District of Columbia, and Puerto Rico. For this reason, FARS data represent a "snapshot in time." The data for 2006 and previous years reported in this chapter were drawn from FARS in May 2008.

In August 2008, the National Highway Traffic Safety Administration (NHTSA) issued a *Traffic Safety Facts* summary that assesses key safety data for 2007. This document indicates that in 2007, 41,059 people died on the Nation's highways, a decrease of 3.9 percent from the total number of traffic fatalities in 2006. Also reported is a decrease in the fatality rate, from 1.42 per 100 million VMT in 2006 to 1.37 per 100 million VMT in 2007. In addition, traffic-related injuries declined from 2.58 million in 2006 to 2.49 million in 2007. The *Traffic Safety Facts* summary can be viewed at http://www-nrd.nhtsa.dot.gov/Pubs/811017.PDF.

The number of highway injuries decreased from 2.79 million in 2004 to 2.76 million in 2006. The injury rate per 100,000 people declined from 950 in 2004 to 860 in 2006, and the injury rate per 100 million VMT dropped from 94 in 2004 to 85 in 2006.

Public transit in the United States has been and continues to be a comparably safe mode of transportation, as evidenced by statistics on incidents, injuries, and fatalities as reported by public transportation agencies for the vehicles they operate directly.

Rail transit vehicles that travel on separate fixed guideways have historically had a lower number of fatalities relative to use than rail transit vehicles that share their guideways with nontransit vehicles. Buses, which travel at slower speeds, have also had low fatality rates per 100 million passenger miles traveled (PMT). Total fatalities fluctuated from 244 in 1997, to 217 in 2004, and 213 in 2006. When adjusted for passenger use, however, the fatality rate per 100 million PMT decreased, falling from 0.66 in 1997, to 0.52 in 2004, to 0.49 in 2006.

Between 2004 and 2006 incidents and injuries both increased, falling from 2004 to 2005 before rising again in 2006. When adjusted for passenger use, incidents per 100 million PMT increased and injuries per 100 million PMT decreased during this time period. In 2006, there were 25,572 incidents and 20,857 injuries on transit compared to 24,031 incidents and 20,439 injuries in 2004. When adjusted for passenger travel, there were 59.07 incidents per 100 million PMT and 48.17 injuries per 100 million PMT on transit in 2006, compared with 58.00 incidents per 100 million PMT and 49.33 injuries per 100 million PMT in 2004.