



# Occupant Protection

In 2010, 22,187 occupants of passenger vehicles (passenger cars, pickup trucks, vans, and SUVs) died in motor vehicle traffic crashes. Of the 22,187 total occupants killed, 9,934 were restrained. Restraint use was not known for 1,706 occupants. Looking at only occupants where the restraint status was known 51% were unrestrained at the time of the crash.

Seat belt use in 2010 reached 85 percent, up from 84 percent in 2009. This result is from the National Occupant Protection Use Survey (NOPUS), which is the only survey that provides nationwide probability-based observed data on seat belt use in the United States.

The proportion of unrestrained passenger vehicle occupants killed in motor vehicle traffic crashes has decreased from 2001 to 2010. Among passenger vehicle occupants killed, when restraint use was known, the percentage of unrestrained deaths decreased by 8 percentage points from 59 percent in 2001 to 51 percent in 2010.

Table 1

**Passenger Vehicle Occupant Fatalities in Crashes by Restraint Use, 2001–2010**

Year	Restraint Use						Total		Percent Known Restrained	Percent Known Unrestrained
	Restrained		Unrestrained		Unknown					
	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
2001	11,946	37%	17,517	55%	2,580	8%	32,043	100%	41%	59%
2002	12,533	38%	17,797	54%	2,513	8%	32,843	100%	41%	59%
2003	12,967	40%	16,764	52%	2,540	8%	32,271	100%	44%	56%
2004	13,250	42%	16,432	52%	2,184	7%	31,866	100%	45%	55%
2005	13,064	41%	16,247	51%	2,238	7%	31,549	100%	45%	55%
2006	12,710	41%	15,635	51%	2,341	8%	30,686	100%	45%	55%
2007	12,322	42%	14,446	50%	2,304	8%	29,072	100%	46%	54%
2008	10,691	42%	12,925	51%	1,846	7%	25,462	100%	45%	55%
2009	10,190	43%	11,545	49%	1,712	7%	23,447	100%	47%	53%
2010	9,934	45%	10,547	48%	1,706	8%	22,187	100%	49%	51%

## Age, Gender, Seating Position, and Restraint Use

Among passenger vehicle occupant fatalities where restraint use was known, the age group 25 to 34 had the highest percentage of unrestrained occupants killed: 3,489 fatalities, of which 2,209 (63%) were unrestrained. The second highest

*In 2010, 63 percent of the passenger vehicle occupants ages 25 to 34 killed in traffic crashes were not using restraints — the highest percentage out of all age groups.*

percentage of unrestrained passenger vehicle occupant fatalities was 61 percent among the 21- to 24-year-olds.

In 2010, there were a total of 235 passenger vehicle occupant fatalities among children under age 4. Among the 221 fatalities in this age group for which restraint use was known, 58 (26%) were unrestrained. In the age group of 4 to 7, there were a total of 206 fatalities. Among the 190 fatalities in this age group for which restraint use was known, 77 (41%) were unrestrained.

Among males, there were a total of 14,265 passenger vehicle occupant fatalities. Of the 13,099 fatalities among males for which restraint use was known, 7,381 (56%) were unrestrained. Of the 7,919 fatalities among females, restraint use was known for 7,381, of which 3,166 (43%) were unrestrained.

The proportion of unrestrained passenger vehicle occupants who were seated in the front seat was 50 percent. The proportion of unrestrained passengers was higher (63%) for second row seats.

Table 2

### Passenger Vehicle Occupants Killed, by Age, Gender, Seating Position, and Restraint Use, 2010

	Restrained		Unrestrained		Unknown		Total		Percent Known Restrained	Percent Known Unrestrained
	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
<b>Age (Years)</b>										
<4	163	69	58	25	14	6	235	100	74	26
4-7	113	55	77	37	16	8	206	100	59	41
8-12	110	51	85	40	19	9	214	100	56	44
13-15	112	38	151	51	34	11	297	100	43	57
16-20	1,035	37	1,532	54	247	9	2,814	100	40	60
21-24	905	36	1,419	56	209	8	2,533	100	39	61
25-34	1,280	34	2,209	58	320	8	3,809	100	37	63
35-44	1,042	37	1,541	55	196	7	2,779	100	40	60
45-54	1,247	44	1,368	49	200	7	2,815	100	48	52
55-64	1,240	53	918	39	188	8	2,346	100	57	43
65-74	1,027	62	528	32	94	6	1,649	100	66	34
75+	1,657	67	648	26	162	7	2,467	100	72	28
Unknown	3	13	13	57	7	30	23	100	19	81
<b>Total</b>	<b>9,934</b>	<b>45</b>	<b>10,547</b>	<b>48</b>	<b>1,706</b>	<b>8</b>	<b>22,187</b>	<b>100</b>	<b>49</b>	<b>51</b>
<b>Gender</b>										
Male	5,718	40	7,381	52	1,166	8	14,265	100	44	56
Female	4,215	53	3,166	40	538	7	7,919	100	57	43
Unknown	1	33	0	0	2	67	3	100	100	0
<b>Total</b>	<b>9,934</b>	<b>45</b>	<b>10,547</b>	<b>48</b>	<b>1,706</b>	<b>8</b>	<b>22,187</b>	<b>100</b>	<b>49</b>	<b>51</b>
<b>Seating Position</b>										
<b>Front Seat</b>										
Left	7,275	46	7,449	47	1,201	8	15,925	100	49	51
Middle	6	12	40	80	4	8	50	100	13	87
Right	1,984	51	1,639	42	289	7	3,912	100	55	45
Other/Unknown	0	0	10	83	2	17	12	100	0	100
<b>Total</b>	<b>9,265</b>	<b>47</b>	<b>9,138</b>	<b>46</b>	<b>1,496</b>	<b>8</b>	<b>19,899</b>	<b>100</b>	<b>50</b>	<b>50</b>
<b>Second Seat</b>										
Left	237	35	387	57	55	8	679	100	38	62
Middle	80	28	184	64	22	8	286	100	30	70
Right	309	37	456	55	69	8	834	100	40	60
Other/Unknown	1	5	18	82	3	14	22	100	5	95
<b>Total</b>	<b>627</b>	<b>34</b>	<b>1,045</b>	<b>57</b>	<b>149</b>	<b>8</b>	<b>1,821</b>	<b>100</b>	<b>38</b>	<b>63</b>
Other	32	12	228	85	9	3	269	100	12	88
Unknown	10	5	136	69	52	26	198	100	7	93
<b>Total</b>	<b>9,934</b>	<b>45</b>	<b>10,547</b>	<b>48</b>	<b>1,706</b>	<b>8</b>	<b>22,187</b>	<b>100</b>	<b>49</b>	<b>51</b>

## Vehicle Type and Restraint Use

A total of 15,921 passenger vehicle drivers were killed in traffic crashes in 2010. Among the 14,721 driver fatalities for which restraint use was known, 51 percent (7,449) were unrestrained. Furthermore, 64 percent (2,083) of the drivers of pickup trucks killed were unrestrained, compared to 57 percent (1,422) for SUVs, 47 percent (365) for vans, and 44 percent (3,577) for passenger cars.

A total of 6,266 passengers were killed in passenger vehicles in 2010. Among the 5,760 passenger fatalities for which restraint use was known, 54 percent (3,098) were unrestrained. Furthermore, among the passenger fatalities 68 percent of the passengers in pickup trucks were unrestrained, compared to 64 percent for SUVs, 53 percent for vans, and 46 percent for passenger cars.

Table 3

### Drivers and Passengers Killed, by Passenger Vehicle Type and Restraint Use, 2010

Type of Passenger Vehicle	Restrained		Unrestrained		Unknown		Total		Percent Known Restrained	Percent Known Unrestrained
	Number	Percent	Number	Percent	Number	Percent	Number	Percent		
<b>Drivers Killed</b>										
Passenger Cars	4,621	52	3,577	40	700	8	8,898	100	56	44
Pickup Trucks	1,171	33	2,083	59	248	7	3,502	100	36	64
SUVs	1,068	40	1,422	53	181	7	2,671	100	43	57
Vans	410	49	365	43	70	8	845	100	53	47
Other Light Trucks	2	40	2	40	1	20	5	100	50	50
<b>Total</b>	<b>7,272</b>	<b>46</b>	<b>7,449</b>	<b>47</b>	<b>1,200</b>	<b>8</b>	<b>15,921</b>	<b>100</b>	<b>49</b>	<b>51</b>
<b>Passengers Killed</b>										
Passenger Cars	1,729	49	1,488	42	320	9	3,537	100	54	46
Pickup Trucks	293	30	618	64	60	6	971	100	32	68
SUVs	420	33	744	59	95	8	1,259	100	36	64
Vans	219	44	247	50	31	6	497	100	47	53
Other Light Trucks	1	50	1	50	0	0	2	100	50	50
<b>Total</b>	<b>2,662</b>	<b>42</b>	<b>3,098</b>	<b>49</b>	<b>506</b>	<b>8</b>	<b>6,266</b>	<b>100</b>	<b>46</b>	<b>54</b>

## Seat Belt Use and Benefits

Research has found that lap/shoulder seat belts, when used, reduce the risk of fatal injury to front-seat passenger car occupants by 45 percent and the risk of moderate-to-critical injury by 50 percent. For light-truck occupants, seat belts reduce the risk of fatal injury by 60 percent and moderate-to-critical injury by 65 percent.

Ejection from the vehicle is one of the most injurious events that can happen to a person in a crash. In fatal crashes in 2010, 78 percent of passenger vehicle occupants who were totally ejected from the vehicle were killed. Seat belts are effective in preventing total ejections; only 1 percent of the occupants reported to have been using restraints were totally ejected, compared with 32 percent of the unrestrained occupants.

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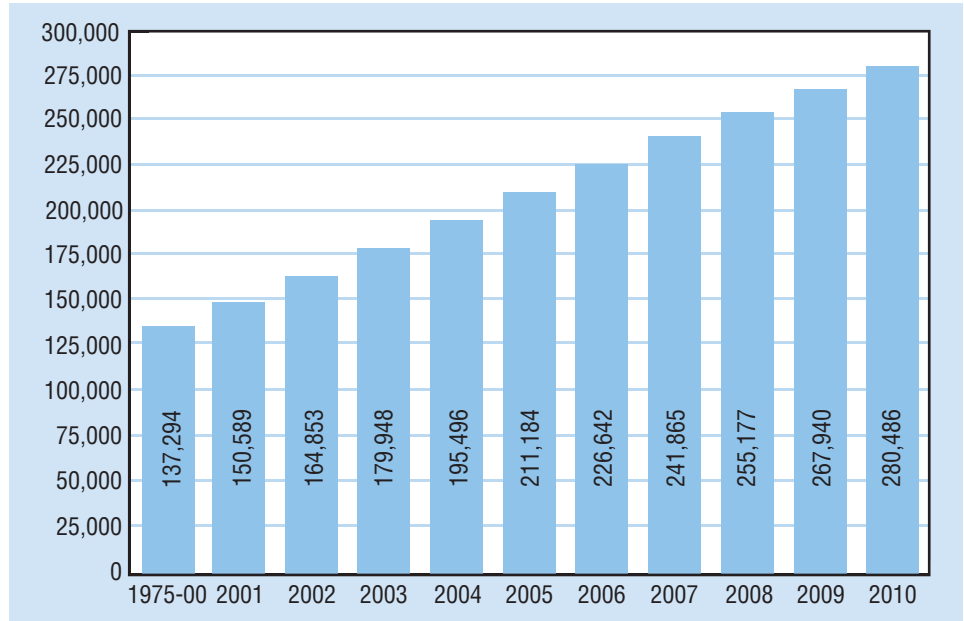
*In 2010, seat belts saved an estimated 12,546 lives among passenger vehicle occupants age 5 and older.*

## Lives Saved by Seat Belts

Among passenger vehicle occupants age 5 and older, seat belts saved an estimated 12,546 lives in 2010. If all passenger vehicle occupants age 5 and older had worn seat belts, 15,887 lives (that is, an additional 3,341) could have been saved in 2010.

Figure 1

### Cumulative Estimated Number of Lives Saved by Seat Belts, 1975–2010



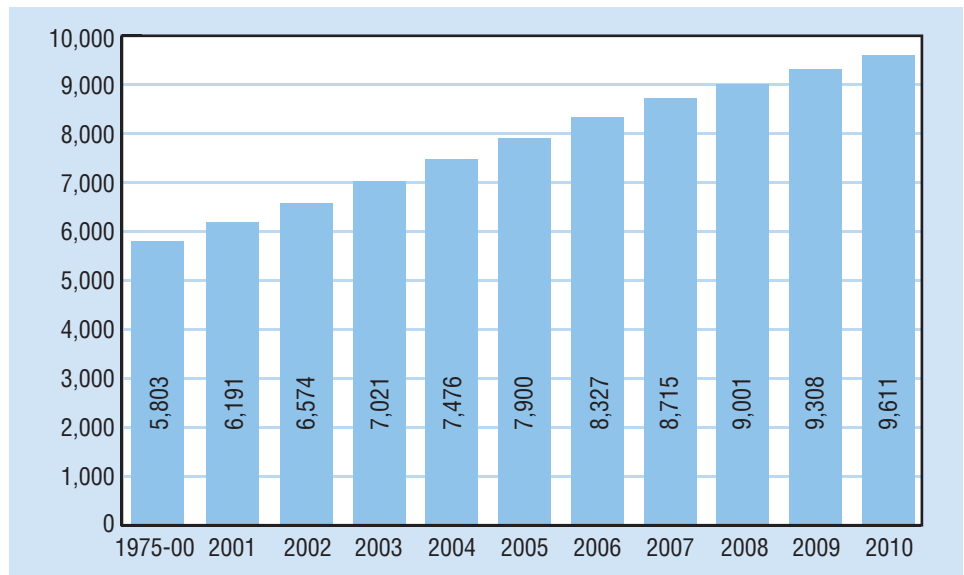
Note: People age 5 years and older.

## Child Restraint Use and Benefits

Research on the effectiveness of child safety seats has found them to reduce the risk of fatal injury by 71 percent for infants (younger than 1 year old) and by 54 percent for toddlers (1 to 4 years old) in passenger cars. For infants and toddlers in light trucks, the corresponding reductions are 58 percent and 59 percent, respectively.

Figure 2

### Cumulative Estimated Number of Lives Saved by Child Restraints, 1975–2010



Child restraints used for infants and toddlers age 4 and younger.

*From 1975 through 2010, an estimated 9,611 lives were saved by child restraints.*

## Lives Saved by Child Safety Seats

Among children under age 5, an estimated 303 lives were saved in 2010 by restraint use. Of these 303 lives saved, 285 were associated with the use of child safety seats and 18 with the use of adult seat belts.

At 100-percent child safety seat use for children under age 5, an estimated 353 (that is, an additional 50) lives could have been saved in 2010.

## Frontal Air Bag Use and Benefits

Frontal air bags, combined with lap/shoulder belts, offer effective safety protection for passenger vehicle occupants. NHTSA analyses indicate a fatality-reducing effectiveness for frontal air bags of 14 percent when no seat belt was used and 11 percent when a seat belt was used in conjunction with frontal air bags.

It is estimated that as of 2010, 187 million air-bag-equipped passenger vehicles were on the road, including 180 million with dual air bags.

Air bags are supplemental protection and are not designed to deploy in all crashes. Most are designed to inflate in a moderate-to-severe frontal crash.

Some crashes at lower speeds may result in injuries, but generally not the serious injuries that air bags are designed to prevent. Lap/shoulder belts should always be used, even in vehicles with air bags.

*Children in rear-facing child safety seats should not be placed in the front seat of vehicles equipped with passenger-side air bags. The impact of a deploying air bag striking a rear-facing child safety seat could result in serious injury to the child.*

*Frontal air bags, combined with lap/shoulder belts, offer effective safety protection for passenger vehicle occupants.*

## Lives Saved by Frontal Air Bags

In 2010, an estimated 2,306 lives were saved by frontal air bags. From 1987 to 2010, a total of 32,544 lives were saved.

Table 4

### Estimated Number of Lives Saved by Restraint Systems, 1975-2010

Restraint Type	1975-00	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
Seat Belts	137,294	13,295	14,264	15,095	15,548	15,688	15,458	15,223	13,312	12,763	12,546	280,486
Child Restraints	5,803	388	383	447	455	424	427	388	286	307	303	9,611
Frontal Air Bags	7,437*	1,978	2,324	2,519	2,660	2,752	2,824	2,800	2,557	2,387	2,306	32,544

\*Note: Total from 1987-2000. Frontal air bags did not exist prior to 1987.

Seat belt use rates in the States, the District of Columbia, and Puerto Rico in 2010 are shown in the last column in Table 5. The results were obtained by observing traffic on roads at selected sites. For more information on seat belt use rates, see the Crash\*Stat titled Seat Belt Use in 2010—Use Rates in the States and Territories (DOT HS 811 493).

The overall observed seat belt use rate was 85 percent in 2010, compared to 73 percent in 2001. In 1994, the overall observed seat belt use rate was 58 percent.

*Between 1987 and 2010, 32,544 lives were saved by frontal air bags.*

Table 5

**Passenger Vehicle Occupants Killed by State, Restraint Use, and Observed Seat Belt Use Rate by State, 2010**

State	Restraint Use						Total Occupants Killed		Observed Seat Belt Use Rate*
	Restrained		Unrestrained		Unknown				
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Alabama	270	39	394	57	25	4	689	100	91.4%
Alaska	23	61	12	32	3	8	38	100	86.8%
Arizona	151	36	223	53	44	11	418	100	81.8%
Arkansas	133	33	241	59	33	8	407	100	78.3%
California	979	62	483	30	127	8	1,589	100	96.2%
Colorado	134	44	161	53	11	4	306	100	82.9%
Connecticut	78	39	85	42	39	19	202	100	88.2%
Delaware	46	69	21	31	0	0	67	100	90.7%
Dist of Columbia	2	25	5	63	1	13	8	100	92.3%
Florida	659	47	707	50	37	3	1,403	100	87.4%
Georgia	380	43	427	48	78	9	885	100	89.6%
Hawaii	20	36	25	45	10	18	55	100	97.6%
Idaho	77	49	72	46	7	4	156	100	77.9%
Illinois	286	46	261	42	78	12	625	100	92.6%
Indiana	261	48	208	38	78	14	547	100	92.4%
Iowa	126	45	119	43	35	13	280	100	93.1%
Kansas	116	33	206	59	29	8	351	100	81.8%
Kentucky	246	44	310	56	1	0	557	100	80.3%
Louisiana	189	36	283	55	46	9	518	100	75.9%
Maine	69	57	40	33	13	11	122	100	82.0%
Maryland	158	53	125	42	13	4	296	100	94.7%
Massachusetts	54	29	92	49	40	22	186	100	73.7%
Michigan	318	53	207	35	74	12	599	100	95.2%
Minnesota	148	50	113	38	37	12	298	100	92.3%
Mississippi	189	36	339	64	1	0	529	100	81.0%
Missouri	193	31	383	62	42	7	618	100	76.0%
Montana	50	34	91	62	6	4	147	100	78.9%
Nebraska	46	31	79	53	23	16	148	100	84.1%
Nevada	78	49	77	48	5	3	160	100	93.2%
New Hampshire	28	31	62	68	1	1	91	100	72.2%
New Jersey	155	48	159	49	9	3	323	100	93.7%
New Mexico	147	58	106	42	0	0	253	100	89.8%
New York	347	55	192	30	93	15	632	100	89.8%
North Carolina	440	48	415	46	54	6	909	100	89.7%
North Dakota	20	27	46	63	7	10	73	100	74.8%
Ohio	303	39	404	53	62	8	769	100	83.8%
Oklahoma	182	37	275	57	29	6	486	100	85.9%
Oregon	126	65	51	26	17	9	194	100	97.0%
Pennsylvania	277	32	507	58	90	10	874	100	86.0%
Rhode Island	12	32	26	68	0	0	38	100	78.0%
South Carolina	234	40	313	53	44	7	591	100	85.4%
South Dakota	28	30	60	64	6	6	94	100	74.5%
Tennessee	303	40	417	54	47	6	767	100	87.1%
Texas	1,060	51	834	40	196	9	2,090	100	93.8%
Utah	82	48	79	46	10	6	171	100	89.0%
Vermont	23	42	31	56	1	2	55	100	85.2%
Virginia	229	43	302	56	4	1	535	100	80.5%
Washington	185	59	101	32	26	8	312	100	97.6%
West Virginia	71	30	131	56	34	14	236	100	82.1%
Wisconsin	169	44	178	46	37	10	384	100	79.2%
Wyoming	34	32	69	65	3	3	106	100	78.9%
<b>U.S. Total</b>	<b>9,934</b>	<b>45</b>	<b>10,547</b>	<b>48</b>	<b>1,706</b>	<b>8</b>	<b>22,187</b>	<b>100</b>	<b>85%</b>
Puerto Rico	61	36	107	64	0	0	168	100	NA

Grey shaded: States with primary seat belt laws in 2010.

\*Crash\*Stats (DOT HS 811 493) dated July 2011

## Restraint Use Laws

The U.S. Department of Transportation's July 1984 rulemaking on automatic occupant protection began a wave of legislative action that resulted in the enactment of seat belt use laws in many States. The goal of those laws is to promote belt use and thereby reduce deaths and injuries in motor vehicle crashes.

The first mandatory belt use law was enacted in the State of New York in 1984. Adult belt use laws are now in effect in 49 States and the District of Columbia. The laws differ from State to State, according to the type and age of the vehicle, occupant seating position, etc.

In 19 of the States with belt use laws, the law specifies secondary enforcement. That is, police officers are permitted to write a citation only after a vehicle is stopped for some other traffic infraction. Thirty States, Puerto Rico, and the District of Columbia have laws that allow primary enforcement, enabling officers to stop vehicles and write citations whenever they observe violations of the seat belt law.

The first mandatory child restraint use law was implemented in the State of Tennessee in 1978. Since 1985, all 50 States and the District of Columbia have had child restraint use laws in effect. These laws also cover various segments of the population.

A 2008 NHTSA research note, *States With Primary Enforcement Laws Have Lower Fatality Rates (Updated)*, indicated that States with primary enforcement seat belt laws achieved significantly higher belt use than did those with secondary enforcement laws. The analysis suggests that belt use among fatally injured occupants was at least 13 percentage points higher in States with primary enforcement laws.

### For more information:

Information on traffic fatalities is available from the National Center for Statistics and Analysis (NCSA), NVS-424, 1200 New Jersey Avenue SE., Washington, DC 20590. NCSA can be contacted at 800-934-8517 or via the following e-mail address: [ncsaweb@dot.gov](mailto:ncsaweb@dot.gov). General information on highway traffic safety can be accessed by Internet users at [www.nhtsa.gov/NCSA](http://www.nhtsa.gov/NCSA). To report a safety-related problem or to inquire about motor vehicle safety information, contact the Vehicle Safety Hotline at 888-327-4236.

Other fact sheets available from the National Center for Statistics and Analysis are *Alcohol-Impaired Driving, Bicyclists and Other Cyclists, Children, Large Trucks, Motorcycles, Older Population, Overview, Passenger Vehicles, Pedestrians, Race and Ethnicity, Rural/Urban Comparisons, School Transportation-Related Crashes, Speeding, State Alcohol Estimates, State Traffic Data, and Young Drivers*. Detailed data on motor vehicle traffic crashes are published annually in *Traffic Safety Facts: A Compilation of Motor Vehicle Crash Data from the Fatality Analysis Reporting System and the General Estimates System*. The fact sheets and annual Traffic Safety Facts report can be accessed online at [www-nrd.nhtsa.dot.gov/CATS/index.aspx](http://www-nrd.nhtsa.dot.gov/CATS/index.aspx).



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