UMTRI-2010-12 MAY 2010

TOWARD UNDERSTANDING THE RECENT LARGE REDUCTIONS IN U.S. ROAD FATALITIES

MICHAEL SIVAK
BRANDON SCHOETTLE

TOWARD UNDERSTANDING THE RECENT LARGE REDUCTIONS IN U.S. ROAD FATALITIES

Michael Sivak
Brandon Schoettle

The University of Michigan
Transportation Research Institute
Ann Arbor, Michigan 48109-2150
U.S.A.

Report No. UMTRI-2010-12
May 2010

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
UMTRI-2010-12		

4. Title and Subtitle	5. Report Date
Toward Understanding the Recent Large Reductions in U.S. Road Fatalities	May 2010
	6. Performing Organization Code: 383818

7. Author(s)	8. Performing Organization Report No.
Michael Sivak and Brandon Schoettle	UMTRI-2010-12

9. Performing Organization Name and Address	10. Work Unit no. (TRAIS)
The University of Michigan Transportation Research Institute 2901 Baxter Road Ann Arbor, Michigan 48109-2150 U.S.A.	11. Contract or Grant No.

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
The University of Michigan Sustainable Worldwide Transportation	14. Sponsoring Agency Code

15. Supplementary Notes

The current members of Sustainable Worldwide Transportation include Autoliv Electronics, Bosch, FIA Foundation for the Automobile and Society, General Motors, Honda R&D Americas, Nissan Technical Center North America, and Toyota Motor Engineering and Manufacturing North America. Information about Sustainable Worldwide Transportation is available at: http://www.umich.edu/~umtriswt

16. Abstract

From 2005 to 2009, U.S. road fatalities dropped by 22% (from 43,510 to 33,963). A reduction of such magnitude over such a short time has not occurred since road-safety statistics were first kept (starting in 1913), except for the reductions during World War II.

The present study was performed to contribute to our understanding about the mechanisms that could be responsible for this unprecedented drop in road fatalities by analyzing the detailed information from FARS (Fatality Analysis Reporting System)—a census of all U.S. crashes that involve a fatality. Specifically, this study compared the data for 2005 (the recent peak year in terms of road fatalities) with the data for 2008 (the latest year for which detailed data are available). The focus was on identifying those conditions that showed the largest reductions and those that showed the smallest reductions (or increases of any magnitude). The analysis involved an examination of all 269 variables in the FARS database, which is divided into accident, vehicle, driver, occupant, and nonmotorist subsets. The report highlights the most interesting patterns of changes for 19 variables.

17. Key Words	18. Distribution Statement
Road fatalities, decline, U.S.A., mechanisms, FARS	Unlimited

19. Security Classification (of this report)	20. Security Classification (of this page)	21. No. of Pages	22. Price
None	None	24	

Acknowledgment

This research was supported by Sustainable Worldwide Transportation (http://www.umich.edu/~umtriswt). The current members of this research consortium are Autoliv Electronics, Bosch, FIA Foundation for the Automobile and Society, General Motors, Honda R&D Americas, Nissan Technical Center North America, and Toyota Motor Engineering and Manufacturing North America.

We thank our colleague Charlie Compton for his assistance with the FARS database.

Contents

Introduction

From 1994 to 2005, U.S. road fatalities increased by 7%, from 40,716 to 43,510. However, from 2005 to 2009, they dropped by 22%, to 33,963 in 2009 (see Figure 1). A reduction of such magnitude over such a short time has not occurred since road-safety statistics were first kept (starting in 1913), except for the reductions during World War II (NSC, 2009).

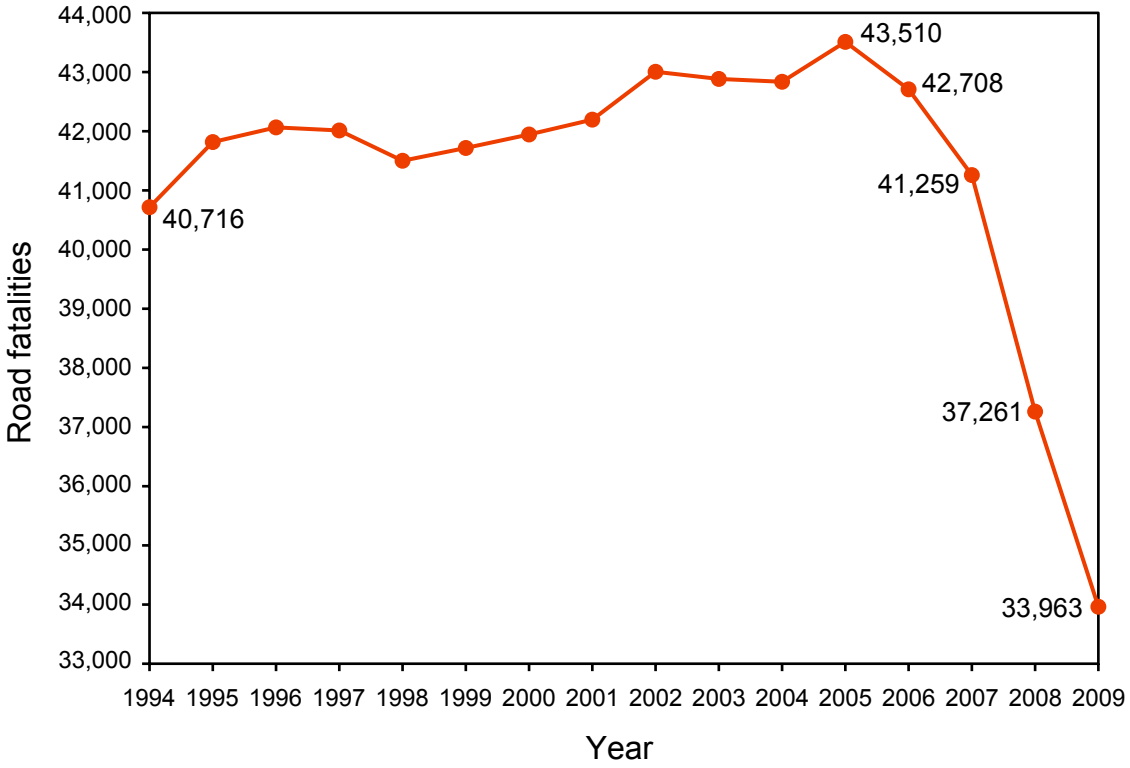

Figure 1. U.S. road fatalities from 1994 through 2009 (NHTSA, 2010a; 2010b).

What has caused this large reduction in road fatalities? In two previous publications, we began our examination of the factors associated with this reduction (Sivak, 2008; 2009), concentrating on the contribution of economic factors (e.g., the increase in the price of gasoline) and the resultant changes in driving amounts and patterns. At the time of the preparation of those two studies, detailed information about

recent fatal crashes was not yet available. Therefore, those studies relied only on the total monthly fatality counts. The present study continues that examination of the possible mechanisms involved in the recent reductions in road fatalities by analyzing the detailed information from FARS (Fatality Analysis Reporting System)—a census of all U.S. crashes that involve a fatality. Specifically, this study compared the data for 2005 (the recent peak year in terms of fatalities) with the data for 2008 (the latest year for which detailed data are available).

Approach

The approach involved comparing the distributions for each of the 269 variables in FARS for 2008 relative to those for 2005. The goal was to identify those conditions that showed the largest reductions and those that showed smallest reductions (or increases of any magnitude).

The FARS database is divided into five subsets that include variables related to accidents,[1] vehicles, drivers, occupants, and nonmotorists. For each variable, the changes for individual conditions from 2005 to 2008 were compared with the overall change for that subset. This approach is illustrated in Table 1, which shows the changes in the frequency of accidents by state. In 2005, there were 39,189 fatal accidents in the U.S. The corresponding number for 2008 was 34,017, for an overall reduction of 13.2%. The entries in Table 1 include the states with the largest reductions in fatal accidents, and the states with the smallest reductions (or any increases). The changes for each state (the extremes being -32.3% for South Dakota and +3.8% for Utah) should be compared with the overall change for the entire U.S. (-13.2%).

The appropriate comparison base (the overall reduction for the U.S.) varies based on the subset that the variable is from. The respective overall reductions were 13.2% for accidents, 15.1% for vehicles and drivers, 17.3% for occupants, and 10.1% for nonmotorists. The appropriate overall reduction for each variable is shown in each relevant table as the last entry (as are the corresponding yearly totals).

The tables in the Results section contain information concerning 18 variables, in addition to the state variable in Table 1, which led to interesting patterns of change. The tables for each of the selected variables highlight, in general, the variable values with the largest reductions from 2005 to 2008, and those with the smallest reductions (or any increases). However, certain extreme entries are not included, primarily because of small frequencies in the corresponding cells.

[1] The currently preferred term is "crashes." However, the FARS database uses the term "accidents." Consequently, when referring to the FARS data, we retain the term "accidents."

Table 1
Changes in fatal accidents for selected states.

Year		State	Change from 2005 to 2008
2005	2008		
235	244	Utah	+3.8%
3,104	3,031	Texas	-2.4%
347	338	West Virginia	-2.6%
238	188	Nebraska	-21.0%
80	63	Rhode Island	-21.3%
714	561	Wisconsin	-21.4%
1,230	950	Illinois	-22.8%
420	324	New Mexico	-22.9%
1,117	845	Missouri	-24.4%
44	32	District of Columbia	-27.3%
158	107	South Dakota	-32.3%
39,189	*34,017*	*Total accidents*	*-13.2%*

To assess the potential influence on the overall fatalities, both the frequencies in the conditions of interest and the changes over time are important to consider. Therefore, Table 1 (and the tables that follow) presents not only the percentage changes from 2005 to 2008 but also the actual frequencies for both years.

Results

Time of day

Fatal accidents during rush hours showed greater reductions than the overall accident reduction (Table 2). This finding is consistent with reduced commuter traffic because of the current economic downturn.

Table 2
Changes in fatal accidents by time of day.

Year		Time of day	Change from 2005 to 2008
2005	2008		
4,998	4,486	12:00 AM - 2:59 AM	-10.2%
3,158	2,774	3:00 AM - 5:59 AM	-12.2%
3,885	3,236	6:00 AM - 8:59 AM	-16.7%
3,740	3,285	9:00 AM - 11:59 AM	-12.2%
5,068	4,356	12:00 PM - 2:59 PM	-14.0%
6,481	5,325	3:00 PM - 5:59 PM	-17.8%
6,149	5,342	6:00 PM - 8:59 PM	-13.1%
5,401	4,952	9:00 PM - 11:59 PM	-8.3%
309	261	Unknown	-15.5%
39,189	*34,017*	*Total accidents*	*-13.2%*

Roadway class

Fatal accidents on rural interstates dropped substantially more than the overall accidents, while those on local roads/streets increased (Table 3). This pattern is consistent with a replacement of some long-distance leisure driving with local leisure driving in response to the economic concerns.

Table 3
Changes in fatal accidents for selected roadway classes.

Year		Roadway class	Change from 2005 to 2008
2005	2008		
RURAL			
3,937	3,848	Principal arterial - other	-2.3%
3,854	3,732	Local road or street	-3.2%
1,400	1,312	Minor collector	-6.3%
2,674	2,075	Principal arterial - interstate	-22.4%
21,010	*18,762*	*Total Rural*	*-10.7%*
URBAN			
3,133	3,214	Local road or street	+2.6%
1,269	1,156	Collector	-8.9%
15,802	*13,209*	*Total urban*	*-16.4%*
39,189	*34,017*	*Total accidents*	*-13.2%*

Manner of collision, *initial impact point*, *and airbag availability/deployment*

Three related aspects were found. First, front-to-side fatal collisions (opposite direction or direction unknown) declined more than all fatal collisions (Table 4). Second, collisions with the initial impact point near 3 o'clock and 9 o'clock were reduced more than other collisions (Table 5). Third, airbag deployment from the side (or from an unknown direction) increased dramatically (Table 6), most likely reflecting the increased installation of side airbags. Consistent with this interpretation is the fact that the number of seats with no airbag protection was reduced more than the number of involved occupants (Table 6).

Front-to-front fatal collisions were also reduced more than all fatal collisions (Table 4). This could be a consequence of reduced speeds (see below), higher proportion of vehicles on the road with front airbags, and improved front airbags.

Table 4
Changes in fatal accidents for selected manners of collision.

Year		Manner of collision	Change from 2005 to 2008
2005	2008		
23,181	21,102	Not a collision with another motor vehicle	-9.0%
2,414	2,113	Front-to-rear (includes rear end)	-12.5%
5,126	4,427	Angle—front-to-side, right-angle	-13.6%
506	423	Angle—font-to-side, same direction	-16.4%
4,010	3,219	Front-to-front (includes head-on)	-19.7%
2,279	1,567	Angle—front-to-side, opposite direction	-31.2%
298	141	Angle—front-to-side, direction unknown	-52.7%
39,189	*34,017*	*Total accidents*	*-13.2%*

Table 5
Changes in the initial impact point on the vehicles involved in fatal accidents.

Year		Initial impact point	Change from 2005 to 2008
2005	2008		
3,088	2,477	Noncollision	-19.8%
37,194	32,049	11 to 1 o'clock	-13.8%
5,416	4,576	2 to 4 o'clock	-15.5%
4,284	3,791	5 to 7 o'clock	-11.5%
6,390	4,964	8 to 10 o'clock	-22.3%
447	393	Top	-12.1%
966	928	Undercarriage	-3.9%
1,588	1,252	Other/Unknown	-21.2%
59,373	*50,430*	*Total vehicles*	*-15.1%*

Table 6
Changes in selected conditions of airbag availability and/or deployment.

Year		Airbag availability/deployment	Change from 2005 to 2008
2005	2008		
159	509	Deployed from the side	+220.1%
962	2,088	Deployed from unknown direction	+117.0%
735	1,052	Deployed from multiple directions	+43.1%
21,183	18,421	Deployed from the front	-13.0%
45,271	31,995	Not available (for this seat)	-29.3%
94,405	*78,066*	*Total occupants*	*-17.3%*

Speed limit and crash avoidance maneuver

Roads with a speed limit of 50 mph or higher showed reductions that were greater than the overall reductions, while the opposite was the case for roads with speed limits between 20 and 45 mph (Table 7). (Roads with speed limits between 5 and 15 mph showed a large increase, but the actual frequencies are small.) This pattern is consistent with the postulated decrease in speeds as a consequence of drivers' efforts to improve the fuel economy of their vehicles (Sivak, 2008). (However, we were unable to find any quantitative data on changes in actual speeds.)

Supporting the reduction-in-speed hypothesis are the data on crash avoidance maneuvers (Table 8). Specifically, there was a disproportionate reduction in cases where no avoidance maneuver was reported. (The slower the speed, the more likely an avoidance maneuver is possible.)

Table 7
Changes in fatal accidents by posted speed limit.

Year		Speed limit	Change from 2005 to 2008
2005	2008		
120	126	No statutory limit	+5.0%
68	92	5-15 mph	+35.3%
3,852	3,613	20-30 mph	-6.2%
12,484	11,056	35-45 mph	-11.4%
14,887	12,524	50-60 mph	-15.9%
6,724	5,697	60+ mph	-15.5%
1,053	908	Unknown	-13.8%
39,189	*34,017*	*Total accidents*	*-13.2%*

Table 8
Changes in crash avoidance maneuvers for drivers involved in fatal accidents.

Year		Crash avoidance maneuver	Change from 2005 to 2008
2005	2008		
199	236	Other avoidance maneuver	+18.6%
2,598	2,177	Steering and braking	-16.2%
3,771	3,157	Braking	-16.3%
5,476	4,548	Steering	-16.9%
28,669	22,864	No avoidance maneuver	-20.2%
18,660	17,448	Not reported (by police)	-6.5%
59,373	*50,430*	*Total drivers*	*-15.1%*

Construction zone

Fatal accidents in construction zones decreased greatly (Table 9). This most likely reflects the fact that reduced highway budgets led to substantial reductions in road construction activities.

Table 9
Changes in fatal accidents occurring in construction zones.

Year		Construction zone	Change from 2005 to 2008
2005	2008		
38,240	33,355	None	-12.8%
949	662	Construction/maintenance/utility	-30.2%
39,189	*34,017*	*Total accidents*	*-13.2%*

Number of fatalities per accident and number of fatalities per vehicle

Accidents with multiple fatalities were reduced more than those with a single fatality (Table 10). The same pattern is also evident in terms of the number of fatalities per vehicle (Table 11). These findings are consistent with the above-discussed increase in the availability and deployment of airbags.

Table 10
Changes in the total number of fatalities per accident.

Year		Number of fatalities per accident	Change from 2005 to 2008
2005	2008		
35,803	31,376	1 fatality	-12.4%
2,784	2,219	2 fatalities	-20.3%
415	311	3 fatalities	-25.1%
187	111	4 or more fatalities	-40.6%
39,189	*34,017*	*Total accidents*	*-13.2%*

Table 11
Changes in the total number of fatalities per vehicle.

Year		Number of fatalities per vehicle	Change from 2005 to 2008
2005	2008		
25,185	21,059	0 fatalities	-16.4%
31,417	27,212	1 fatality	-13.4%
2,311	1,848	2 fatalities	-20.0%
339	230	3 fatalities	-32.2%
121	81	4 or more fatalities	-33.1%
59,373	*50,430*	*Total vehicles*	*-15.1%*

Vehicle body type

The number of minivans, hatchbacks, 2-door vehicles, and utility station wagons in fatal crashes was reduced more than the overall vehicle reduction (Table 12), presumably reflecting the reduced frequency of these particular vehicles on the road. On the other hand, the involvement of motorcycles increased. This finding would be consistent with continuations of (1) an increase in motorcycle ownership by middle-aged men with little or no prior experience and (2) an increase sale of motorcycles with larger engine sizes—the trends noted by Shankar and Varghese (2006).

Table 12
Changes in fatalities for selected vehicle body types.

Year		Vehicle body type	Change from 2005 to 2008
2005	2008		
4,492	5,129	Motorcycle	+14.2%
16,932	14,355	4 door sedan/hard top	-15.2%
2,574	1,967	Minivan	-23.6%
1,111	794	3 door/2 door hatchback	-28.5%
5,055	3,359	2 door sedan/hard top/coupe	-33.6%
464	264	Utility station wagon	-43.1%
59,373	*50,430*	*Total vehicles*	*-15.1%*

VIN truck weight code

The involvement of heavy trucks was reduced more than the involvement of all vehicles (Table 13). This is consistent with the overall reduction in freight shipments due to the economic downturn (BTS, 2010).

Table 13
Changes in selected categories of weights for vehicles involved in fatal accidents.

Year		VIN truck weight code	Change from 2005 to 2008
2005	2008		
1,562	1,251	10,001 – 33,000 lbs.	-19.9%
3,780	3,081	33,001 or more lbs.	-18.5%
59,373	*50,430*	*Total vehicles*	*-15.1%*

Driver drinking and previous DWI (driving while intoxicated) convictions

As shown in Table 14, the number of drivers with drinking reported showed a disproportionately small reduction. (Conversely, the number of drivers with no drinking reported showed a disproportionately large reduction.) This could be a reflection of the increased alcohol consumption per capita (of beer, wine, and distilled spirits) from 2005 to 2008 (USDA, 2010), or increased DWI enforcement leading to higher detection.

At the same time, the number of repeat DWI offenders showed a disproportionately large reduction (Table 15). This may be a consequence of a disproportionate decrease in driving by repeat DWI offenders due to economic factors, because drivers from lower socio-economic groups tend to be overrepresented among repeat DWI offenders (Jones and Lacey, 2000).

Table 14
Changes in reported drinking for drivers involved in fatal accidents.

Year		Driver drinking	Change from 2005 to 2008
2005	2008		
11,783	11,015	Drinking reported	-6.5%
47,590	39,415	No drinking reported	-17.2%
59,373	*50,430*	*Total drivers*	*-15.1%*

Table 15
Changes in selected categories of previous DWI convictions for drivers involved in fatal accidents.

Year		Number of previous DWI convictions per driver	Change from 2005 to 2008
2005	2008		
54,917	46,865	0 DWI convictions	-14.7%
1,477	1,222	1 DWI conviction	-17.3%
208	157	2 DWI convictions	-24.5%
59,373	*50,430*	*Total drivers*	*-15.1%*

Previous involvement in accidents

The number of drivers with two or more previous accidents was reduced more than the average reduction in the number of involved drivers (Table 16). Possible explanations include the above-discussed disproportionate reduction in driving by drivers with multiple prior DWI convictions, and a disproportionate reduction in driving by persons from lower socio-economic groups who tend to have worse driving records (Stamatiadis and Puccini, 1999).

Table 16
Changes in selected categories of previous accidents for drivers involved in fatal accidents.

Year		Number of previous accidents per driver	Change from 2005 to 2008
2005	2008		
45,699	39,057	0 accidents	-14.5%
6,112	5,239	1 accident	-14.3%
1,070	795	2 accidents	-25.7%
230	167	3 accidents	-27.4%
59,373	*50,430*	*Total drivers*	*-15.1%*

Driver-related factors[2]

As shown in Table 17, among driver-related factors that exhibited unusually large reductions were operating the vehicle in an erratic, reckless, careless, or negligent manner (possibly due to decreased speeds), as well as being drowsy, sleepy, asleep, or fatigued (possibly due to a disproportionate reduction in long-distance leisure driving, which more frequently involves nighttime driving than commuter driving). On the other hand, inattentive driving (talking, eating, using cell phones, etc.) showed a large increase (possibly reflecting the increased pace and complexity of daily lives, increased distractions, or increased sensitivity of coders to the issue of distractions). (The data on road rage are based on small numbers.)

Table 17
Changes in selected driver-related factors for drivers involved in fatal accidents.

Year		Driver related factors	Change from 2005 to 2008
2005	2008		
189	409	Illegal driving on road shoulder, in ditch, on sidewalk or on median	+116.4%
48	97	Road rage/aggressive driving	+102.1%
2,369	3,366	Inattentive (talking, eating, using cell phones, etc.)	+42.1%
5,419	5,125	Under the influence of alcohol, drugs or medication	-5.4%
21,324	17,437	None	-18.2%
8,860	6,323	Failure to keep in proper lane	-28.6%
785	477	Drowsy, sleepy, asleep, fatigued	-39.2%
176	75	Pedestrian, pedalcyclist, or other nonmotorist	-57.4%
1,009	426	Operating the vehicle in an erratic, reckless, careless or negligent manner	-57.8%
59,373	*50,430*	*Total drivers*	*-15.1%*

[2] The FARS database contains four sets of driver-related factors. Here we report only on the first (primary) factor.

Driver age

Drivers between 16 and 25 years of age showed a disproportionate decrease of involvement in fatal accidents (Table 18). Possible explanations include a disproportionate reduction in the amount of driving in this age group because young drivers are likely to be more affected by economic fluctuations, and the increased implementation of effective graduated driver licensing.

Table 18
Changes in the ages of drivers involved in fatal accidents.

Year		Driver age	Change from 2005 to 2008
2005	2008		
304	213	15 or younger	-29.9%
7,293	5,729	16-20	-21.4%
7,939	6,503	21-25	-18.1%
11,084	9,402	26-35	-15.2%
10,683	8,762	36-45	-18.0%
9,147	8,154	46-55	-10.9%
5,623	5,390	56-65	-4.1%
3,082	2,749	66-75	-10.8%
2,158	1,899	76-85	-12.0%
602	537	86 or older	-10.8%
1,458	1,092	Unknown	-25.1%
59,373	*50,430*	*Total drivers*	*-15.1%*

Nonmotorist locations

Table 19 indicates that there was an unusually large drop in pedestrian fatalities due to jaywalking (being on the roadway away from a designated pedestrian crossing). This would be consistent with the above-postulated general decrease in driving speeds, because slower speeds would make jaywalking less dangerous.

Table 19
Changes in selected categories of the locations relative to the roadway for nonmotorists involved in fatal accidents.

Year		Nonmotorist location	Change from 2005 to 2008
2005	2008		
173	294	Intersection – on roadway, crosswalk availability unknown	+69.9%
187	222	Intersection – on roadway, crosswalk not available	+18.7%
1,941	2,065	Nonintersection – on roadway, crosswalk not available	+6.4%
462	487	Intersection – in crosswalk	+5.4%
434	378	Intersection – on roadway, not in crosswalk	-12.9%
1,701	1,002	Nonintersection – on roadway, not in crosswalk	-41.1%
6,629	*5,960*	*Total nonmotorists*	*-10.1%*

Conclusions

This study examined the changes in the characteristics of U.S. fatal crashes from 2005 (the recent peak year in terms of fatalities) to 2008 (the latest year for which detailed data are available). The main findings, and possible explanations, are summarized in Table 20.

Table 20
Summary of the main findings.
Desirable changes are in green and undesirable changes are in red.

Aspect	Change from 2005 to 2008 relative to the average change	Possible explanation(s)
Rush hours	Down	Decreased commuter travel
Interstates	Down	Reduced long-distance leisure travel
Local roads/streets	Up	Increased local leisure travel
Side crashes	Down	More side airbags
Deployment of side airbags	Up	More side airbags
Seats with no airbags	Down	More airbags
Frontal crashes	Down	Decreased speeds; more seats with front airbags; improved airbags
Roads with higher speed limits	Down	Decreased speeds
No avoidance maneuver	Down	Decreased speeds
Construction zone	Down	Reduced road construction
Multiple fatalities per crash and per vehicle	Down	More airbags
Motorcycles	Up	Increased ownership (1) by middle-aged men and (2) of larger motorcycles
Heavy trucks	Down	Reduced freight shipments
Reported alcohol use	Up	Increased alcohol consumption; increased DWI enforcement
Repeat DWI offenders	Down	Disproportionate reduction in driving by repeat DWI offenders
Repeat crash involvement	Down	Decreased alcohol involvement; fewer high-risk drivers on the road
Reckless driving	Down	Decreased speeds
Drowsy driving	Down	Disproportionate decrease in long-distance leisure driving
Inattentive driving	Up	Increased complexity of daily lives; increased distractions; increased coder sensitivity to the issue of distractions
Young drivers	Down	Fewer young drivers on the road; increased use of graduated licensing
Jaywalking	Down	Decreased speeds

References

BTS [Bureau of Transportation Statistics]. (2010). *Transportation Services Index*. Available at http://www.bts.gov/xml/tsi/src/index.xml.

Jones, R.K. and Lacey, J.H. (2000). *State of knowledge of alcohol-impaired driving: Research on repeat DWI offenders* (Report No. DOT HS 809 027). Washington, D.C.: National Highway Traffic Safety Administration.

NHTSA [National Highway Traffic Safety Administration]. (2010a). *Early estimate of motor vehicle traffic fatalities in 2009* (Report No. DOT HS 811 291). Washington, D.C.: Author.

NHTSA [National Highway Traffic Safety Administration]. (2010b). *Fatality Analysis Reporting System*. Available at http://www-fars.nhtsa.dot.gov.

NSC [National Safety Council]. (2009). *Injury facts* (2009 edition). Itasca, IL: Author.

Shankar, U. and Verghese, C. (2006). *Recent trends in fatal motorcycle crashes: An update* (Report No. DOT HS 810 606). Washington, D.C.: National Highway Traffic Safety Administration.

Sivak, M. (2008). *Is the U.S. on the path to the lowest motor vehicle fatalities in decades?* (Technical Report No. UMTRI-2008-39.) Ann Arbor: The University of Michigan Transportation Research Institute.

Sivak, M. (2009). Mechanisms involved in the recent large reductions in U.S. road fatalities. *Injury Prevention*, *15*, 205-206.

Stamatiadis, N. and Puccini, G. (1999). Fatal crash rates in the Southeastern United States: Why are they higher? *Transportation Research Record*, *1665*, 118-124.

USDA [U.S. Department of Agriculture]. (2010). U.S. per capita food availability: Beverages by individual beverage. Available at http://www.ers.usda.gov/Data/FoodConsumption/app/reports/displayCommodities.aspx?reportName=Beverages%20by%20individual%20beverage&id=42#startForm.