

# Crash Characteristics of Middle Age Drivers

## **Compared to Younger and Older Drivers: Results of an Examination of National FARS and GES Data**

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## Background and Methods

Having already developed effective programs for reducing crash risk of younger and older drivers, ADEPT Driver is uniquely positioned to develop a similar program directed at reducing the crashes of “middle-age” drivers between the ages of 20 and 65. Although typically some of the safest drivers on the roadway, drivers in this large, middle age range are nevertheless involved in over three-fourths of all fatal, injury, and property-damage-only crashes (Traffic Safety Facts 2013). This report summarizes the results of analyses of national crash data carried out with the goal of providing ADEPT an indepth description of the characteristics and causes of middle-age drivers’ fatal and non-fatal crashes in comparison to those of their younger and older counterparts.

The analyses included examination of national FARS (Fatality Analysis Reporting System) and GES (General Estimates System) data. These two databases were the same ones used in the NHTSA funded “Taxonomy of Older Driver Behaviors and Crash Risk” study.<sup>1</sup> FARS is a census of fatal traffic crashes in the 50 U.S. States, the District of Columbia, and Puerto Rico. To be included in FARS, a crash must involve a motor vehicle traveling on a trafficway customarily open to the public, and must result in the death of an occupant of a vehicle or a nonoccupant within 30 days of the crash. GES is a nationally representative sampling of all police-reported crashes in the U.S. To be eligible for the GES sample, a police crash report must be completed for the crash, and the crash must involve at least one motor vehicle traveling on a trafficway and must result in property damage, injury, or death. Detailed information is gathered for over 50,000 such crashes each year, and results are then weighted to reflect national estimates. Since 2010, substantial changes have been introduced to standardize data elements across the two databases and to make them more compatible with the Model Minimum Uniform Crash Criteria that States use in developing their motor vehicle crash report forms.<sup>2</sup>

Using the most recent three years (2011-2013) of FARS and GES data, we carried out descriptive analyses similar to what was conducted for the earlier referenced report characterizing older driver crashes. As in the earlier study, we limited our analyses to crashes involving passenger cars, utility vehicles/other light trucks, pickups, and vans. However, rather than examining just single and two-vehicle crashes, we examined single and multi- (2+) vehicle crashes. We also did not attempt an analysis based on fault status of the driver, since neither FARS nor GES contains such a variable, and we were only successful at identifying a likely at-fault driver for about half of the two-vehicle crashes in our earlier GES data analysis.

The table below shows the number of *vehicles* included in the current study. Actual numbers of vehicles represented in the study tables are slightly lower due to missing information on driver age in each of the databases (less than 1% for drivers involved in fatal collisions, but 5-8% of drivers in all crashes). All results reported for the GES data are based on the weighted values shown.

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<sup>1</sup> See Stutts, J, Martell, C and Staplin, L (2009), “Identifying Behaviors and Situations Associated with Increased Crash Risk for Older <http://www-nrd.nhtsa.dot.gov/Pubs/812092.pdf> Drivers.” Report DOT HS 811 093. Washington, DC: National Highway Traffic Safety Administration.

<sup>2</sup> Information describing the FARS and GES databases taken from [Traffic Safety Facts 2013](#) and the [2013 FARS/NASS GES Coding and Validation Manual](#). The actual coding manuals used in creating the analysis files were the most recent [FARS](#) and [GES](#) Analytical User’s Manuals.

Crash Type	Vehicles in Fatal Crashes (2011-2013 FARS Data)	Vehicles in All Crashes (2011-2013 GES Data)	
		Unweighted	Weighted
Single Vehicle	43,567	46,186	4,517,097
Multi-Vehicle	60,160	185,834	22,750,000
Total	103,727	232,020	27,267,097

While not all of the FARS variables had counterparts in the GES data, most did, and recent efforts to standardize variable levels across the two databases greatly facilitated comparisons across the two databases, i.e., fatal vs. all crashes. Thus, for the current analyses we opted to display results for fatal (FARS) and all (GES) crashes side-by-side, while still keeping the results separate for single-vehicle vs. multi-vehicle crashes. The general formats for the tables are shown below. The percentages shown are column percents, or percentage distribution of a variable within each age group category. For example, if the variable of interest was intersection type, the column percentages would show the percentage of middle-age driver fatal crashes occurring at signal-controlled intersections, compared to the percentages for younger and older drivers. Given that middle-age drivers account for the majority of crashes overall, their variable distributions closely mimic those shown in the “total” or overall column.

Single Vehicle Crashes:

Crash Characteristic	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
Variable								
Variable level 1	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %
Variable level 2, etc.	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %

Multi-Vehicle Crashes:

Crash Characteristic	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
Variable								
Variable level 1	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %
Variable level 2, etc.	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %	Col. %

A second set of tables was developed to allow for more direct comparisons of single and multi-vehicle crashes just for our target population of middle-age drivers. The format for these tables is shown below. The tables do not present new information, but rather combine results from the two sets of tables above just for middle-age drivers.

Crash Characteristic	Fatal Single-Veh Crashes (FARS)	All Single-Veh Crashes (GES)	Fatal Multi-Veh Crashes (FARS)	All Multi-Veh Crashes (GES)
Variable				
Variable level 1	Col. %	Col. %	Col. %	Col. %
Variable level 2, etc.	Col. %	Col. %	Col. %	Col. %

Both sets of tables are important, since it is useful to understand the ways middle-age driver crashes (and thus any intervention efforts) differ from those of younger and older drivers, and it is also important to understand differences between single- and multi-vehicle crashes. Although ADEPT's educational interventions have primarily emphasized the cultivation of driving behaviors to avoid collisions with other vehicles (or pedestrians or bicyclists), it is also important to look for opportunities for interventions that might impact run-off-road and other types of single-vehicle collisions.

As a general comment, we want to again emphasize that the reported results for multi-vehicle crashes reflect all drivers/vehicles involved in such crashes, without any distinction as to which driver/vehicle might have been at fault in the crash. Although some multi-vehicle crashes may not have an "at fault" driver, and others may have more than one "at fault" driver, the percentages shown in the tables simply reflect "involved" drivers, including many who may have been innocent parties to a crash occurrence. Given the generally higher exposure of the middle-age driver cohort compared to younger or older drivers, it is reasonable to assume that middle-age drivers will also be over-represented as "innocent parties" in crashes.

The sections below highlight key findings with respect to available driver, vehicle, environmental, roadway, crash characteristic, and driver contributing factor variables. The referenced report tables contain the combined single and multi-vehicle crash results for middle-age drivers only, while the findings across all age groups can be found in Appendix A for multi-vehicle crashes, and Appendix B for single-vehicle crashes. A few additional cross-tabulations of key variables provide further insight into the characteristics and causes of middle-age driver crashes.

### **Driver and Vehicle Characteristics**

Findings with respect to driver and vehicle characteristics are summarized in Table 1, with the corresponding "all age" tables found in **Appendix Table A.1** (Multi-Vehicle Crashes) and **Table B.1** (Single-Vehicle Crashes). The information provided in these tables doesn't so much inform potential educational interventions as it does clarify the target audience for the interventions. Highlights include the following:

**Age** – Drivers ages 20-64 are involved in 80% of all police-reported multi-vehicle crashes and 79% of all police-reported single-vehicle crashes. They are only slightly less represented in fatal multi- and single-vehicle crashes, due primarily to the greater likelihood of fatality (i.e., greater fragility) for the 65+ age group.

**Gender** – While 20-64 year-old male drivers are only slightly more likely to be involved in police-reported multi-vehicle crashes than their female counterparts (52.5% vs 47.5%), they are much more likely than females to be involved in fatal multi-vehicle crashes (65% vs. 35%). Males are also much more likely than females to be involved in single-vehicle crashes (60% vs 40% overall, 74% vs. 26% fatal). These trends hold across all age groups, and suggest that males may accumulate more "high risk" driving miles than females.

**Restraint Use** – Across all age groups, reported restraint use is higher for drivers in multi-vehicle vs. single vehicle crashes, and for drivers in all crashes vs. those in fatal crashes. The lowest reported use level is for middle-age drivers in fatal single-vehicle collisions (48.1%). (And of course, fatally injured drivers are unable to falsely claim to have been wearing their seat belts in a crash.)

**Number of Occupants in Vehicle** – Drivers in fatal crashes are more likely than those in all crashes to be carrying passengers in their vehicle. These results hold for both single and multi-vehicle crash

types, and across all age groups. However, the vast majority of middle-age driver crashes still involve only the driver in the vehicle, ranging from 64% of drivers involved in fatal multi-vehicle collisions to 79% of drivers involved in all police-reported single-vehicle collisions.

**Vehicle Body Type** – While the majority (57%) of middle-age drivers involved in either multi- or single-vehicle crashes are operating passenger cars, substantial percentages are also driving sport utility vehicles (22% multi-vehicle, 21% single-vehicle) or pickup trucks (15% multi-vehicle, 16% single-vehicle). The percentage for pickup trucks increases dramatically for drivers in fatal single-vehicle collisions, reaching 24.5% (highest for any age group).

**Extent of Damage** – Vehicles being driven by middle-age drivers are much less likely to suffer disabling damage when involved in a multi-vehicle vs. a single-vehicle crash (23% vs. 46%). However, the likelihood of disabling damage increases substantially in fatal collisions (77% multi-vehicle, 72% single vehicle). Generally, middle-age driver crashes are less likely than young or older driver crashes to result in disabling damage; the exception is fatal single-vehicle crashes, which again likely reflects the greater fragility of drivers age 65+.

**Driver Injury Severity** – Overall, 58% of drivers involved in fatal SV crashes are reported as killed. For the remaining 42% of crash-involved vehicles, it is likely the case that the fatally injured party was either a passenger in the vehicle or a struck pedestrian or bicyclist.

## Environmental Characteristics

Environmental characteristics of middle-age driver crashes are summarized in **Table 2**, with the corresponding “all age” tables found in **Appendix Tables A.2** (Multi-Vehicle Crashes) and **B.2** (Single-Vehicle Crashes). As with the driver and vehicle characteristics, these characteristics are not necessarily amenable to “intervention,” but knowledge of how they differ for middle-age vs. younger or older drivers, and for single vs. multi-vehicle crashes, might nevertheless help inform program development. Highlights include the following:

- **Day of Week** – Day of week was examined in the context of weekday (6am Monday – 6pm Friday) vs. Weekend (6pm Friday – 6am Monday). Over three-fourths of middle-age drivers in multi-vehicle crashes are in crashes that occur during the week, compared to 62% of middle-age drivers in single-vehicle crashes. For fatal single-vehicle crashes, this percentage drops to just 53%. In other words, middle-age drivers’ single-vehicle crashes are more likely than their multi-vehicle crashes to occur over weekends. Younger drivers tend to be more overinvolved in weekend single-vehicle crashes, while older drivers tend to be more overinvolved in weekday multi-vehicle crashes.
- **Daytime/Nighttime** – 77% of middle-age drivers involved in multi-vehicle crashes are in crashes occurring during the daytime (6:00am – 5:59pm), compared to only half (50%) of middle-age drivers in single-vehicle crashes. This finding likely mimics the fact that more vehicles are simply out on the road during daytime hours. However, daytime percentages drop to 59% for drivers in fatal multi-vehicle crashes, and only 35% for drivers in fatal single-vehicle crashes. These results are similar to those for younger drivers, but quite different from the older driver population which tends to be heavily overrepresented in daytime crashes.
- **Light Condition** – Results for light condition generally parallel those for daytime/nighttime, but with added information with respect to whether the roadway was lighted or unlighted at the time of the (nighttime) crash. Whereas middle-age drivers’ multi-vehicle crashes are more likely to occur on lighted rather than unlighted roadways (14% vs. 4%), their single-vehicle

crashes are more likely to occur on unlighted roadways (26% vs. 20%). And fatal single-vehicle crashes are especially likely to occur on unlighted roadways (39% vs. 23%). These trends were consistent across age groups, even though overall, older drivers were involved in many fewer non-daylight crashes.

- **Weather** – 87% of middle-age drivers’ multi-vehicle crashes (both overall and fatal only) occurred under clear or cloudy weather conditions, as well as 88% of fatal single-vehicle crashes. The only subgroup of crashes that were overrepresented under adverse weather conditions were all single-vehicle crashes; 12% of middle-age drivers’ single-vehicle crashes occurred under rainy weather conditions, and 7% under conditions of sleet/hail/freezing rain/snow. These trends also held for crashes involving young drivers, while older drivers were again underrepresented under such adverse driving conditions.

### Roadway Characteristics

Characteristics of the roadways on which middle-age driver crashes occurred are summarized in **Table 3**, with the corresponding “all age” tables found in **Appendix Tables A.3** (Multi-Vehicle Crashes) and **B.3** (Single-Vehicle Crashes). Although not all of the FARS variables were available in the GES database (e.g., route signing, roadway function class), together the variables provide a fairly detailed description of where middle-age driver crashes are most likely to occur. Highlights include:

- **Number of Travel Lanes** – Three-fourths of middle-age driver single vehicle crashes (both overall and fatal) occur on two-lane roadways, as well as two-thirds of fatal multi-vehicle crashes. These results are not surprising, in that rural two-vehicle roadways are a common location for “run-off-road” single-vehicle crashes, while “head-on” collisions are also especially likely on two-lane roadways and are among the most serious multi-vehicle crashes. In contrast, only half of multi-vehicle crashes overall occur on two-lane roadways; 15% occur on 3-lane roadways, and 29% on 4- or 5-lane roadways. Younger and, to a lesser extent, older drivers were even more likely to be involved in crashes on two-lane roadways.
- **Trafficway Description** – Similar results are reflected with respect to trafficway details, with over 60% of single-vehicle crashes and 46% of multi-vehicle crashes occurring on two-way *undivided* roadways. However, 28% of single-vehicle and 36% of multi-vehicle crashes occurred on two-way *divided* roadways; and 7% of multi-vehicle crashes on two-way roadways with continuous left turn lanes.
- **Speed Limit** – Whereas almost three-fourths of middle-age drivers’ multi-vehicle crashes occur on roadways with speed limits of 45 mph or less, their fatal multi-vehicle crashes were most likely to occur on roadways with speed limits of 50 mph or more. The higher than expected proportion of single-vehicle crashes occurring on roadways with speed limits of 35 mph or less may reflect the inclusion of pedestrian and bicyclist crashes in the sample.
- **Roadway Alignment** – Middle-age drivers’ fatal multi-vehicle crash involvements were three times more likely to take place on curved roadways (16%, vs. 5% for all multi-vehicle crashes), and curved roadways were especially characteristic of middle-age drivers’ single vehicle crashes (21% of all single vehicle crashes, and 30% of fatal single-vehicle crashes).
- **Rural/Urban Roadway** – Whereas middle-age drivers’ fatal multi-vehicle crash involvements were equally distributed across urban and rural roadways, their single-vehicle crashes were more likely to occur on rural roadways (54% vs. 46%). The percentages of rural fatal crashes were lower than those for younger and older drivers. Urban/rural information for non-fatal crashes was not available.

- **Route Signing** – Over half (55%) of middle-age drivers’ fatal multi-vehicle crash involvements occurred on U.S. or State highways, compared to only 39% of their fatal single-vehicle crash involvements. The latter were especially overrepresented on county roadways (20% of fatal single-vehicle crashes, vs. 11% of fatal multi-vehicle crashes). Again, the high percentage of fatal single-vehicle crashes on local streets (25%) is likely due to the inclusion of pedestrian and bicyclist collisions in the sample. Similar information is reflected for the **Roadway Function Class** variable.
- **Intersection Type** – Just under half (47%) of middle-age drivers’ multi-vehicle crashes occurred at intersections, decreasing to 34% for fatal multi-vehicle crashes. Both percentages are lower than those for younger and older drivers. With respect to single-vehicle crashes, nearly nine of ten occurred at non-intersection locations, a proportion that was fairly consistent across the age groups.
- **Traffic Control Device** – Nearly a third (31.5%) of middle-age drivers’ multi-vehicle crash involvements occurred at intersections controlled by a traffic signal, and an additional 7.5% at stop-sign controlled intersections. While the percentage of traffic-signal controlled intersections was fairly consistent across the age groups, the percentage of stop-sign controlled intersections for middle-age drivers was lower than that for both younger and older drivers, especially with respect to fatal multi-vehicle crashes.
- **Relation to Junction** – This information was only available for fatal crashes, and generally parallels information already summarized above. Additional details include the fact that 5% of fatal multi-vehicle crashes occur at driveway locations, while only 1% of fatal multi-vehicle and 2% of fatal single-vehicle collisions are entrance or exit ramp related.

These variables will be further (and more meaningfully) explored later in conjunction with crash type and vehicle maneuver at the time of the crash.

### Crash Type

This section presents information on the specific types of multi- and single- vehicle crashes in which middle-age drivers are involved. Figure 1, taken from the FARS Analytical User’s Manual (p. 451), contains diagrams of all the various crash configurations currently coded for both the FARS and GES databases. Since crash types are so distinctive for single- vs. multi-vehicle crashes, results are summarized in **Table 4A** for middle-age drivers in single-vehicle crashes, and **Table 4B** for those in multi-vehicle crashes. Results are displayed grouped into major categories in the top portion of each table, then in greater detail in the bottom portion of the table. Results across all age groups again appear as appendix tables (**Appendix Tables A.4 and B.4**).

The largest category of middle-age drivers’ **single vehicle crashes** is that of a forward impact collision with a pedestrian or animal (Category 13) – 27% for single-vehicle crashes overall as well as for fatal single-vehicle crashes. But aside from these pedestrian and animal-related crashes, most single vehicle crashes involve a roadway departure, more often to the right side of the roadway, and more often without experiencing a loss of control or traction. About 7% of roadway departure crashes result from the driver trying to avoid another vehicle, pedestrian, or animal in the roadway. An additional 8% of middle-age drivers’ single-vehicle crashes involve forward impact into a parked vehicle (Category 11), although these are generally less severe and not likely to result in fatality. The likelihood of a roadway departure crash (to either the left or right) generally declines with age, as does the likelihood that the departure involves a loss of control or traction. Interestingly, younger drivers were much less likely than middle-age or older drivers to strike pedestrians or animals in the roadway.

Appendix A:  
PC23 Crash Type Diagram

Category	Configuration	CRASH TYPES (includes intent)									
I Single Driver	A Right Roadside Departure	01 DRIVE OFF ROAD	02 CONTROL/ TRACTION LOSS	03 AVOID COLLISION WITH VEH., PED., ANIM.	04 SPECIFICS OTHER	05 SPECIFICS UNKNOWN					
	B Left Roadside Departure	06 DRIVE OFF ROAD	07 CONTROL/ TRACTION LOSS	08 AVOID COLLISION WITH VEH., PED., ANIM.	09 SPECIFICS OTHER	10 SPECIFICS UNKNOWN					
	C Forward Impact	11 PARKED VEH.	12 STA. OBJECT	13 PEDESTRIAN/ AN. MAL.	14 END DEPARTURE	15 SPECIFICS OTHER	16 SPECIFICS UNKNOWN				
II Same Trafficway Same Direction	D Rear End	20 STOPPED 21, 22, 23	21 22 23	24 SLOWER 25, 26, 27	25 26 27	26 27	28 29 30 31	29 30 31	(EACH - 32) SPECIFICS OTHER	(EACH - 33) SPECIFICS UNKNOWN	
	E Forward Impact	34 CONTROL/ TRACTION LOSS	35 CONTROL/ TRACTION LOSS	36 CONTROL/ TRACTION LOSS	37 CONTROL/ TRACTION LOSS	38 AVOID COLLISION WITH VEH.	39 AVOID COLLISION WITH VEH.	40 AVOID COLLISION WITH OBJECT	41 AVOID COLLISION WITH OBJECT	(EACH - 42) SPECIFICS OTHER	(EACH - 43) SPECIFICS UNKNOWN
	F Angle, Slowswipe	44 45	45 46	46 47	47	48	49	(EACH - 48) SPECIFICS OTHER	(EACH - 49) SPECIFICS UNKNOWN		
III Same Trafficway Opposite Direction	G Head-On	50 51	(EACH - 52) SPECIFICS OTHER	(EACH - 53) SPECIFICS UNKNOWN							
	H Forward Impact	54 CONTROL/ TRACTION LOSS	55 CONTROL/ TRACTION LOSS	56 CONTROL/ TRACTION LOSS	57 CONTROL/ TRACTION LOSS	58 AVOID COLLISION WITH VEH.	59 AVOID COLLISION WITH VEH.	60 AVOID COLLISION WITH OBJECT	61 AVOID COLLISION WITH OBJECT	(EACH - 62) SPECIFICS OTHER	(EACH - 63) SPECIFICS UNKNOWN
	I Angle, Slowswipe	64 65	(EACH - 66) Lateral Moves SPECIFICS OTHER	(EACH - 67) SPECIFICS UNKNOWN							
IV Change Trafficway Vehicle Turning	J Turn: Across Path: Opposite Directions	68 69	70 71	72 73	74	75	(EACH - 74) SPECIFICS OTHER	(EACH - 75) SPECIFICS UNKNOWN			
	K Turn: Into Path: Turn Into Same Direction	76 77	78 79	80 81	82 83	84	(EACH - 84) SPECIFICS OTHER	(EACH - 85) SPECIFICS UNKNOWN			
V Intersect. Paths	L Straight Paths	86 Striking from the Right	87 Struck on the Right	88 Striking from the Left	89 Struck on the left	(EACH - 90) SPECIFICS OTHER	(EACH - 91) SPECIFICS UNKNOWN				
VI Misc.	M Backing, Etc.	92 Backing Veh.	93 Other Veh. or Object	98 Other Accident Type	99 Unknown Accident Type	00 No Impact					

Figure 1. FARS/GES Crash Type Diagram

(Note to Richard – Larger and clearer version of this can be printed from p. 451 of [FARS User's Manual](#).)



The crash type information for **multi-vehicle crashes** is more challenging to interpret, since middle-age drivers can be involved in a particular crash as an “at-fault” vehicle or as an “innocent party.” Theoretically, at least, all of middle-age drivers’ “rear-end” collisions *could* represent situations where they were struck from behind by a younger or older driver, and all of their “angle, sideswipe” collisions *could* involve a younger or older driver veering into their pathway. Thus, from Table 4B, one can only draw conclusions about the types of multi-vehicle crashes in which middle-age drivers are most likely to *be involved*. Primarily, these include:

- Rear-end collisions in which both vehicles are traveling the same direction on the same roadway - Category II.D
- Angle or sideswipe collisions in which both vehicles are traveling the same direction on the same roadway - Category II.F
- Turn across path collisions in which two vehicle are initially travelling on the same roadway, and one of the vehicles turns into the path of the other when changing roadways – Category IV-J
- Turn into path collisions in which two vehicles start out traveling on different roadways, and one of the vehicles turns into the path of the other vehicle when turning onto that vehicle’s roadway – Category IV-K
- Straight path collisions in which the vehicles are both traveling straight ahead on different, intersecting roadways – Category V.L

Together, these five categories comprise 86% of middle-age drivers’ multi-vehicle crash involvements, overall (i.e., as reported in the GES database).

Middle-age drivers’ fatal multi-vehicle crashes are most likely to involve vehicles traveling in opposite directions on the same roadway (Category III) – 33% for fatal multi-vehicle crashes, compared to only 2-3% of all multi-vehicle crashes. In most instances, the vehicles end up striking head-on, hence the greater severity of these crashes. Otherwise, the fatal multi-vehicle crash pattern generally mimics the overall multi-vehicle crash pattern.

More detailed middle-age driver crash characteristic information is contained in **Table 5**. The **Manner of Collision** variable provides information similar to the collapsed Crash Type variable. All single-vehicle crashes appear simply as “not a collision with motor vehicle in transport.” Middle-age drivers’ multi-vehicle collision involvements overall are most often rear-end (front-to-rear) collisions (51%), followed by angle (30%) and sideswipe, same direction (11.5%) collisions. In contrast, their fatal multi-vehicle collision involvements are most likely to be angle (41%) and head-on (26%) collisions, followed by the rear-end collisions (16%).

**Pre-Event Movement** describes the crash-involved vehicle’s activity prior to the driver’s realization of an impending critical event or just prior to impact if the driver took no action or had no time to attempt an evasive maneuver. Not surprisingly, when vehicles involved in single-vehicle crashes were not going straight ahead just prior to their crash, they were most likely to be negotiating a curve in the roadway (16% of single-vehicle crash-involved vehicles overall, and 29% of fatal single-vehicle crashes). These patterns generally held across all age groups, with the exception of a higher proportion of “negotiating curve” movements characterizing young driver crashes.

For multi-vehicle crash situations, we again have the situation where roughly half of the vehicles are simply “innocent victims” in the crash, thus contributing to high percentages of vehicles traveling

straight ahead on the roadway, or being stopped or decelerating in the roadway. However, it is worth noting that significantly more vehicles were making left-hand as opposed to right-hand turns, and very few (less than 1-2%) were making a U-turn, passing or overtaking a vehicle, backing, or leaving or entering a parking space. Slightly more vehicles (3.5% overall, and 2% of those in fatal multi-vehicle crashes) were changing lanes or merging just prior to their crash. Compared to other age drivers, middle-age drivers were *less* likely to be turning left, turning right, or changing lanes or merging – all suggesting that they are more likely to be “innocent victims” in their crashes.

A final variable reported in Table 5 is any attempted **Avoidance Maneuver** taken by the driver in response to the pending crash. There was a high percentage of “unknown” and “not reported” information for this variable, especially in the GES database (50% and 42% of vehicles in single-vehicle and multi-vehicle crashes, respectively). The results reported in the table have excluded these unknowns so as to allow for more direct comparisons across the databases. With regard to single-vehicle crashes, no avoidance maneuver at all was coded for about two-thirds of the vehicles in fatal as well as all police-reported crashes. When an avoidance maneuver was attempted at all in a single-vehicle crash, it most often involved steering only (approximately 20% of drivers), or less often, braking only (less than 10% of drivers). In general, middle-age drivers were more likely than older drivers to engage in any avoidance maneuver, but much less likely than younger drivers to do so (see **Appendix Table A.5**).

Remembering again that “innocent victim” vehicles are included in the totals for multi-vehicle crashes, the most common avoidance maneuver reported for middle-age drivers involved in all such crashes was braking, whereas drivers in fatal multi-vehicle crashes were more likely to engage in steering as well as braking. Again, these percentages generally fell in between those for older and younger drivers.

To shed further light on the characteristics of middle-age driver crashes, and in particular their multi-vehicle crashes, some additional crosstabulations were generated for the intersection type, traffic control type, vehicle maneuver, and crash type variables. Based on a crosstabulation of intersection type by traffic control device, the top locations where middle-age drivers are involved in multi-vehicle crashes are:

Location	% of All Multi-Vehicle Crash Involvements
Non-intersection	52.6%
4-way intersection controlled by traffic signal	21.2%
4-way intersection uncontrolled	6.6%
T-intersection, uncontrolled	5.8%
T-intersection controlled by traffic signal	3.3%
4-way intersection controlled by stop sign	4.1%
T-intersection controlled by stop sign	2.5%

Together these seven situations represent 96 percent of all locations where middle-age drivers are involved in multi-vehicle crashes.

**Table 6** provides more specific information on the movements of middle-age drivers' vehicles in some of the most common two-vehicle crashes, compared to those of younger and older drivers. The table is derived from the most detailed levels of crash type shown in Figure 1. For example, for rear-end collisions (Crash Type II-D), the detailed codes enable one to determine which is the striking vehicle, and whether the struck vehicle is stopped, moving at a slower speed, or decelerating. Although it may usually be the case that the striking or turning vehicle is the "at fault" vehicle in a crash, the crash type codes do not necessarily imply fault. For example, for Category V-L crashes, in which both vehicles are moving straight ahead on perpendicular paths, a vehicle striking from the right may have a green light at the intersection, while the struck vehicle may be running a red light. In most cases, however, the not-at-fault driver will more likely be traveling straight ahead on a roadway, stopped in traffic, slowing in traffic, etc. And as is clear from the table, younger drivers and, in most cases, older drivers are both much more likely than middle-age drivers to be the striking, backing, or turning vehicle in a multi-vehicle crash.

Even without consideration of driver fault, Table 6, especially when examined in conjunction with Table 4B which provides information on the relative frequency of the various crash types, provides insights into the specific crash scenarios that an educational intervention directed at middle-age drivers might address.

### **Driver Contributing Factors**

Two final tables summarize available information on the driver's physical condition at the time of the crash (**Table 7**), and other identified driver factors that may have contributed to the crash (**Table 8**). For the Table 7 results, "unknowns" and "not reporteds" have been retained in the table. With respect to single vehicle crashes overall, 17% of drivers were identified with some form of impairment, most often from alcohol or other drugs (11%), followed by being asleep or fatigued (3%). The percentage of impaired drivers jumps to 32% for fatal single-vehicle crash involvements, with 27% of the drivers impaired by alcohol or drugs. The condition of an additional 23% of drivers is reported as unknown. Percentages of impaired drivers are lower for multi-vehicle crashes, especially the less serious police-reported crashes. But once again, if only at-fault drivers were being examined, the percentage impaired would likely be higher.

More specific information with respect to alcohol and drug involvement is reported in the bottom portion of the table. While the combined percentages for alcohol involved and drugs involved is somewhat higher than that reported for the driver condition variable, this may be due at least in part to the likelihood that some drivers were impaired by both alcohol *and* drugs at the time of their crash. In general, middle-age drivers are much more likely than either younger or older drivers to be impaired by alcohol or drugs at the time of their crash (**Tables A.6 and B.6**)

**Table 8** contains information on a list of other "Driver Related Factors" along with reported "Driver Distraction." For both variables, more than one factor could be coded for an individual driver. Also, the GES database does not contain all the detailed Driver Related Factor codes that appear in the FARS database. For fatal multi-vehicle fatal crashes, factors most often cited were failure to keep in proper lane (10.5%), failure to yield right-of-way (9.1%), and failure to obey traffic sign, traffic device, officer, or traffic zone laws (5.5%). For fatal single-vehicle crashes, most often cited driver factors were overcorrecting (11.4%), failure to keep in proper lane (7.4%), operating a vehicle in an erratic, reckless, or negligent manner (7.0%), and careless driving (4.7%). For middle-age drivers in single-vehicle fatal crashes, these percentages were generally lower than for young drivers, but higher than those for older

drivers. For fatal multi-vehicle crashes, they were clearly lower than those for young drivers, and sometimes for older drivers as well (a result that may once again simply reflect a greater likelihood of being the “innocent party” in a two-vehicle crash).

Finally, very few drivers were reported as being distracted at the time of their crash. For single-vehicle crashes in general, and fatal single-vehicle crashes in particular, this information was often recorded as “unknown” (16% of all single-vehicle crashes, 23% of fatal single-vehicle crashes). While this level of uncertainty is understandable, especially for the fatal single-vehicle crashes, it nevertheless seems clear that driver distraction is an underreported variable in both the FARS and GES databases.

**Table 1. Driver and Vehicle Characteristics of Middle-Age Driver Crashes**

<b>Driver Characteristics</b>	<b>Fatal Single-Veh Crashes (FARS)</b>	<b>All Single-Veh Crashes (GES)</b>	<b>Fatal Multi-Veh Crashes (FARS)</b>	<b>All Multi-Veh Crashes (GES)</b>
<b>Age</b>				
<20	9.5	13.0	7.2	9.8
20-64	78.8	79.4	76.1	80.4
65+	11.7	7.7	16.7	9.8
<b>Gender</b>				
Male	73.6	59.6	64.8	52.5
Female	26.4	40.4	35.2	47.5
<b>Reported Restraint Use</b>				
None used	41.6	3.9	17.1	1.0
Shoulder AND lap belt	48.1	83.9	75.2	90.7
Shoulder OR lap belt only	0.8	1.2	0.9	1.4
Other / Not reported / Unk.	9.5	10.9	6.8	6.9
<b>Injury Severity</b>				
No apparent injury (O)	28.1	79.6	26.8	85.1
Possible injury (C)	3.1	8.8	12.2	9.9
Suspected minor injury (B)	5.7	8.2	16.2	3.7
Suspected serious injury (A)	5.0	2.3	12.6	0.8
Fatal injury (K)	58.1	0.4	31.8	0.1
Unknown injury severity	0.1	0.7	0.3	0.5
<b>Body Type</b>				
Passenger car	48.0	56.8	50.1	57.0
Pickup	24.5	16.4	22.7	14.5
Light truck	22.5	21.0	20.1	21.8
Van	5.1	5.8	7.1	6.7
<b>Number Occupants in Vehicle</b>				
1	67.0	79.1	63.5	74.4
2	19.3	14.1	21.7	16.6

3	7.1	4.2	7.9	5.6
4	3.6	1.7	4.1	2.3
5+	3.0	0.9	2.7	1.1
<b>Extent of Damage</b>				
No damage	2.3	2.9	0.9	1.7
Minor damage	9.4	22.5	7.8	37.3
Functional damage	13.0	12.8	11.9	16.9
Disabling damage	72.3	46.0	76.8	23.4
Not reported / Unknown	2.2	15.8	2.5	20.7

**Table 2. Environmental Characteristics of Middle-Age Driver Crashes**

<b>Environmental Characteristics</b>	<b>Fatal Single-Veh Crashes (FARS)</b>	<b>All Single-Veh Crashes (GES)</b>	<b>Fatal Multi-Veh Crashes (FARS)</b>	<b>All Multi-Veh Crashes (GES)</b>
<b>Weekday / Weekend</b>				
Weekday (6am Mon-6pm Fri)	53.4	62.3	62.6	76.0
Weekend (6pm Fri – 6am Mon)	46.6	37.7	37.4	24.0
<b>Daytime/Nighttime</b>				
Daytime (6:00am-5:59pm)	35.4	50.1	59.2	77.1
Nighttime (6:00pm-5:59am)	64.6	49.9	40.8	22.9
<b>Light Condition</b>				
Daylight	34.0	47.2	58.4	77.6
Dark, not lighted	39.0	26.1	20.9	4.3
Dark, lighted	22.5	19.9	15.7	14.4
Dark, lighting unknown	0.7	1.5	0.3	0.3
Dawn	1.9	3.1	2.1	1.1
Dusk	2.0	2.2	2.3	2.4
<b>Weather</b>				
Clear or cloudy	88.4	77.5	87.4	87.2
Rain	7.5	11.7	7.9	9.4
Fog, smog, smoke	1.2	0.8	1.4	0.3
Sleet, hail, freezing rain, snow	1.6	7.3	2.8	2.3
Other/Unknown	1.2	2.8	0.5	0.7

**Table 3. Roadway Characteristics of Middle-Age Driver Crashes**

<b>Roadway Characteristics</b>	<b>Fatal Single-Veh Crashes (FARS)</b>	<b>All Single-Veh Crashes (GES)</b>	<b>Fatal Multi-Veh Crashes (FARS)</b>	<b>All Multi-Veh Crashes (GES)</b>
<b>Number of Travel Lanes</b>				
1 lane	1.9	3.6	0.8	3.0
2 lanes	75.9	75.0	67.1	50.2
3 lanes	7.6	8.6	10.2	15.0
4 lanes	11.8	7.7	17.3	22.3
5+ lanes	2.6	1.7	4.1	6.4
Non-trafficway/driveway access	0.2	3.3	0.5	3.2
<b>Trafficway Description</b>				
One-way trafficway	1.3	2.3	0.9	3.9
Two-way, not divided	63.4	61.1	56.5	46.9
Two-way, divided, unprotected	16.4	9.3	19.3	15.2
Two-way, divided, median	12.3	19.1	15.9	21.1
Two-way, continuous left turn lane	4.6	1.9	6.1	6.9
Entrance/exit ramp	1.8	3.3	0.8	2.9
Non-trafficway/driveway access	0.2	3.2	0.5	3.1
<b>Speed Limit</b>				
<= 35 mph	25.5	34.8	15.8	41.0
40-45 mph	23.1	16.8	23.6	33.5
50-60 mph	35.1	32.9	41.2	18.0
65+ mph	16.4	15.5	19.3	7.5
<b>Interstate</b>				
Interstate	12.1	89.1	13.4	9.3
Non-interstate	87.9	10.9	86.6	90.7
<b>Roadway Alignment</b>				
Straight	69.3	76.1	83.9	92.1
Curve right	11.9	7.7	6.9	2.3
Curve left	15.9	8.8	7.1	1.4
Curve - unknown	2.6	4.6	1.6	1.5
Non trafficway or driveway	0.2	2.7	0.5	2.7
<b>Rural/Urban Roadway</b>				
Rural	54.1		49.2	
Urban	45.9		50.8	
<b>Route Signing</b>				
Interstate	11.8		13.2	
U.S. highway	12.3		20.7	
State highway	26.6		33.8	
County road	20.2		10.8	
Local street	25.1		18.0	
Other	4.1		3.5	

(Table continued next page)





Roadway Characteristics	Fatal Single-Veh Crashes (FARS)	All Single-Veh Crashes (GES)	Fatal Multi-Veh Crashes (FARS)	All Multi-Veh Crashes (GES)
<b>Roadway Function Class</b>				
Interstate, principal arterial	12.1		13.4	
Freeway and expressway, principal arterial	3.5		4.8	
Principal arterial, other	21.5		33.8	
Minor arterial	17.3		22.0	
Collector	21.2		14.6	
Local	24.4		11.3	
<b>Intersection Type</b>				
Not an intersection	87.3	89.4	65.3	52.6
4-way intersection	6.6	5.3	23.8	33.9
T-intersection	5.4	4.8	9.9	12.3
Other inters. (Y, L, >4-way)	0.7	0.4	0.9	0.9
Traffic circle or roundabout	0.1	0.2	<0.1	0.3
<b>Traffic Control Device</b>				
No controls	88.0	89.0	75.0	56.9
Traffic control signal	4.8	4.4	13.8	31.5
Other signal (flashing, lane use)	0.3	0.2	0.6	0.6
Stop sign	2.0	2.9	7.0	7.5
Yield sign	0.1	0.2	0.3	2.2
Other sign (school, pedestrian crossing, RR crossing)	4.8	3.4	3.3	1.3
<b>Relation to Junction</b>				
Non-junction	81.5		56.1	
Intersection	5.1		29.9	
Intersection-related	8.0		5.3	
Driveway access /related	1.0		5.2	
Entrance/exit ramp /related	2.0		1.0	
Railway grade crossing	0.6		<0.1	
Through roadway	1.1		2.0	
Other within interchange area Crossover/accel/decl lane/shared use tra	0.7		0.5	

**Table 4A. Middle-Age Driver Single-Vehicle Crash Types<sup>3</sup>**

<b>Crash Type</b>	<b>Fatal Single-Veh Crashes (FARS)</b>	<b>All Single-Veh Crashes (GES)</b>
<b>Grouped Crash Type</b>		
A. Right roadside departure	35.9	31.5
B. Left roadside departure	28.8	22.6
C. Forward impact	30.0	38.7
M. Miscellany - Backing	0.3	3.9
98. Other	3.6	1.4
99. Unknown	0.1	0.7
00. No impact	1.3	1.1
<b>Specific Crash Type</b>		
A. Right Roadside Departure		
01. Drive off road	23.5	16.4
02. Control / traction loss	11.6	10.6
03. Avoid collision with veh, ped, animal	0.2	4.3
04. Specifics other	0.1	0.1
05. Specifics unknown	0.4	0.3
B. Left Roadside departure		
06. Drive of road	17.2	11.0
07. Control / traction loss	10.9	8.9
08. Avoid collision with veh, ped, animal	0.2	2.6
09. Specifics other	0.1	0.1
10. Specifics unknown	0.4	0.1
C. Forward impact		
11. Parked vehicle	0.6	8.2
12. Stationary object	0.3	1.9
13. Pedestrian / animal	27.4	27.3
14. End departure	1.1	1.0
15. Specifics other	0.6	0.6
16. Specifics unknown	<0.1	<0.1
M. Miscellany - Backing	0.3	3.9
98. Other crash type	3.6	1.4
99. Unknown	0.1	--
00. No impact	1.3	1.1

<sup>3</sup> Letters and numbers at the beginning of the labels correspond to those shown in the Figure 1 crash type diagram.

Table 4B. Middle-Age Driver Multi-Vehicle Crash Types <sup>4</sup>

Crash Type	Fatal Multi-Veh Crashes (FARS)	All Multi-Veh Crashes (GES)
<b>Grouped Crash Type</b>		
I. Single driver	3.2	0.3
II. Same trafficway, Same direction	16.1	54.7
III. Same trafficway, Opposite direction	32.8	2.5
IV. Change trafficway, Vehicle turning	14.6	22.3
V. Intersect paths – Straight paths	13.9	9.1
VI. All other	19.3	11.1
<b>Specific Crash Type</b>		
I. Single driver	--	--
A. Right roadside departure	0.8	0.1
B. Left roadside departure	0.7	0.1
C. Forward impact	1.7	0.1
II. Same trafficway, Same direction	--	--
D. Rear end	11.7	44.6
E. Forward impact	0.1	0.1
F. Angle, sideswipe	4.3	10.1
III. Same trafficway, Opposite direction	--	--
G. Head-on	22.1	0.9
H. Forward impact	0.2	<0.1
I. Angle, sideswipe	10.5	1.6
IV. Change trafficway, Vehicle turning	--	--
J. Turn across path	9.1	11.3
K. Turn into path	5.5	11.0
V. Intersect paths – Straight paths	13.9	9.1
VI Miscellany - Backing	0.2	2.5
98. Other accident type	18.9	8.2
99. Unknown accident type	0.1	0.3
00. No impact	0.1	<0.1

<sup>4</sup> Letters and numbers at the beginning of the labels correspond to those shown in the Figure 1 crash type diagram.

Table 5. Other Characteristics of Middle-Age Driver Crashes

Crash Characteristics	Fatal Single-Veh Crashes (FARS)	All Single-Veh Crashes (GES)	Fatal Multi-Veh Crashes (FARS)	All Multi-Veh Crashes (GES)
<b>Manner of Collision</b>				
Angle			40.8	29.8
Head-on (front-to-front)			25.9	3.2
Rear-end (front-to-rear)			16.1	50.9
Sideswipe, same direction			4.0	11.5
Sideswipe, opposite direction			3.5	1.8
Backing (rear→side or rear→rear)			0.3	1.3
Other			0.5	0.8
Not collision with mv in transp.	100.0	100.0	9.0	0.8
<b>Pre-Event Movement</b>				
Going straight	64.8	66.7	63.2	46.8
Decelerating in road	0.1	0.6	1.8	8.2
<b>Starting</b> or accelerating in road	0.3	0.7	1.0	2.9
Stopped in roadway	0.1	0.2	5.7	20.8
Passing or overtaking a vehicle	1.3	0.4	1.9	0.9
Turning right	0.7	3.4	0.5	2.8
Turning left	1.4	3.8	8.7	9.4
Making a U-turn	0.1	0.3	0.5	0.5
Negotiating a curve	28.7	16.2	13.6	2.4
<b>Changing lanes</b> or merging	1.4	1.7	2.0	3.5
<b>Leaving</b> or entering parking	0.1	1.3	0.1	0.5
Backing (other than for parking)	0.4	3.6	0.1	1.1
Other maneuver (Disabled or parked, other avoidance maneuver, other, no driver)	0.6	1.1	0.9	0.3
<b>Avoidance maneuver</b>				
None	69.4	64.2	80.6	84.2
Braking only	6.7	9.3	5.9	10.5
Steering only	18.3	20.2	8.8	3.4
Braking + steering	4.7	2.5	3.6	1.0
<b>Accelerating</b> (+/- steering)	0.1	0.4	0.3	0.3
Other	0.7	3.3	0.7	0.6

**Table 6. Vehicle Maneuvers within Specific (Multi-Vehicle) Crash Types (See Figure 1 for Diagrams)**

Crash Category	Description	Vehicle Movement	Drivers <20	Drivers 20-64	Drivers 65+
II-D	Rear-End Same Trafficway, Same Direction	Striking (20)	70.4%	46.3%	44.6%
		Stopped (21-23)	29.6%	53.7%	55.4%
		Striking (24) Slower (25-27)	69.7% 30.3%	46.7% 53.3%	34.8% 65.2%
		Striking (28) Decelerating (29-31)	68.5% 31.5%	47.0% 53.0%	40.0% 60.0%
II-F	Angle / Sideswipe Same Trafficway, Same Direction	Straight ahead on left or changing lanes (44, 46, 47) Straight ahead (45)	59.1% 40.9%	45.1% 54.9%	58.4% 41.6%
III-G	Head-on Same Trafficway, Opposite Direction	Lateral move left/right (50) Straight (51)	67.3% 32.7%	47.8% 52.2%	49.5% 50.5%
III-I	Angle, Sideswipe Same Trafficway, Opposite Direction	Lateral move left/right (64) Straight (65)	67.5% 32.5%	45.3% 54.7%	38.9% 61.1%
IV-J	Turn Across Path Change Trafficway, Vehicle Turning	Opp. directions, turning (68)	61.6%	45.6%	65.5%
		Opp. directions, straight (69)	38.4%	54.4%	34.5%
		Same direct., turning (70, 72)	52.4%	45.5%	58.7%
		Same direct., straight (71, 73)	47.6%	54.5%	41.3%
IV-K	Turn Into Path Change Trafficway, Vehicle Turning	Turning left into same direction (76)	60.8%	46.7%	58.2%
		Going straight (77)	39.2%	53.3%	41.8%
		Turning right into same direction (78)	60.5%	43.1%	69.7%
		Going straight (79)	39.5%	56.9%	30.3%
		Turning right into opposite directions (80)	75.6%	41.7%	52.6%
		Going straight (81)	24.4%	58.3%	47.4%
		Turning left into opposite directions (82)	59.4%	47.3%	57.4%
		Going straight (83)	40.6%	52.7%	42.6%
V-L	Straight Paths Intersecting	Striking from right (86) Struck on right (87)	48.1% 51.9%	49.4% 50.6%	521.2% 47.8%

		Striking from left (88)	53.0%	49.3%	48.7%
		Struck from left (89)	47.0%	50.7%	51.3%
VI-M	Backing	Backing vehicle (92)	55.7%	46.6%	55.3%
		Other vehicle (93)	44.3%	53.4%	44.7%

**Table 7. Driver Factors in Middle-Age Driver Crashes -- Driver Condition**

Driver Condition	Fatal Single-Veh Crashes (FARS)	All Single-Veh Crashes (GES)	Fatal Multi-Veh Crashes (FARS)	All Multi-Veh Crashes (GES)
<b>Driver Condition (Impairment) (Multiple Coding Allowed)</b>				
No impairment	45.6	77.9	72.7	95.6
Ill, blackout	1.3	1.5	0.6	0.1
Asleep or fatigued	2.8	3.4	1.1	0.3
Under influence of alcohol, drugs, or medication	27.0	11.3	10.7	1.4
Emotional (depressed, angry, etc.)	0.4	0.4	0.2	<0.1
Other impairment	0.9	0.3	0.5	0.1
Not reported or unknown	22.7	5.6	14.6	2.5
<b>Drinking (Police Reported Alcohol Involvement)</b>				
Alcohol not involved	37.7	81.1	59.4	94.0
Alcohol Involved	30.6	11.4	11.1	1.4
Not reported / Unknown	31.8	7.5	29.5	4.6
<b>Drug (Police Reported Drug Involvement)</b>				
Drugs not involved	38.1	88.4	47.4	94.4
Drugs involved	8.8	2.7	5.3	0.3
Not reported / Unknown	53.1	8.9	47.3	5.3

**Table 8. Driver Factors in Middle-Age Driver Crashes – Other Contributing Driver Factors**

<b>Driver Characteristics</b>	<b>Fatal Single-Veh Crashes (FARS)</b>	<b>All Single-Veh Crashes (GES)</b>	<b>Fatal Multi-Veh Crashes (FARS)</b>	<b>All Multi-Veh Crashes (GES)</b>
<b>Driver Related Factors</b>				
Careless driving (2012 & 2013)	4.7	3.2	2.1	1.8
Aggressive driving / Road rage	1.0	0.1	0.4	0.1
Following improperly	0.2	0.0	1.5	
Improper or erratic lane changing	0.6		1.0	
Failure to keep in proper lane	7.4		10.5	
Starting or backing improperly	0.2		0.1	
Passing where prohibited	0.2		0.4	
Passing on wrong side	0.1		0.1	
Passing with insufficient distance or inadequate visibility or failure to yield to overtaking vehicle	0.3		0.8	
Operating vehicle in erratic, reckless, or negligent manner	7.0	1.3	2.8	0.2
Failure to yield right-of-way	2.1		9.1	
Failure to obey traffic sign, traffic device, officer, or traffic zone laws	2.0		5.5	
Making improper turn	2.8		1.4	
Driving on wrong side of road	0.7	0.2	3.6	0.1
Overcorrecting	11.4	2.5	1.6	0.1
<b>Driver Distraction</b>				
Not distracted	66.8	77.5	82.0	87.2
Looked but did not see	1.1	0.7	0.9	1.4
Lost in thought / Day dreaming	0.4	0.4	0.3	0.3
Other occupants	0.6	0.3	0.5	0.2
Moving object in vehicle	<0.1	<0.1	0.1	0.1
Using cell phone (talking, listening, manipulating, other)	1.3	1.0	1.4	1.4
Adjusting audio or climate controls	0.2	0.1	0.2	0.1
Using other component/ controls integral to vehicle	0.1	0.1	0.2	0.1
Using or reaching for device/ object brought into vehicle	0.2	0.2	0.9	0.4
Outside person, object, event	0.6	0.3	0.8	0.7
Eating or drinking	0.1	0.1	0.2	0.1
Smoking related	0.1	<0.1	0.1	<0.1
Distracted/Inattentive/Careless	4.7	3.2	5.9	5.9
Other distraction	0.7	0.4	0.8	0.4
Not reported or Unknown	23.4	15.8	5.8	2.7





## Appendix A FARS & GES Multi-Vehicle Crashes

**Table A.1. Driver and Vehicle Characteristics of Multi-Vehicle Crashes**

Driver/Vehicle Characteristics	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Age</b>								
<20				7.2				9.8
20-64				76.1				80.4
65+				16.7				9.8
<b>Gender</b>								
Male	62.7	64.8	64.7	64.6	51.2	52.5	55.3	52.7
Female	37.3	35.2	35.3	35.4	48.8	47.5	44.7	47.3
<b>Reported Restraint Use</b>								
None used	17.5	17.1	15.0	16.7	0.8	1.0	0.9	1.0
Shoulder AND lap belt	74.5	75.2	78.4	75.5	92.5	90.7	90.8	90.8
Shoulder OR lap belt only	1.1	0.9	1.2	1.0	0.8	1.4	1.1	1.3
Other / Not reported / Unk.	7.0	6.8	5.4	6.8	5.8	6.9	7.2	6.9
<b>Injury Severity</b>								
No apparent injury (O)	25.6	26.8	15.3	24.8	88.6	85.1	83.9	85.3
Possible injury (C)	12.4	12.2	7.3	11.4	7.1	9.9	10.0	9.6
Suspected minor injury (B)	18.8	16.2	10.5	15.5	3.5	3.7	4.4	3.7
Suspected serious injury (A)	13.2	12.6	9.0	12.0	0.6	0.8	1.1	0.8
Fatal injury (K)	29.7	31.8	57.6	36.0	0.1	0.1	0.2	0.1
Unknown injury severity	0.3	0.3	0.3	0.3	0.2	0.5	0.6	0.4
<b>Body Type</b>								
Passenger car	61.2	50.1	60.8	52.7	63.7	57.0	62.5	58.2
Pickup	19.8	22.7	17.7	21.6	13.1	14.5	13.1	14.2
Light truck	16.7	20.1	13.6	18.7	20.8	21.8	17.8	21.3
Van	2.2	7.1	7.9	6.9	2.4	6.7	6.6	6.3
<b>Number Occupants in Vehicle</b>								
1	53.5	63.5	64.7	63.0	67.6	74.4	76.9	73.9
2	26.2	21.7	29.5	23.3	22.4	16.6	19.3	17.4
3	12.2	7.9	3.6	7.5	6.6	5.6	2.5	5.4
4	5.3	4.1	1.7	3.8	2.5	2.3	1.0	2.2
5+	2.8	2.7	0.5	2.4	0.9	1.1	0.4	1.0
<b>Extent of Damage</b>								
No damage	0.8	0.9	0.4	0.8	1.6	1.7	1.5	1.7
Minor damage	6.0	7.8	4.7	7.2	37.3	37.3	34.6	37.0
Functional damage	10.0	11.9	9.4	11.3	17.2	16.9	17.2	16.7
Disabling damage	81.2	76.8	82.7	78.0	28.1	23.4	24.9	23.3
Not reported / Unknown	2.0	2.5	2.7	2.6	15.8	20.7	21.8	21.3



**Table A.2. Environmental Characteristic of Multi-Vehicle Crashes**

Driver Characteristics	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Weekday / Weekend</b>								
Weekday (6am Mon-6pm Fri)	60.5	62.6	71.6	63.9	75.3	76.0	79.1	76.2
Weekend (6pm Fri – 6am Mon)	39.5	37.4	28.4	36.1	24.7	24.0	20.8	23.7
<b>Daytime/Nighttime</b>								
Daytime (6:00AM-5:59PM)	57.4	59.2	79.8	62.5	73.3	77.1	86.5	77.6
Nighttime (6:00PM-5:59AM)	42.6	40.8	20.2	37.5	26.7	22.9	13.5	22.4
<b>Light Condition</b>								
Daylight	58.7	58.4	79.4	62.0	75.2	77.6	86.5	78.3
Dark, not lighted	20.8	20.9	10.8	19.2	4.5	4.3	2.6	4.1
Dark, lighted	16.0	15.7	6.8	14.3	16.7	14.4	8.2	14.0
Dark, lighting unknown	0.5	0.3	0.1	0.3	0.2	0.3	0.2	0.3
Dawn	1.6	2.1	0.9	1.9	0.8	1.1	0.6	1.0
Dusk	2.3	2.3	1.8	2.2	2.6	2.4	1.9	2.4
Other	0.1	0.1	0.1	0.1				
<b>Weather</b>								
Clear or cloudy	87.8	87.4	88.8	87.7	86.6	87.2	89.6	87.4
Rain	8.2	7.9	7.4	7.8	10.3	9.4	7.7	9.3
Fog, smog, smoke	1.2	1.4	0.8	1.3	0.2	0.3	0.1	0.3
Sleet, hail, freezing rain, snow	2.5	2.8	2.4	2.7	2.3	2.3	1.8	2.3
Other/Unknown	0.3	0.5	0.5	0.5	0.5	0.7	0.8	0.7

Table A.3. Roadway Characteristics of Multi-Vehicle Crashes

Roadway Characteristics	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Number of Travel Lanes</b>	<1% Missing				20% missing			
1 lane	0.7	0.8	1.0	0.8	2.8	3.0	2.5	2.9
2 lanes	73.3	67.1	72.2	68.4	56.6	50.2	52.1	51.0
3 lanes	7.2	10.2	7.4	9.5	11.9	15.0	12.3	14.4
4 lanes	15.4	17.3	15.2	16.8	20.1	22.3	22.5	22.1
5+ lanes	1.4	2.2	1.6	2.1	2.5	3.9	3.1	3.7
6+ lanes	1.6	1.9	1.2	1.7	2.2	2.5	2.3	2.4
Non-trafficway/driveway access	0.5	0.5	1.4	0.7	4.0	3.2	5.2	3.5
<b>Trafficway Description</b>	1% missing				17% missing			
One-way trafficway	0.9	0.9	0.7	0.9	3.1	3.9	2.8	3.8
Two-way, not divided	64.8	56.5	62.4	58.1	54.0	46.9	51.0	48.0
Two-way, divided, unprotected	17.1	19.3	18.2	18.9	15.3	15.2	14.3	15.1
Two-way, divided, median	10.0	15.9	10.1	14.5	15.1	21.1	16.5	20.0
Two-way, contin. left turn lane	6.3	6.1	6.3	6.1	6.8	6.9	8.1	7.0
Entrance/exit ramp	0.4	0.8	0.9	0.8	1.9	2.9	2.3	2.7
Non-trafficway/driveway access	0.5	0.5	1.4	0.7	3.8	3.1	5.0	3.4
<b>Speed Limit</b>								
<= 35 mph	16.9	15.8	20.4	16.7	43.4	41.0	46.7	41.8
40-45 mph	26.3	23.6	26.2	24.2	36.2	33.5	33.9	33.8
50-60 mph	42.7	41.2	38.9	40.9	15.9	18.0	14.4	17.5
65+ mph	14.2	19.3	14.5	18.2	4.6	7.5	5.1	7.0
<b>Interstate</b>								
Interstate	8.4	13.4	8.2	12.2	5.3	9.3	4.9	8.4
Non-interstate	91.6	86.6	91.8	87.8	94.7	90.7	95.1	91.5
<b>Roadway Alignment</b>								
Straight	82.7	83.9	86.6	84.3	91.4	92.1	90.7	91.9
Curve right	8.1	6.9	5.3	6.7	2.6	2.3	2.3	2.3
Curve left	6.9	7.1	5.2	6.8	1.6	1.4	1.3	1.4
Curve – unknown direction	1.7	1.6	1.4	1.6	1.0	1.5	1.3	1.4
Non-trafficway/driveway access	0.5	0.5	1.4	0.7	3.4	2.7	4.4	3.0
<b>Rural/Urban Roadway</b>								
Rural	53.3	49.2	51.3	49.8				
Urban	46.7	50.8	48.7	50.2				
<b>Route Signing</b>								
Interstate	8.0	13.2	7.9	11.9				
U.S. highway	19.3	20.7	24.8	21.3				
State highway	33.7	33.8	35.6	34.1				
County road	15.3	10.8	10.8	11.2				
Local street	19.6	18.0	18.1	18.1				
Other	4.1	3.5	2.7	3.4				
<b>Roadway Function Class</b>								

Interstate, principal arterial	8.4	13.4	8.2	12.2				
Freeway and expressway, principal arterial	3.1	4.8	3.0	4.4				
Principal arterial, other	29.6	33.8	38.6	34.3				
Minor arterial	24.5	22.0	23.7	22.5				
Collector	19.7	14.6	15.2	15.1				
Local	14.7	11.3	11.2	11.6				
<b>Intersection Type</b>								
Not an intersection	59.2	65.3	52.1	62.6	48.7	52.6	46.4	51.6
4-way intersection	26.9	23.8	32.4	25.5	34.5	33.9	38.3	34.4
T-intersection	12.6	9.9	14.3	10.9	15.5	12.3	14.0	12.8
Other inters. (Y, L, >4-way)	1.2	0.9	1.2	1.0	1.0	0.9	0.9	0.9
Traffic circle or roundabout	0.0	<0.1	<0.1	<0.1	0.3	0.3	0.4	0.3
<b>Traffic Control Device</b>								
No controls	70.0	75.0	62.0	72.5	56.2	56.9	52.0	56.3
Traffic control signal	12.5	13.8	16.4	14.1	28.8	31.5	32.4	31.3
Other signal (flashing, lane use)	0.7	0.6	0.7	0.6	0.7	0.6	0.5	0.6
Stop sign	13.2	7.0	17.2	9.1	10.5	7.5	11.7	8.2
Yield sign	0.7	0.3	0.6	0.4	2.1	2.2	2.2	2.2
Other sign (school, pedestrian crossing, RR crossing)	3.1	3.3	3.0	3.2	1.6	1.3	1.3	1.3
<b>Relation to Junction</b>								
Non-junction	50.5	56.1	40.3	53.0				
Intersection	37.2	29.9	43.4	32.7				
Intersection-related	4.0	5.3	5.0	5.1				
Driveway access /related	5.9	5.2	8.5	5.8				
Entrance/exit ramp /related	0.5	1.0	0.8	0.9				
Railway grade crossing	<0.1	<0.1	<0.1	<0.1				
Through roadway	1.2	2.0	1.2	1.8				
Other within interchange area Crossover/accel/decl lane/shared use tr.	0.6	0.5	0.8	0.6				

**Table A.4. Multi-Vehicle Crash Types**

Crash Type	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Grouped Crash Type</b>								
Single driver	3.7	3.2	2.0	3.0	0.3	0.3	0.2	0.3
Same trafficway, Same direction	12.9	16.1	12.8	15.3	55.0	54.7	45.6	53.9
Same trafficway, Opposite direction	33.5	32.8	25.8	31.7	2.3	2.5	2.2	2.5
Change trafficway, Vehicle turning	19.7	14.6	25.8	16.8	25.6	22.3	30.1	23.4
Intersect paths – Straight paths	17.9	13.9	20.9	15.4	9.6	9.1	11.9	9.4
All other	12.3	19.3	12.7	17.7	7.2	11.1	9.8	10.6
<b>Specific Crash Type</b>								
Single vehicle								
Right roadside departure	0.7	0.8	0.6	0.7	0.1	0.1	0.1	0.1
Left roadside departure	1.6	0.7	0.5	0.8	0.2	0.1	0.1	0.1
Forward impact	1.3	1.7	0.9	1.5	<0.1	0.1	0.1	0.1
Same trafficway, Same direction								
Rear end	8.6	11.7	9.8	11.2	46.8	44.6	34.4	43.8
Forward impact	0.1	0.1	0.1	0.1	<0.1	0.1	<0.1	0.1
Angle, sideswipe	4.2	4.3	3.0	4.1	8.2	10.1	11.2	10.0
Same trafficway, Opposite direction								
Head-on	20.0	22.1	18.1	21.3	0.8	0.9	0.7	0.8
Forward impact	0.1	0.2	0.2	0.2	<0.1	<0.1	<0.1	<0.1
Angle, sideswipe	13.4	10.5	7.5	10.2	1.4	1.6	1.5	1.6
Change trafficway, Vehicle turning								
Turn across path	12.0	9.1	15.3	10.3	12.7	11.3	14.5	11.7
Turn into path	7.7	5.5	10.5	6.5	12.9	11.0	15.6	11.6
Intersect paths – Straight paths	17.9	13.9	20.9	15.4	9.6	9.1	11.9	9.4
Miscellany - Backing	0.2	0.2	0.3	0.2	1.9	2.5	2.9	2.5
Other accident type	11.7	18.9	12.2	17.3	4.9	8.2	6.5	7.7
Unknown accident type	0.3	0.1	0.1	0.1	0.4	0.3	0.4	0.4
No impact	0.1	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1

Table A.5. Other Multi-Vehicle Crash Characteristics

Crash Characteristics	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Manner of Collision (MAN_COLL)</b>								
Angle	51.0	40.8	53.7	43.7	32.6	29.8	38.3	30.9
Head-on (front-to-front)	23.3	25.9	21.9	25.0	3.7	3.2	3.5	3.2
Rear-end (front-to-rear)	10.6	16.1	13.0	15.2	50.7	50.9	39.8	49.8
Sideswipe, same direction	4.0	4.0	2.7	3.8	9.4	11.5	13.5	11.5
Sideswipe, opposite direction	2.9	3.5	2.9	3.3	1.6	1.8	1.7	1.8
Backing (rear→side or rear→rear)	0.1	0.3	0.1	0.3	0.9	1.3	1.6	1.3
Other	0.4	0.5	0.4	0.5	0.7	0.8	0.9	0.8
Not collision with mv in transp.	7.6	9.0	5.3	8.3	0.6	0.8	0.7	0.8
<b>Pre-Event Movement</b>								
Going straight	59.1	63.2	56.3	61.8	51.3	46.8	41.9	46.8
Decelerating in road	1.0	1.8	1.4	1.7	6.6	8.2	6.2	7.8
<b>Starting</b> or accelerating in road	1.6	1.0	2.7	1.3	3.5	2.9	3.1	3.0
Stopped in roadway	3.3	5.7	4.0	5.2	11.6	20.8	17.0	19.5
Passing or overtaking a vehicle	3.2	1.9	0.9	1.8	0.9	0.9	0.9	0.9
Turning right	0.6	0.5	1.0	0.6	3.6	2.8	5.0	3.1
Turning left	13.2	8.7	20.7	11.0	13.4	9.4	15.7	10.4
Making a U-turn	0.7	0.5	0.9	0.6	0.7	0.5	0.7	0.5
Negotiating a curve	14.5	13.6	9.6	13.0	2.5	2.4	1.8	2.4
<b>Changing lanes</b> or merging	2.0	2.0	1.6	1.9	4.4	3.5	5.3	3.8
<b>Leaving</b> or entering parking	0.0	0.1	<0.1	<0.1	0.3	0.5	0.6	0.5
Backing (other than for parking)	0.1	0.1	0.2	0.1	0.9	1.1	1.5	1.1
Other maneuver (Disabled or parked, other avoidance maneuver, other, no driver)	0.8	0.9	0.7	0.9	0.3	0.3	0.3	0.3
<b>Pre-crash Critical Event (P_CRASH2) (Lots of categories to try to make sense of. Printed off table.)</b>								
<b>Avoidance maneuver (P_CRASH3)</b>	12% unknown				42% unknown			
None	79.6	80.6	88.1	81.8	75.2	84.2	88.3	83.8
Braking only	6.0	5.9	3.6	5.6	18.8	10.5	7.8	11.0
Steering only	10.3	8.8	5.8	8.4	3.8	3.4	2.6	3.3
Braking + steering	3.1	3.6	1.6	3.3	1.1	1.0	0.6	0.9
<b>Accelerating</b> (+/- steering)	0.3	0.3	0.4	0.3	0.4	0.3	0.1	0.3
Other	0.7	0.7	0.5	0.7	0.7	0.6	0.5	0.6
<b>First Harmful Event (HARM_EV)</b>	99% collision with MV in transport							
<b>Most Harmful Event (M_HARM)</b>	99% collision with MV in transport							
<b>Initial Impact (IMPACT1)</b>								
Front (12 o'clock)	60.6	65.0	55.2	63.0	60.7	46.6	46.1	48.1
Right side (1-5 o'clock)	15.5	10.0	13.8	11.0	10.0	10.2	13.1	10.5
Rear (6 o'clock)	7.5	10.9	8.5	10.2	19.6	32.1	27.9	30.5
Left side (7-11 o'clock)	14.4	12.0	21.4	13.7	9.6	10.8	12.7	10.9
Top / Undercarriage / Other	1.4	1.8	1.0	1.7	0.1	0.2	0.1	0.2
Non-collision	0.6	0.4	0.1	0.3	0.1	<0.1	<0.1	<0.1





**Table A.6. Driver Factors in Multi-Vehicle Crashes – Driver Condition**

Driver Factors	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Driver Condition (Impairment) at Time of Crash (Note: Mult. Codings)</b>								
No impairment	75.5	72.7	78.0	73.8	97.5	95.6	96.2	95.9
Ill, blackout	0.3	0.6	1.8	0.7	0.1	0.1	0.4	0.2
Asleep or fatigued	2.0	1.1	0.7	1.1	0.2	0.3	0.2	0.3
Under influence of alcohol, drugs, or medication	7.0	10.7	1.8	9.0	0.4	1.4	0.5	1.2
Emotional (depressed, angry, etc.)	0.3	0.2	0.0	0.2	0.1	<0.1	<0.1	<0.1
Other impairment 3,4,5,6,7,10,96	0.3	0.5	1.3	0.6	0.1	0.1	0.3	0.1
Not reported or unknown	14.7	14.6	16.5	14.9	1.7	2.5	2.5	2.4
<b>Drinking (Police Reported Alcohol Involvement)</b>	Total % Includes missing age				Used VEH_ALCH / Driver Drinking for correct total %			
Alcohol not involved	64.2	59.4	68.3	61.1	95.9	94.0	94.7	94.3
Alcohol Involved	6.6	11.1	2.4	9.3	0.4	1.4	0.5	1.2
Not reported / Unknown	29.2	29.5	29.3	29.6	3.7	4.6	4.8	4.5
<b>Driver Drinking (NHTSA)</b>								
No	91.7	85.5	96.0	87.7				
Yes	8.3	14.5	4.0	12.3				
<b>Drug (Police Reported Drug Involvement)</b>								
Drugs not involved	49.8	47.4	53.2	48.4	95.6	94.4	94.5	92.0
Drugs involved	4.7	5.3	1.3	4.6	0.2	0.3	0.2	0.3
Not reported / Unknown	45.5	47.3	45.5	47.0	4.2	5.3	5.3	7.6

**Table A.7. Driver Factors in Multi-Vehicle Crashes – Other Contributing Driver Factors**

Driver Characteristic	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES) KEEP THESE			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Driver Related Factors</b>								
6 – Careless driving (2012 & 2013)	2.7	2.1	2.0	2.1	2.5	1.8	1.8	1.9
8 Aggressive driving / Road rage	0.9	0.4	0.1	0.4	<0.1	0.1	<0.1	0.1
26 Following improperly	1.1	1.5	1.8	1.5				
27 Improper or erratic lane changing	1.0	1.0	0.7	1.0				
28 Failure to keep in proper lane	15.4	10.5	8.7	10.5				
31 Starting or backing improperly	0.1	0.1	0.1	0.1				
33 Passing where prohibited	0.7	0.4	0.1	0.4				
34 Passing on wrong side	0.2	0.1	0.1	0.1				
35 Passing with insufficient distance or inadequate visibility or failure to yield to overtaking veh.	1.1	0.8	0.4	0.7				
36 Operating vehicle in erratic, reckless, or negligent manner	3.7	2.8	1.2	2.6	0.3	0.2	0.1	0.2
38 Failure to yield right-of-way	15.8	9.1	26.3	12.4				
39 Failure to obey traffic sign, traffic device, officer, or traffic zone laws	8.8	5.5	8.7	6.2				
47-48 Making improper turn	2.2	1.4	2.8	1.7				
51 Driving on wrong side of road	3.7	3.6	3.2	3.5	0.1	0.1	0.1	0.1
58 Overcorrecting	3.4	1.6	0.7	1.5	0.1	0.1	<0.1	0.1
<b>Driver Distraction</b>								
Not distracted	73.4	77.5	75.7	76.9	82.2	87.2	85.8	86.6
Looked but did not see	1.1	0.7	1.2	0.8	2.0	1.4	2.6	1.6
Lost in thought / Day dreaming	0.6	0.4	0.5	0.4	0.3	0.3	0.3	0.3
Other occupants	0.4	0.3	0.1	0.3	0.3	0.2	0.1	0.2
Moving object in vehicle	0.1	<0.1	<0.1	<0.1	0.1	0.1	0.1	0.1
Using cell phone (talking, listening, manipulating, other) 5,6,15	1.6	1.0	0.2	0.9	2.3	1.4	0.4	1.4
Adjusting audio or climate controls	0.2	0.1	0.0	0.1	0.4	0.1	<0.1	0.1
Using other component/ controls integral to vehicle	0.1	0.1	<0.1	0.1	0.1	0.1	0.1	0.1
Using or reaching for device/ object brought into vehicle	0.2	0.2	<0.1	0.2	0.7	0.4	0.2	0.4
Outside person, object, event	0.3	0.3	0.3	0.3	1.1	0.7	0.8	0.7
Eating or drinking	0.2	0.1	<0.1	0.1	0.2	0.1	0.1	0.1
Smoking related	0.0	<0.1	0.0	<0.1	<0.1	<0.1	0.0	<0.1
Distracted/Inattentive/Careless 17,18,19,92,93	5.0	3.2	4.3	3.5	8.8	5.9	6.8	6.4
Other distraction	0.8	0.4	0.4	0.4	0.5	0.4	0.3	0.4

Not reported or Unknown 96,99	16.1	15.8	17.2	16.0	2.2	2.7	2.6	2.6
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**Table A.8. Driver Violation (grouped)**

Driver Violation (Type of Offense)	Fatal Multi-Vehicle Crashes (FARS)				All Multi-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
No violation	81.1	86.9	89.9	87.0	62.3	74.9	74.8	73.7
Reckless, careless, hit-run	7.0	5.4	2.2	5.0	5.5	3.8	3.5	3.9
Impairment offense	2.5	3.6	0.3	2.9	0.3	1.0	0.3	0.8
Speed related	1.8	0.8	0.4	0.8	6.1	3.7	2.3	3.8
Rules of the road – traffic signs & signals	1.5	1.0	1.5	1.1	2.4	1.6	2.6	1.8
Rules of the road – turning, yielding, signaling	3.9	1.9	4.2	2.4	8.9	4.6	8.8	5.4
Rules of the road – wrong side, passing & following	1.2	0.9	0.5	0.8	5.7	3.5	2.3	3.6
Rules of the road – lane usage	1.0	0.7	0.5	0.7	1.8	1.3	2.0	1.4
Non-moving – license & registration violations	2.7	2.4	0.5	2.1	7.1	6.0	2.4	5.8
Equipment violation	1.1	0.6	0.1	0.6	0.3	0.3	0.1	0.3
License, registration & other violations	2.9	1.6	1.3	1.6	4.6	3.0	3.0	3.2
<b>Speeding (NHTSA, speed)</b>								
Not speeding	82.3	88.2	95.1	88.9	88.9	93.1	95.8	93.0
Speeding	17.7	11.8	4.9	11.1	11.1	6.9	4.2	7.0

## Appendix B FARS & GES Single-Vehicle Crashes

**Table B.1. Driver and Vehicle Characteristics of Single-Vehicle Crashes**

Driver Characteristics	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Age</b>								
<20				9.5				13.0
20-64				78.8				79.4
65+				11.7				7.7
<b>Gender</b>								
Male	71.8	73.6	70.3	73.0	59.9	59.6	58.4	59.5
Female	28.2	26.4	29.7	27.0	40.1	40.4	41.6	40.5
<b>Reported Restraint Use</b>								
None used	39.7	41.6	28.1	39.6	4.4	3.9	3.2	3.7
Shoulder AND lap belt	50.0	48.1	63.3	49.7	85.6	83.9	84.3	78.9
Shoulder OR lap belt only	1.2	0.8	1.1	0.9	1.1	1.2	1.5	1.1
Other / Not reported / Unk.	9.1	9.5	7.5	9.8	8.9	10.9	11.0	16.3
<b>Injury Severity</b>								
No apparent injury (O)	21.1	28.1	25.6	27.1	75.8	79.6	79.2	79.1
Possible injury (C)	5.7	3.1	2.5	3.3	10.5	8.8	8.5	9.0
Suspected minor injury (B)	11.5	5.7	3.2	5.9	10.9	8.2	8.2	8.5
Suspected serious injury (A)	9.3	5.0	3.2	5.2	2.1	2.3	2.5	2.3
Fatal injury (K) (or died prior)	52.1	58.1	65.3	58.4	0.2	0.4	0.8	0.4
Unknown injury severity	0.2	0.1	0.1	0.1	0.5	0.7	0.9	0.7
<b>Body Type</b>								
Passenger car	58.7	48.0	50.6	49.3	65.6	56.8	60.8	58.3
Pickup	20.0	24.5	22.8	23.9	15.1	16.4	13.2	16.0
Utility vehicle / Light truck	19.3	22.5	17.8	21.6	16.9	21.0	18.7	20.3
Van	2.0	5.1	8.8	5.2	2.4	5.8	7.4	5.5
<b>Number Occupants in Vehicle</b>								
1	44.7	67.0	76.7	66.0	67.5	79.1	80.7	77.7
2	25.9	19.3	18.9	19.9	21.4	14.1	17.0	15.3
3	14.4	7.1	2.7	7.3	7.1	4.2	1.7	4.4
4	8.1	3.6	1.1	3.7	2.5	1.7	0.4	1.7
5+	6.8	3.0	0.6	3.1	1.4	0.9	0.2	0.9
<b>Extent of Damage</b>								
No damage	1.7	2.3	1.9	2.2	2.0	2.9	5.2	2.9
Minor damage	6.2	9.4	10.3	9.2	18.0	22.5	25.8	21.7
Functional damage	9.6	13.0	13.4	12.8	12.1	12.8	12.3	12.3
Disabling damage	80.4	72.3	70.3	72.4	57.6	46.0	35.5	45.1
Not reported / Unknown	2.1	2.2	4.3	3.3	10.3	15.8	21.2	18.0

**Table B.2. Environmental Characteristic of Single-Vehicle Crashes**

Environmental Characteristics	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Weekday / Weekend</b>								
Weekday (6am Mon-6pm Fri)	50.4	53.4	68.5	54.9	60.5	62.3	71.4	62.8
Weekend (6pm Fri – 6am Mon)	49.6	46.6	31.5	45.1	39.5	37.7	28.6	37.2
<b>Daytime/Nighttime</b>								
Daytime (6:00AM-5:59PM)	35.2	35.4	68.6	39.3	51.4	50.1	69.2	51.7
Nighttime (6:00PM-5:59AM)	64.8	64.6	31.4	60.7	48.6	49.9	30.8	48.3
<b>Light Condition</b>								
Daylight	36.0	34.0	66.0	37.9	51.0	47.2	66.4	49.2
Dark, not lighted	41.7	39.0	17.2	36.7	23.8	26.1	15.7	25.0
Dark, lighted	17.8	22.5	12.6	20.9	19.4	19.9	12.6	19.3
Dark, lighting unknown	0.7	0.7	0.3	0.7	1.1	1.5	0.9	1.4
Dawn	1.9	1.9	1.7	1.9	2.3	3.1	1.6	2.9
Dusk	1.9	2.0	2.2	2.0	2.5	2.2	2.8	2.3
<b>Weather</b>								
Clear or cloudy	88.6	88.4	88.5	88.5	77.0	77.5	84.1	77.9
Rain	7.7	7.5	7.1	7.5	12.8	11.7	7.2	11.5
Fog, smog, smoke	1.4	1.2	1.0	1.2	0.7	0.8	0.5	0.8
Sleet, hail, freezing rain, snow	1.4	1.6	2.4	1.7	7.9	7.3	5.3	7.2
Other/Unknown	0.9	1.2	0.9	1.1	1.6	2.8	2.9	2.7

**Table B.3. Roadway Characteristics of Single-Vehicle Crashes**

Roadway Characteristics	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Number of Travel Lanes</b>								
1 lane	1.6	1.9	1.9	1.9	3.7	3.6	2.9	3.6
2 lanes	83.3	75.9	78.3	76.9	80.3	75.0	75.4	75.7
3 lanes	5.2	7.6	6.1	7.2	6.1	8.6	5.0	8.1
4 lanes	8.1	11.8	11.3	11.4	5.9	7.7	8.0	7.5
5+ lanes	1.6	2.6	1.8	2.4	1.0	1.7	1.1	1.6
Non-trafficway/driveway access	0.1	0.2	0.5	0.3	3.0	3.3	7.5	3.5
<b>Trafficway Description</b> <span style="float: right;">19% missing</span>								
One-way trafficway	1.4	1.3	1.3	1.3	1.9	2.3	1.5	2.2
Two-way, not divided	72.9	63.4	66.3	64.6	70.3	61.1	62.7	62.4
Two-way, divided, unprotected	12.6	16.4	16.2	16.0	7.0	9.3	9.8	9.0
Two-way, divided, median	8.4	12.3	10.2	11.7	12.5	19.1	14.6	17.9
Two-way, continuous left turn lane	3.5	4.6	4.2	4.5	1.9	1.9	2.4	1.9
Entrance/exit ramp	1.1	1.8	1.3	1.6	3.6	3.3	1.6	3.2
Non-trafficway/driveway access	0.1	0.2	0.5	0.3	2.8	3.2	7.2	3.4
<b>Speed Limit</b>								
<= 35 mph	28.0	25.5	28.9	26.1	40.9	34.8	44.5	36.4
40-45 mph	23.4	23.1	20.5	22.8	18.0	16.8	18.4	17.1
50-60 mph	36.7	35.1	34.2	35.1	30.8	32.9	26.9	32.2
65+ mph	11.9	16.4	16.4	16.0	10.3	15.5	10.2	14.4
<b>Interstate</b>								
Interstate	7.8	12.1	11.2	11.6	92.6	89.1	94.4	89.9
Non-interstate	92.2	87.9	88.8	88.4	7.4	10.9	5.6	10.1
<b>Roadway Alignment</b>								
Straight	65.7	69.3	74.7	69.6	67.4	76.1	80.4	75.3
Curve right	14.2	11.9	9.3	11.8	10.9	7.7	4.9	7.9
Curve left	16.9	15.9	13.4	15.7	14.0	8.8	6.2	9.3
Curve - unknown	3.1	2.6	2.1	2.6	5.2	4.6	2.5	4.5
Non trafficway or driveway	0.1	0.2	0.5	0.3	2.5	2.7	6.0	3.0
<b>Rural/Urban Roadway</b>								
Rural	60.5	54.1	56.7	55.0				
Urban	39.5	45.9	43.4	45.0				
<b>Route Signing</b>								
Interstate	7.4	11.8	11.0	11.3				
U.S. highway	9.5	12.3	14.7	12.3				
State highway	24.4	26.6	28.5	26.6				
County road	27.1	20.2	16.6	20.4				
Local street	28.0	25.1	25.4	25.4				
Other	3.7	4.1	3.8	4.0				

<b>Roadway Function Class</b>								
Interstate, principal arterial	7.8	12.1	11.2	11.6				
Freeway and expressway, principal arterial	2.5	3.5	2.3	3.3				
Principal arterial, other	15.9	21.5	23.4	21.2				
Minor arterial	16.5	17.3	18.8	17.4				
Collector	23.7	21.2	21.5	21.5				
Local	33.7	24.4	22.7	25.1				
<b>Intersection Type</b>								
Not an intersection	91.2	87.3	84.5	87.4	87.6	89.4	85.5	88.9
4-way intersection	4.1	6.6	7.5	6.4	4.9	5.3	8.0	5.4
T-intersection	4.2	5.4	7.2	5.5	6.9	4.8	5.7	5.1
Other inters. (Y, L, >4-way)	0.5	0.7	0.7	0.6	0.5	0.4	0.5	0.4
Traffic circle or roundabout	<0.1	0.1	0.1	0.1	0.1	0.2	0.4	0.2
<b>Traffic Control Device</b>								
No controls	90.5	88.0	85.6	88.0	89.7	89.0	85.2	88.8
Traffic control signal	2.9	4.8	5.7	4.8	3.1	4.4	5.7	4.3
Other signal (flashing, lane use)	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2
Stop sign	1.4	2.0	2.7	2.0	3.1	2.9	4.6	3.1
Yield sign	<0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2
Other sign (school, pedestrian crossing, RR crossing)	5.1	4.8	5.6	4.9	3.8	3.4	4.1	3.5
<b>Relation to Junction (RELJCT2)</b>								
Non-junction	87.3	81.5	77.8	81.6				
Intersection	3.3	5.1	5.9	5.0				
Intersection-related	5.9	8.0	10.1	8.0				
Driveway access /related	0.6	1.0	1.8	1.0				
Entrance/exit ramp /related	1.1	2.0	1.6	1.9				
Railway grade crossing	0.7	0.6	1.4	0.7				
Through roadway	0.5	1.1	0.8	1.0				
Other within interchange area Crossover/accl/decl lane/shared use tra	0.6	0.7	0.7	0.7				



**Table B.4. Single-Vehicle Crash Types**

Crash Type	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Grouped Crash Type</b>								
Right roadside departure	39.7	35.9	38.2	36.5	43.9	31.5	24.8	32.6
Left roadside departure	33.6	28.8	27.7	29.1	29.5	22.6	16.3	23.0
Forward impact	20.2	30.0	29.8	29.0	19.0	38.7	48.0	36.9
Miscellany - Backing	0.1	0.3	0.4	0.3	3.9	3.9	8.0	4.2
Other	5.1	3.6	2.8	3.7	2.0	1.4	1.2	1.5
Unknown / No impact	1.4	1.4	1.3	1.4	0.6	1.1	0.9	1.0
<b>Specific Crash Type</b>								
Right Roadside Departure								
Drive off road	22.8	23.5	29.9	24.2	20.9	16.4	15.8	17.0
Control / traction loss	16.0	11.6	7.5	11.6	17.0	10.6	6.2	11.1
Avoid collision with veh, ped, animal	0.4	0.2	0.3	0.3	6.2	4.3	2.5	4.4
Other / Unknown specifics	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4
Left Roadside Departure								
Drive of road	17.6	17.2	20.8	17.7	13.1	11.0	10.5	11.3
Control / traction loss	15.3	10.9	6.4	10.8	13.4	8.9	4.7	9.2
Avoid collision with veh, ped, animal	0.3	0.2	0.1	0.2	3.0	2.6	1.1	2.5
Other / Unknown specifics	0.3	0.5	0.4	0.5	0.3	0.2	0.1	0.2
Forward impact								
Parked vehicle	0.5	0.6	0.8	0.6	6.3	8.2	10.5	8.1
Stationary object	0.1	0.3	0.4	0.3	1.0	1.9	2.7	1.8
<b>Pedestrian / animal</b>	<b>18.6</b>	<b>27.4</b>	<b>25.7</b>	<b>26.4</b>	<b>10.9</b>	<b>27.3</b>	<b>32.5</b>	<b>25.6</b>
End departure	0.5	1.1	1.7	1.1	0.9	1.0	1.6	1.1
Other / Unknown specifics	0.5	0.6	1.2	0.6	0.2	0.6	1.1	0.6
Miscellany - Backing	0.1	0.3	0.4	0.3	3.9	3.9	8.1	4.3
Other crash type	5.1	3.6	2.8	3.7	2.0	1.4	1.2	1.5
Unknown	0.1	0.1	0.1	0.1	--	--	--	--
No impact	1.3	1.3	1.2	1.3	0.6	1.1	0.9	1.0

Table B.5. Other Single-Vehicle Crash Characteristics

Crash Characteristics	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Manner of Collision</b>	All "not a collision with mv in transport"							
<b>Pre-Event Movement (P_CRASH1)</b>								
Going straight	61.0	64.8	69.9	65.0	56.3	66.7	64.5	65.2
Decelerating in road	0.1	0.1	0.2	0.1	0.7	0.6	0.4	0.6
Accelerating or starting in road	0.3	0.3	0.3	0.3	0.6	0.7	1.2	0.7
Stopped in roadway / disabled or "parked" in travel lane	0.1	0.1	0.1	0.1	<0.1	0.2	0.2	0.2
Passing or overtaking a vehicle	2.1	1.3	0.7	1.3	0.6	0.4	0.6	0.4
Turning right	0.4	0.7	1.0	0.7	4.6	3.4	4.9	3.7
Turning left	1.0	1.4	2.0	1.5	5.6	3.8	5.9	4.2
Making a U-turn	<0.1	0.1	0.1	0.1	0.5	0.3	0.3	0.3
Negotiating a curve	32.5	28.7	23.1	28.4	24.1	16.2	9.7	16.7
<b>Changing lanes</b> or merging	1.4	1.4	0.8	1.2	1.7	1.7	1.6	1.7
<b>Leaving</b> or entering parking	0.0	0.1	0.3	0.1	0.7	1.3	2.6	1.4
Backing (other than for parking)	0.2	0.4	0.7	0.4	3.7	3.6	7.0	3.9
Other	0.8	0.6	0.7	0.7	0.9	1.1	1.0	1.0
<b>Pre-crash Critical Event (P_CRASH2) (Lots of categories to try to make sense of. Printed off table.)</b>								
<b>Avoidance maneuver (PCRASH3)</b> Excludes 13% Unk. Excludes 50% Unk								
None	62.3	69.4	78.0	69.7	51.8	64.2	78.2	63.7
Braking only (with/without lockup)	7.8	6.7	4.6	6.6	14.3	9.3	5.8	9.7
Steering only (L>F, R>GES)	22.4	18.3	13.7	18.2	26.8	20.2	12.1	20.4
Braking + steering	6.2	4.7	2.9	4.6	2.7	2.5	1.6	2.5
Accelerating + steering	0.1	0.1	0.2	0.1	0.8	0.4	0.2	0.5
Other	1.3	0.7	0.7	0.8	3.6	3.3	2.1	3.3
<b>First Harmful Event (HARM_EV)</b> PRINTED TABLE – many levels								
<b>Most Harmful Event (M_HARM)</b> PRINTED TABLE – many levels								
<b>Initial Impact (IMPACT1)</b>								
Front (12 o'clock)	54.8	64.1	73.3	64.4	63.2	65.5	64.6	65.2
Right side (1-5 o'clock)	9.4	7.0	5.1	7.0	12.6	11.4	12.7	11.6
Rear (6 o'clock)	2.5	1.8	1.5	1.9	6.6	6.4	9.3	6.7
Left side (7-11 o'clock)	9.8	7.3	5.0	7.3	7.1	8.3	6.1	8.0
Top / Undercarriage / Other	5.4	4.7	4.6	4.8	2.9	2.8	3.7	2.9
Non-collision	18.0	15.0	10.5	14.7	7.6	5.5	3.5	5.7

Table B.6. Driver Factors in Single-Vehicle Crashes – Driver Condition

Driver Factors	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Driver Condition (Impairment) at Time of Crash (Mult. Codings)</b>								
No impairment	54.8	45.6	56.5	47.7	85.3	77.9	80.5	79.0
Ill, blackout	0.3	1.3	9.4	2.2	0.5	1.5	5.0	1.6
Asleep or fatigued	3.3	2.8	4.1	3.0	3.7	3.4	4.0	3.5
Under influence of alcohol, drugs, or medication	19.3	27.0	5.7	23.8	5.9	11.3	3.1	10.0
Emotional (depressed, angry, etc.)	0.4	0.4	0.2	0.4	0.2	0.4	0.1	0.3
Other impairment 3,4,5,6,7,10,96	0.5	0.9	3.5	1.2	0.1	0.3	1.1	0.3
Not reported or unknown	21.8	22.7	21.8	22.5	4.5	5.6	6.5	5.5
<b>Drinking (Police Reported Alcohol Involvement)</b>				Includes missing				Includes missing
Alcohol not involved	48.0	37.7	60.8	41.1	86.7	81.1	88.2	77.6
Alcohol involved	20.7	30.6	6.7	26.6	6.0	11.4	3.1	9.5
Not reported / Unknown	31.3	31.8	32.4	32.2	7.2	7.5	8.8	12.9
<b>Driver Drinking (NHTSA)</b>								
No	73.4	58.6	89.5	63.6	93.5	87.7	96.6	89.1
Yes	26.6	41.4	10.5	36.4	6.5	12.3	3.4	10.9
<b>Drug (Police Reported Drug Involvement)</b>				Includes missing				Includes missing
Drugs not involved	42.6	38.1	49.6	39.6	90.3	88.4	89.7	83.6
Drugs involved	8.3	8.8	2.0	7.9	1.5	2.7	0.8	2.2
Not reported / Unknown	49.2	53.1	48.4	52.6	8.2	8.9	9.5	14.2

**Table B.7. Driver Factors in Single-Vehicle Crashes – Other Contributing Driver Factors**

Driver Characteristic	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
<b>Driver Related Factors</b>								
6 Careless driving (2012 & 2013)	4.7	4.7	4.2	4.6	4.1	3.2	3.5	3.3
8 Aggressive driving / Road rage	1.8	1.0	0.1	0.9	0.2	0.1	0.1	0.1
26 Following improperly	0.3	0.2	0.3	0.2	0.0	0.0	0.0	0.0
27 Improper or erratic lane changing	0.8	0.6	0.5	0.6				
28 Failure to keep in proper lane	8.5	7.4	7.9	7.6				
31 Starting or backing improperly	0.1	0.2	0.3	0.2				
33 Passing where prohibited	0.3	0.2	<0.1	0.2				
34 Passing on wrong side	0.1	0.1	0.1	0.1				
35 Passing with insufficient distance or inadequate visibility or failure to yield to overtaking vehicle	0.5	0.3	0.2	0.3				
36 Operating vehicle in erratic, reckless, or negligent manner	10.7	7.0	2.9	6.9	1.8	1.3	0.8	1.3
38 Failure to yield right-of-way	1.5	2.1	3.2	2.2				
39 Failure to obey traffic sign, traffic device, officer, or traffic zone laws	1.6	2.0	2.4	2.0				
47-48 Making improper turn	2.8	2.8	2.3	2.8				
51 Driving on wrong side of road	1.1	0.7	0.8	0.8	0.2	0.2	<0.1	0.2
58 Overcorrecting	15.5	11.4	7.9	11.4	4.5	2.5	1.6	2.7
<b>Driver Distraction</b>								
Not distracted	65.0	66.8	69.8	67.0	79.3	82.0	77.7	81.3
Looked but did not see	0.5	1.1	1.2	1.0	0.6	0.9	2.0	1.0
Lost in thought / Day dreaming	0.6	0.4	0.5	0.4	0.4	0.3	0.4	0.3
Other occupants	0.9	0.6	0.2	0.6	0.7	0.5	0.2	0.5
Moving object in vehicle	0.1	<0.1	0.1	0.1	0.4	0.1	0.3	0.2
Using cell phone (talking, listening, manipulating, other) 5,6,15	2.4	1.3	0.2	1.3	2.3	1.4	0.4	1.4
Adjusting audio or climate controls	0.3	0.2	0.1	0.2	0.7	0.2	<0.1	0.3
Using other component/ controls integral to vehicle	0.1	0.1	0.1	0.1	0.4	0.2	0.2	0.2
Using or reaching for device/ object brought into vehicle	0.4	0.2	0.2	0.2	1.1	0.9	1.3	1.0
Outside person, object, event	0.7	0.6	0.5	0.6	0.7	0.8	1.2	0.8
Eating or drinking	0.1	0.1	0.1	0.1	0.4	0.2	0.3	0.2
Smoking related	<0.1	0.1	<0.1	0.1	0.2	0.1	<0.1	0.1
Distracted/Inattentive/Careless 17,18,19,92,93	5.6	4.7	4.7	4.8	7.3	5.9	9.4	6.3
Other distraction	0.8	0.7	0.9	0.7	0.7	0.8	0.8	0.8

Not reported or Unknown 96,99	22.6	23.4	21.6	23.1	5.1	5.8	6.1	5.7
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**Table B.8. Driver Violation (grouped)**

Driver Violation (Type of Offense)	Fatal Single-Vehicle Crashes (FARS)				All Single-Vehicle Crashes (GES)			
	<20	20-64	65+	Total	<20	20-64	65+	Total
No violation	84.3	87.2	93.9	87.7	59.7	68.5	78.6	68.1
Reckless, careless, hit-run	8.9	6.7	2.8	6.4	9.8	7.8	6.4	8.0
Impairment offense	4.6	4.7	0.8	4.3	4.2	7.6	1.8	6.7
Speed related	2.4	1.0	0.6	1.1	11.0	5.8	3.6	6.3
Rules of the road – traffic signs & signals	0.2	0.1	0.1	0.1	0.3	0.4	0.5	0.4
Rules of the road – turning, yielding, signaling	0.3	0.5	0.7	0.5	0.8	0.8	2.1	0.9
Rules of the road – wrong side, passing & following	0.3	0.2	0.2	0.2	0.9	0.6	0.3	0.6
Rules of the road – lane usage	0.8	0.7	0.6	0.7	4.4	3.1	2.7	3.3
Non-moving – license & registration violations	2.8	2.3	0.4	2.1	7.6	6.4	1.5	6.2
Equipment violation	1.0	0.7	0.3	0.7	1.0	0.9	0.6	0.9
License, registration & other violations	2.1	1.7	1.1	1.7	10.5	7.7	5.3	7.9
<b>Speeding (NHTSA, speed)</b>								
Not speeding	50.7	65.0	84.4	65.9	65.7	79.1	89.3	78.1
Speeding	49.3	35.0	15.6	34.1	34.3	20.9	10.7	21.9