

Traffic Safety Facts

Traffic Tech – Technology Transfer Series

Number 380

October 2009



Identifying Situations Associated With Older Drivers' Crashes

Previous research has highlighted a number of situations that pose particular difficulty for older drivers. Specific driving maneuvers that have been problematic for this population include left turns across traffic, high-speed roads, lane changes, and navigating intersections.

This report extends previous findings by analyzing national crash data to identify driver, vehicle, roadway, and environmental characteristics associated with increased crash involvement by older drivers. The findings will be useful in developing countermeasures to improve safety of older drivers.

Methods

This study used 2002-2006 data from the Fatality Analysis Reporting System (FARS) and National Automotive Sampling System (NASS) General Estimates System (GES). For both the FARS and GES data, the analyses were restricted to single-vehicle and two-vehicle crashes involving passenger cars, sport utility vehicles, light vans, pickups, and other light trucks.

Separate descriptive analyses of single-vehicle and two-vehicle crashes, using FARS and GES data, identified characteristics that most strongly represented crashes involving older drivers. The age groups of interest in these analyses were 60-69, 70-79, and 80+. The analyses identified characteristics of the driver, vehicle, roadway/environment, and crash in which older drivers were overrepresented or underrepresented compared to other age groups.

A limitation of the descriptive analysis is that both exposure to particular driving situations and "increased risk" may contribute to observed differences among age groups. To address this limitation, the researchers performed more in-depth *induced exposure* analyses for the two-vehicle crashes. These analyses compared *crash involvement ratios* across driver age groups. Crash involvement ratios were defined as the proportion of at-fault crashes versus not-at-fault crashes for an age category. This approach assumes that the not-at-fault drivers represent the exposure level of their age group in the driving situation under study, and therefore, controls

for potentially different exposure levels across different age groups.

Driver fault or responsibility for the crash was based on a driver's contributing factors and/or violations. A driver was deemed at fault in the crash if one or more contributing factors or certain moving violations were present, and the other driver had no identified contributing factors or moving violations. Non-performance-related violations (e.g., driving with a suspended or revoked license) were not considered in determining fault. Two-vehicle crashes in which both drivers were deemed at fault or neither of the drivers was deemed at fault were excluded from the analysis.

Results

Descriptive Analysis

As expected, the descriptive analyses of the FARS and GES data revealed that older drivers were overrepresented in certain types of crashes, while they were underrepresented in other types of crashes. Drivers 60 to 69 had crash rates similar to those of middle-aged drivers under most conditions. The oldest group of drivers, 80 and older, were overrepresented in overall crashes. This group generally differed from those 70 to 79 more in terms of degree of risk elevation, than in number of conditions under which risk was elevated.

Left turns posed the greatest problem for older drivers. Twenty percent of two-vehicle crashes for drivers 70 to 79 and 32% of two-vehicle crashes for drivers age 80 and above involved a left turn. In contrast, only 9% of two-vehicle crashes across drivers of all ages and 11% of two-vehicle crashes for drivers 60 to 69 involved a left turn.

In two-vehicle crashes, those 60 and older were more likely to be the struck vehicle (as opposed to the striking vehicle), to be involved in angle crashes, and to have received citations for failure to yield. This pattern of elevated risk increased with age.

In single-vehicle crashes, drivers 60 and older were more likely to have been alone in the vehicle, more likely to crash

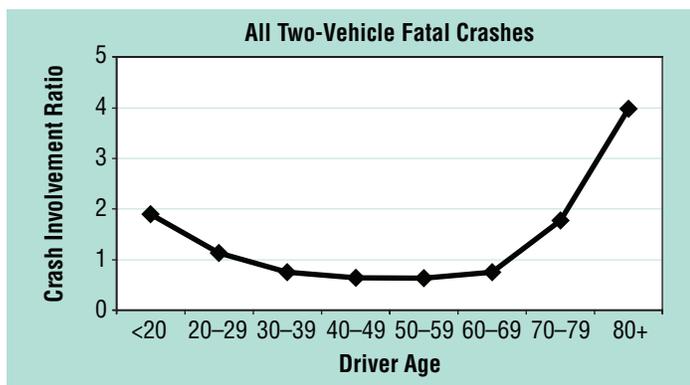
into a parked car, and were less likely to have made a maneuver to avoid the collision, compared to drivers of all ages. Drivers 70 and older had elevated risk levels under additional conditions including driveways, alleys, and at intersections controlled by stop or yield signs.

Older drivers were *less* likely than other drivers to be involved in certain types of crashes. Drivers 60 and older were less likely to be involved in alcohol-related, speed-related, or nighttime crashes. Older drivers were less likely to be involved in crashes related to poor weather, such as rain or snow.

Induced Exposure Analysis

The induced exposure analyses added further insight to these findings by providing the ratio of at-fault to not-at-fault drivers (the crash involvement ratio, or CIR) for various crash types for each age group. Values under 1.0 indicate a low rate of at-fault crashes, and values higher than 1.0 represent a high rate of at-fault crashes. Overall, FARS data indicate that drivers 60 to 69 had a CIR of 0.75, indicating a below-average risk of being found at fault in a crash. This risk increased to 1.75 for drivers 70 to 79, and to 4.0 for those 80 and older (see Figure 1).

Figure 1: Two-Vehicle Fatal CIRs by Driver Age Group

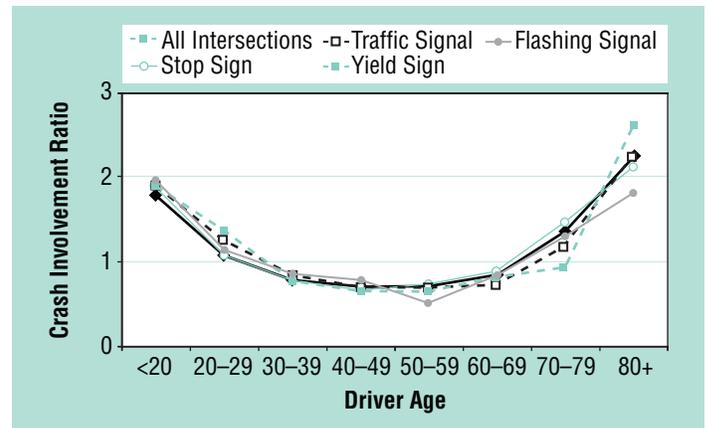


Results based on GES data differed in that the increase in CIR with age was less extreme. The CIR for the 60-to-69 age group was similar to that for the FARS data at 0.73. The overall values were 1.14 for drivers 70 to 79 and 1.91 for those age 80 and older. While these scores are higher than 1.0, they are well below those based on the FARS data. The results suggest that at least some of the increase in crash risk seen in the

FARS analyses may result from older adults' increased risk of dying in a crash.

Both the FARS and GES analyses demonstrated that drivers 60 to 69 managed most traffic situations nearly as well as their middle-aged counterparts. CIRs increased somewhat for drivers 70 to 79 under complex driving conditions such as navigating higher speeds, multiple lane roadways, and junctions. The oldest group, 80 and older, generally had substantially higher CIRs under a variety of conditions, including various intersection types (see Figure 2). Drivers 80 and older were especially vulnerable to right-side impacts, a situation that can occur when turning left at a stop sign. One of the most risky situations for older drivers was turning left at a signal-controlled intersection.

Figure 2: Two-Vehicle CIRs for Police-Reported Crashes by Traffic Control Device



Discussion

Across this entire set of analyses there is little evidence of elevated risk for drivers 60 to 69. Most often, the data only begin to demonstrate a substantial upturn in crashes for drivers 70 to 79, with overrepresentation for many crash types then accelerating more sharply for drivers 80 and older.

How to Order

Download a copy of *Identifying Behaviors and Situations Associated with Increased Crash Risk for Older Drivers* (46 pages plus appendices) from www.nhtsa.gov, or write to the Office of Behavioral Safety Research, NHTSA, NTI-130, 1200 New Jersey Avenue SE., Washington, DC 20590, fax 202-366-7394. Dr. Kathy Sifrit was the NHTSA Task Order Manager on this project.