Better designed roadway intersections can boost older drivers' performance

February 14 2007

Changes in roadway intersection design can keep older drivers safer and on the road longer, report University of Florida researchers in the current issue of Traffic Injury Prevention.

Wider road shoulders, right-turn lanes that allow drivers to merge into traffic without stopping and angle intersections no sharper than 90 degrees all led to better driving performance by older and younger drivers involved in a UF study of roadway intersection design.

"I think the research shows early support that environmental enhancements are conducive to older driver safety and improved performance," said principal investigator Sherrilene Classen, an assistant professor in the UF College of Public Health and Health Professions' department of occupational therapy. "But what we found is that it didn't just benefit older drivers, it benefited the younger drivers involved in the study, some of whom were between the ages of 35 and 54, which is also the safest group of drivers."

In 2003 about one in seven licensed drivers was 65 or older. By 2029, that proportion is expected to rise to one in four drivers, according to the AARP Public Policy Institute. Although drivers 65 and older have lower rates of crashes than younger drivers, they are at higher risk for injury or death because of increased fragility.

The UF study is the first to test the Federal Highway Administration's proposed guidelines for highway design to increase safe driving ability

of older drivers. Released in 2001, the guidelines include recommendations for four categories of roadway design. The UF researchers, members of the college's National Older Driver Research and Training Center, focused on the recommendations for intersections in urban areas because of the high prevalence of crashes associated with them.

The study included 71 participants — 39 younger drivers between the ages of 25 and 45, and 32 older drivers, aged 65 and older. Each completed a one-hour road course that included five intersections with traffic signals that met federal guidelines and five "unimproved" intersections that weren't consistent with the guidelines. Testing was done in Gainesville in optimal driving conditions: daylight, good weather and non-peak traffic hours.

The test car was a 2004 Buick Century, typical of the vehicles driven by older adults. During the road course, instruments collected data on the car's stability and speed and cameras recorded the drivers' head movements. In addition, evaluators who sat in the passenger seat recorded data on the participants' driving behaviors such as yielding, signaling, visual scanning, adjustment to stimuli/traffic signals and gauging the distance between oncoming traffic.

The study results showed that the younger and older drivers had enhanced driving performance for three of the improved intersections: a widened receiving lane for left turns, which provides an extra four feet to the shoulder; right-turn lanes that channel drivers into the flow of oncoming traffic without requiring a complete stop; and intersections that are at a 90-degree angle, rather than a sharper angle, such as 75 degrees.

"There are many changes that go hand-in-hand with normal aging such as decreased peripheral vision and slower reaction time," Classen said.

“Improving the roads, taking these age-related changes into consideration, can really benefit older drivers by keeping them on the road longer.”

Future research should include tests of the federal guidelines under other conditions such as in bigger cities, rural areas or at night, Classen said. In addition, ongoing driving simulator studies led by Orit Shechtman, an associate professor in UF’s department of occupational therapy, may demonstrate that the simulator is just as effective at evaluating driving ability as on-road tests, thereby providing a less expensive and safer alternative to traditional road tests.

“The Classen … study is the first to measure changes in safe driving performance with improved intersections using objective driving measures taken directly from the vehicle,” said David Eby, a research associate professor and head of the Social and Behavioral Analysis Division of the University of Michigan Transportation Research Institute. “Given the great expense involved in improving intersections, the study shows that these improvements lead to safer driving for older adults. This information is important for city planners who are in the process of improving intersections.”

Source: University of Florida