

SENIOR DRIVERS

It is a beautiful sunny day and you are driving home from your local grocery store.

In such nice weather and with a clean, 50-year

driving record, potential crash involvement is the last thing on your mind. You approach a busy four-way stop and, when you think it is your turn, you accelerate through the intersection. The problem is that it was not your turn. A honking horn warns of the imminent crash, just as the rear end of your vehicle is struck. Luckily, due to the low speed of travel of both cars, the damage to both vehicles is minimal and no one sustains any injuries. However, as the driver of the other car exits his vehicle and demands to know why you did not yield the right of way, you have a sinking feeling that this crash is entirely your fault.

Senior drivers have an ever-growing presence on the road. Although they generally have more experience than other drivers, various aspects of aging can pose road safety risks. Research shows that vehicle safety features can prevent and mitigate crashes when paired with safe driving techniques. In order for senior drivers to accrue the maximum benefits of safety features, it is important to understand how the effects of aging influence driving ability, and the scope of protection that safety features offer.

WHO ARE SENIOR DRIVERS?

Most studies on senior drivers define this group as 65 years of age or older. Occasionally researchers will differentiate groupings of seniors, including those 64-74, 74-85, and 85 and older.

HOW DO SENIOR DRIVERS AFFECT TRAFFIC SAFETY?

According to Statistics Canada, in 2009 there were 3.25 million Canadians aged 65 and older who had a valid driver's licence. Of this group, 200,000 were aged 85 and older (Statistics Canada 2012). As Canada's population ages, the number of senior drivers is expected to increase significantly (Robertson & Vanlaar 2008). Research has also consistently found a positive relationship between age and crash involvement (Mayhew & Simpson 2006), that is, elderly drivers are a high crash-risk group. With respect to road safety, as the population ages this means that more drivers with comparatively elevated crash rates will be on the road in the future.

There are a variety of reasons why seniors represent a high crash-risk group. One important reason is that seniors tend to drive mostly on local streets and avoid freeways (Robertson & Vanlaar 2008; Mayhew & Simpson 2006; Braitman et al. 2011). Since local streets tend to be more congested and contain more intersections than freeways, there are more opportunities for seniors to be involved in crashes. In addition to driving mostly on busy city streets, older drivers tend to drive less overall than younger drivers. Despite years of driving experience, the typically low annual mileage rate of senior drivers is positively correlated with an increased crash-risk (Alvarez & Fierro 2008).

Some older drivers may experience medical problems or conditions that interfere with their ability to drive safely. However, while the threat to public safety is undeniably present in cases where a medically at-risk driver is on the road, studies

suggest that fewer than 10% of senior crashes are triggered by a medical condition (Mayhew & Simpson 2006). Most often, natural effects of aging are stronger determinants of an increased crash-risk (Mayhew & Simpson 2006).

In addition to the above, seniors have the second-highest motor vehicle death rate, behind drivers aged 15 to 24 (TIRF 2007). An important reason for this is the physical frailty of some senior drivers. In a crash of equal severity, a senior driver is more likely to suffer serious or fatal injuries than a younger driver (Robertson & Vanlaar 2008).

WHAT FACTORS AFFECT SENIOR DRIVERS?

Many factors associated with advancing age can affect driving ability. Some factors, such as slower reaction times and reduced mobility, occur as a function of normal age-related declines in abilities (Alvarez & Fierro 2008; Dobbs 2005). In addition, there are many medical issues that commonly occur among the elderly which may adversely affect driving, such as visual impairment, more pronounced physical limitations that affect a driver's ability to move, in addition to other



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medical factors such as heart disease, stroke, and cognitive declines such as dementia (Charlton et al. 2004; Dobbs 2005).

The driving ability of elderly people may also be further impaired by a number of medications, such as antidepressants, benzodiazepines, non-steroidal inflammatory drugs, anticoagulants, and angiotensin converting enzyme inhibitors (McGwin et al. 2000). This is important because the frequency and quantity of prescription drug use tend to increase with age.

The influence of these factors on crash risk can be gauged by examining the types of crashes involving senior drivers. Elderly drivers are more likely than other drivers to be involved in intersection crashes, side-impact crashes, angle crashes, and when turning, particularly when turning left across traffic flow (Mayhew et al. 2006; Braitman et al. 2010; IIHS 2007). In addition, elderly drivers are also more likely than other drivers to be involved in collisions because of a traffic violation, such as failure to yield right-of-way or disregarding the traffic signal (Mayhew et al. 2006; Braitman et al. 2010; IIHS 2007). Involvement in these types of crashes tends to increase with age, especially after the age of 80 (Mayhew et al. 2006; IIHS 2007).

WHAT EFFECT DOES AGE HAVE ON THE ABILITY TO BENEFIT FROM SAFETY FEATURES?

Vehicle safety features reduce crash-risk and enhance overall road safety when paired with safe driving practices. However, some of the driving errors that elderly drivers are prone to can have a negative effect on their ability to drive safely, and therefore can affect the optimal performance of a variety of safety features. There are several ways that this can happen.

Activation depends on prior reaction: Since safety features have no way of autonomously “watching the road”, many features must take their cues based on braking and steering input from drivers. These safety features are only triggered after drivers take specific actions. Since elderly drivers typically take longer to react to situations, safety features may activate later than they would otherwise. Safety features work best when given optimal time and distance to perform, so a delayed reaction time on the part of drivers can detract from the performance of safety features by limiting the time and distance available for these features to work.

Significant amount of coordination and force: Before and during the activation of safety features and performance of emergency driving maneuvers, it is likely that a high level of force and/or coordination will be required on the part of drivers. First, some safety features like **brake assist** require that the initial application of the brakes be hard and fast. Declines in motor skills and mobility among older drivers may make achieving this level of force and speed difficult. Second, while safety features are working, high-level decision-making and acting may be required on the part of drivers to work with the safety features to resolve the situation. For example, **electronic stability control (ESC)** may initiate targeted braking to help bring a vehicle back under control, but drivers must still moderate the speed and steer the vehicle out of danger. In high-stress situations where safety features engage, the ability of drivers to think and act quickly is of crucial importance. The natural aging process affects this ability, and declines may be exacerbated further by certain medical conditions and medications.

Age-related collisions and safety feature limitations: Safety features cannot address many types of collisions where age-related deficits cause the collision. Crashes that take place at relatively low speeds, in good weather, and over short time periods (e.g., a driver fails to yield the right-of-way to another at a four-way stop), may not activate many safety features. Furthermore, while airbags and seatbelts will always be available to protect vehicle occupants from further injury, the fact remains that elderly drivers are at an increased risk of injury in less severe collisions because of their increased frailty. This means that the scope of collisions that are not addressed by many safety features but may nevertheless cause injury could be broader for older drivers.

When factors that influence the performance of safety features are challenged by factors that affect the ability of older drivers to drive safely, the result is a potential loss in the overall benefits that safety features can offer road users. The best way to accrue optimal safety benefits from safety features is to focus on driving safely, and to avoid relying on safety features to compensate for declines in driving ability.

WHAT SAFETY FEATURES ARE DIRECTLY AFFECTED BY AGE?

Longer reaction times, impaired visual ability, limited physical mobility, and cognitive declines can directly affect several safety features, notably those whose peak performance requires active participation from the driver. **Antilock braking systems (ABS), electronic stability control**



(ESC), brake assist, and electronic brake-force distribution (EBFD) all are activated based on driver input, and continue to rely upon appropriate driver directions after activation. Anything that delays activation of these features - be it a slow response to roadway hazards caused by poor vision or difficulty processing a dangerous situation and judging what actions are required - can make it difficult for these safety features to work at their best.



Other safety features like **adaptive headlights, forward collision warning systems, and lane departure warning systems** are designed to activate automatically, and do not rely upon prior driver action. However, realizing the safety benefits of these features still depends upon the driver's reaction. For example, adaptive headlights will light up parts of the road at night that would normally be left unlit, but if a potential hazard is illuminated, it is still up to the driver to take evasive action to avoid a collision. This may require quick thinking and a considerable level of refined driving skill; qualities that diminish with age.

Some safety features may seem to target exactly the types of problems that affect some senior drivers. For example, lane departure warning systems and forward collision warning systems alert senior drivers of potentially dangerous situations that result from momentary declines in driving ability. However, it is not advisable for elderly drivers to rely on these features to protect them, particularly since once an alert sounds, drivers could have a very limited amount of time to react to the situation. Senior drivers who, for example, experience bouts of sleepiness or temporary loss of consciousness, should consider limiting their driving exposure as opposed to purchasing a car with safety features that sound an alarm when danger is detected.

ARE THERE ANY LAWS SPECIFIC TO SENIOR DRIVERS?

Currently, there are no laws in Canada specific to senior drivers. However, for drivers who are over 80 years old, there are some changes in the licensing process. The details of these changes vary across Canada, as licensing standards are set by provinces and territories.

In Ontario, for example, prior to their 80th birthday and then every two years thereafter, senior drivers receive notice instructions and licence renewal forms in the mail from the Ministry of Transportation, Ontario (Ministry of Transportation, Ontario 2015). The license renewal process includes: a vision test, an in-class screening exercise, a driver record review, a G1 road test if necessary, and a Group Education Session (GES). If successful, drivers are issued a new licence that is valid for two years (unlike drivers in other age groups, whose licences are valid for five years).

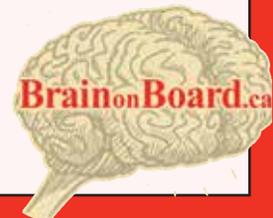
WHERE CAN I FIND MORE INFORMATION ON SENIOR DRIVERS?

Information for and about senior drivers is available from a variety of sources. TIRF has published research - accessible at www.tirf.ca - on the topic of older drivers. The Insurance Institute for Highway Safety in the United States has made their research available at www.iihs.org.

More information including safety tips for older drivers is available from Transport Canada - www.tc.gc.ca - and the Canadian Association for Occupational Therapists, at www.olderdriversafety.ca. In the United States, the National Institute on Aging is a good resource for older drivers. Their information is located at www.nia.nih.gov.

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