



The impact of restricted driver's licenses on crash risk for older drivers: A systematic review



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ABSTRACT

Background: As the Canadian population ages, there is an urgent need to identify evidence-informed strategies that have the potential to enhance older adults' safety and independent mobility. Previous research has demonstrated the positive impact of continued independent mobility on older adults' quality of life, through improvements in health, and community engagement. Restricted driver licensing policies have been mandated in several countries, with the goal of facilitating traffic safety and independent mobility for older drivers. Studies testing the effectiveness of these policies have produced mixed findings; a systematic examination of the impact of restricted driver licensing policies on reducing morbidity and mortality among senior drivers is warranted.

Aims: The objectives of this study were to examine if restricted driver licenses are more effective than unrestricted driver licenses in (1) reducing crashes; (2) reducing traffic violations; and (3) facilitating continued independent mobility for older drivers.

Methods: A systematic review was completed. A comprehensive electronic database search was conducted to identify all literature related to restricted driver license policies. A total of 3331 abstracts and 39 full text articles were reviewed. Seven papers met the inclusion criteria and were evaluated for quality and risk of bias assessment using the Newcastle-Ottawa Scale (NOS). All seven studies reported motor vehicle collisions as the primary outcome, which included more than 2.1 million participants with or without a driving restriction. The search resulted in a heterogeneous set of included studies, meaning that meta-analysis was not appropriate. A narrative interpretation and discussion of the seven individual studies is presented.

Results: Results demonstrated that restricted driver licensing may be effective at reducing crash risk for older drivers who have few health conditions, and those requiring few driving restrictions. It was noted that medically-restricted drivers incur fewer traffic violations than non-restricted drivers, or drivers with non-medical restrictions. Overall, evidence on both crash risk and traffic violations yielded mixed, yet promising results.

Only one included study assessed the impact of restricted licenses on older adults' independent mobility, with results indicating a positive impact. A major limitation of this body of research is a failure to consider if, and how, restricted licenses facilitate older adults' independent mobility.

Discussion: Restricted driver licensing has the potential to improve traffic safety among the general population and positively impact independent mobility of older Canadians. Efforts should be focused on providing education to health care professionals and motor vehicle

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licensing authorities on this topic, so that they may advise their clients appropriately, and avoid making premature driving cessation recommendations. Moving forward, more evidence is needed on the direct impact of restricted licensing on older adults' independent mobility and, more generally, quality of life.

Conclusion: Supporting older drivers to safely remain independent and engaged in the community has positive impacts on all strata of society. Restricted licensing is one approach that has the potential to promote road safety for all and contribute to improved quality of life for older adults.

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1. Introduction

In much of Europe, Australia, as well as in North America, the proportion of seniors (those aged 65 and older) continues to grow (Rosenbloom, 2001). Among the many implications of an aging population is an increased proportion of seniors who expect to continue driving independently (Langford and Koppel, 2011; Desapriya et al., 2010). In Canada, three quarters of all seniors have a driver's license, 16% of whom are over the age of 85 (Turcotte, 2012). Worldwide, traffic crash-related injuries are a significant cause of mortality among older adults, resulting in approximately one million deaths annually for those 60-years and older (Owsley and McGwin, 1999; WHO, 2001; Braitman et al., 2010). In Canada, older drivers accounted for 17% of traffic fatalities, while only accounting for 14% of the population (Turcotte, 2012). Yee et al. reported that traffic-related mortality rates in seniors were twice as high when compared to rates among younger adults (Yee et al., 2006), though the increased mortality was largely attributed to a reduced ability to withstand injuries in a traffic crash, rather than decreased fitness to drive (Langford et al., 2007).

Driver cessation is often viewed as a personal issue, one that is centered on individual driving ability. A more realistic view of driver cessation recognizes that it has far reaching familial and societal implications. In North America, communities have been developed with the expectation, and in many cases, requirement of independent transportation. When older adults are supported in maintaining their ability to drive, we know that they contribute a great deal to their communities through volunteerism, social support of peers, and experience more positive physical, social and cognitive health outcomes themselves (Curl et al., 2013; Chihuri et al., 2015; Marottoli et al., 2000). Previous literature has highlighted the importance of driving and access to a vehicle for older adults in relation to their quality of life. One study reported that access to a vehicle is a major deciding factor for older adults' social engagement and family involvement (Turcotte, 2012). In this sense, driving enhances seniors' self-determined mobility, an essential attribute of quality of life and independence (Marottoli et al., 2000; Karthaus and Falkenstein, 2016). Driving cessation can have negative consequences for seniors' personal mobility, individual well-being and independence, resulting in reduced access to social networks, limited social functioning, and increased dependence on others for mobility (Rosenbloom, 2001; von Mering et al., 1994; Whitehead et al., 2006; Rothe, 1994). As such, the loss of the right to drive often represents a crisis in older adulthood (Rothe, 1994). Thus, as an aging society, we stand to benefit from keeping older drivers on the road.

As older drivers make up an increasing proportion of the driving population, it is important to consider their needs, strengths and limitations when developing evidence-based traffic safety policies. Such policies should aim to keep senior drivers licensed and allow for continued independent mobility, if safety permits (Langford, 2008). One such program is a restricted driver's license, which, like a graduated driver's license (GDL) program for new and novice drivers, places limitations on when and where an individual can drive to reduce crash risk. Driver license restrictions are not a new road safety strategy; such policies were first enacted in North America in 1968. The same year American clinicians undertook an analysis of the policy, with study results published in the *Journal of the American Medical Association* (Crancer and McMurray, 1968).

Restrictions vary by jurisdiction, but typically include one or more of the following: (1) prohibition from nighttime driving; (2) requirement to drive under certain speed limits; (3) installation of additional mirrors; (4) restricted driving to specified places; (5) restriction of driving beyond a limited radius from the driver's home (Marshall et al., 2002). Driver licensing authorities (DLAs) have established processes that allow for the review and monitoring of fitness to drive. Assessment of driving safety mainly focuses on cognitive, visual, and motor abilities, though the effectiveness of methods of assessment has been shown to vary (Siren and Meng, 2012). In addition to road testing, assessment may include a physical exam, laboratory tests, and occasionally referral to a specialist such as a neurologist, optometrist, ophthalmologist, or geriatrician. No single test has been proven as an adequate diagnostic tool for assessing older drivers safe driving abilities; therefore, older drivers are often referred to medical and/or driver rehab specialists for further evaluation (Owsley et al., 2015). Based on the results of fitness-to-drive tests, and any required health assessments, the DLAs: (a) renew the license, (b) refuse to renew, or (c) suspend, revoke, or restrict the license.

Many countries now offer restricted driver licenses to those with functional limitations or medical conditions, which may include seniors. License restrictions may be an effective alternative to premature driving cessation and provide older drivers with continued mobility and independence, while facilitating community living (Braitman et al., 2010; Rothe, 1994; Marshall et al., 2002; Stutts et al., 2000; Macdonald and Hebert, 2010; Desapriya et al., 2014; Nasvadi and Wister, 2009).

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