The Nelson A. Rockefeller Center at Dartmouth College
The Center for Public Policy and the Social Sciences
Policy Research Shop

MEDICALLY AT-RISK DRIVERS

A Review of Research and Policies

Presented to the New Hampshire Older Driver Task Force and Department of Transportation

PRS Policy Brief 1314-15
October 1, 2014

Prepared By:

Sean Connolly
Kristopher Jorgenson
Nicholas Shallow

This report was written by undergraduate students at Dartmouth College under the direction of professors in the Rockefeller Center. Support for the Policy Research Shop is provided by the Ford Foundation and by the Fund for the Improvement of Postsecondary Education, U.S. Department of Education.

Contact:
Nelson A. Rockefeller Center, 6082 Rockefeller Hall, Dartmouth College, Hanover, NH 03755
http://rockefeller.dartmouth.edu/shop/ • Email: Ronald.G.Shaiko@Dartmouth.edu

TABLE OF CONTENTS

EXECUTIVE SUMMARY

New Hampshire does not impose additional license renewal requirements on older drivers. In 2011, the state stopped requiring drivers age 75 and older to pass a road test to renew their licenses. The state's policies regarding older drivers are now broadly similar to many state policies. Whether they are optimal for reducing traffic accidents and deaths is unclear. This report proceeds in three stages. First, it reviews research on the association between age and medical impairments on driving safety. Second, the age-specific driving requirements for states are reviewed. Finally, the report considers potential policy options for improving traffic safety and reducing fatalities. While evidence about the effectiveness of many policies is so far mixed, mandatory reporting of medically at-risk drivers and requiring in-person renewals for older drivers appears to be most effective in improving safety.

1. SAFETY RISKS OF OLDER DRIVERS

Central to license approval and renewal practices for medically at-risk drivers is the discussion of how aging impacts driving ability. Much of the impetus to discuss medically at-risk drivers has come from the aging American population and the effects this might have on driver safety as a whole.

Traditionally it has been thought that older drivers, similar to teenagers, are far more likely to cause accidents than other mature drivers. This has driven many to request that licensing procedures for elderly drivers be altered in order to protect the general public from this perceived threat (under the same justification as teens in most states are required to go through some form of a graduated licensing program). However recent research has called into question the validity of the assumption that older drivers cause more crashes. In this section we outline some driving risk factors that tend to increase with age as well as discuss the statistical literature surrounding the effects of age on driving.

Ultimately we conclude that the statistical evidence for whether elderly drivers put others at-risk to be, at best, inconclusive. Given that aging, though responsible for many of the health risk factors, does not, in and of itself, conclusively lead to more crashes,[1] policies tailored to risk factors and not age are expected to be more effective in ensuring safety-conscious licensure. Such policy would not be age discriminatory, which caused the 2011 reversal of the road tests for drivers 75 and older in New Hampshire.

1.1 Relationship between Accidents and Age

Statistical analyses of the relationship between age and driving accidents sometimes conclude that drivers age 65 and older are less safe if they adjust only for the number of miles that individuals travel. Older drivers tend to travel fewer miles. A RAND study by

Loughran et al. (2007) accounts for several previously overlooked factors, including the rate at which accidents are reported in different age groups. Fatal and serious crashes are more likely to be reported to the police for accidents involving elderly drivers. The RAND study results show that drivers over age 65 are only 16 percent more likely to be involved in accidents than adults age 25 to 65. By comparison, teen drivers are almost three times more likely to be involved in an accident than those 25 to 65 years old, according to the study.

The RAND report proposes that older drivers have only somewhat higher accident rates because they drive less often and avoid road conditions that may put them at a higher risk. Older drivers may drive less often, avoid risky conditions, and drive more slowly because they have health limitations. However, the authors reiterate that older drivers who have accidents are more likely to suffer injuries. The study did not analyze accident rates for specific age categories with the older cohort. In general, the results suggest that older drivers only cause marginally more accidents. These findings are also supported by a study of older drivers using Dutch travel survey data.[2] New Hampshire removing general age-based license renewal standards is broadly consistent with these findings.

1.2 Specific Medical Risk Factors

While broad age categories may not be associated with a substantially higher accident risk, specific health conditions can be. Drivers age 75 and older are more likely to experience specific health conditions that increase their likelihood of experiencing accidents. Ross et al. (2009) studied older individuals with higher accident risks, finding that many with visual and mobility limitations were increasingly likely over five years to get into accidents—despite self-regulation techniques likes driving less often over time.

Health risk factors may be a growing concern for policymakers as the baby boomer population ages. Addressing such factors may be a preferable way to make driving safer without targeting an entire age group. Because health issues tend to develop over a driver's lifetime, drivers will likely already have their licenses before they become severe. Therefore, licensing agencies will not always be able to take them into account. The health-related factors described below—vision, hearing, mobility, and cognitive impairments—are shown to be associated with an increased vehicle accident propensity, and tend to be experienced more as individuals age. State policies might limit drivers with one or more of these risk factors.

Vision: Poor vision is one of the most obvious health factors that affect a person's accident propensity. Because driving requires the ability to detect changing conditions and react quickly it is not surprising that a decrease in (corrected) visual acuity results in more accidents. For the most part corrective lenses can correct visual problems, but some visual problems cannot be corrected. One such problem is loss of peripheral vision. Useful field of view (a measure of the visual area over which one can extract information

from a quick glance without moving the eyes or head) has repeatedly been shown to be a strong predictor of accident propensity. Clay et al. (2005) provide a comprehensive meta-analysis of the effects of vision impairments on driving performance, simulator performance, and state-recorded accidents.[3] Additionally, on-road driving performance for a small sample of drivers with mild to moderate restricted peripheral visual had worse driving performance.[4]

The ability to judge distance and velocity also decreases over time (Staplin 1995). Most drivers naturally account for these types of vision changes by leaving more space and using other self-regulation techniques. However, unexpected road irregularities can still cause problems for individuals with significantly impaired vision. Moreover, macular degeneration and glaucoma dramatically impair vision and often cannot be compensated for fully by corrective lenses. These conditions can therefore pose a more serious risk for drivers.

Hearing: Hearing is well documented to decrease over time. Like vision it can be corrected to an extent. Past the point of correction it may pose a problem for drivers who are unable to hear sirens, horns, and various sounds coming from their own car all of which serve as important warning signs.

Mobility: Mobility issues are another important health risk that can reduce driving safety. For example, limited leg mobility might reduce a driver's ability to quickly react to changes in environment and switch from gas to brake pedal. Reduced flexibility in the neck and torso can also reduce the ability to recognize oncoming vehicles, according to Isler, Parsonson, and Hansson (1997).[5] However, Romoser and colleagues (2013) show that while older drivers are less likely to look for hazards outside their intended path of travel, impaired neck and head movements are not the reason.[6]

Cognition: A final category of health problems that can increase accident propensity is cognitive impairments. Cognitive issues often develop with age, much like hearing, vision, and mobility impairments. Some cognitive issues are minor and experienced nearly universally over time. Major age-related cognitive issues include a diminished ability to attend to important situational cues while driving.[7] Larger cognitive issues related to dementia and Alzheimer's might also impair driving abilities.

2. CURRENT STATE POLICIES

Insufficient research exists on the effects of medically at-risk driver policies, according to a recent AAA report (Tefft 2014).[8] The AAA project created a comprehensive and remarkably thorough database of state medically at-risk driver policies. This section reviews the database and other research to compare New Hampshire's current requirements with those in other states, highlighting similarities, differences, and potential benefits and drawbacks of each policy action. The section also reviews a recent

NHTSA report with universal guidelines for addressing medically at-risk drivers. The discussion of policy options focuses largely on ones highlighted by the NHTSA Uniform Guidelines, but is not meant to be exhaustive. A successful medically at-risk driver program is likely to utilize a holistic mix of policies.

2.1 Uniform Guideline Recommended Policies

The Uniform Guidelines for State Highway Safety Programs published in April 2014 recommends that all states include an older driver safety program in their highway safety approach: "To maximize benefits, each State older driver safety program should address driver licensing and medical review of at-risk drivers, medical and law enforcement education, roadway design, and collaboration with social services and transportation services providers."[9] The Uniform Guidelines clearly lay out that successful policy for minimizing medically at-risk drivers is multifaceted. Overall the Uniform Guidelines provide a strong basis for medically at-risk driver policy and will provide a general outline for which policy options we address in this paper. The Uniform Guidelines do suggest mandatory in person renewal for drivers of a certain age, which, given the previous discussion of the uncertainty surrounding elderly driver crash rates and past New Hampshire action on elderly drivers, may not be necessary or politically feasible at this point in time.

2.2 In-Person Renewal for Older Drivers

The Uniform Guidelines recommend that drivers "over a specified age" be required to renew their license in person. Some states even require accelerated renewal periods for elderly drivers as well. This presents several dilemmas. First, as mentioned above, aging itself has not been definitively proven to significantly increase car accidents. This policy could, therefore, place an unnecessary burden on the elderly population. Furthermore there is some question as to whether DMV employees would be able to identify risky drivers from an in person renewal. The Uniform Guidelines address this by also recommending DMV employee training. Perhaps more importantly is the issue of whether DMV employees would be willing to take away a license, which can extract a significant emotional burden and garner significant resistance from the licensee. In person renewal might require increased DMV hiring to deal with the increased customer load. Depending on the amount of new employees needed the cost could range from negligible to significant.

The Driver's Licensing and Policies Database available online from the AAA provides information about states' license renewal requirements. States allow eight years on average between renewals. The following tables summarize the AAA database license renewal information. Table 1 indicates that almost all states require renewals to occur in person either every renewal or every other renewal. Specifically, 23 states always require in-person renewals; 22 states require in-person renewals every other time.

Table 1. General In-Person License Renewal Cycles: All States and DC

Every renewal	23
Every other renewal	22
Every third renewal	1
Every 8 years	2
In-person renewal optional	3

Source: AAA Driver Licensing Policies and Practices database.

For older drivers, states are more likely to require license renewals to occur in person each time. States allow five years on average between in-person renewals for older drivers. The usual definition of an older driver in the AAA data is 72 years old and over. Table 2 presents the distribution of state policies for older drivers. Thirty-six states have no renewal length requirements for older drivers. Fifteen states require more frequent in-person renewals for older drivers than other drivers in the state.

Table 2. Older Driver In-Person Renewal Cycles: All States and DC

No age distinction	36
Every other renewal	1
Every renewal	14

Source: AAA Driver Licensing Policies and Practices database.

Table 3 reports the number of states with any age-specific renewal requirements, including vision tests and rules about in-person (rather than online or mail) renewals. Twenty-two states have no additional requirements for older drivers, according to the AAA policies database. The remaining states have some additional age-specific requirements.

Table 3. Additional Renewal Requirements for Older Drivers: All States and DC

None	22
Additional vision test only	4
More frequent, or in-person, renewals	25

Source: AAA Driver Licensing Policies and Practices database.

2.3 New Hampshire's Current Policies

New Hampshire no longer imposes extra license renewal requirements for older drivers. The state is among the 22 in Table 3 without age-specific requirements. For all licensed drivers, New Hampshire requires in-person renewals every 10 years (every other renewal). Like other drivers, older drivers are typically allowed to renew on-line every other renewal. All in-person renewals require a vision test. New Hampshire's requirements for in-person license renewals are broadly in line with other states.

All states allow physicians to report medically at-risk drivers, but some states encourage reporting in different ways. New Hampshire is among the 40 percent of states that provide education and training to encourage physician reporting of medically at-risk drivers. We are unaware of studies on the effectiveness of this training. Additionally, New Hampshire does not require physicians to report drivers they suspect are medically at-risk. Approximately 25 percent of states require physicians to report medically at-risk drivers. This requirement represents one option to make physician training and reporting more effective in New Hampshire, discussed in further detail below. As of January 1, 2015, health care providers who report medically unfit drivers are immune to civil and criminal liability (RSA 263:6-d).

2.4 DMV Employee Training

Similar to a medical reporting system DMV employee training would be a relatively low cost, and non-age discriminatory policy. By training the DMV employees to recognize common health risk factors like limited neck mobility, the hope is that they could identify medically at-risk drivers and refer them into further screening programs (like a road test). Though probably less effective than medical referrals (because not everyone renews their license in person and DMV employees are not medical professionals), by implementing several low cost referral systems medically at-risk drivers are more likely to identified and taken off the road. Ultimately the costs of training DMV employees must be weighed against the likely limited additional benefits.

2.5 Law Enforcement Training

Since medically at-risk drivers are more likely to be involved in accidents, law enforcement officers have the opportunity to recognize medically at-risk drivers who have already been involved in one accident and prevent it from happening again. As is the case for both of the previous referral suggestions policy would have to be changed to protect law enforcement officials from liability issues.

2.6 Medical Referral System

A medical employee referral system promises to target the specific medical issues that lead to riskier driving. A medical referral system would allow (or require) doctors to report any patient with a medical condition that makes them unfit to drive. This system has several important benefits. It avoids the possibility of age discrimination because anyone who attended the doctor's office would simultaneously be undergoing an assessment of their ability to drive. This is important because, though older drivers do likely self-regulate, drivers of all ages have been shown to overestimate their driving abilities. Furthermore it puts the burden of recognizing the conditions that affect driving ability on medically trained professionals who are likely more competent and confident than DMV employees at making this call.

2.7 Mandatory Reporting

For mandatory reporting of medically at-risk drivers to be implemented, a state must either provide sufficient incentive for physicians to report, or sufficient enforcement. First, are there non-legal incentives for physicians to report a medically at-risk driver without a statutory imperative? In most programs, a physician is required to write a letter to the license-issuing bureau, or fill out a form provided by the bureau and send or fax the form or letter. This all incurs overhead cost and notably requires the physician to actively consider at every appointment whether a patient is fit to drive. Some states have attempted to mitigate the associated time costs of reporting at-risk drivers by providing an online form. New Hampshire is among the majority of states that does not provide an online method of reporting to date. A 1993 study found that in Connecticut, a state with no mandatory reporting laws, only 14 percent of doctors reported high-risk patients to the licensing bureau whereas 77 percent discussed driving risks with their patients.[10] Without any legal or personal incentive to report drivers, physicians may be easily deterred by the required effort and costs.

The second issue surrounds the possibility of mandatory physician reporting. If the reporting of at-risk drivers is made mandatory, New Hampshire must consider how this will be enforced. When an accident is found to be the caused by a medical condition, will an investigation be conducted into the liability of the physician? Under what conditions must a physician report a medically at-risk driver? The policy adopted by California and other states is that the diagnosis of a limited set of medical conditions will require the physician to report the patient to the licensing bureau (the Department of Motor Vehicles in the US). The information reported by the physician is then reviewed by a Medical Review Unit to determine ability to drive. This process takes the ultimate judgment out of physician hands and ultimately removes the common physician concern of being a dual agent of both patient and state and makes the line of liability if a patient is involved in an accident more clear. The policy does not, however, account for the possibility that mandatory reporting would discourage patients from seeking treatment.

The Medical Review Unit is a team of medical and/or nonmedical staff who review cases and/or prepare them for review by the Medical Advisory Board (MAB). In a majority of cases, the MAB is composed of medical personnel (nurses and doctors) which oversees and advises the Medical Review Unit. In some states the MAB reviews all cases prepared by the Medical Review Unit. Thus in many cases, the MAB is a policy-making board, with limited direct involvement in the review of impaired driver reports. This function has left MAB members in Massachusetts unsatisfied. In Massachusetts the majority of MAB members suggested expanding the composition of the board to include a wider range of relevant medical specialties.[11] Furthermore, the NHTSA suggests all states "maintain or enhance the role [their] MAB."[12] In New Hampshire this would ideally include both policy development and a direct role in some or all case decisions, working in tandem with the Medical Review Unit.

Mandatory reporting of medically at-risk drivers is one of the few policy options that has the potential to reduce accidents that New Hampshire has not yet implemented. According to established research, physicians' reporting of drivers should first include advising on driving risks to the patient directed by their obligation to patient welfare.[13] A discussion between doctor and patient should include strong recommendation to cease driving with high-risk patients. Further, with collaboration between medical professionals, state agencies, and a possible Medical Advisory Board, terms should be negotiated that allow and require physicians to report certain very high-risk conditions to the DMV, where records are kept. Changes in these records can prompt a review by the Medical Review Unit of the driving history and history of physician reports, ultimately coming to a conclusion on fitness to drive.[14] It is important that the range of conditions which require reporting is kept only to the most dangerous, because the added safety of required reporting may not outweigh the hazard of discouraging patients from seeking help.

Furthermore, the presence of some mandated reporting laws will place a burden on physicians to review the laws and policies surrounding the topic. Complemented by a strong physician education program and an easier reporting process, doctors may be more likely to report those who are at moderate risk as well, thus having a greater effect than simply taking the small population of highly dangerous drivers off the road.

The costs of a medical referral system vary from state to state depending on the setup of the MAB and Medical Review Unit as well as the referral volume. Some states, however, have chosen to follow up medical referrals with a road test. Road tests, while somewhat more expensive, ensures that driving privileges are not taken away from anyone who is capable of driving.[15]

2.8 Road Tests

As mentioned above, road tests can be used in a variety of manners to help screen for medically at-risk drivers. Given the current policy climate in New Hampshire, and overturn of earlier older driver policy, it is unlikely that blanket road tests for older drivers are politically feasible or cost-effective. This policy would be expensive and likely viewed as age discriminatory. However, road tests can be used as a more focused tool to assess safety among medically at-risk drivers. Road tests offer benefits of direct driver observation that other processes for identifying medically at-risk drivers cannot provide. Limited driver tests implemented only for individuals with medical issues proven to increase accident propensity would be far less expensive than blanket road test approaches, and avoid age discrimination. There is, however, some concern about whether road tests can accurately simulate the actual driving conditions that medically at-risk drivers encounter on a normal basis. If drivers are self-regulating they may not ever have to face some of the conditions presented during the road test.

2.9 Cognitive and Computer-Assisted Tests

New cognitive and computer-assisted tests have been developed to evaluate older drivers' safety risks. Such tests can complement existing license renewal programs and ways of identifying at-risk drivers, even though researchers agree that they should not yet be the sole determinant of driver safety.[16] For example, New Hampshire's system for notifying drivers of their ability to renew online allows the state discretion about which drivers renew in person rather than online. New Hampshire could use a simple computer-assisted test that accurately identifies high-risk drivers to help determine individuals who should continue to renew in person.

Many computer-assisted tests require relatively inexpensive software and can be implemented without much additional training. The Useful Field of Vision (UFOV) and MaryPODS tests are shown to be effective in identifying riskier drivers.[17] Extensive research exists on the UFOV in particular. The Bern Cognitive Screening Test (BCST) for older drivers is a more recently developed tool assessing reaction times and distance judgments, among other safety indicators. The BCST accurately identified drivers with and without crash histories in initial tests by Bieri et al. (2014), and can be implemented more easily than simulator tests.[18] Paper-and-pencil tests may be less accurate than computer-assisted ones. While it is unclear how extensively states utilize such tests, states like Florida appear to use them in some capacity.[19]

3. CONCLUSION

Policies in New Hampshire regarding driver's license renewal for older drivers are broadly similar to many other states' policies. However, reducing the frequency of accidents and fatalities among older drivers is always a priority, and many states are actively seeking to improve driver safety through licensing and vehicle operation policies. This report reviews research and guidelines about the policies with the greatest potential to achieve these safety goals. Given the mixed findings about the relationship between age and driver riskiness, there may be no reason to impose strict in-person renewal requirements for all older drivers in an age-targeted approach. State DMVs are likely to improve safety most effectively by specifically identifying medically at-risk drivers. Mandatory physician reporting of medically at-risk drivers is a potentially highly effective policy option. This may require the state to enhance the Medical/Vision Advisory Board's role. New Hampshire's recent legislation to remove legal liability for reporting such drivers appears to be a useful first step. New Hampshire can also consider using crash history and computer-assisted tests to identify individuals with high safety risk to renew in person rather than online.

REFERENCES

[1] David S. Loughran, Seth A. Seabury, and Laura Zakaras, "Regulating Older Drivers: Are New Policies Needed?" (2007). Santa Monica, CA: RAND Corporation.

[2] Jim Langford, Rob Methorst, and Liisa Hakamies-Blomqvist, "Older drivers do not have a high crash risk—A replication of low mileage bias" (2006). *Accident Analysis & Prevention*: 574-8.

[3] Olivia Clay, Virginia Wadley, Jerri Edwards, David Roth, et al., "Cumulative Meta-analysis of the Relationship Between Useful Field of View and Driving Performance in Older Adults: Current and Future Implications" (2005). *Optometry and Vision Science* 82: 724-31.

[4] Alex Bowers, Eli Peli, Jennifer Elgin, Gerald McGwin, and Cynthia Owsley, "On-Road Driving with Moderate Visual Field Loss" (2005). *Optometry and Vision Science* 82: 657-67.

[5] Robert B. Isler, Barry S. Parsonson, and Glenn J. Hansson, "Age Related Effects of Restricted Head Movements on the Useful Field of View of Drivers" (1997). *Accident Analysis & Prevention* 29: 793-801.

[6] Matthew R. E. Romoser, Alexander Pollatsek, Donald L. Fisher, and Carrick C. Williams, "Comparing the Glance Patterns of Older versus Younger Experienced Drivers: Scanning for Hazards while Approaching and Entering the Intersection" (2013). *Transportation Research Part F: Traffic Psychology and Behaviour*: 104-16.

[7] Cheryl Bolstad, "Situational Awareness: Does It Change with Age?" (2001). Proceedings of the Human Factors and Ergonomics Society 45th Annual Meeting.

[8] Brian C. Tefft, "Driver License Renewal Policies and Fatal Crash Involvement Rates of Older Drivers, United States, 1985–2011" (July 2014). AAA Foundation for Traffic Safety.

[9] National Highway Traffic Safety Administration, "Older Driver Safety," *Uniform Guidelines for State Highway Safety Programs: Older Driver Safety* (April 2014).

[10] *Medical Oversight Noncommercial Drivers* (2005). Washington, DC: National Transportation Safety Board.

[11] Nina Silverstein and Kelli Barton, "Assessing Stakeholder Opinions of Medical Review of Impaired Drivers and Fitness to Drive: Recommendations for Massachusetts" (2009). *Gerontology Institute Publications:* Paper 63. Accessed at: http://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1062&context=gerontologyinstitute_pubs.

[12] *Impaired Drivers: The Physician's Dilemma*. The Medical Society of the State of New York (2003). Accessed at: https://www.mssny.org/App_Themes/MSSNY/pdf/Public_Health-Public_Health_Concerns_Ongoing_Health_Concerns_Impaired_Drivers_White_Paper_on_Impaired_Drivers.pdf.

[13] Ibid.

[14] Jeffrey T. Berger, Fred Rosner, Pieter Kark, and Allen J. Bennett, "Reporting by Physicians of Impaired Drivers and Potentially Impaired Drivers" (2000). *Journal of General Internal Medicine* 15: 667-72. Accessed at: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1495589/.

[15] NHTSA, *Licensing Procedures for Older Drivers* (September 2013).

[16] Jim Langford, "Usefulness of Off-Road Screening Tests to Licensing Authorities When Assessing Older Driver Fitness to Drive" (2008). *Traffic Injury Prevention* 9: 328-35.

[17] Ibid.

[18] Rahel Bieri, Michael Jäger, Nicole Gruber, et al., "A Novel Computer Test to Assess Driving-Relevant Cognitive Functions – A Pilot Study" (2014). *International Psychogeriatrics* 26: 229-38.

[19] "Florida Senior Safety Resource Centers," Florida Department of Highway Safety and Motor. Accessed at: http://flhsmv.gov/FloridaGrandDriver/fssrc.html.