

Seniors face serious driving safety and mobility issues.



## Medical Fitness to Drive and a Voluntary State Reporting Law

*October, 2008*



## About the Researchers

### Principal Investigators

Thomas M. Meuser, PhD  
Associate Professor of Social Work & Psychology  
Director, Gerontology Graduate Program  
University of Missouri - St. Louis  
1 University Blvd., 406 Tower  
St. Louis, MO 63121-4400  
Office: (314) 516-5421  
Fax: (314) 516-5210  
E-mail: meusert@umsl.edu

David B. Carr, MD  
Associate Professor of Medicine & Neurology  
Division of Geriatrics & Nutritional Science  
Washington University School of Medicine  
4488 Forest Park  
St. Louis, MO 63108  
Office: (314) 286-2700  
Fax: (314) 286-2701  
E-mail: dcarr@im.wustl.edu

### Co-Investigators\*

Gudmundur F. Ulfarsson, PhD, University of Iceland  
Marla Berg-Weger, PhD, Saint Louis University  
Patricia Niewoehner, OTR/L, CDRS, St. Louis VA Medical Center, Jefferson Barracks  
Joon-Ki Kim, DSc, Korea Research Institute for Human Settlements  
Thomas J. Epplin-Zapf, Washington University, St. Louis (student)  
Peggy Barco, MS, OTR/L, Washington University, St. Louis  
Katherine MacLean, MSW, Alzheimer's Association, St. Louis Chapter  
Scott Osberg, PhD, AAA Foundation for Traffic Safety

## About the Sponsor

This workshop was funded by the AAA Foundation for Traffic Safety in Washington, D.C. Founded in 1947, the AAA Foundation is a not-for-profit, publicly supported charitable research and education organization dedicated to saving lives by preventing traffic crashes and reducing injuries when crashes occur. Foundation funding is provided by voluntary contributions from AAA/CAA and their affiliated motor clubs, individual members, AAA-affiliated insurance companies, and other organizations and sources.

The AAA Foundation for Traffic Safety distributes this publication at no charge, as a public service. It may not be resold or used for commercial purposes without the explicit permission of the Foundation. It may, however, be copied in whole or in part and distributed for free via any medium, provided the AAA Foundation is given appropriate credit as the source.

The opinions, findings, conclusions, and recommendations expressed in this publication represent the views of the authors and are not necessarily those of the AAA Foundation for Traffic Safety or of any individual who reviewed this publication. The AAA Foundation for Traffic Safety assumes no liability for the use or misuse of any information, opinions, findings, conclusions, or recommendations contained in this publication.

If trade or manufacturers' names are mentioned, it is only because they are considered essential to the object of this publication, and their mention should not be construed as an endorsement. The AAA Foundation for Traffic Safety does not endorse products or manufacturers.

© 2008 AAA Foundation for Traffic Safety

## Acknowledgements

This project was funded by research grants from the AAA Foundation for Traffic Safety (T.M. Meuser, Principal Investigator) and the Washington University Center for Aging (G.F. Ulfarsson, Principal Investigator). The authors are grateful to officials from the Missouri Department of Revenue and the Missouri State Highway Patrol for their unwavering support and dedication of additional resources in making this project possible.

We are also thankful to John C. Morris, MD, Director of the Washington University Center for Aging and the Washington University Alzheimer's Disease Research Center (NIA P50-AG05681), for his helpful advice and generous instrumental support. We are thankful to Mike Right from AAA Auto Club of Missouri, Carol Rodriguez from the St. Louis Chapter of the Alzheimer's Association, Leanna Depue, PhD, and Jacqueline Rogers from the Division of Highway Safety, Missouri Department of Transportation, and Sheldon Suroff from Concerned Americans for Responsible Driving, for their leadership in this area and strong support of this project.

We wish to thank the many Missouri Department of Revenue staff (especially former Director Trish Vincent, Norma Hensiek, Brad Brester, Julie Allen, Roger Doerhoff, Carisa Bunting, Laura Scott, Gina Wisch, Lynn Armour, Charlotte Braun, John Sappington), State Highway Patrol staff (especially Ronald Beck, William Nelson, Rhonda Czarnecki, Gary Moore, Cynthia Anders, Arie Hoard, Reita Cyrus, Gerry Estes) and other assistants (especially Jessica Lester, Jami Croston, Jamin Barber, Donna Keller, Emily Kissel, Mathew Minn, Mimi Hillburg) for their generous and dedicated assistance during implementation of this complex data collection and analysis project.

Finally, we are thankful to the staff of the AAA Foundation for Traffic Safety (Peter Kissinger, Brian Tefft) and the three peer reviewers of this manuscript for their many helpful suggestions to make this report as complete and comprehensible as possible.

# Medical Fitness to Drive & A Voluntary Reporting Law: Characteristics of Reported Older Drivers & Safety Outcomes

## SECTION 0

### Executive Summary

---

#### 0.1 Background

This project evaluated the functional impact and efficacy of Missouri’s Voluntary Reporting Law (House Bill HB-1536) for drivers considered as potentially unfit due to real or suspected medical-functional deficit or compromise. Passed in 1998, HB-1536 provides a voluntary, legal process whereby concerned family members, police officers, physicians, license office staff, and others can report a driver for re-evaluation and possible license revocation. The reporter’s identity is maintained as confidential, and HB-1536 provides civil immunity protection from prosecution for breach of patient confidentiality (if applicable). HB-1536 is non-specific with respect to age, such that a 20-year-old with psychosis can be reported as readily as an 80-year-old with dementia. However, historically, most of those reported were 50 years of age or older (93%).

HB-1536 is administered through the driver licensing authority in Missouri, the Department of Revenue (DOR), in cooperation with the Missouri State Highway Patrol (MSHP) which provides on-road testing services utilizing a standardized operational test applied to all prospective drivers regardless of age or functional condition. To retain a valid license, reported drivers must submit a Physician’s Statement (Form 1528) within 30 days and, depending on health status and physician recommendations, may be subject to immediate license revocation (i.e., when health status clearly precludes safe operation of a motor vehicle) or may be required to participate in on-road testing to certify ongoing fitness to drive. DOR staff members make all such determinations based on available data, with preference given to physician opinion when congruent with other information.

The current evaluation project was undertaken pursuant to ongoing educational partnerships between the authors (St. Louis Aging & Driving Research & Education “Team”) and officials from the DOR, the MSHP, and the Division of Highway Safety, Missouri Department of Transportation. Various outreach efforts targeting physicians, other health professionals, law enforcement officials, family members, and others, revealed that many of these “stakeholders” in older driver safety were unaware of the HB-1536 process. In addition to motivating additional educational outreach concerning the reporting process, this finding also prompted a number of research questions to explore with the DOR; most important being how HB-1536 functions to identify, evaluate and adjudicate potentially unfit drivers.

HB-1536 is considered by many to be a “model law” for voluntary reporting on the state level. It emphasizes medical-functional status over chronological age, provides important confidentiality and legal immunity protections, and has well-defined procedures and forms. Although most states have voluntary reporting procedures, until now little was known about the functional efficacy of such procedures. How do voluntary mechanisms actually work in practice? Are drivers with medical fitness problems identified and evaluated appropriately?

Findings from Missouri will provide a basis for understanding voluntary reporting and offer a point of comparison for other states.

Funding support was provided by the AAA Foundation for Traffic Safety (primary grant) and the Washington University Center for Aging (secondary grant to G.F. Ulfarsson), and the 2-year project was initiated in May 2006. A team of over 30 state officials, university investigators, health professionals, and students donated their time and expertise, working cooperatively, to make this project possible.

## 0.2 Evaluation Sample & Controls

The research team reviewed case materials for 4,100 individuals, aged 50 and older, reported to the DOR as potentially unfit during years 2001-2005. Over 15,000 document pages were extracted from microfilm, printed, reviewed, and the data hand entered to an integrative database over a 9-month period in 2007. This “reported” sample represented 87% of all drivers aged 50 and older reported during this period. Time and resource constraints precluded gathering the remaining 13%. Younger drivers (aged 16-49) were reported, but in very small numbers (just 375 individuals during this period), and consequently were not included in this evaluation project. A 2.8:1 age and gender matched control sample of non-reported drivers was created; and all reported and control cases were linked to the MSHP Statewide Traffic Accident Reporting System (STARS) crash database to document retrospective and prospective crash history for 1993 to early 2007.

## 0.3 Research Questions & Key Findings

*What groups filed reports under HB-1536 and for what reasons?*

HB-1536 was developed, in part, to encourage identification and reporting of *medically-at-risk* drivers by physicians and other health professionals. During 2001-2005, more than half of all reports were submitted by police officers (30%) and license office staff (27%). Most police-initiated reports (87%) were made pursuant to a crash, dangerous action, and/or traffic violation involving the reported driver.

Reports from license office staff, in contrast, focused on first hand observations of cognitive and physical function, and included concerns about balance/ambulation (33%), confusion (15%), and appearance of frailty (15%).

Physicians (20%) and family members (16%) were the sources for most other reports. While concerns about driving were noted by these sources, their primary concerns were related to health and functional status (e.g., medical diagnosis, observed confusion). In most instances, when a physician was the source of report, the DOR staff utilized this information to make a license or testing determination directly (i.e., and did not require a second physician evaluation be submitted).

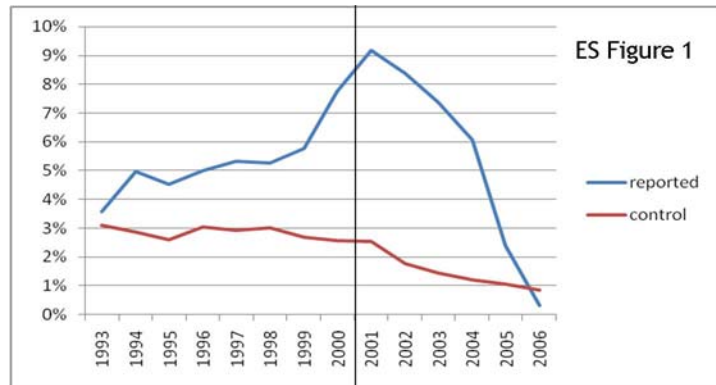
*What were the demographic and health characteristics of reported drivers?*

Reported drivers in this sample were quite old, with a mean age of 80 years (Range 50-105, SD = 9), and disproportionately male (55%). Race and education data were not available. Mortality was high, such that 38% of reported drivers were listed as deceased when records were gathered in December 2006, just 12 months after the end of the reporting period for this study. Mortality in the control sample was somewhat lower at 33%.

Eight health condition categories were examined: dementia/cognitive impairment (listed in 45% of all cases), vision conditions (31%), musculoskeletal/neuromuscular conditions (28%), disorders of consciousness (16%), cardiac/cardiovascular conditions (12%), brain insult/tumor/stroke (10%), psychiatric conditions (8%), and alcohol/drug abuse (3%). The mean number of health conditions for reported drivers was 1.6 (Range 0-8, SD = 1.4).

*What was the annual crash involvement of reported drivers in comparison to controls?*

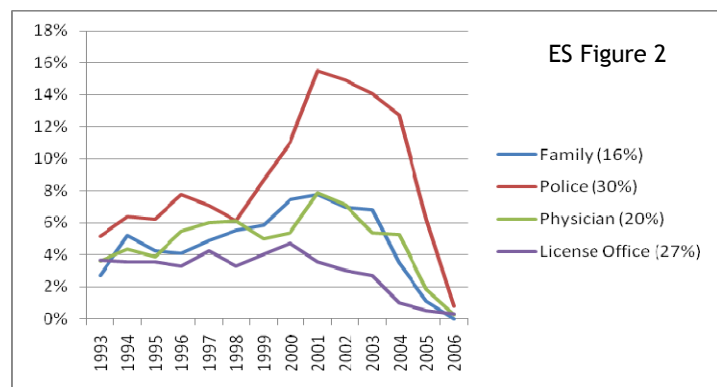
As shown in ES Figure 1, reported drivers were more likely to be involved in a crash as the driver (vertical axis) relative to controls starting in 1993 and through 2005, with involvement percentage peaking at over 9% in 2001 at the start of the reporting period (a threefold difference from controls). Annual crash involvement increased sharply in reported drivers immediately before the reporting period, and declined sharply as these individuals were reported, retired from driving, and/or died.



Over this fourteen year period, reported drivers (n = 4,100) were involved in 3,472 crashes, whereas controls (n = 11,615) were involved in 4,345 crashes. When involved in a crash, more than half in both samples were involved in just one incident (58% and 73% respectively), but reported drivers were somewhat more likely to have multiple crash histories. The vast majority (98%) of all crashes in the reported sample, however, occurred before the Department Action date (i.e., report date) when the HB-1536 process was initiated. There is little evidence that older adults pose a traffic safety problem following license revocation, at least from the perspective of crashes.

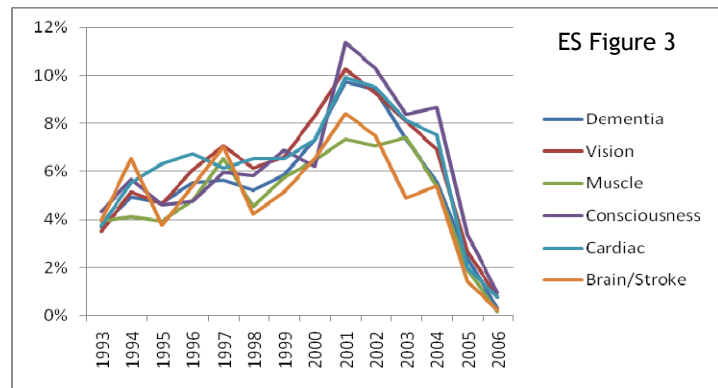
In 2006, there were ~7,800 control drivers and ~2,600 reported drivers still living. All but 75 of the reported group had been de-licensed at this point. It is not known how many control drivers had retired from or restricted their driving by 2006, but it is likely that some had given their advancing age. Substantially more individuals in the control sample were involved in crashes in 2006 relative to the reported sample (165 drivers vs. 19 drivers), suggesting that HB-1536 was effective in removing potentially unsafe drivers from the road.

As shown in ES Figure 2, crash involvement varied by report source. Not surprisingly, those reported by police had the highest annual crash involvement, peaking at 16% in 2001. Those reported by family and physicians were similar. Those reported by license office staff mirrored controls in their annual crash involvement, suggesting that license office staff may identify drivers as unfit *before* any potential increase in crash risk and related compromise in public safety.



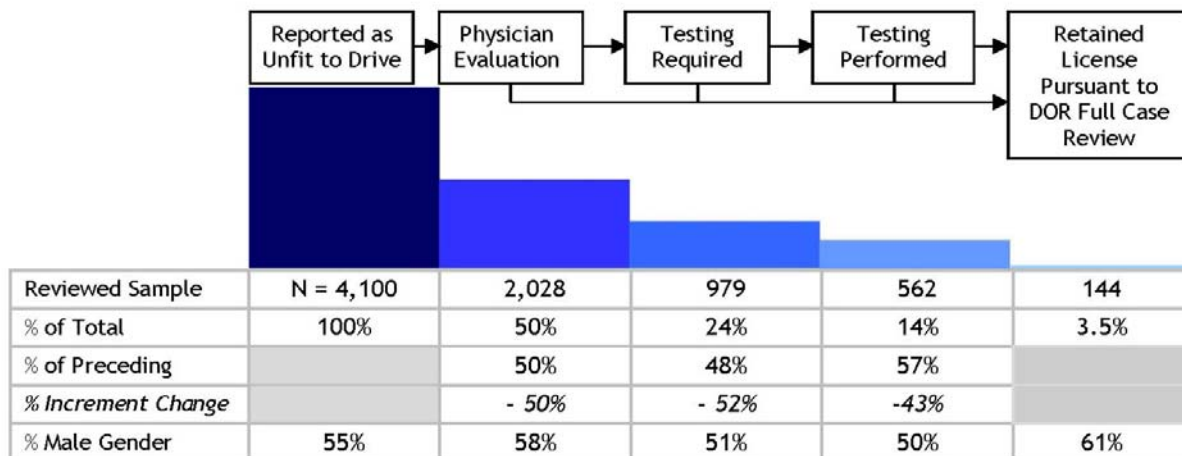
As shown in ES Figure 3, crash involvement varied somewhat by disease category, but all followed a similar overall pattern. Annual crash involvement percentages for those with disorders of consciousness, cognition, and vision were somewhat elevated over other conditions in 2001-2003, but all declined to similar levels as these drivers retired from driving and/or died.

Data concerning on-road exposure (i.e., miles traveled) and attrition (i.e., date of death, date of driving cessation) were not available in HB-1536 case files. Hence, these graphs *do not represent crash rates* but merely crash involvement (i.e., percentage of individuals in a documented crash as the driver in a given year). While informative, these figures tell only part of the story and must be interpreted with caution.



*What happened to reported drivers as they moved through the HB-1536 process?*

ES Figure 4 summarizes what occurred at each step in the HB-1536 process for those reported in 2001-2005, starting with the sample of 4,100 reported drivers reviewed for this study and ending with the 144 individuals (3.5%) who retained a valid license in the end. In contrast, 67% of age-gender matched control drivers held valid licenses at this time.



A few findings are especially notable in this figure:

- Half of reported drivers, for one reason or another, did not pursue the required physician evaluation and were subject to immediate license revocation. This does not mean, however, that all of these drivers were necessarily unfit or would have necessarily failed a driving skills test. The DOR allows 30 days (with another 30 day extension by request) for reported drivers to see their physicians and have a medical evaluation submitted. *Why did so many choose to drop out at this early stage?* The

advanced age of these individuals, their health status and physical frailty, and their high mortality were probably all contributing factors. Many (45%) had dementia or cognitive impairment. For some, simply receiving official written notification was probably enough to give up driving, while for others notification likely initiated discussions with family members and health providers that motivated a decision to retire from driving.

- Based on this input, DOR officials revoked the licenses of 52% of the remaining individuals and required 48% to participate in on-road testing to certify ongoing fitness to drive. Even more individuals chose or were forced by circumstances of life or function to drop out at this stage. Just 14% of those originally reported presented in person for on-road testing through the MSHP. The fitness of other drivers was determined based on physician and other input represented in the figure. In the end, 144 (3.5%) of the drivers in this sample retained a valid license to drive. Eighty-two of these individuals were still living in 12/06 when mortality data were obtained. We do not know if they or other de-licensed individuals were actively driving, but the <1% crash percentage for the reported sample in 2006 suggests that few were. *These data indicate that the overall HB-1536 process was effective during this period in moving reported drivers into driving retirement. We cannot conclude, however, that these drivers were necessarily medically unfit behind the wheel, as most dropped out before on-road testing. In other words, their fitness levels were never evaluated.*
- Given the advanced age of this sample, population demographics would have predicted that females outnumber males approximately 60% to 40%. As a general observation, males are more likely to be licensed drivers, however, and to travel more miles than females. Their higher presence in this sample is, therefore, not surprising. Tracing the proportion of males that remained active across the HB-1536 process, however, is rather interesting. Males were somewhat more likely to see their physician and have an evaluation submitted, but a similar number of both genders were required to take on-road testing. This change may be explained by the fact that males had a higher mean number of health conditions (1.7 vs. 1.4), suggesting greater physical-functional compromise. In the end, however, males were somewhat more likely to pass and retain a valid license to drive - possibly because they were more persistent and otherwise less willing to relinquish the driving privilege.

#### 0.4 Summary & Implications

This Executive Summary and the full report that follows only begin to scratch the surface on the voluminous data gathered and questions raised through this collaborative project. A number of initial conclusions and implications are suggested:

- The HB-1536 process is effective in moving those reported as potentially unfit into driving retirement. While we cannot say that all of those reported were truly unfit to drive, a substantial number were likely at risk due to advanced age, frailty, medical compromise, observed problematic driving behaviors, and crash history. Many dropped out at each step in the evaluation process, and only a handful were tenacious and/or functional enough to participate in and pass on-road testing and retain a valid license to drive. Only 2% of total crashes occurred after the reporting process was initiated. Crash data indicate that, once reported, these individuals likely ceased to be active drivers, and public safety was thereby enhanced.

- The high attrition across the HB-1536 process raises questions of reasonableness. In our managed health care system, was it reasonable to require all reported drivers see a physician and submit a form in just 30 days? Arranging to see a physician involves both time and cost. Was this requirement a barrier that prevented some “fit” drivers from proceeding and having a chance to test out and retain a valid license? Similarly, was it reasonable to apply a one-size-fits-all driving skills test to this heterogeneous group of reported drivers? Might there be some justification for testing to be tailored for certain groups? Data are not available in this project to answer these questions precisely. The HB-1536 process is arguably reasonable and fair in its detailed standardization - all must traverse the same hurdles regardless of age or infirmity. That said, it may be valid to question the impact of HB-1536 from a perspective of mobility promotion. Driving cessation is one point along the mobility continuum. What happens to the mobility and well-being of those forced into driving retirement is beyond the scope of HB-1536, but this remains an important (even central) consideration for health care, quality of life, and reasonableness in public policy. In our view, a *complete* voluntary reporting system is one that is nested within an organized, collaborative strategy to promote older adult mobility on local, regional and state levels.
- The high rate of reporting by police officers, while helpful, indicates that there’s room for safety-related improvements in the system. When police officers are filing reports based on crashes and on-road incidents, public safety is already compromised. Procedural and educational initiatives to enhance reporting by physicians, family members, and health/service professionals (groups hardly represented in the 7% of other reporters not specifically quantified in this report) could go a long way in changing the crash-safety profile of reported drivers. Early recognition of “red flags” in health and function, along with the knowledge and motivation to intervene with respect to driving, could mean that more drivers are reported when less medically compromised and, by extension, before a crash is likely to occur. Right now, police officers are the reporters of last resort, and they will always fill this role to some extent. Can the proportionate burden of reporting be shifted from police to other stakeholders? *We believe so.*
- Our data suggest that dementia is a top public health concern with respect to fitness to drive in older adults. Almost half of this sample of reported drivers had an indication of dementia and/or cognitive impairment in their records. Vision problems were a distant second in prevalence, possibly because of systems are already in place to address vision loss. Dementia and other forms of cognitive impairment, in contrast, can be difficult to identify, especially in those experiencing the early stages of decline. Other research has shown that it is *not a question of if persons with dementia should retire from driving, but merely when.* Some of those reported under Missouri’s HB-1536 surely passed over this line and drove too long into the progression of their disease. Organizations, such as the Alzheimer’s Association, have devoted significant resources to educating the public and family caregivers about dementia and driving. Our data suggest that such education is critical and has public safety implications.
- Finally, our data suggest that license office staff may play a more significant role in identifying at risk drivers than may be apparent on the surface. License office staff members interact with and otherwise observe individuals at the time of driver license and auto plate renewal. Their observations of problems in ambulation, confusion and

frailty were influential with respect to driving retirement; few of those they identified as potentially unfit passed through the HB-1536 process and retained valid licenses to drive. This was true, of course, for everyone in this sample. But, those reported by license office staff had much lower annual crash involvement - very similar to controls, in fact. Were these individuals destined to experience higher crash involvement over time, and was this eventuality prevented by the intervention of license office staff? While not a form of testing, per se, the observations of license office staff still constituted direct, official interactions concerning the licensing process. With more training, could license office staff provide an even higher and more useful level of feedback in the voluntary reporting process? This is an important consideration. The proactive role of license office staff in identifying potentially unfit drivers should not be underestimated, in our view.

- Voluntary reporting is one of number of tools employed in most states to ensure driver fitness. The accessibility and acceptability of the voluntary reporting law, along with its known outcomes, are important considerations. Missouri's HB-1536 is well-defined and applied with consistent standardization. It's non-specificity with respect to age and its provisions regarding confidentiality elevate it to "model law" status in the minds of many. That said, our data suggest that HB-1536 is potentially under-utilized in a state with over 600,000 drivers aged 65 years and older. While we cannot say for sure, prevalence data for conditions, such as dementia, suggest that many more individuals could be reported than the ~1,000 annual reports over the past few years. Limited knowledge of HB-1536 may be part of this. From our own educational efforts, we know that most potential reporters from these groups do not know that HB-1536 even exists. Most "decisions" concerning driving retirement happen on the level of the individual and their immediate circle of caregivers - family, medical and social. Increased knowledge of HB-1536 and its primary outcome (i.e., almost certain driving retirement) could promote greater reporting to state authorities, or it could just as well motivate further private action (i.e., so as not to put seniors through this process). These are empirical issues for future study.
- Although Missouri's voluntary reporting law only impacted a relatively small number of drivers in 2001-2005, it still served a vital and necessary role as a safety net for evaluation and de-licensing of potentially unfit drivers. When drivers lack insight and continue to drive despite clear deficits (i.e., as in dementia), or when the independent efforts of older adults, their families, health professionals, police officers, etc., fail to promote appropriate restriction or retirement from driving, there must be a mechanism in place to force the issue and enhance public safety. HB-1536 accomplishes this task in Missouri, and we believe is a model for other states to follow.

In the future, additional analyses will examine a variety of specific questions comparing individuals by diagnosis or health profile, characteristics of crashes, how observations of license office staff and MSHP driver examiners contribute, etc. For now, this first report provides a helpful summary for use in enhancing driver safety in Missouri and other states, especially in the area of medical fitness to drive. A number of recommendations flow from this first analysis and are offered below.

## 0.5 Recommendations

This descriptive evaluation project supports a number of policy recommendations and best practice suggestions put forward at the *2008 North American License Policies Workshop* sponsored by the AAA Foundation for Traffic Safety (Molnar & Eby, 2008), including an emphasis on function over chronological age in driver fitness determinations, an emphasis on voluntary reporting as a national standard, the provision of legal immunity from prosecution protection for those filing reports, encouragement of in-person license renewal procedures, the promotion of Medical Advisory Boards to assist (and provide helpful credibility) state officials in making licensing determinations, and a need for validated assessment approaches and tools. Additional recommendations are specific to Missouri, based in the findings of this study and in our team's very collaborative relationship with state officials over the past few years.

- Voluntary reporting in Missouri appears to identify frail older adults nearing the end of their driving life expectancies. It does so via a standardized process that moves reported individuals into driving retirement, with little evidence of post-revocation driving. We conclude that this mechanism is successful and appropriate for implementation in other states. This view is also consistent with a recent position statement by the American Academy of Neurology (Bacon, Fisher, Morris, Rizzo, & Spanaki, 2007) arguing that individual differences in disease presentation, and a relative lack of driving safety information for many health conditions, are sufficient reasons for reporting to remain voluntary - physicians (and others) need to make individual decisions in this complex area.
- Although we support voluntary reporting as the national standard, we recognize that mandatory reporting has potential advantages, especially with respect to certain conditions, such as progressive dementia. More comparative research is needed between voluntary and mandatory states to clarify the benefits and downsides of each respective approach. Is it necessary, for example, to list specific diagnoses, such as Alzheimer's disease, for reporting as in California? Or, might less specificity in mandatory and/or voluntary mechanisms be more effective? More research is needed, especially in the area of disease-specific reporting.
- Voluntary reporting procedures should be embedded within a larger mobility service continuum, and not simply engines for de-licensing. As pointed out by the AAA Foundation for Traffic Safety (Molnar & Eby, 2008), additional emphasis is needed in most communities to provide information and guidance on the difficult question of when to stop driving and how to remain mobile afterwards. Most especially, newly de-licensed drivers and their families need targeted guidance and support. The degree to which such integrated support may be possible will vary by state and available resources. Simple changes to the HB-1536 process, such as provision of a handout on driving retirement and alternative mobility options at the point of initial notification and/or after license revocation could go a long way in helping to support ongoing mobility.
- Medical review and other evaluative procedures must be sufficiently comprehensive and evidence-based so as to be reasonable to all concerned. Missouri meets this standard to a reasonable extent, we believe. Although it may be that many drivers reported under such mechanisms will be subject to license revocation, all must have an adequate opportunity to work through the process. In the case of Missouri, many reported drivers appear to drop out before medical review. Little is known about why

this attrition may occur, but the short window for response may be a factor. Enhanced communication and flexible procedures may be useful to overcome potential barriers. To this end, we make the following focused recommendations:

- We recommend that a single form be adopted for the reporting by all stakeholders. This form should provide clear guidance concerning the types and level of information necessary to support licensing review, emphasizing check boxes and explicit instructions to ensure ease of use and recording of pertinent information.
- Once a driver is reported, the Missouri DOR sends a letter requiring that a Physician's Statement be returned within 30 days. For some, this time window may be insufficient to schedule a physician visit and otherwise consider the implications of moving forward with the review process. We recommend that this period be extended to 60 days so as to allow more time and flexibility.
- While drivers de-licensed under Missouri's HB-1536 may appeal this decision to the DOR Director, the specific appeal process and its evidentiary basis remains undefined. We recommend that a formal, structured appeal process be instituted whereby reported drivers may appeal revocation decisions viewed as unnecessary or unfair. This process might include automatic review by members of the Medical Advisory Board. Perhaps, too, other trained health professionals, such as occupational therapists, could provide "second opinion" evaluations in all or certain grievance cases. Occupational therapists are trained to evaluate broad aspects of human function, and their input could be especially helpful in circumstances favoring license restriction over revocation. Such an approach could counter any perceived age-related bias and provide a form of "medical" confirmation that may be more acceptable to the involved parties (although we did not see any overt bias in this project).
- For DOR officials to make reasoned decisions concerning driver licensing, they need reasonably comprehensive and comprehensible information from physicians and other report sources. The current forms utilize a combination of quantitative check boxes and space for written remarks. On many of the forms we reviewed, often only check boxes were marked and potentially helpful qualifying information was left out. For example, a checked box by *Dementia* says nothing about level of impairment and function. Whereas someone with very mild dementia may be safe behind the wheel, someone with severe dementia would not. We recommend revision of forms to allow qualifiers and to include other important medical conditions (e.g., stroke, macular degeneration) and driving history data (e.g., recent crashes) which are currently absent.
- Missouri utilizes a one-size-fits-all, pass-fail testing strategy, such that teenagers and older adults are evaluated on the same set of operational driving skills. While our data suggest that the current test is quite challenging for older adults, we nonetheless believe the basic approach to be valid. The MSHP has made a commitment to train driver examiners concerning the aging process and driver fitness, and their case documentation now includes a listing of observed strengths and weaknesses to better inform DOR licensing decisions. It is likely that some older drivers with borderline passing scores might be best served by receiving a restricted license. Yet, it is unclear to what extent DOR officials utilize MSHP data to consider individual circumstances and the option of

restricted licensure. More integration of HB-1536 process with the current restricted licensure review system appears warranted.

- A unique aspect of this project was the integration of voluntary reporting data with statewide crash data over a multi-year period. While lines of communication exist between the Missouri DOR and those that maintain the STARS database at the Highway Patrol, crash evidence was lacking in more than half of the DOR files on reported drivers. It took our study to bring these data points together. Yet, it would seem that knowledge of crash history would be valuable for DOR staff and their Medical Advisory Board members when licensing decisions are made. Such information could serve as a trigger for more detailed review, for example, or as a means of determining if on-road testing should be pursued. Would DOR require a driver involved in multiple crashes in the immediate years before the report date to engage in on-road testing? As of now, this level of review is not possible, yet this seems a relatively simple intervention to implement. We recommend that this linkage be pursued.
- Those professionals expected to participate in the identification of at-risk drivers and to utilize reporting procedures need adequate, evidence-based training, as recommended by the AAA Foundation for Traffic Safety (Molnar & Eby, 2008). Such training must be tailored to the learning needs of each group, and be readily accessible for all to participate and benefit. Materials are available for tailored outreach through many national organizations, including:
  - The National Highway Traffic Safety Administration (see [http://safety.fhwa.dot.gov/older\\_driver/index.htm](http://safety.fhwa.dot.gov/older_driver/index.htm); <http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.31176b9b03647a189ca8e410dba046a0>);
  - AAA (<http://www.aaapublicaffairs.com/Main/>);
  - AAA Foundation for Traffic Safety (<http://www.seniordrivers.org/home/>);
  - American Medical Association (<http://www.ama-assn.org/ama/pub/category/8925.html>).

Our team has worked closely with state officials in Missouri to educate health professionals, driver examiners, and police officers. We are now targeting license office staff. In each case, our approach has been tailored to the group, recommending specific behaviors and outcomes. A significant barrier to such education, however, is its expense. Internet-based resources and training systems may provide the most cost-effective avenue for such efforts.

We further recommend that educational initiatives target reporting groups so as to boost the activity level of physicians, other health and service professionals and family members. Proportionately more reporting from these groups could enhance public safety by identifying at-risk drivers before crashes occur. While some may disagree with this interpretation and approach, we believe this is an empirical issue worthy of implementation and evaluation.