Pursuit of Licensure by Senior Drivers Referred by Police to a State Licensing Agency's Medical Advisory Board

Carl A. Soderstrom, MD, Mary Anne Scottino, MD
Maryland Motor Vehicle Administration, Medical Advisory Board, Glen Burnie, MD

Cynthia A. Burch, MPH, Shiu M. Ho, MS, Timothy J. Kerns, MS
National Study Center for Trauma and EMS - Shock, Trauma and Anesthesiology Research (STAR) Organized Research Center; University of Maryland School of Medicine, Baltimore, MD

John J. Joyce, JD
TransAnalytics, LLC; Kulpsville, PA

ABSTRACT – In all fifty United States and the District of Columbia, police Requests for Re-examination (RRE) concerning fitness to driver are accepted by licensing agencies. This study assessed licensing outcomes of senior drivers, ≥75 years of age, who had RREs submitted to the Medical Advisory Board (MAB) of a Maryland Motor Vehicle Administration from March 2005 through April 2007. RRE traffic event information (including crashed, did not crash), driver demographic information, initial MAB recommendations (suspension vs no suspension), driving occupational therapists assessments, and drivers' pursuit of continued licensure were entered into a database. During the period of study, 475 RREs were referred to the MAB. The percent of referred senior drivers (n=240, 50.4%) was similar to that of younger drivers (n=235, 49.5%). A higher percentage of senior drivers retired from driving compared to younger drivers; being, 57.1% vs 23.8% ($p < .01$), respectively. Further analyses limited to the 240 senior drivers found: 139 (57.9%) were men, 150 (62.5%) were 75-84 years of age, 119 (49.5%) were noted to be disoriented at the traffic scene, 141 (58.8%) were involved in a crash, and 127 (52.9%) were initially suspended as the result of MAB review. The following factors were significantly related to retiring from driving, initial MAB suspension and greater age. Of the 127 drivers who were initially suspended, 82 (64.6%) retired from driving, and 45 (35.4%) pursued further licensure ($p < 0.01$). In contrast, the percentage of non-suspended drivers who did or did not pursue further licensure was similar; being 48.7% vs 51.3%. Among drivers ≥85 years of age, 68.9% retired from driving, compared with 50% of the drivers who were 75 to 84 years of age ($p < 0.01$) While not statisically significant, higher percentages of driving retirement were noted for the following: sex - a greater percentage of men compared to women (61.9% vs 49.5%); confusion at the traffic scene (confused, 57.1% vs non-confused, 42.9%); and crash involvement (56.7% who crashed, retired vs 43.3% of those who did not crash, retired). Overall, the most important finding of this study is that as a result of police referral, only one-fifth (20.4%) of senior drivers 75 years of age or older, continued to maintain their driving privilege. However, only 40 drivers (16.7%) retained their original driving privilege without added restrictions. The data suggest that senior drivers who are not medically fit to drive may be identified by police referrals to a licensing agency. Driving occupational therapy assessments and training, and additional driving restrictions are recommended to facilitate continuation of the driving privilege for some drivers.

INTRODUCTION

The Institute of Medicine's report *Retooling for an Aging America: Building the Health Care Workforce* [2008] notes the United States is well into the process of realizing a significant increase in the percentage of older adults, i.e., individuals age 65 years or greater. It is estimated that between 2005 and 2030, the percentage of older adults will increase from 12% to 20%. In 2011 the first of the "baby boomers" – those born between 1946 and 1964 - will begin to reach the age of 65.

Attaining senior citizen status is not infrequently associated with the development of medical conditions that can impact on the ability to safely operate a motor vehicle. Hence, with the "graying" of the United States and many other countries, it is of no surprise that the last decade has witnessed the publication of reports focused on medical fitness to drive among senior citizens. Topics addressed include: identifying and counseling at-risk drivers [Wang et al, 2003], the effects of medications on driving among senior citizens [Lococo & Staplin, 2006; LeRoy & Morse, 2008; MacLennan PA, Owsley C, Rue LW, McGwin G, 2009], medical review of elderly drivers [Driver Fitness Working Group, 2009]; and licensing agency practices [Lococo & Staplin, 2005; Government Accountability Office, 2007].

In view of age-attendant cognitive, physical and visual impairments, retirement from driving is a matter of important consideration for senior drivers, clinicians, and licensing agencies. Foley and colleagues [2002] assessed the "driving life expectancy" of senior citizens of 70 years of age and older. Overall, they found that among a cohort of 4,699 drivers 70 to 74 years of age who were first assessed in 1993 and then again in 1995, that the driving life expectancy was similar for both men and women; being 11.5 years and 11.2 years, respectively. Between the ages of 75-79, drive life expectancy fell to 8.0 years for men and 7.9 years for women.

There are essentially two reasons why senior citizens cease driving. It is either a voluntary decision or driving cessation is mandated. A number of reports highlight reasons that brought about driving retirement among senior citizens. Examples of reasons for voluntary retirement include: no longer having a need to drive because friends and relatives provide transportation, transportation needs are met by living in a retirement community, and driver concerns/fears about driving competency. The concerns/fears are usually the result of health problems and/or traffic incidents such as crashes and near-miss collisions. Reasons for forced retirement from driving include "taking of the keys" by family members who consider the senior citizen at-risk of crashing, adhering to advice/warning from their physician or other clinician to retire from driving, or suspension of the driving privilege by a licensing agency.

Meuser, Carr and Ulfarsson [2008] documented the results of 4,100 drivers reported to the Missouri licensing agency because of concerns about medical fitness to drive by police (30%), agency staff (27%), physicians (20%), family members (16%) and others (7%). They found that "about half" did not submit required reports, hence did not pursue continued licensure. Eventually, only 3.5% of reported drivers retained their privilege to drive.

A report of senior Florida drivers by McGwin and colleagues [2008] documented voluntary retirement because of a mandatory licensing requirement. As the result of a law which took effect in January 2004, drivers 80 years of age or older who wanted to renew their license either in-person or by mail or internet had to pass a visual acuity test. They found that 80.2% of drivers who were eligible sought renewal, with 93.3% being successful. Further, among those who were not initially successful in meeting vision requirements, either as the result of testing at the licensing agency or an evaluation by an ophthalmologist or optometrist, almost 90% sought treatment to meet vision requirements. Over three-quarters (77.6%) were successful in maintaining their driving privilege.

The senior drivers in Florida who did seek renewal were queried about that decision [McGwin and colleagues, 2008]. The survey yielded some interesting findings that were not mutually exclusive. Just over half (51.4%) did not seek renewal because they "knew" they could not pass the vision test. Additional fitness to drive/functional concerns expressed by those who did not seek renewal were: "medical problems" (43.8%), "not safe" (18.3%), "family does not want me to drive" (4.3%), "slow reactions" (2.4%), "recommended not to drive" (1.9%) and "accidents" (1.0%). Almost one-third (31.7%) of those who did not seek renewal indicated they "don't need a car" and 1.4% indicated "someone else drives me."

In Finland, senior drivers who reach the age of 70 are required to undergo a medical screening process. A study by Hakamies-Blomqvist and Wahlström [1998] found that upon reaching 70 years of age, 67% of women and 82% of men pursued continued licensure. A survey of those who did not pursue licensure found different reasons for retirement for men and women. The survey findings were not mutually exclusive. The primary reason given for retirement by men was health concerns (41.4%). About 15% of men were advised by "someone" to stop driving. Among women 55.7% indicated they had already ceased driving, while only about 30% of men had already stopped. About 20% of women indicated that driving was "frightening," while less than 10% of men expressed fears about driving.

Throughout all 50 United States and the District of Columbia police officer referrals regarding medical concerns about fitness to drive are accepted by licensing agencies [Lococo, 2003]. In Maryland, Request for Re-examination reports (RREs) are submitted to the Motor Vehicle Administration's Driver Wellness and Safety Division. If initial review by an Administrative Nurse Case Reviewer or their Supervisor raises immediate concerns about fitness to drive a police request is referred to the MVA's Medical Advisory Board [Soderstrom & Joyce, 2008]. Examples of immediate concern include: loss of consciousness, marked disorientation or obvious severe physical limitations. Most cases referred to the MAB result in a recommendation for suspension of the driving privilege until a medical evaluation for fitness to drive is conducted. In a

number of cases driving occupational therapy assessments are requested. Suspended drivers may appeal suspensions by being afforded an administrative hearing.

A previous report [Soderstrom et al, 2009] documented the driving actions, and mentions of medical concerns and conditions of 486 drivers referred by police to the Medical Advisory Board of the Maryland Motor Vehicle Administration. Analyses revealed a number of significant findings relative to older drivers. Drivers 60 years of age or older were over represented in the cohort of referred drivers compared to the general population of drivers that age; being 71.4% vs 20.6% ($p<0.01$). The most common mentioned police concern was that 40.3% of drivers appeared to have been disorientated at the traffic scene (this included mentions of severe confusion, including indications that the driver was lost when encountered). Compared to younger drivers, mentions of confusion/disorientation were over four times more prevalent among those 60 years of age and older; being, 11.1% vs 48.1% ($p<.01$).

Study Purpose and Hypotheses

Originally, the purpose of this study was to analyze the licensing outcomes of all police referred drivers to a state's licensing agency Medical Advisory Board. Two reasons emerged to change the focus of the study from all referred drivers to senior drivers. First, preliminary study results revealed two interesting findings. We found there were similar percentages of drivers who were under 75 years of age and those 75 years of age and older referred by the police. Also, compared with younger drivers, older drivers were significantly less likely to pursue continued licensure. Second, we found the results of the studies by McGwin and colleagues [2008] and Meuser and colleagues [2009] involving senior drivers who did not pursue licensure when requirements were placed on them a compelling reason to limit our analyses to senior drivers. Hence, further analyses were centered on the pursuit of the driving privilege of police referred drivers who were 75 years of age and older.

There were four questions of specific interest. 1. What factors were associated with retirement from driving? 2. Did age impact on the decision to pursue licensure? 3. What were the MAB recommendations for those who pursued licensure? 4. Did driving occupational therapy assessments help drivers to maintain their driving privilege?

Human Subjects

This study was found to meet the criteria to be exempt from the Institutional Review Board (IRB) process by the University of Maryland IRB (Baltimore, MD).

METHODS

As described in a previous paper involving the first part of this study [Soderstrom et al, 2009], information from Request for Re-examination reports submitted for review by the Maryland MVA's Medical Advisory Board for the 25-month period March 2005 through April 2007 were entered into a database. Data elements for the first study included driver demographic (age and sex) information, traffic incident information (including whether or not the traffic incident involved a crash), violations/issuance of a summons, and officer mentions of medical concerns and medical conditions. A medical concern of interest in our initial study was a report of confusion/disorientation at the traffic scene. In this study we explored whether there is an association between initially reported disorientation and license pursuit.

For this effort, additional data elements, which focused on licensing outcomes from the police referral event, were added to the original database. Creation of data elements and categories for each of these data sets are discussed below.

Age groups

For the purposes of this study, drivers were divided into two age groups, e.g., drivers under the age of 75 and those 75 years of age and greater. Seventy-five years of age was chosen to delineate senior drivers for two reasons. The first was based on the results of a previous study involving 1, 910 licensed Maryland drivers 55 years of age or greater. In that prospective cohort study, Ball and colleagues [2006] found that after adjusting for annual miles driven, drivers 78 years of age or older were 2.11 more likely to be involved in a future at-fault crash compared to younger drivers. The second reason for choosing 75 years of age or older was that the results could be compared to the previously mentioned study of driving life expectancy conducted by Foley and colleagues [2002].

Medical Advisory Board Suspension

As noted above, based on the description of the traffic event, the driver's actions and behavior, and medical concerns and conditions, the Medical

Advisory Board can recommend suspension of the driving privilege until a fitness to drive assessment is conducted. A field for suspension was created in the database.

Pursuit of the Driving Privilege

All drivers referred to the MAB, both suspended and not suspended, are required to submit a report from his/her physician and a health questionnaire. In some cases they are initially required either to take an MVA course driving test and/or when there are concerns about decline in cognitive function to have functional capacity screening [Ball et al, 2006; Soderstrom & Joyce, 2008].

A field was created to determine if a driver continued to pursue their driving privilege after referral to the MAB. A driver was considered to have pursued their driving privilege if they submitted a favorable physician's report, and when recommended, took an MVA driving test. Lack of pursuit was defined by: not submitting requested reports, or not pursuing licensure after submitting an unfavorable medical report.

Retaining the Privilege to Drive and New License Restrictions

A field was created in the database indicating whether or not drivers who pursued licensure were successful or unsuccessful. Success was defined as continued licensure for those who were not initially suspended by the MAB, or lifting of an initially imposed suspension. To attain success, drivers were required to submit favorable clinical reports and the vast majority were required to pass a drive test. Some drivers who maintained or regained their driving privilege had additional new restrictions placed on their licenses. A data field was created for that information.

Utilization of Driving Occupational Driving Therapists and Licensure

As noted in the American Medical Association/National Highway Traffic Safety Administration *Physician's Guide to Assessing and Counseling Older Drivers* [Wang et al, 2003] driving rehabilitation specialists (DRSs) are clinicians who assess and provide training to drivers with physical and cognitive problems which impact on driving. In Maryland, in addition to a satisfactory recommendation to drive from their primary care provider, some drivers were required to submit a favorable report from a driving occupational therapist that is qualified to perform clinical assessments and on-the-road drive testing [Soderstrom and Joyce, 2008]. We assessed outcomes of drivers who were referred by the MAB to driving occupational therapists [Wheatley & Di Stefano, 200].

Analyses

Chi-square analysis was used with a p value of <0.05 being considered significant.

RESULTS

Preliminary Results

A total of 475 drivers qualified for this research effort. There were 240 drivers (50.5%) 75 years of age or older, i.e., senior drivers and 235 drivers (49.5%) less than 75 years of age. Compared to the state's total number of drivers who were 75 years of age or older during the study period, the percentage of the drivers in that age group that were referred to the Medical Advisory Board was significantly higher; being 50.5% vs 5.5% (the percentage of drivers in the general Maryland population of drivers greater than 75 years of age), $p<0.01$. [Note: The age distribution of the 235 younger drivers not considered for further analyses was as follows:17-39 years - n=53, 22.6%; 40-59 years – n=86, 36.6%; 60-74 years – n=96, 40.9%.]

In addition, a significantly higher percentage of the referred senior drivers did not pursue licensure; being 57.1% vs 23.8% ($p<0.01$), respectively. Further analyses were limited to assessing factors associated with retirement from driving among the senior drivers.

Note: Two of the senior drivers involved in the first study had two requests for re-examination events during the period their case was under review by the MAB, and one had three. For these drivers, analysis of results (pursuit/non-pursuit of the driving privilege) took into account only the initial RRE referral. In addition, two drivers who died during the follow-up period after the initial MAB review were excluded from further study.

Senior Driver Results

Group Characteristics of Referred Senior Drivers. Characteristics of the 240 senior drivers included for study were as follows: 139 were men (57.9%), almost two-thirds were 75 to 84 years of age (n=150, 62.5%), 119 (49.5%) were noted to be disoriented at the traffic scene, and 141 (58.8%) were involved in a traffic crash. (Table 1)

Table 1 - Characteristics of 240 Senior Drivers Referred by Police to the Medical Advisory Board of the Maryland Motor Vehicle Administration

Age	Number	Percent
75-79	68	28.3
80-84	82	34.2
85-89	55	22.9
90-94	25	10.4
95-99	10	4.2
Sex		
Women	101	42.1
Men	139	57.9
Disoriented at Traffic Scene		
All	119	49.6
Women (n=101)	49	48.5
Men (n=139)	70	50.4
Crashed		
All	141	58.3
Women (n=101)	63	62.4
Men (n=139)	78	56.1

Medical Advisory Board Suspension

Overall, as a result of their initial review by the Medical Advisory Board, 52.9% (127/240) of senior drivers had their driving privilege emergency suspended. Relative to age, the highest percentage of drivers suspended were 90 to 94 years of age group, being 68.0% ($p<0.02$) and the lowest percentage of drivers was in the age group 80 to 84 years of age, being 47.6%. One notes that only one of the ten drivers 95 to 99 years of age was suspended. A higher percentage of the referred men were suspended compared to referred women; being 56.1% vs 48.5%, respectively. Over two-thirds of the senior drivers (68.1%) who were suspended were disoriented at the traffic scene. Finally, 57.5% of suspended drivers had been involved in a crash.

Pursuit of Licensure

Of the 240 senior drivers who were referred to the Medical Advisory Board by police, only 103 (42.9%) pursued further licensure. Factors that were significantly associated with pursuit were age and whether or not the driver was initially suspended by the MAB. Of the drivers ≥85 years of age, 68.9% retired from driving, compared with 50% of the drivers who were 75 to 84 years of age ($p <0.01$). [It is interesting to note that 7 of the 10 drivers 90 years of age or greater pursued further licensure.] About one-third (35.4%) of the drivers who were initially suspended by the MAB pursued licensure compared with about a one-half (51.3%) who were not suspended ($p<0.01$). A review of Table 2 indicates that sex, disorientation at the traffic scene, and a crash involvement in the request for re-examination event were not signficant factors in pursuit of licensure.

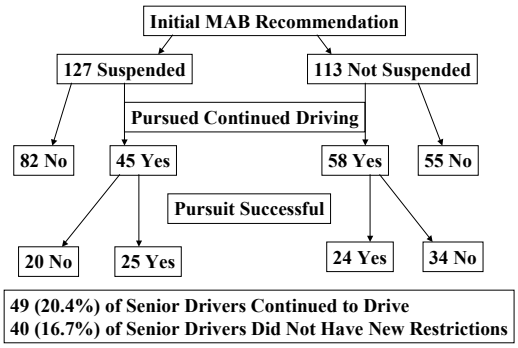
Table 2 - Factors Associated with Pursuit of Driving Privilege Among 240 Senior Drivers Referred to the Medical Advisory Board

	Number	Percent	P
Age	Who Pursued		
75-79 (n=68)	36	52.9	
80-84 (n=82)	39	47.6	
85-89 (n=55)	19	34.5	
90-94 (n=25)	2	8.0	
95-99 (n=10)	7	70.0	<0.01
Sex			
Women (n=101)	50	49.5	
Men (n=139)	53	38.1	<0.07
Disorientation at Traffic Scene			
Not Disoriented (n=121)	52	43.0	
Disoriented (n=119)	51	42.9	NS
Crashed			
Did not Crash (n=99)	42	42.4	
Crashed (n=141)	61	43.3	NS
Initially Suspended			
Not Suspended (n=113)	58	51.3	
Suspended (n=127)	45	35.4	<0.01

Retaining the Privilege to Drive

As noted, 103 drivers pursued further licensure. Figure 1 illustrates the steps and outcomes for each step relative to pursuit of licensure. One notes that less than one-half of the drivers, i.e., 49 or 47.6% were successful in retaining their driving privilege. The success rate for the following characteristics were as follows: 47.1% of the 51 drivers who were noted to be disoriented at the time of the sentinel traffic event, 54.1% of those who were involved in a crash, and 55.6% of those whose driving privilege was suspended after initial MAB review. Only 20.4% (49/240) of senior drivers, who were referred to the MAB by police, eventually retained their driving privilege.

Figure 1 - Eventual Licensing Outcome of 240 Senior Drivers Referred by Police to MAB



Nine of the 49 who retained their driving privilege had a new restriction placed on their license, 7 had a geographic restriction placed on their license, 2 of which also had a driving only in daylight restriction. One had a daylight driving only restriction and another had an alcohol restriction placed on their license. Overall, of the 240 drivers referred by the police, only 16.7% retained their original driving privileges.

Occupational Therapy Evaluations and Driving Privilege Retention

Of the 103 drivers who pursued licensure, 29 (28.2%) underwent driving occupational therapy evaluations in an attempt to retain their driving privilege. Overall, 8 or 27.6%, retained their driving privilege as the result of these evaluations. Five of these drivers had a geographic restrictions (2 with daylight only driving) placed on their licenses.

DISCUSSION

The major findings of this study are as follows: First, among 240 senior drivers referred by police, only 42.9% percent pursued continuation of their driving privilege when they were required to submit medical reports and/or undergo driving tests. Second, of the 103 drivers who pursued continued licensure, only 49 (47.6%) were successful in that pursuit. Hence, only one-fifth (20.4%) of all police referred drivers, continued to drive.

As noted earlier, a Missouri study [Meuser, Carr & Ulfarsson, 2008] documented the licensing outcomes of drivers reported to the licensing agency because of concerns about medical fitness to drive. In contrast to that report in which 30% of referrals were made by police, this study involved only drivers referred by police as the result of a traffic incident. Both studies involved relatively older seniors drivers. The mean age of the drivers in the Missouri study was 80 years of age and inclusion criteria for this study began at 75 years of age. Both the Missouri and the current studies found that referrals to a licensing agency resulted in one-half or more of the drivers voluntarily retiring from driving. While only 3.5% of the Missouri drivers eventually retained their driving privilege, 20.4% of referred Maryland continued to drive.

In contrast to the above mentioned studies the Florida study of McGwin and colleagues [2003] and a Finnish study of Hakamies-Blomqvist and Wahlström [1998] assessed the pursuit of continued licensure by senior drivers when licensing agencies imposed additional requirements with increasing age (80 years of age in the Florida study and 70 years of age in the Finnish study). The percentage of drivers who did not pursue licensure in these studies were, overall one-fifth of drivers in the Florida study and one-fifth of men and one-third of women in the Finnish study, respectively. These are much lower than the 50% or more lack of pursuit rates in the Missouri and current Maryland studies.

Persson [1993] stated that the decision to stop driving among senior citizens is one that is "usually made with great reluctance." Important contributions from the Florida [McGwin et al, 2003] and the Finnish [Hakamies-Blomqvist and Wahlström, 1998] studies is that drivers provided reasons about why they did not seek renewal of their driving privilege. While this study did not query about reasons for not seeking continued driving, we were able to ascertain that age, particularly being 85 years of age or greater, and initially being suspended by the Medical Advisory Board were significantly associated with lack of pursuit. An interesting finding of this study is that seven of the ten police referred drivers who were 95 years of age or older pursued licensure and four of them retained their driving privilege.

A number of reports provide insights as to why drivers retire from driving, other than having to respond to licensing agency requests for reports or tests. Dellinger and colleagues [2001] noted that among 141 drivers who retired from driving during a five-year study, only 12.2% did so as the result of "licensing or license renewal problems." The main reasons given were "medical problems" (41.0%) - the two most common problems were vision and cardiovascular conditions - and "changes due to aging" (19.4%) - the two most common changes mentioned were vision and slower reactions or slow

driving. It was noted that there was no clear association relative to being involved in crashes in the previous five-year period. In a smaller sample of 56 former senior drivers, Persson [1993] assessed reported reasons for driving retirement. Mutually exclusive reasons for retiring involved advice from a doctor to stop driving in 27% of cases, loss of confidence behind the wheel in 20% of cases, and trouble seeing in 20% of cases. Only, 5% of cases involved "minor accidents" and 4% retired because of license revocation. In another report by Anstey and colleagues [2006], it was concluded that subjective self-related health by drivers is a strong predictor of retirement from driving.

A reason for variable results in drivers not pursuing licensure may be that criteria for evaluations and licensing procedures are not standardized in jurisdictions throughout the United States [Lococo, 2003; Government Accountability Office, 2007] and in other countries. It is important that standard methods are in place and that assessments for fitness to drive are based on function, not age or medical conditions [Wang et al, 2003; Soderstrom and Joyce, 2008].

There are several limitations to this study. Information was not available regarding culpability for drivers who were involved in crashes. Additionally, we did not assess prior crashes relative to study results. Meuser and colleagues [2009] found that one-third of drivers referred to the Missouri licensing agency because of concerns about medical fitness to drive had been involved in a previous crash. Unlike previously mentioned studies we were not able to query drivers about why they did not pursue licensure. Anecdotally, in some cases drivers notified the MVA that they were retiring from driving and provided a reason, such as moving into a retirement community that met their transportation needs.

The current study and those previously discussed indicate that senior drivers referred to a licensing agency because of concerns about fitness to drive, frequently do not pursue licensure, or fail to retain their driving privilege. These reports suggest that referrals, particularly from police are useful in identifying drivers who are medically unfit to drive. In the past two years, since the period involving this study, statewide training began for Maryland police using the *Older Driver Law Enforcement Course* [National Highway Traffic Safety Administration, 2006]. The impact of that program on referral patterns will need to be evaluated.

As noted above, in addition to referrals for fitness to drive, reports also indicate that when additional requirements are placed on senior drivers at the time of renewal, retirement from driving is a common occurrence. It is important to understand the reasons prompting such a decision. The consequences/results of forced or voluntary retirement from driving has many societal impacts. Family/friends and retirement community programs must take up the responsibility of providing transportation to seniors who no longer drive. In addition, as noted by McGwin and colleagues [2008] loss of the driving privilege impacts not only on mobility and independence, it is also associated with development of depression, and can impede access to medical care.

Of significant note in the current study is that driving occupational therapy evaluations enabled a number of senior drivers to maintain their driving privilege.. In addition, allowing drivers to have restricted licenses for a limited geographic area with or without night restrictions help to preserve the mobility of some drivers. Unfortunately, driving occupational therapy evaluations are not covered by most health plans [Wang et al, 2003]. Also, geographic restrictions are not an option for drivers who live in areas of high traffic volume and complexity.

CONCLUSION

Police referrals regarding fitness to drive in senior drivers often result in loss of licensure – often because of lack of pursuit of continued licensure. A better understanding of why drivers do not pursue licensure is needed. Of most importance is that our societal infrastructure must meet the transportation needs of seniors who no longer are able to drive.

REFERENCES

Ball KK, Roenker DL, Wadley VG, et al: Can high-risk older drivers be identified through performance-based measures in a department of motor vehicles setting? *Journal of the American Geriatric Society* 2006;54:77-84.

Dellinger AM, Sehgal M, Sleet DA, Barrett-Connor: Driving cessation: what older former drivers tell us. *Journal of the American Geriatric Society* 2001;49:431-435.

Driver Fitness Working Group: *Driver Fitness Medical Guidelines*. American Association of Motor Vehicle Administrator; Arlington, VA; and National Highway Traffic Safety Administration; Washington, DC; DOT HS 811 210; September 2009.

Foley DJ, Heimovitz HK, Gurainik JM, Brock DB: Driving life expectancy of persons aged 70 years and older in the United States. *American Journal of Public Health* 1993;92:1284-1280.

Government Accountability Office (GAO). (2007). *Older driver safety: Knowledge sharing should help states prepare for increase in older driver population.* United States GAO; Washington, DC; GAO-07-413; April 2007.

Hakamies-Blomqvist L, Wahlström B: Why do older drivers give up driving? *Accident Analysis & Prevention* 1998;30:305-312.

Institute of Medicine: *Retooling for an Aging America: Building the Health Care Work Force*. The National Academies Press; Washington, DC; April 2008.

Leroy AA, Morse ML: *Multiple Medications and Vehicle Crashes: Analysis of Databases*. National Highway Traffic Safety Administration; Washington, DC; DOT HS 810 858; May 2008.

Lococo KH: *Summary of Medical Advisory Board Practices.* Transanalytics; Kulpsville, PA, 2003.

Lococo KH, Staplin L: *Strategies for Medical Advisory Boards and Licensing Review*. National Highway Traffic Safety Administration; Washington, DC; DOT HS 809 874; July 2005.

Lococo KH, Staplin L: *Polypharmacy and Older Drivers: Identifying Strategies to Study Drug Usage and Driving Functioning Among Older Drivers*. National Highway Traffic Safety Administration; Washington, DC; DOT HS 810 681; December 2006.

MacLennan PA, Owsley C, Rue LW, McGwin G: *2009 Older Adults' Knowledge About Medications That Can Impact Driving.* AAA Foundation for Traffic Safety; Washington, DC; August 2009.

McGwin G Jr, McCartt AT, Braitman KA, Owsley C: Survey of older drivers' experiences with Florida's mandatory vision re-screening law for licensure. *Ophthalmic Epidemiology* 2008;15:121-127.

Meuser TM, Carr DB, Ulfarsson GF: Motor-vehicle crash history and licensing outcomes for older drivers reported as medically impaired in Missouri. *Accident Analysis & Prevention* 2009;41:246-252.

National Highway Traffic Safety Administration (NHTSA): *Older Driver Law Enforcement Course, Participant Manual*. NHTSA; Washington, DC; HS 00577 R7/06, 2006.

Persson D: The elderly driver: deciding when to stop. *The Gerontologist* 1993;33:88-91.

Soderstrom CA, Joyce JJ: Medical review of fitness to drive in older drivers: the Maryland experience. *Traffic Injury Prevention* 2008;9:341-348.

Soderstrom CA, Scottino MA, Joyce JJ, Kerns TJ, Burch C, Ho SM: Police referral of drivers to the Maryland Motor Vehicle Administration's Medical Advisory Board. *Annals of the Association for the Advancement of Automotive Medicine*. 2009;53:105-116.

Wang C, Kosinki CJ, Schwartzberg JG, Shanklin AV: *Physician's Guide to Assessing and Counseling Older Driver*s American Medical Association; Chicago, IL and National Highway Traffic and Safety Administration, DOT HS 809 647; Washington, DC; September 2003.

Wheatley CJ, Di Stefano M: Individualized assessment of driving fitness for older individuals with health, disability, and age-related concerns. T*raffic Injury Prevention* 2008;9:320-327.