

status including reports detailing potential medical concerns.

5. Family members must be sought to provide valuable information on functional ability and to serve as allies when appropriate measures must be taken to prevent driving in the high risk elderly.

References

- Reuben, D. 1991. Assessment of Older Drivers. *Clinics in Geriatric Medicine* 9(2):449-459.
- State of Maine. Department of State Motor Vehicle Division.
- Functional Ability Profiles Governing Physical, Emotional and Mental Competence to Operate a Motor Vehicle. 1-28.
- Utah State Driver License Medical Advisory Board. State of Utah Functional Ability in Driving: Guidelines and Standards for Health Care Professionals. 1992 edition:1-40.
- Wallace, R. and Retchin S. 1992. A Geriatric and Gerontologic Perspective on the Effects of Medical Conditions on Older Drivers: Discussion on Waller. *Human Factors* 43(1):17-24.

VISION SCREENING

David Shinar, Ph.D.

Problem

1. Failing visual-attentional abilities of older drivers.

Most perceptual-motor skills deteriorate with age, and the complex visual-attentional and oculo-motor functions do so at a faster rate and begin at an earlier age than the sensory-peripheral and static functions, such as static foveal acuity. This has been shown for dynamic visual acuity, dynamic contrast sensitivity, and effective visual field. Associated with the age-related average decrease in performance is the increase in individual differences.

2. Elderlies' lack of awareness of their reduced ability.

Because the deterioration is typically gradual, visual impairments are often not detected in the process of daily living activities, but only through clinical and functional assessments (e.g., glaucoma and scotomas, respectively).

3. *Need of license to retain independence and mobility.* Based on self-report surveys people who lose their license and stop driving tend to reduce their activity levels in terms of visiting friends and relatives, shopping, going 'out', and going to church.

4. *Cost of vision re-assessment, and lack of agreement on appropriate standards.* Licensing agencies are reluctant to introduce any new vision screening criteria that would prolong the test duration to beyond one minute. Static foveal acuity under optimal illumination is currently the accepted standard. There is also no consensus in the research community on (a) the best alternative or additional test(s), (b) the pass/fail standard for these test(s), and (c) recommended action for those who fail the test(s). Consequently it is still legally irresponsible for a DMV to change the vision licensing standards.

Needs

The problems described give rise to three major needs.

1. *Public education of older driver's low involvement in crashes, importance of license for mobility, and the elderlies' self limiting behaviors.* Despite their relative dearth, older drivers' accidents are very salient in the media - which tends to highlight the age factor. Possibly because they drive slower, their driving behavior may also be annoyingly conspicuous to much of the motoring public. However, it would be interesting to assess public awareness of the actual low frequency of older driver crashes, the criticality of driving to mobility, and the need for tolerance, because there but for the grace of a few years, go.

2. *Education of older drivers on detecting vision problems and compensating driving strategies.* Many of the drivers who voluntarily limit their driving exposure (or stop altogether), do so because they detect their own limitations. But it is possible to introduce some quick gross 'tests' that can serve people as 'rule of the thumb' indicators of their visual ability. For example, it is easy to determine the snellen equivalent of 20/40 for the distance from which license plate numbers should be readable; and self test for horizontal visual field.

3. *More conclusive research on the potentially relevant visual functions, performance requirements for each, and implications for license restrictions.* Intensive research underway now includes evaluations of Useful Field of View (UFOV), Contrast Sensitivity, Low-Contrast Acuity, Dynamic acuity, and Dynamic contrast sensitivity. The UFOV is most significant because it taps both visual-sensory skills as well as oculomotor and attentional skills. Older drivers in particular should be evaluated on the combination of the latter two skills, since these tend to deteriorate most rapidly.

Since vision alone cannot — even theoretically account for a high proportion of accidents — the

research community should agree on surrogate measures for validation of visual skills and vision tests. There is a need for uniformly accepted behavioral performance measures that would be considered safety-related. There is a need to validate the new vision tests relative to these measures. And there is a need for large scale research that would simultaneously evaluate multiple measures, to eliminate redundancies.

Actions

The following actions are recommended:

1. Develop simple self awareness tests - and test kits - to check on some of the simpler critical functions such as contrast sensitivity, acuity, visual field. The use of these tests can then be promoted through AAA, AARP, and AAAM.

2. Promote annual or bi-annual clinical and functional vision tests with inclusion of tests for specific diseases (cataracts, lens opacity/transmission), retinitis pigmentosa, scotomas, glaucoma.

3. Evaluate the cumulative experiences of states with different programs for elderly drivers. Mobility needs and patterns are not the same across the nation, and different licensing approaches are emerging in several states. A compendium of the existing alternative approaches with information on their successes and benefits should be written and disseminated to all DMVs.

4. Conduct/continue research on:

a. Relevance of different visual skills to specific driving maneuvers (rather than accidents).

b. Effective compensating behaviors - e.g., head turning, mirror checking, for reduced visual field; directing gaze away from glare sources to overcome phototropism.

c. Continue research on association between accident involvement and performance on selected vision tests including contrast sensitivity, divided attention, effective visual field (Useful Field of View), and dynamic acuity and contrast sensitivity. The tests should focus on older drivers, and should control for co-morbidity.

5. Until there is sufficient conclusive data on alternatives to the 20/40 acuity standard, state licensing agencies would do best to set up an expert panel who will issue recommended guidelines for state DMVs. The current vision-related licensing recommendations can serve as a starting point. The panel's role would be to update the recommendations in the following areas:

a. The indications for waivers and variations from the standard (whatever each state's standards are).

b. Recommended additional tests, relative to the referral issues and observed impairments (candidates include tests of visually-based divided attention, glare sensitivity, and contrast sensitivity).

c. Recommended limits on the license (including range of driving within residence, hours of driving, and speed of driving, and road types).

USE OF TRAFFIC RECORDS TO IDENTIFY HIGH RISK DRIVERS

Carol L. Popkin, M.S.P.H.

Identifying a method for detecting drivers with functional impairments that may affect their ability to drive has long been the goal of driver licensing authorities. The use of traffic records to identify high risk older drivers is attractive given that there is great individual variation in driver performance decrements, that older drivers constitute the fastest growing proportion of the driving population, that there are limited resources for screening drivers, and that traditional methods for identifying drivers at risk are changing, i.e., new license renewal procedures have meant that the period of time between visits to license examiners is increasing. However, the question remains "Is there a cost effective model that can be employed to better predict future crash involvement so as to permit pre-crash intervention through reexamination, retraining and/or driving restriction?"

Problem

Compared with other age groups, older drivers have relatively few crashes. In general, their crash risk does not exceed that of the general driving population until around age seventy. There is a substantial body of research indicating that when driving exposure is taken into account, the crash rate of older drivers begins to rise around the age of fifty and increases sharply around the age of seventy. As in other age groups, only a small portion of this population experiences a crash or violation within a particular year, and most crash-involved drivers have 'clean' records in the year following a crash.

Identifying that group of older drivers who are at elevated risk is especially important because older drivers are more vulnerable to injury when involved in a crash. Unfortunately, identifying driving impairment and predicting crash risk is especially difficult because decrements in driving ability occur in an unpredictable fashion and there is not definitive age after which one should not drive.