Screening for Cognitive Impairment at Driver License Renewal

A Presentation to the

Annual International Conference

of the

American Association of Motor Vehicle Administrators

by

John J. Joyce, Esq.

TransAnalytics, LLC

August 22, 2012
Why consider functional screening at renewal?

• With an aging population, an increasing number/proportion of drivers will evidence diminished capacity.

• Fatal crash involvement by older drivers is rising, while overall motor vehicle fatalities are falling.

• Existing (referral) methods of catching functionally impaired drivers are haphazard; and once referred for medical review, there are no standardized tools to quantify functional status (except vision) for potentially at-risk drivers, which negatively impacts licensing outcomes.

• Screening results help target the right drivers for more in-depth assessment, permitting better allocation of limited resources.
Why focus on cognitive abilities?

• Current mechanisms exist for detecting drivers with impaired vision or physical impairments.
• Epidemiological trends/projections underscore an increasing prevalence of (older) drivers with dementia.
• Cognitive loss (especially dementia) robs the driver of his/her capacity to self-regulate; and self-regulation is the cornerstone of our existing system of ensuring driver competence.
• Case-control research shows the strongest validity for measures of cognitive ability as crash predictors.
Choosing the best tools for the job

- Many different measures of cognitive ability (impairment) have been used in laboratory and clinical settings.

- The most suitable for use as a screening application in a DMV setting should:
  1. Tap into domains of cognitive ability for which there is the strongest evidence as crash predictors.
  2. Be complementary to, and easily integrated with, a State’s existing medical review system, serving as simply one more referral source.
  3. Be implemented using techniques and procedures that are standardized, objective (unbiased), and ‘user-friendly’ for the driving public.
  4. Not place excessive demands on the DMV in terms of staffing, equipment, support, or other operational costs.
Evidence: Prospective Crashes

2003 NHTSA / NIA “Maryland Pilot Older Drivers Study”

• ~2,000 drivers 55+ completed functional measures at MVA offices
• Sample was a representative cross-section of MD older drivers
• Police-reported crashes were the validation criteria

Key findings: Cognitive abilities (measures) emerging as significant crash predictors were *visual search with divided attention* (Trail-making Part B); *visual information processing speed with divided attention* (UFOV subtest 2); *visualizing missing information* (MVPT/VC); and *working memory* (cued/delayed recall).


Evidence: Prospective Crashes (con’t)

2009 NHTSA Study: “Older Drivers: Relationship Between Assessment Tool Scores and Safety Outcomes”

2012 NHTSA Study: “Older Driver Assessment Scores, Citations, and Crashes”

- 692 drivers age 70 and older completed functional measures at MVA offices
- Sample was a representative cross-section of MD older drivers
- Police-reported crashes were the validation criteria

Key findings: In a ‘route planning’ task, using mazes presented on a computer touch-screen, results identified specific mazes as highly significant predictors of future safety risk for older drivers. These findings support the use of the Maze Test as a measure of executive function, complementing other screening tools keyed to narrower domains of cognitive ability that predict crash risk.

Integration with a State’s existing License Renewal process

- The licensing authority adds brief cognitive screening to the license renewal process at a specified age.
- This screening adds 5 - 15 minutes to the individual’s transaction. The screening proceeds unattended.
- Customer resumes standard renewal process.

Nothing in this process precludes the licensing authority from refusing or restricting licensure to any driver license applicant as it would in its current operations.
Generating referrals to a State’s existing Medical Review system

Branch Offices

HQ Server

- Data Storage
- Rules Application
- Referrals
- Reporting

Existing Referral Sources

Existing Medical Review Process

AAMVA Annual International Conference    Charlotte, NC    August 22, 2012
A user-friendly, operationally feasible application

Key attributes:

• The user interface for cognitive screening must accommodate a high proportion of elderly drivers ➞ simple, easy instructions; not intimidating or causing discomfort. A computer-based system should be operated by touch, not mouse; and with no need for keyboard entries.

• Potentially large volumes of drivers must be accommodated without imposing unacceptable demands for personnel (number of staff, level of training) on a DMV: a self-administered screen holds clear advantages.

• The test protocol should minimize demands on drivers’ time by using a progressive program flow: use measures most sensitive to dementia/MCI first to identify the most at-risk drivers, then proceed with measures more sensitive to cognitive decline among normally aging drivers.
Safe Driving Basics

Brief Auto-Screening Instrument for Cognitive Status
The Effects of Medical Conditions on Driving Performance

- Born from widely-recognized, peer-reviewed studies of crash predictors.
- Represents ‘next generation’ of system in current use by Maryland MAB.
- Versatile and reliable: A DMV can take this system and plug it into their existing process with virtually no changes to existing methodology.
Safe Driving BASICS™: Program Flow

Part 1

GETTING STARTED
Authenticate Driver ID

ROUTE PLANNING
Maze navigation test

VISUAL SEARCH ‘A’
Trail-making: numbers only

VISUAL SEARCH ‘B’
Trails: letters + numbers

Part 2

Most sensitive measures for:
Normal cognitive aging

VISUALIZE MISSING INFORMATION
MVPT: visual closure

VISUAL ATTENTION 1
UFOV® Subtest 1

VISUAL ATTENTION 2
UFOV® Subtest 2

Part 1 fail = Exit
Safe Driving BASICS™
Refer for medical evaluation

Part 1 pass = Continue with
Safe Driving BASICS™ Part 2

<1 minute 5 minutes 12-15 minutes
Cumulative amount of time required to complete Brief Auto-Screening Instrument for Cognitive Status

PASS FULL SCREEN
Cognitive status is not a factor in determination of license status.

FAIL FULL SCREEN
Marker(s) for cognitive impairment indicate an elevated crash risk and need for in-depth assessment to determine license status.

© 2012 TransAnalytics Health & Safety Services LLC
What about concerns over age discrimination?

• There are precedents in applying special criteria for driver qualifications at particular (older) ages: FL (vision); PA (exam with physician report); other states (see www.seniordrivers.org).

• Applying the “medical model,” it is appropriate and cost-effective to screen for impairing conditions only among those with the highest probability of manifesting them.

• Prominent policy studies endorse age-based screening (cf. AAAFTS Licensing Policy Workshop, pg 6).

• Another constituency, another perspective: Baby boomers with aging parents strongly support DMV initiatives in this area.
Screening for Cognitive Impairment at Driver License Renewal

A Presentation to the

Annual International Conference

of the

American Association of Motor Vehicle Administrators

by

John J. Joyce, Esq.

jjoyce@transanalytics.com

(215) 538-3820 x.106