Optimizing Functional Ability in Driving

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Conflict of interest: none

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Howard Leaman, MD Sleep Medicine
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Outline

• Introduction
• Effects of age, medical conditions, medications on driving ability
• Driving Evaluation
• Resources

Driving Characteristics

Older Adults Depend on Driving for Transportation
-Age 75-79: 85%
-Age 80-84: 78%
-Age 85 & older: 60%

-40% reduction in annual mileage
-Daylight hours and optimal road conditions
-Failure to read traffic signs and yield right of way
-Difficulty with situations that require rapid judgment
-Crashes occur at lower speed and cause less damage
-Risk for injury increases

Reuben JAGS 1988
Motor Vehicle Crash (MVC) Fatalities

<table>
<thead>
<tr>
<th>Fatalities</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utah</td>
<td>213</td>
<td>275</td>
</tr>
<tr>
<td>US</td>
<td>32,675</td>
<td></td>
</tr>
</tbody>
</table>

In the US

- 2 million serious injuries / year
- leading cause of death for age 5-27
- leading cause of injury-related deaths in those 65-74
- second cause of injury-related deaths for those 75 and over (falls are number 1)

http://ut.zerofatalities.com/
http://www.worldlifeexpectancy.com
http://www.iihs.org/iihs/topics/

Crash Mortality per Capita*

2014, by AGE & GENDER
*http://www.iihs.org/iihs/topics/t/older-drivers/fatalityfacts/
Risk of Death from MVC Adjusted for Miles*

<table>
<thead>
<tr>
<th>AGE</th>
<th>Fatal MVC</th>
<th>MILES</th>
<th>RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-44</td>
<td>3,180</td>
<td>331,007,230,699</td>
<td>1.0</td>
</tr>
<tr>
<td>75-79</td>
<td>1,050</td>
<td>39,017,246,582</td>
<td>2.7</td>
</tr>
<tr>
<td>80-84</td>
<td>837</td>
<td>19,901,904,422</td>
<td>4.2</td>
</tr>
<tr>
<td>≥85</td>
<td>677</td>
<td>7,705,924,745</td>
<td>8.8</td>
</tr>
<tr>
<td>Total</td>
<td>39,543</td>
<td>2,195,141,011,613</td>
<td>1.8</td>
</tr>
</tbody>
</table>

2008, per 100 million miles
*http://www.iihs.org/iihs/topics/t/older-drivers/fatalityfacts/

Fatal MVC Per Miles Driven Peak over age 85

http://www.iihs.org/iihs/topics/t/older-drivers/fatalityfacts/
Case Example

Independent in ADLs, IADLs, hypertension, CKD Stage 3B

Description of MVC

Age 20-25: majority involve front of car
Age > 70

– side impact or angled impact, occur at merges, turns at intersections, turns into gap in cross-traffic, lane changes*
– ↓ ability to maintain situational awareness
– ↓ scanning & processing information combined with slowed reaction time

*Bryer, 2000; Ryan et al., 1998
Age-Related Changes

- Cognitive: memory, perception, visual processing, and visuospatial skills, selective and divided attention, judgment
- Vision: ↓ acuity, ↓ contrast sensitivity, ↓ rod density (needed for dim light)
- Hearing
- Respiratory
- Cardiac
- Muskuloskeletal: neck and torso range of motion
- Neurologic

Examples of Chronic Medical Conditions

- Conditions affecting vision: cataracts, macular degeneration-loss of central vision, glaucoma - ↑ pressure and damage to the optic nerve, loss of peripheral vision – for driving need useful field of vision 120°, ↓ UFOV, OR 6 for one or more crashes in the previous five years, visual fields by confrontation (low sensitivity of 31%) ophthalmologist every 1-2 yrs over age 65
- Cardiovascular disease: arrhythmias, ASHD
- Neurologic disease: Alzheimer Dementia, ↑ 4.5 MVC over 5 years* compared with a control population, Parkinson’s Disease
- Mental Health: depression, bipolar affective disorder
- Metabolic: diabetic retinopathy, neuropathy
- Musculoskeletal: osteoarthritis, rheumatoid arthritis
- Chronic renal failure
- Respiratory disease: COPD

*Friedland Annals of Neuro 1988, ** Ball, 1993
Cognitive Assessment

- Trail-making test part B
- Clock Drawing test

Medical Conditions with Unpredictable/Episodic Events, Red Flags

- Pre-syncope or syncope or vertigo, angina
- Seizure
- Transient ischemic attack
- Hypoglycemia
- Sleep disorders
- Drugs/Alcohol
- Surgery
- Delirium: acute confusion, encephalopathy

At hospital, emergency department, SNF discharge, provide recommendations regarding driving (and admission)
Red Flags Continued: Patient’s or Family’s Concern

• Recent crashes: (OR 2.1 95% CI 1.5-3.0)*
• Near-misses
• Traffic tickets
• Getting lost

• Poor night vision
• Forgetfulness
• Confusion
• Inattention
• Drowsy

Return to Case Discussion

• Dougie, 95 ADLs, IADLs, lisinopril, ca/VitD, supplements, alcohol: -1 glass wine with 3-5 meals/week
• Continues to drive, avoids dark & freeways, no accidents, tickets, getting lost, or concerns from family
• Age 96, MMSE 30, involved in local politics, he reports decreased driving, son notes he drives 10-15 miles under speed limit, usually defers driving
• Discussed issues and risks of continued driving and recommend stopping driving -he agrees and obtains Identification Card at DLD to replace his license and makes alternative plans for transportation
Drugs Associated with Fatal Crash*

<table>
<thead>
<tr>
<th>Drug</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana</td>
<td>1.8</td>
<td>1.4, 2.4</td>
</tr>
<tr>
<td>Opioids</td>
<td>3.0</td>
<td>2.0, 4.5</td>
</tr>
<tr>
<td>Stimulants</td>
<td>3.6</td>
<td>2.6, 4.8</td>
</tr>
<tr>
<td>Depressants</td>
<td>4.8</td>
<td>3.2, 7.2</td>
</tr>
<tr>
<td>Alcohol &amp; Drug</td>
<td>23.2</td>
<td>18, 30</td>
</tr>
</tbody>
</table>

*Li G, Acc Anal & Prev, 2013

Case control design, n=737 drivers involved in fatal MVC, controls n=7719, Participants in National Roadside Survey of Alcohol and Drug Use by Drivers

Medications May Cause Confusion/ Sedation

• Anticholinergic
• Anticonvulsants
• Antidepressants
• Antiemetics
• Antihistamines
• Antiparkinson

• Antipsychotic
• Benzodiazepines* (MVC OR 5.2, CI .9, 32)
• Sedatives / Anxiolytics
• Muscle relaxants
• Opioids
• Stimulants

*McGwin G, Am Jour Epidemiology, 2000
Drowsy Driving is Associated with About 1/3 of Crashes for People ≥ 70

↓alertness
↓judgment & decision-making
↓attention
↓reaction time

CRASH
(high risk without falling asleep)


Predictors/Screening

• Do you drive?
• Do you ever get lost while driving?
• Have any of your family members expressed concerns about your driving?
• Have you received any traffic violations or warnings?
• Have you been involved in a car crash in the last two years?

Occupational Therapist

• Trained to assist individuals with disabilities in returning to their daily activities through remediation or adaptation.
• Educated in assessing vision/perception, cognition, physical abilities, & how they impact performance of an activity.
• Educated in adaptive equipment and compensatory strategies to enhance activity performance.

Courtesy of Heather Welch, OTD, MS, CDRS

Certified Driver Rehabilitation Specialists

ARE QUALIFIED TO:
• Evaluate client’s driving performance skills
• Develop driving intervention plans
• Educate and train clients to use assistive technology
• Address psychosocial issues related to community mobility
• Advocate for policies to promote community mobility

Heather Welch, OTD, MS, CDRS
Benefits of OT Driving Evaluation

- Evaluate skills; motor, visual, perceptual, cognitive
- Review of medication and medical issues
- Provide recommendations and education
- Rehabilitation to improve component skills
- Adaptive equipment recommendation & training
- Person to vehicle to environment assessment of fitness

Courtesy of Heather Welch

Occupational Therapy Driving Evaluation

- Clinical Testing
  - Review health & driving history
  - State written test
  - Visual
  - Cognitive/Perceptual
  - Physical

- “On the Road” Evaluation

- Recommendations and Education

Courtesy of Heather Welch
Clinical Assessment of Driving Safety

- No test or battery of tests has been found to adequately predict driving safety
- Clinical screening tests are poor predictors of on-road performance
- MMSE, Trails A and B, UFOV do not evaluate judgment or self-awareness
- Diagnosis of cognitive impairment + Hx crash = crash risk of 80%
- Suspicion of a cognitive deficit should trigger further cognitive evaluation & a functional driving evaluation

On-Road Evaluation

- Must have current drivers license
- Conducted by an Occupational Therapist & a Driving Instructor
- Evaluate skills; motor, visual, perceptual, cognitive
- Evaluate overall ability to drive
- On-road test is the “Gold-standard” for driving
How much does it cost?

• Driving evaluations are not covered by health insurance.
• They may be covered by workers compensation or vocational rehabilitation.
• The clinical evaluation may be covered as an “occupational therapy evaluation”
• Costs range from $300-500

Courtesy of Heather Welch

Resources for Drivers Rehabilitation

• Association for Drivers Rehabilitation Specialists: www.ADED.net
• American Occupational Therapy Association: www.AOTA.org/olderdriver
• American Automobile Association: www.aaa.com
• American Association of Retired Persons: www.aarp.org
• National Highway Transportation Safety Association: www.nhtsa.dot.gov

Courtesy of Heather Welch
Summary

• Ask: driving and transportation
  – Hx of crashes and moving violations
• Assess
• Eliminate or reduce medications-sedating
• Refer: evaluation & community resources
  – Modifications
  – Transportation alternatives
• Recommend suspending driving during..... Acute & post-acute care, post-op, delirium, acute illness
• Reassess

Ignition Interlock Restricted Driver

• If convicted for an alcohol-related offense, the court may order installment of an Ignition Interlock Device, requiring breathing into device prior to driving.
Utah Guidelines for Driving Safety

- 1979: legislature’s goal to increase highway safety and allow many people with health concerns to drive within appropriate safety limits
- Individuals are personally responsible to be sure they are in reasonably good health when they drive
- Physicians are responsible to advise them
- Established Driver License Medical Advisory Board to advise physicians and the Driver License Division. Board emphasizes functional ability to operate a vehicle safely, rather than stressing impairments and developed “Functional Ability Evaluation Medical Report,” to help providers advise their patients and to simplify reporting.
- Designed to be the least restrictive possible while maintaining safety.
- Driver license applicants are asked to answer health-related questions.
- “If you have a health problem, you should ask your physician about how it might affect your driving.”

Utah Driver Handbook
Utah State Statute
This letter was provided by Dr. David Hilmo to the Medical Advisory Board of the Driver License Division as a means of documenting driving recommendations to his patients.

Date
Department of Public Safety
Driver License Division
P.O. Box 144501
Salt Lake City, Utah 84114-4501

Attention: Medical section supervisor or assistant

Due to:
_____ Loss of consciousness        _____ Seizure        _____ Sleep Apnea
_____ Brain injury                 _____ Stroke           _____ Cognitive impairment
_____ Orthopedic issues            _____ Cardiovascular issues  _____ Multiple medical issues
_____ Medication changes           _____ Visual impairment  _____ Other

I recommend that ____________________ not operate a motor vehicle until reevaluated and deemed safe to drive. A functional driving evaluation can be scheduled once he/she is medically cleared by his/her primary care physician and/or specialists for all relevant medical issues.

Patient Name:
Date of Birth:
Driver License #: 

Thank you,

____________________________
Health Care Provider
Address
Phone Number

This information has been discussed with me:

____________________________
Patient/ Family Member

When to Schedule a Driving Evaluation

• Second opinion for patient, family or physician
• Questionable vision, cognitive or motor skills
• New medical condition or procedure
• Medication changes
• Change in circumstances that affect where or how much an individual drives
• Patient believes they are safe, family doesn’t
• Patient needs assistance with adaptive equipment or “driving retirement”

Courtesy of Heather Welch, OTD, MS, CDRS
Learning Objectives

1. Recognize risk factors for motor vehicle crashes among older adults
2. Describe an approach to assessing driving ability
3. Provide examples of treatment and interventions for drivers