LOCAL DRIVING RESOURCES IN THE KC METRO

AMBER CONN, DRS, OT- KU DRIVING AND MOBILITY SERVICES- RESEARCH

ANNETTE MAGGARD LEWER, MOT, OTR, CDRS- ABILITY KC- STROKE'S IMPACT ON DRIVING

KRISTIN NICHOLS, OTR/L, SCDCM, CDRS- AVENUES DRIVING REHAB- EVALUATION AND ALTERNATIVE TRANSPORTATION

PRESENTED BY Amber Conn

Evidence-based Research: Stroke & Driving

LARRS
Laboratory for Advanced Rehabilitation Research in Simulation

KU MEDICAL CENTER
The University of Kansas


Where driving assessment processes informs research
…..and research influences clinical driving practice.

Two Examples of Evidence-Based Research

1. Retrospective data analysis of clinical driving assessments.
   Study in progress.

2. Effect of simulator training on driving after stroke:
   a randomized controlled study

   Akinwuntan AE[1], De Weerdt W, Feys H, Pauwels J, Baten G, Arno P, Kiekens C.
   Published in Neurology (2005)

Study question:

What clinical tests can predict driving outcomes?

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Study Outline: Example 1

- First 113 driving assessments at **KU Driving & Mobility services**
  - Range of evidence based tests selected
    - Vision, cognition, physical, driving simulator performance, brake reaction time tests
      - Demographic information & driving history collected
        - Overall driving determination:

          Satisfactory- Borderline- Unsatisfactory
          - Data analyzed in relation to driving performance outcome

List (1) of all test items

Vision

- Distance Acuity
- Depth Perception
- Color: blue/violet &Red/green
- Glare recovery
- Peripheral vision
- Phoria
- Contrast sensitivity

Physical

- ROM
- Strength
- Coordination
- Proprioception
- Rapid Pace Walk

Driving Simulator

- Driving performance assessment
- Brake Reaction test

List (2) of all test items

Cognition

- MMSE
- MoCA
- Rey Osterreith complex copy
- Stroke Driver Screening Assessment
    I. Matrix
    II. Compass
    III. Road Sign Recognition
    IV. Dot cancellation
- Trail Making A & B

- UFOV
    I. Speed of Processing
    II. Divided attention
    III. Selective attention

Demographics & Driving History

Examples

- Traffic violations
- Collisions in last 3 years

Preliminary Outcomes of Study

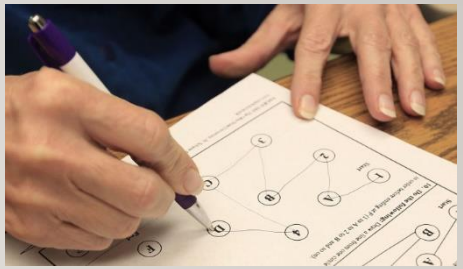
- Dr. Bunmi Morohunfola

- 8 test items have been identified as being predictive of an unsatisfactory driving outcome 93% of the time.
- As a result we have been able to shorten our clinical assessment time from approximately 3 hours to 2 hours.

Effect of simulator training on driving after stroke: a randomized controlled trial

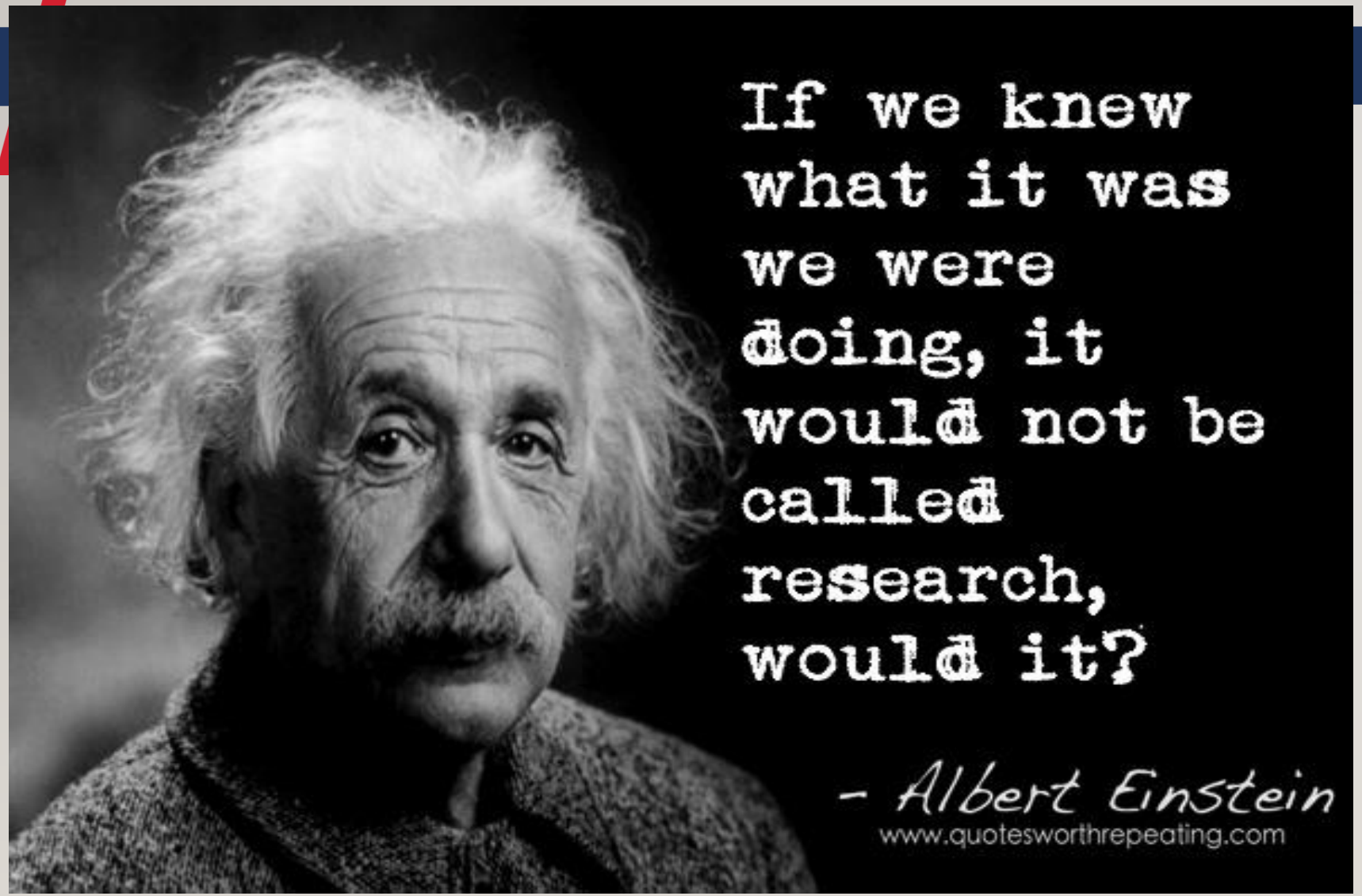
Akinwuntan AE[1], De Weerdt W, Feys H, Pauwels J, Baten G, Arno P, Kiekens C.
Published in Neurology (2005)

- 83 subacute stroke patients
- 5-week 15-hour training program
- Randomly allocated
- Groups: experimental (simulator based training) or control (driving-related cognitive tasks).
- Off-road evaluations & an on-road test were used to assess the driving ability of subjects pre- and post-training.
- 6 - 9 months post-stroke official driving test administered



Effect of simulator training on driving after stroke: a randomized controlled trial

- Both groups significantly improved after training.
- Clinical tests pre- to post-training: no significant differences btn groups in improvements, except "road sign recognition test" in which the experimental subjects improved more.
- Decision "fit to drive," "temporarily unfit to drive," & "unfit to drive": Significant improvements were found with favorable decisions to the experimental group post-training.
- Official driving assessment: Significantly more experimental subjects (73%) than control subjects (42%) passed the follow-up assessment & were legally allowed to resume driving.


If we knew what it was we were doing, it would not be called research, would it?
- Albert Einstein
www.quotesworthrepeating.com

DRIVING TASK

- Driving Safely Requires:
- Planning
- Concentration
- Inhibition of distractors
- Anticipation
- Problem-solving abilities
- Ability to interpret complex and changing stimuli
- Prompt, effective, and calm motor responses

(Tamietto et al 2006)

IT TAKES ALL YOU'VE GOT

"ALL YOU'VE GOT" CAN BE DIFFERENT AFTER A STROKE

For many people post stroke there may be more than one barrier to getting back to driving.

- Physical limitations, paralysis or increased tone
- Visual disturbances, binocular vision issues
- Cognitive status, alertness, multitasking
- Physical and mental fatigue
- Emotional state, ability to handle unexpected situations

LEFT BRAIN CVA
COMMON IMPAIRMENTS

- Right Hemiparesis
- Visual Problems (field deficits, diplopia, abnormal eye movement, visual perceptual issues)
- Slow, cautious behavioral style
- Memory loss
- Attention problems
- Speech/language problems
- Emotional lability

RIGHT BRAIN CVA COMMON IMPAIRMENTS

- Left Hemiparesis
- Visual Problems (field deficits, diplopia, abnormal eye movement, visual perceptual issues, left neglect)
- Quick, inquisitive behavioral style
- Memory loss
- Attention problems
- Impulse control problems
- Emotional lability

DRIVING IMPACTS OF DEFICITS IN MOTOR SKILLS

- Difficulty feeling pedals or maintaining consistent pressure, making accelerating and braking difficult
- Problems keeping a firm grip on the wheel
- Difficulty controlling the wheel with the impaired side
- Difficulty turning the steering wheel or checking blind spots
- Difficulty putting on seat belt
- Difficulty telling where hands and feet are positioned
- Difficulty entering vehicle or loading mobility device.

ADAPTIVE EQUIPMENT CONSIDERATIONS FOR LEFT HEMIPLEGIA

- RIGHT SPINNER KNOB
- TURN SIGNAL MODIFICATIONS
- WINDSHIELD WIPER MODIFICATIONS

- Parking brake modifications if located on the floor
- Seat belt modifications for reaching over left shoulder
- Cruise control modifications

ADAPTIVE EQUIPMENT CONSIDERATIONS FOR RIGHT HEMIPLEGIA

- LEFT FOOT ACCELERATOR
- LEFT SPINNER KNOB
- IGNITION MODIFICATIONS
- CRUISE CONTROL MODIFICATIONS

- Windshield wiper modifications
- Gear shift modifications
- Seatbelt modifications
- May need to carry a communication card if language skills are affected

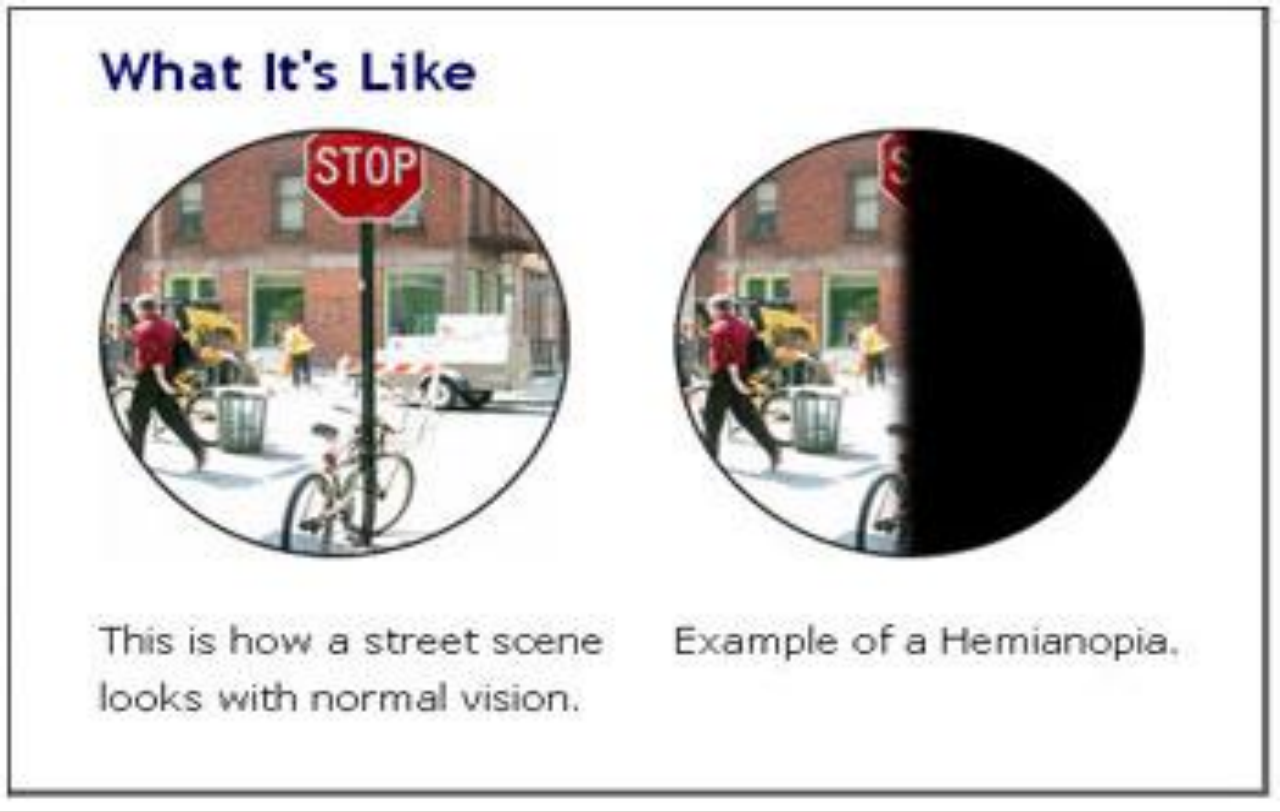
ADAPTED MIRRORS

DRIVING IMPACTS OF DEFICITS IN VISION

- Difficulty distinguishing roadway features, including signs, signals and road markings
- Difficulty recovering from headlight's glare or sun glare
- Difficulty seeing other vehicles, cyclists and pedestrians in front of, on the side of or behind the vehicle
- Difficulty accurately judging distance and speed of traffic
- Difficulty recognizing objects in low light conditions i.e. dawn, dusk, rain, haze, fog and snow
- As many as two-thirds of stroke victims experience vision impairments as a result of a stroke. This can include vision loss, blurred vision, and visual processing problems. Stroke survivors with vision problems should not drive until their problems are resolved and they have been cleared by a doctor.

HEMIANOPSIA-VISUAL FIELD LOSS

- Difficulty detecting pedestrians/unexpected situations on the deficit side
- May show bias in lane position favoring the side with residual vision
- Complicated if also has neglect

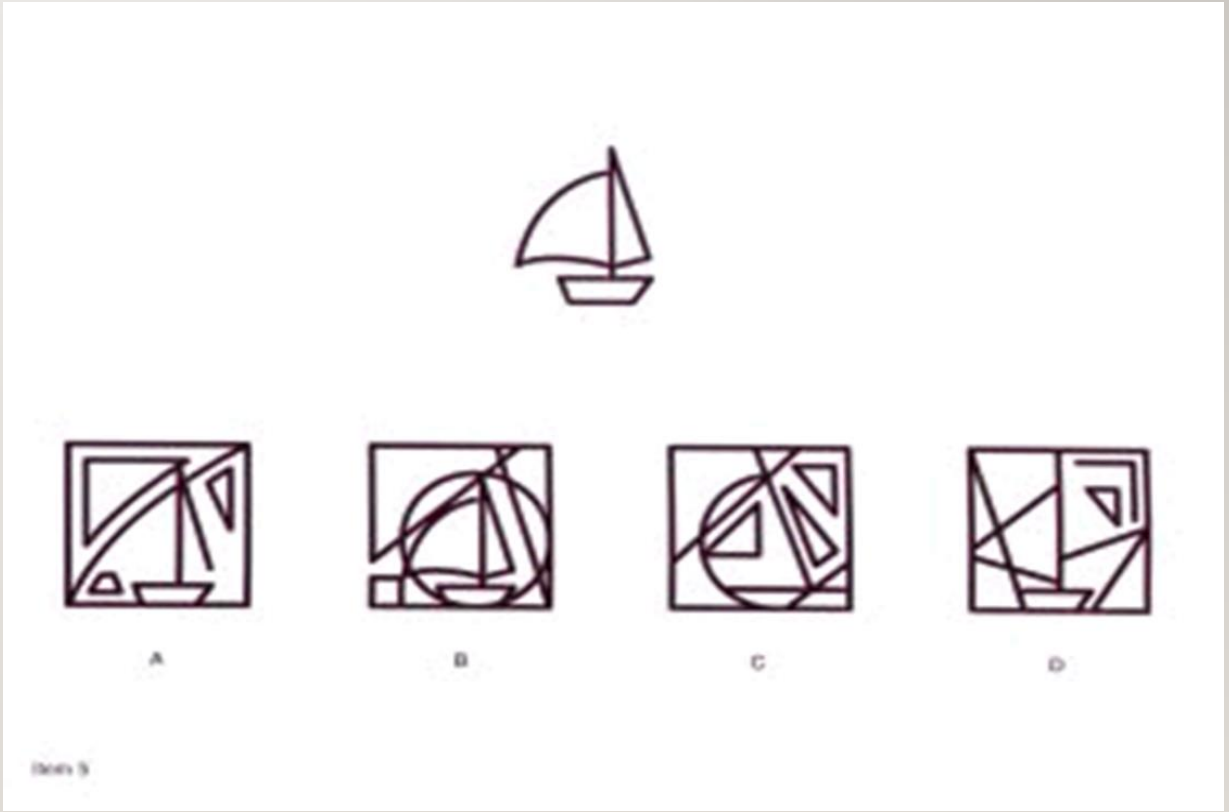


UNILATERAL SPATIAL INATTENTION

- When certain portions of the brain are damaged, the person may fail to appreciate space to one side, which is usually to the left.
- Unlike visual field loss, this problem is not a physical loss of sensation, but rather a loss of attention to the area.
- Both neglect and field loss may occur together.

VISUAL PERCEPTION: FIGURE GROUND

- the ability to detect an object relative to its background



EXAMPLES OF FIGURE GROUND

DRIVING IMPACTS OF DEFICITS IN COGNITION

- Difficulty judging the speed of oncoming vehicles
- Distraction or disorientation while driving
- Forgetting how to operate the vehicle
- Problems operating the controls while watching the road
- Forgetting destination and/or how to get there
- Difficulty recognizing changes in traffic conditions
- Slower response time to signs, signals and roadway markings

WARNING SIGNS

- Driving faster or slower than the posted speed or the wrong speed for the current driving conditions
- Consistently asking for instruction and help from passengers
- Ignoring posted signs or signals
- Making slow or poor decisions
- Becoming easily frustrated or confused
- Getting lost in familiar areas
- Being in an accident or having close calls
- Drifting into other lanes
- **When there are warning signs or there is a need for adaptive equipment, a referral for a driving rehabilitation evaluation is recommended.**

PRIOR TO DRIVING

- Encourage a recent eye exam, especially if vision was impacted by the injury
- Try to have pertinent medical records sent to the evaluator, so that they may capture the big picture
- Emphasize that return to driving is near the end of the rehab process, it does not usually happen quickly
- Encourage them to review rules of the road, even if they are experienced drivers
- Receptiveness to feedback is key to success, lack of insight or defensiveness may affect their outcome

GOALS FOR DRIVING EVALUATION PROCESS

- Comprehensive examination of skills necessary for fitness to drive
- Assist physicians in making recommendations about returning to driving
- Assist the State Driver's Licensing Bureau in handling individual cases
- Assist in determining recommendations to keep the individual as independent as possible for as long as they are fit to drive

CLINICAL EVALUATION

- **Interview**- Goal to gain rapport, reduce anxiety, get medical and driving history and establish goals
- **Consent Form-** Understanding of liability insurance, consent for treatment and consent for reporting concerns to the State's DMV
- **Vision**- Looking at state requirements including acuity and peripheral vision, as well as contrast sensitivity, phoria, depth perception, color perception, sign recognition
- **Visual Perception-** Evaluating how the brain interprets what it sees, processing speeds and ability to shift attention/recall directions with multiple sections
- **Cognition**- Processing speed, memory, attention, problem solving/judgment and LTM/STM
- **Motor Skills-** AROM, brake reaction testing, oculomotor skills, sensation, strength

BEHIND THE WHEEL EVALUATION

- Done in a car with an instructor brake
- Parking lot for basic foundational skills
- Low Traffic Residential Area
- Light commercial, 30-35 mph zones
- Moderate to Heavy commercial, 40-45 mph zones
- Highway/Interstate

DRIVING SIMULATOR

- RESPONSE TO HAZARDS (CHILDREN) ENTERING ROADWAY (LEFT/RIGHT)
- LANE POSITIONING
- SPEED CONTROL
- STEERING/BRAKE HANDLING
- LANE CHANGES/ MERGING LANE
- ROAD RULES KNOWLEDGE
- USE OF SIDE MIRRORS/INDICATORS
- BRAKE REACTION TIME
- TRIALING HAND CONTROLS/SPINNER KNOB
- DE-SENSITIZATION EXPOSURE FOR ROAD TRAUMA

Lane change

ASSESS THE OCCURRENCE OF CRITICAL ERRORS

- Doesn't observe stop signs or signals
- Drifting into another lane
- Near collision with another vehicle, requiring evaluator intervention
- Misjudging spacing while completing an unprotected left turn
- Not yielding right of way to other traffic
- Stopping for no reason
- Having difficulty moving feet between the gas and the brake or confusing the two pedals

ASSESS THE OCCURRENCE OF SMALLER ERRORS

- Repeatedly not signaling for turns or lane changes
- Drifting within the lane
- Noticing stop signs or signal color at the last minute
- Following too closely to other vehicles
- Driving at speeds that are inconsistent with posted speed limits
- Difficulty turning to check over shoulder for blind spots
- Difficulty navigating turns
- Parking inappropriately

RECOMMENDATIONS

- Resume driving without restrictions
- Resume driving with restrictions, i.e. daylight only, radius restriction, no highway/interstate
- Driver training
- Not appropriate for driving at this time, but may be referred back to program after more therapy or time has elapsed to improve condition
- Driving cessation

KANSAS AND MISSOURI DRIVING REGULATIONS

- No mandatory reporting laws

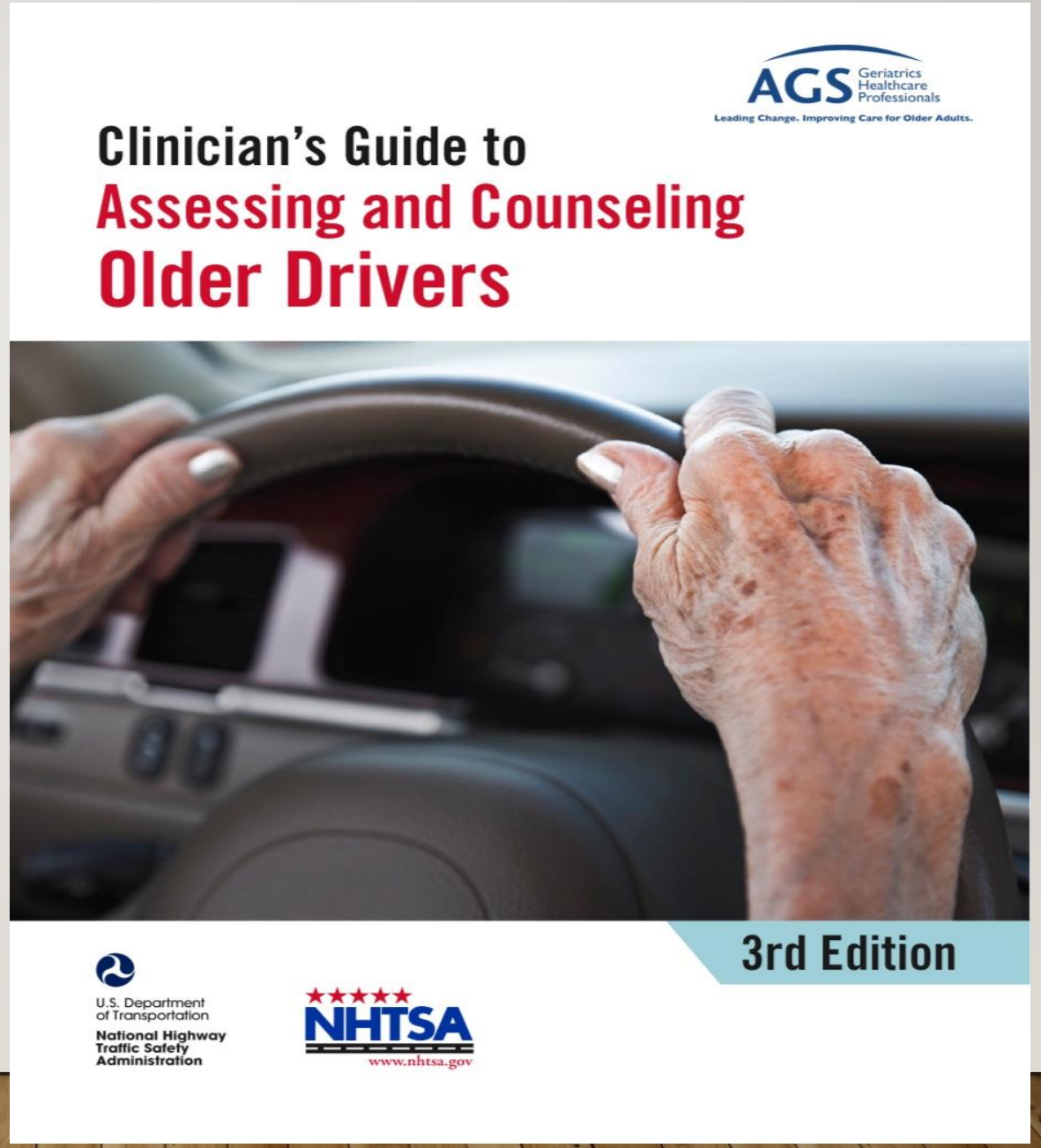
- Anyone can report someone in "in good faith" to the Vehicle Director's Office with concerns about an impaired driver.

- MO- there is a form, Driver Condition Report- Form 4319
- dor.mo.gov/forms/4319.pdf
- KS- there is a form, Letter of Concern
- www.ksrevenue.org/pdf/DriverEvalRequest.pdf
- Anonymous and protected in both states.
    - In KS, COMAR Regulation 8-255c protect healthcare providers

www.nhtsa.gov

313 page document on-line, PDF

Third Edition, 2016



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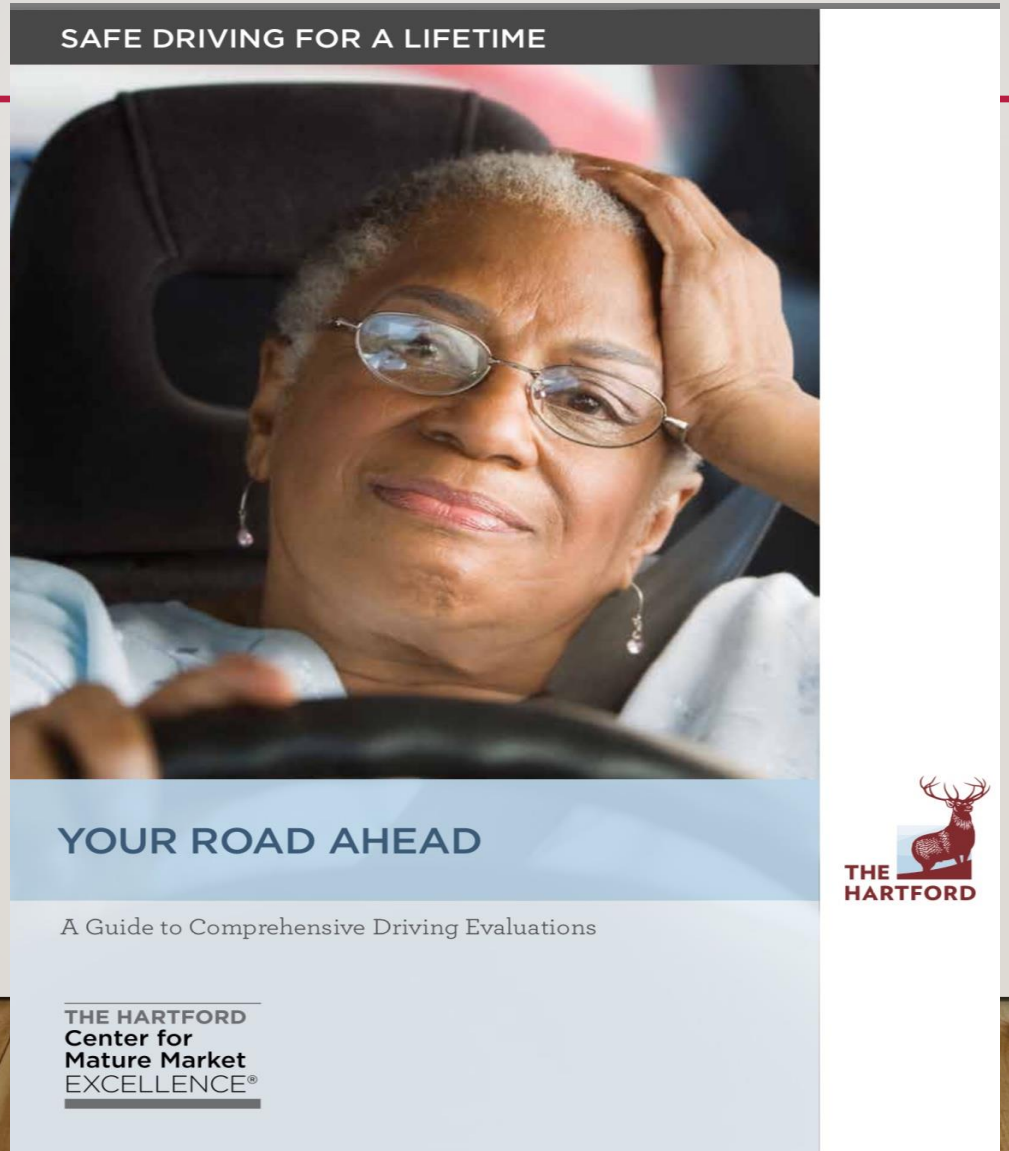
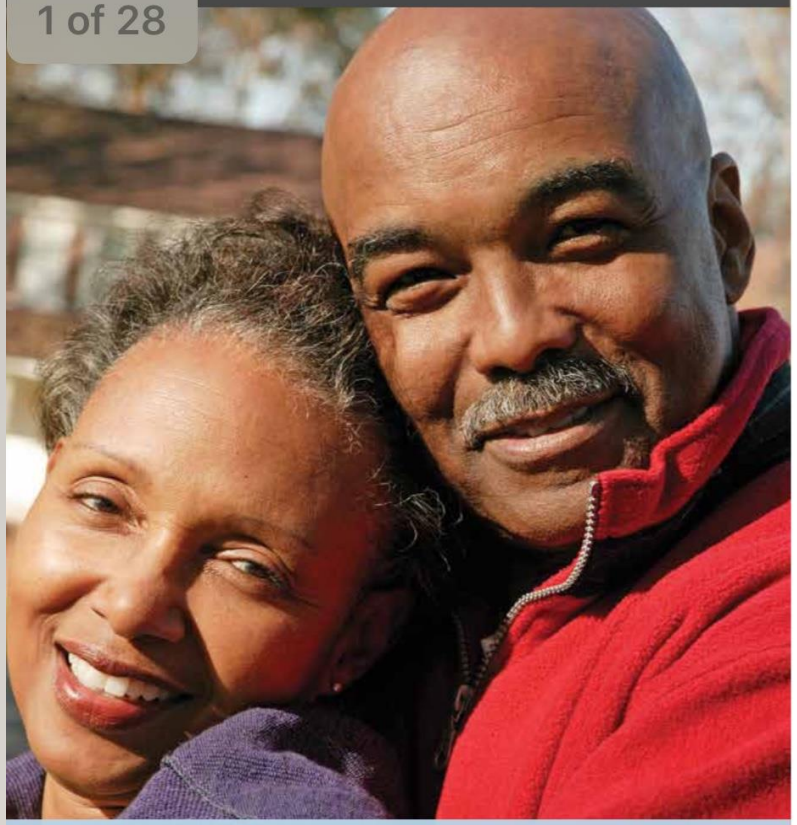


SAFE DRIVING FOR A LIFETIME



AT THE CROSSROADS

Family Conversations About Alzheimer's Disease, Dementia & Driving

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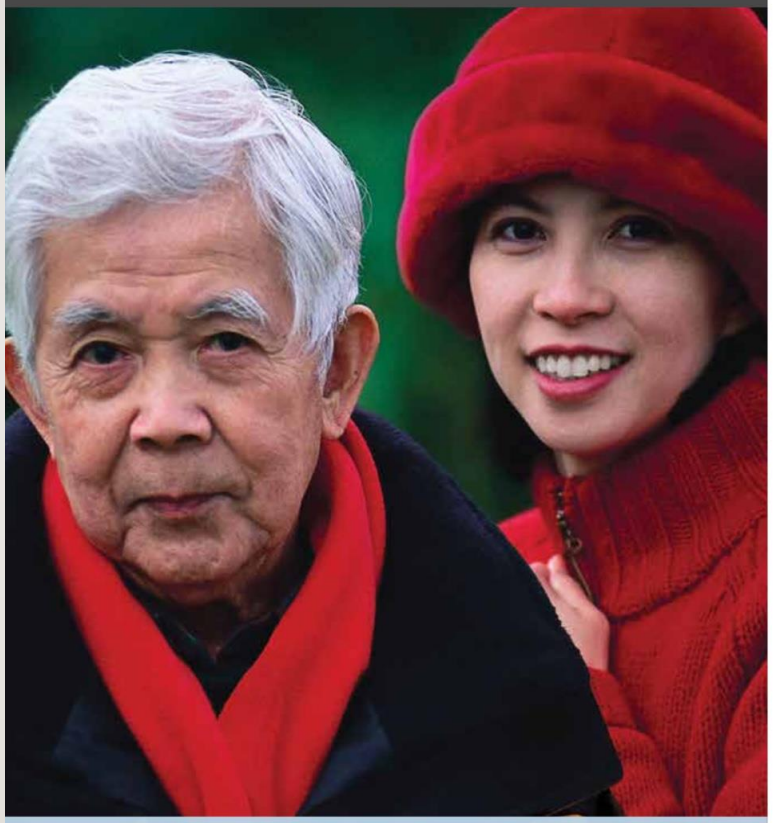
SAFE DRIVING FOR A LIFETIME



WE NEED TO TALK ...

Family Conversations with Older Drivers

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ALTERNATIVE TRANSPORTATION OPTIONS

- www.gogograndparent.com or 855-464-6872 website that is set up to assist seniors without smart phones to set up custom rides, or scheduled rides. This is a partnership with Lyft and Uber
- www.linkforcare.org website that is a wide ranging and in-depth directory of services for seniors and adults with disabilities in the Kansas City Metro area.
- www.ridesinsight.org 1-855-607-4337 Rides in Sight is a non-profit service that works to find local rides to fit needs

RESOURCES

- Tamietto, M., Torrini, G., Adenzato, M., Pietrapiana, P., Rago, R., & Perino, C. To drive or not to drive after TBI? A review of the literature and its implications for rehabilitation and future research. NeuroRehabilita1on 2006; 21:81-92.