


**Department of
Rehabilitation Science
and Technology**

**Continuing
Education**


School of Health and
Rehabilitation Sciences
University of Pittsburgh



Driving Rehabilitation

VA-PRAT 11th Virtual Grand Rounds

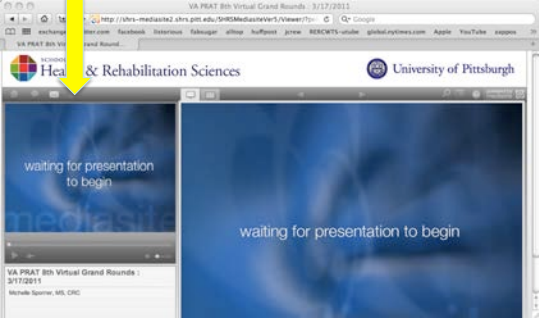
Presenter:
Amy Lane
December 16, 2011


University of Pittsburgh
Department of Rehabilitation Science and Technology


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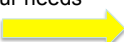
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The Driving Facts

- Driving is an Instrumental Activity of Daily Living-a cornerstone for independence in our society
- Rite of passage, symbol of autonomy and independence
- After injury or illness, safe community mobility/ driving skills can be impaired
- Lack of ability to safely move in the community can lead to isolation, depression*, loss of function

*Fonda SJ, Wallace RB, Herzog AR. Changes in driving patterns and worsening depressive symptoms among older adults. J Gerontol B Psych Sci soc Sci. 2001 Nov; 56(6): S343-51.

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Medical conditions and age related changes can affect driver competence



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Older Drivers: What's the Concern?



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Older Drivers: What's the Concern?

- In 2007, 31 million licensed drivers ages 65+ in the United States-19% increase from 1997.
- Rely on automobile transportation while living in suburban or rural communities-outside public transportation systems.

*National Highway Transportation Safety Administration. Traffic Safety Facts 2006, and 2008.

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Older Drivers: What's the Concern?

- Older drivers are safe drivers and self-regulate their driving
- Not all older drivers know when to restrict or cease driving (self reporting not reliable)

*National Highway Transportation Safety Administration. Traffic Safety Facts 2002, 2006, and 2008.

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Driving and Alzheimer's/Dementia

- **Warning signs**
 - **Driving too slowly, doesn't observe signs or signals**
 - **Difficulty interpreting traffic situations and predicting changes**
 - **Failure to yield**
 - **Easily frustrated or confused, frequently gets lost**
 - **Needs instructions from passengers**

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Brain Injury and Driving

- **Physical, cognitive and emotional changes post injury are multi-faceted and complex**
 - Speed too fast or too slow
 - Relies on prompts, instruction from others
 - Loses attention, lacks vigilance
 - Doesn't observe signs, signals, speed limit
 - Easily frustrated, confused
 - Near misses, collisions
 - Blames others, lacks insight into errors/deficits

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Brain Injury and Driving

- Restriction of driving remains a greater concern for clients than any other functional limitation¹
- Independent community mobility after discharge correlated with overall life satisfaction²

¹C. Hopewell, Driving assessment issues for practicing clinicians, J Head Trauma Rehab 17 (2002), 48-61

²M. Johnston, Y. Goverover, m. Dijkers, Community activities and individual's satisfaction with them: Quality of life in the first year after traumatic brain injury, Arch Phys Med Rehabil 86 (2005), 735-745



Brain Injury and Driving

- Nearly half will resume driving, 66% without any formal medical, legal or driving evaluation.*
- All rehabilitation practitioners should consider driving as an important part of the rehabilitation continuum

*M. Tamietto, et. AL., To drive or not to drive (after TBI)? A review of the literature and its implications for rehabilitation and future research, NeuroRehabil 21 (2006), 81-92



Spinal Cord Injury and Driving

- Proper evaluation and training by Driving Rehabilitation Specialist
- Consideration of functional skills, transfer ability, vehicle and adaptive equipment needs
- Adaptive equipment should be trialed prior to prescribing or purchasing

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Peripheral Neuropathy and Driving

- Loss of sensation and mobility can impact driving performance
 - Steering
 - Pedal controls
- Use of adaptive equipment compensates for loss of sensory-motor control

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How do we assess driver capability?



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Driver Capability Assessment

- Physician's office based assessment:
 - -AMA Physician's Guide to Assessing and Counseling Older Drivers
 - Available free at:
www.ama-assn.org/go/olderdrivers
www.nhtsa.gov

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Driver Capability Assessment

- Physician's office based-AMA Physician's Guide to assessing and Counseling Older Drivers
- Driving Simulators
- Family and caregiver report

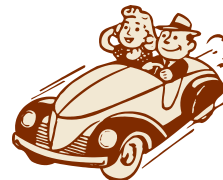
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Family and Caregiver Report, Warning Signs

- Complaints of difficulty seeing at night
- More frequent dents/scratches on vehicle
- More frequent minor accidents
- Traveling much slower than the common flow of traffic
- Tendency to stay in the right lane, avoiding changing lanes
- Gets lost



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Driver Capability Assessment

- Physician's office based-AMA Physician's Guide to assessing and Counseling Older Drivers
- Driving Simulators
- Family and caregiver report
- Self assessment
- Driver's License Bureau/Department of Motor Vehicles (DMV)

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Medical Guidelines for Department of Motor Vehicles*

- DMVs are tasked with determining whether or not individuals are functionally able to drive safely.
- Balancing public safety and individual driving privileges is challenging

*National Highway Transportation Safety Administration. Driver Fitness Medical Guidelines, September 2009.

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Medical Recommendations for Department of Motor Vehicles*

- Vision
- Physical Limitations
- Diabetes
- Seizures
- Sleep Disorders

*National Highway Transportation Safety Administration. Driver Fitness Medical Guidelines, September 2009.



Driver Capability Assessment

- Physician's office based-AMA Physician's Guide to assessing and Counseling Older Drivers
- Driving Simulators
- Family and caregiver report
- Self assessment
- Penn DOT Driver's License Bureau
- Referral to Driver Rehabilitation Specialist



Driving Rehabilitation

- A Driver Rehabilitation Specialist “plans, develops, coordinates, and implements driving services for individuals with disabilities”.
- A CDRS obtains certification from the Association for Driver Rehabilitation Specialists (ADED) by fulfilling education and experience qualifications and passing a certification exam.



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What does a
Driving
Rehab
program
do?



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Driving Program Process

- Referral
- Driving and medical history
- Pre-driver's evaluation
- On-road evaluation
- Recommendations



Driving Program Process

- Referral
- General Information
- Driving History





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Clinical Assessment

- Vision Screen
- Visual-Perceptual Assessment
- Cognitive Screen
- Communication and Behavior Observations
- Motor/Mobility Skills (including wheelchair or mobility device)
- Knowledge of Driving

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Pre-Driver's Evaluation

- Vision Screen
 - Vision history
 - Corrective lenses
 - Visual acuity
 - Visual fields
 - Ocular-motor skills



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Pre-Driver's Evaluation

- Visual-Perceptual Assessment
 - MVPT
- Cognition
 - Includes: attention, following directions, awareness of deficits, processing and reaction time, memory
 - Trail making Part A and B

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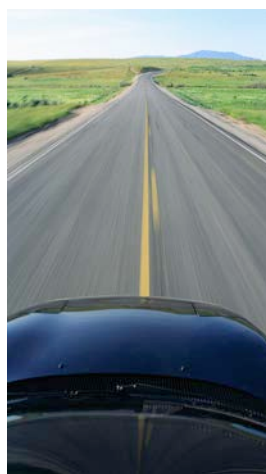
Pre-Driver's Evaluation

- Communication and Behavior
- Knowledge of Driving
- Motor and Mobility Skills



On-The-Road Evaluation

- Optimal method to assess driver capability
- Completed within the context of a real traffic environment.





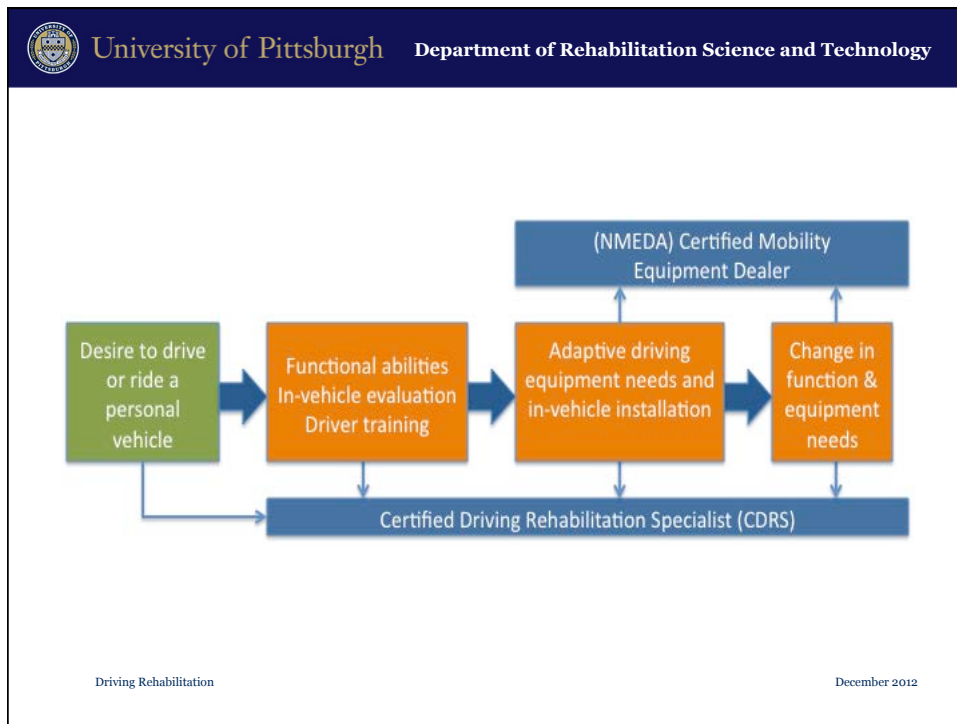
Evaluation Results

- Should not drive, counseling, review options
- Additional training
- Re-evaluation
- May resume driving with restrictions
- No concerns, may resume driving
- State re-test



**What vehicle
modifications
and
technologies
are available?**





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Vehicle Options

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Vehicle Options: Side entry mini-van



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Vehicle Options: Rear entry mini-van



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Vehicle Options: Full size van, side entry lift



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Vehicle Options: Freedom Motors-Honda Element



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Vehicle Options: Freedom Motors PT-Cruiser



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Toyota Scion-Freedom Motors



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Vehicle Options: Goschichi



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Martin Conquest Trike



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How to (not) transport your w/c



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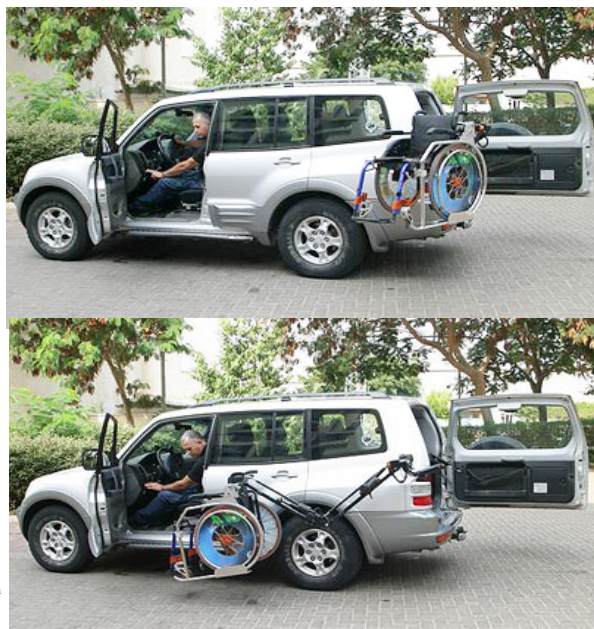
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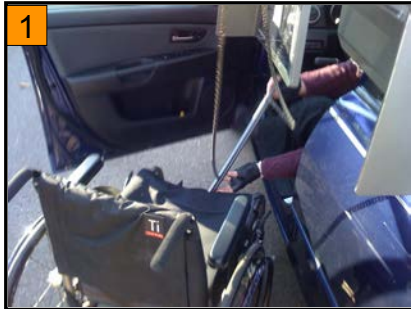
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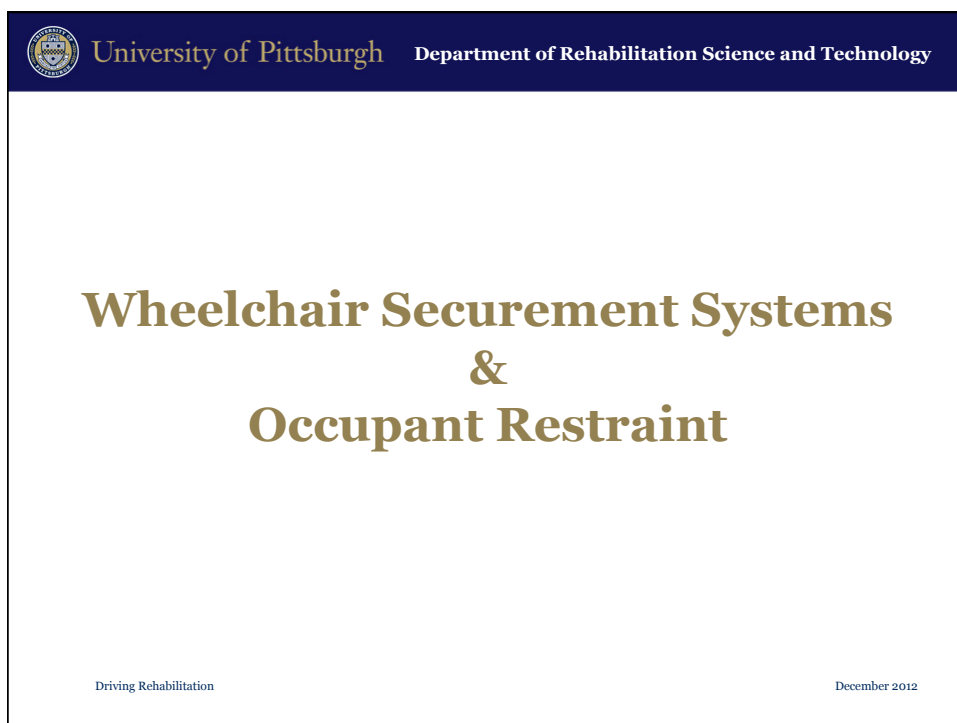
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ATRS-Freedom Sciences



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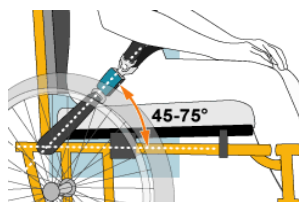
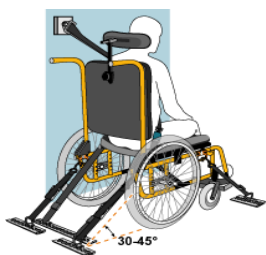
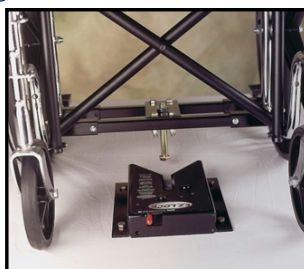


Wheelchair Securement

- 4-point tiedown systems are NOT designed for independent use
- Automated docking systems allow independent securement for wheelchair-seated drivers

- EZ-Lock
- Permoloock
- QLK
- Dock 'N Lock

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Ride-Safe brochures are available from:
University of Michigan
Transportation Research
Institute
umtridocs@umich.edu

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Seating and Seat Base Options

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Adaptive Equipment

- **Primary Controls**-Gas, Brake, Steering
- **Secondary Controls**-Headlights, Turn Signals, Windshield Wiper, Wash/Spray, Horn, etc...

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High-Tech Driving Systems

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Technological Advances

- Intelligent Transportation Systems (transportation infrastructure)
- Advances Driving Systems (automotive industry)



Intelligent Transportation Systems

- Timed traffic signals
- Real time traffic updates
- Interface between vehicle and traffic environment



Advanced Driving Systems

- Command Centers with natural voice recognition systems
- Semi-automated parallel parking
- Autonomous cruise control
- Lane departure warning
- Blind zone assist (lane changes or backing up-cross traffic)
- GPS- learns driver preferences

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Thank You!

Amy Lane, OTR/L CDRS

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