

University of Pittsburgh Department of Rehabilitation Science and Technolog

#### **Objectives**

- Understand the impact of driving and the implications on one's independence in our society
- · Recognize the basic components and different types of driver rehabilitation programs
- · Appreciate the effects of disability, aging, and functional impairments that impact driver capability
- Explore adaptive driving equipment, vehicle modifications, and transportation options



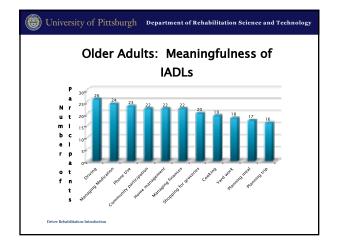
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#### The Driving Facts

- · Driving is an Instrumental Activity of Daily Living-a cornerstone for independence in our society
- Rite of passage, symbol of autonomy and independence
- Car ownership and driving are highly correlated with independence and life satisfaction in older adults  $^{\rm 1}$
- After injury or illness, safe community mobility, and driving skills can be impaired
- · Lack of community mobility/driving can lead to social isolation, and is associated with a variety of health conditions including depression<sup>2</sup>

<sup>1</sup>Choi et al., 2014; Fonda et al., 2001; Marottoli et al., 1997; Ragland et al., 2005 2Ragland D, Satariano W, MacLeod K. Driving cessation and increased depressive symptoms. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences. 2005; 60(3):399-403. Driver Rehabitation Introduction.

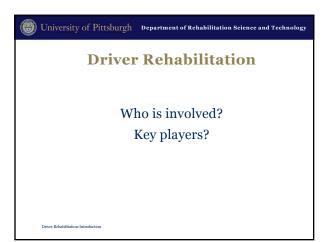


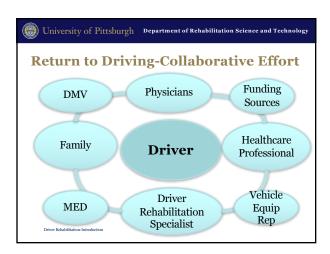


# What is Driver Rehabilitation? Consists of evaluation, training, and vehicle modification recommendations for drivers and passengers with disabilities and age-related impairments as well as counseling and supports in the pursuit of maintaining mobility within the community Best Practice Guidelines for the Delivery of Driver Rehabilitation Services (2016), Association for Driver Rehabilitation Specialists (ADED).



- In the US
  - Department of Veteran Affairs, 1970s
  - Association for Driver Rehabilitation Specialists (ADED), 1977
  - National Mobility Equipment Dealer's Association (NMEDA), 1989
  - American Occupational Therapy Association (AOTA), 2003







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#### **Driver Rehabilitation-DRS**

- Driver Rehabilitation Specialist (DRS)
- Plans, develops, coordinates and implements driver rehabilitation services for individuals with disabilities.
- · Work with people of all ages and abilities.
- · Requires specialized training and education.
- Typically conducts clinical and on-road assessments, equipment or vehicle modification recommendations, and training.



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#### **Driver Rehabilitation-CDRS**

• CDRS-Certified Driver Rehabilitation Specialist. Offered by the Association for Driver Rehabilitation Specialists. www.aded.net



- Certification validates specialist's experience and knowledge in the field of driver rehabilitation.
- Certification maintenance requires criteria specific continuing education.



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How do we assess driver capability?



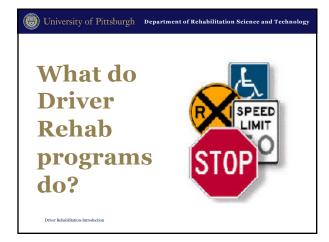
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# **Driver Capability Assessment**

- AMA Physician's Guide to Assessing and Counseling Older Drivers
- Driving Simulators
- Family and caregiver report
- Self assessment
- State Driver's License Bureau (DMV)
- Driver Rehabilitation Programs

Community-Based Education		Medically Based Assessment, Education, & Referral		Specialized Evaluation and Training	
PROGRAM	DRIVER SAFETY PROGRAMS	DRIVING SCHOOL	DRIVER SCREEN	CLINICAL IADL EVALUATION	DRIVER REHABILITATION PROGRAMS (INCLUDES DRIVER EVALUATION)
TYPICAL PROVIDERS AND CREDENTIALS	Program specific credentials (e.g. AASP and AAA Driver Improvement Program)	Licensed Driving Instructor (LDI) certified by state licensing agency or Dept. of Education	Health care professional (e.g., physician, social worker, neuropsychologist)	Occupational Therapy Practitioner (Generalist or Driver Rehabilitation Specialist) Other health professional degree with expertise in Instrumental Activities of Daily Living (IADL).	Oriver Rehabilitation Specialist*, Certified Driver Rehabilitation Specialist*, Occupational Thorapata with Specialty Certification in Driving and Coerrmanity Mobility*.
Required PROVIDER'S KNOWLEDGE	Program specific knowledge. Trained in course content and delivery.	Instructs novice or relocated drivers, excluding medical or aging conditions that might interfere with driving, for purposes of teaching/training/ retheathing/updating driving skills.	Knowledge of relevant medical condition, medical condition, assessment, referral, and/or innervention processes. Understand the limits and value of assessment tools, including simulation, as a measurement of fitness to drive.	Encodings of medical conditions and the implication for community mobility including driving. Assess the cognitive, visual, perceptual, behavioral and physical invisions that may impact driving performance. Encodedge of available services. Understands the limits and value of assessment looks, including anniamon, as a measurement of finess to drive.	Ageins towedge of models canolises with implications to sink online. Because the capital would, presentable Archarises and physical Intentions that may impact dowing professionars.  Septimized control benday with assurance of on mode performance.  Septimized control towers where the decisions about expansion and models on the control towers and congitive medic, was to the decisions about expansion and models on the control towers and congitive and control towers and control towers and and control towers and congressions. The control of the control of controls and confidence of the control of services, horizontal professional controls services, horizontal professional controls services, horizontal professional controls congress reports.
TYPICAL SERVICES PROVIDED	computer based refresher for licensed drivers: review of rules of the road, driving techniques, driving strategies,	3) Enhance driving performance, parformance, 2) Acquire driver, 2) Acquire driver, 5) Councel with family members for 53 Gounted with family members for 53 George driving and/or undergoing and/or undergoing (e.g., licenia (e.g., licenia regular temporary (e.g., licenia regular temporary (e.g., licenia regular temporary (e.g., licenia regular (e.g., licenia reduction course)	with specific conditions (see a, medications, fractures, post-surgers). Investigate advisor, fractures, post-surgers, lovestigate advisor, see a successful with changes in sensory-nested fractions.  3) Determine actions for the strait driver:  - Refer to JALD, re-shaddle, other rehalbelatation of the sensory-nested processing or other conditions of the sensory provide access to counseling and education for attenuative transportation options.  - Section of the sensor of the	Il fabilitat and interpret ricks is sociated with charges in vision, certifician, and discopring rich department of charges in vision, certifician, and discopring rich department of the control of the	Angewise in distinguished is completed or devalation, type of despination, and experted an extraction of the size of elegation of the size of th

PROGRAM TYPE	DRIVER REHABILITATION PROGRAMS Administers comprehensive driving evaluation to determine filtness to drive and/or provides rehabilitative services.				
LEVELS OF PROGRAM AND TYPICAL PROVIDER CREDENTIALS	BASIC Provider is a driver rehabilitation specialist (DRS)* with professional background in occupational therapy, other allied health field, driver education, or a professional team of CDRS or SCDCM with LDI**.	LOW TECH Driver Rehabilitation Specialist*, Certified Driver Rehabilitation Specialist*, Occupational Therapic with Speciality Certification in Driving and Community Mobility*, or in combination with LO. Certification in Driver Rehabilitation is recommended as the provider for comprehensive driving evaluation and training.	HIGH TECH which was believed to be a second of the sea of the sea of the second of t		
PROGRAM SERVICE	Offers comprehensive driving evaluation, training and education. May include use of dagglive driving aids that do not affect operation of primary or secondary controls (e.g. seat cushlers or additional mirrors). May include training paramite framation and optional, costation paramites and optional, costation paramites and optional, costation paramites of the commendations for clients as passengers.	Office competitionally driving auditation, politics and countries, and countries, with the affects of the affec	ones a site a design to experient and entitle approach to experient and entitle approaches a comprehense change qualitation, someony and entitle control and entitle a comprehense a comprehense and controls bear der discrit row of a delib store. And a control and a c		
ACCESS TO DRIVER'S POSITION	Requires independent transfer into OEM* driver's seat in vehicle.	Addresses transfers, seating and position into OEM^ driver's seat. May make recommendations for assistive devices to access driver's seat; improved positioning, wheelchair securement systems, and/or mechanical wheelchair loading devices.	Access to the whole hybridly requires same or this and may require adaptation to CTM drivant, Access to five position may be depended on one of strander seat beau, or determiny erive from their wheelchair. Provider evaluates and recommends whole structural modification to accommodate products such as result, fits, wheelchair and occess healts, transfer sea base wheelchairs suitable to utilize as a driver seat, and/or wheelchair securement systems.		
TYPICAL VEHICLE MODIFICATION: PRIMARY CONTROLS: GAS, BRAKE, STEERING	Uses OEM^ controls.	Primary driving control examples: All mechanical goal / Irvale hand control; Blind from accelerator pedal; C) pedal instemiora; O) park brake lover or electronic park brake; B) stgesting device (spinner knob, tri-pin, C-cuff).	Friency relating control examples (in addition to low tech options): A) powered past Note Integrated with a powered past I traine system; B) power past Note Integrated with a powered past I traine system; C) variable effort senting systems; O variable effort senting systems; Description of demonstrative serving wheel extension, joydisk control, Control, Condition, Conditi		
TYPICAL VEHICLE MODIFICATION: SECONDARY CONTROLS	Uses OEM^ controls.	Secondary driving control examples: A) remote horn butters B) turn signal modification (remote, crossover lever); C) remote wiper controls; O) goze selector modification; E) key/grition adaptations.	Exertronic systems to access secondary and accessory controls.  Secondary driving control examples in addition to leve tech optional;  All remote peans; such asks or wanted arrays that inserface with OEM* electronics;  By wing extension for OEM* electronics;  Output Control of Control		



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# **Driving Program Process**

- Referral, intake, driving and medical history
- Clinical assessment
- On-road assessment
- Training-when indicated
- Vehicle and equipment assessment
- Recommendations

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#### The Clinical Interview

- Demographics
- Medical History
- Medications
- Seizure History
- Substance Use/Abuse



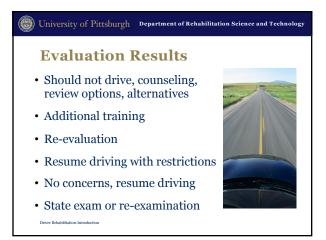


- Visual-Perceptual Assessment
- Cognition
- · Communication and Behavior
- Motor/Mobility Skills (including wheelchair or mobility device)
- · Knowledge of Driving











### **Department of Transportation Bureau of Driver's Licensing**

- License Requirements
- · Medical Reporting
- Medical Restrictions





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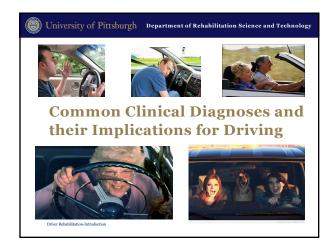
#### **Medical Restrictions**

- Physical and Mental Criteria
- Vision Standards
- Seizure Restrictions



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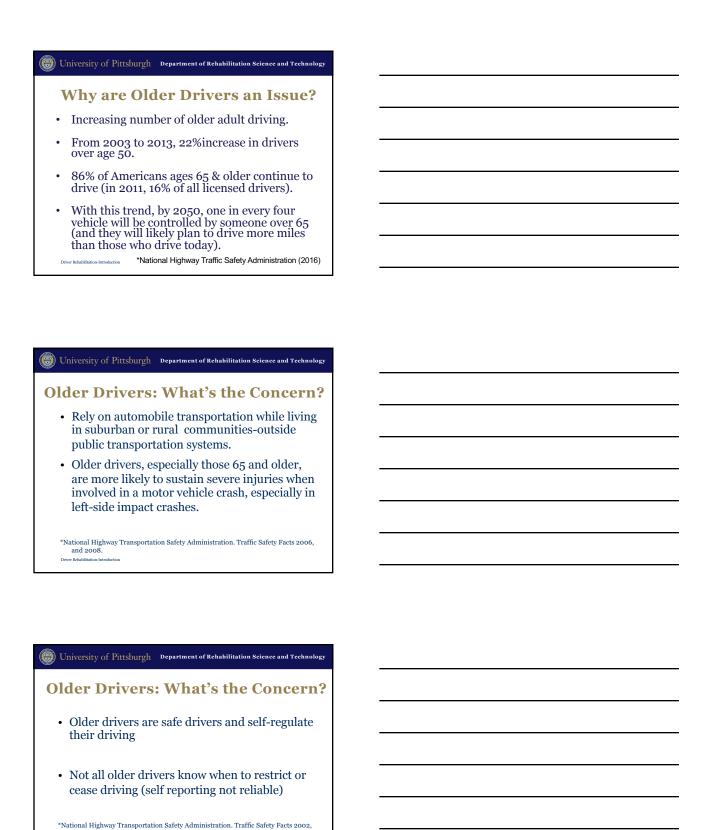
Driving is a highly complex and demanding task. Medical conditions and age related changes, either physical, visual or cognitive, can affect driving ability.





- Neurological Conditions
- Orthopedic Conditions
- Congenital/Developmental
- Chronic Health Issues
- Other



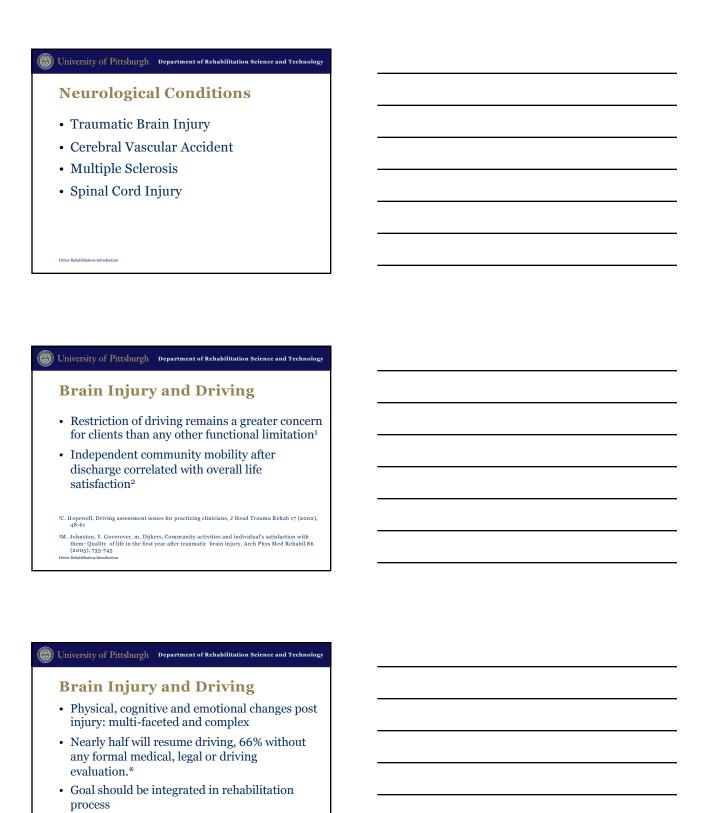


Older Driver	
Age related changes	
– Vision, Cognition, Physical	
Chronic medical conditions	
– Diabetes, Arthritis	
Progressive neurological disease	
– Dementia, Parkinson's	
	-
Medications	
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University of Pittsburgh Department of Rehabilitation Science and Technology  Older Adult-Cognitive Decline	
University of Pittsburgh Department of Rehabilitation Science and Technology  Dider Adult-Cognitive Decline  Driving too slowly, doesn't observe signs or signals	
University of Pittsburgh Department of Rehabilitation Science and Technology  Older Adult-Cognitive Decline  Driving too slowly, doesn't observe signs or signals  Difficulty interpreting traffic situations and predicting changes  Failure to yield	
University of Pittsburgh Department of Rehabilitation Science and Technology  Older Adult-Cognitive Decline  Driving too slowly, doesn't observe signs or signals  Difficulty interpreting traffic situations and predicting changes  Failure to yield	
<ul> <li>Difficulty interpreting traffic situations and predicting changes</li> <li>Failure to yield</li> <li>Easily frustrated or confused, frequently gets</li> </ul>	
University of Pittsburgh Department of Rehabilitation Science and Technology  Older Adult-Cognitive Decline  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	



# **Older Adult-Vision Decline**

- · Unable to read road sign or markings
- Difficulty in seeing things in the environment, especially on gray/overcast days-poor light conditions.
- Difficulty when light changes from light to dark (for example travel through tunnels)
- · Avoid driving at night
- Poor estimation of space and time when making turns at intersections
- · Lane maintenance issues-shifts



\*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 Drive Rehabilitation-Introduction



# **Brain Injury and Driving Assessment & Training Considerations**

- Various situations
- · Impulsive behaviors
- Topographical orientation
- Fatigue
- Insight
- Attention and distractibility

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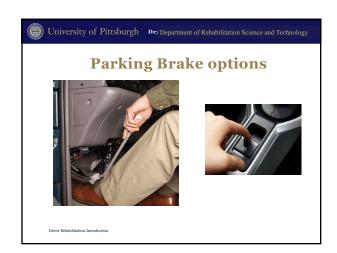
# **CVA and Driving**

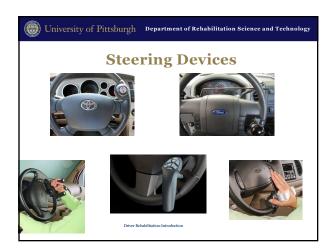
Clinical presentation is varied and complex

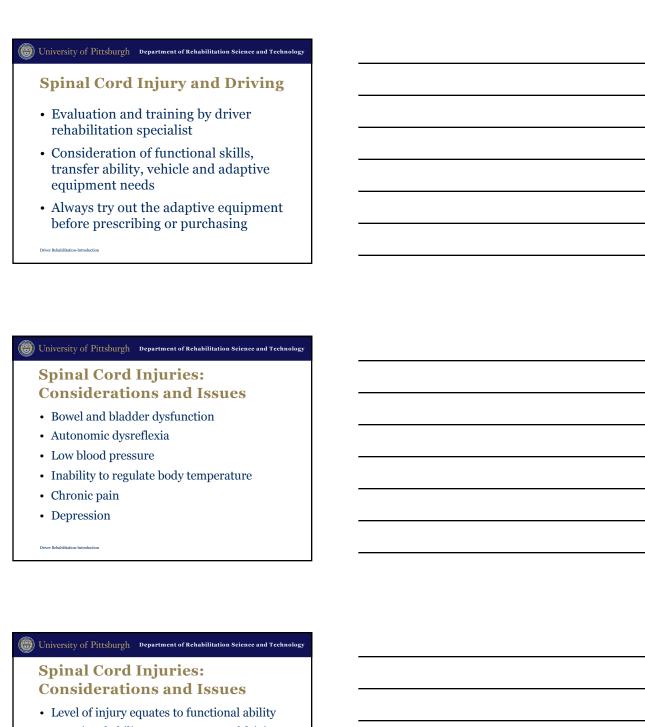
- Vision: Hemianopia, neglect
- Hemiparesis, functional use of extremities
- Balance and mobility: ambulation, transfers
- Cognition: attention, impulsive behavior, memory, executive skills
- · Communication: aphasia, dysarthria



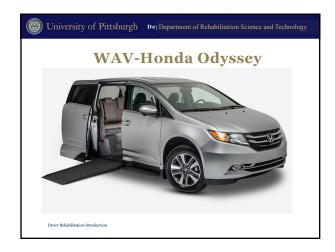


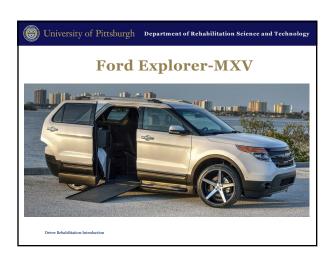


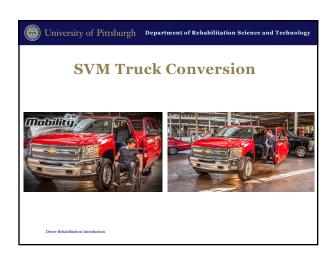




• Functional ability equates to type of driving equipment and vehicle modifications



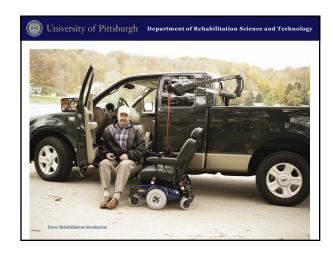




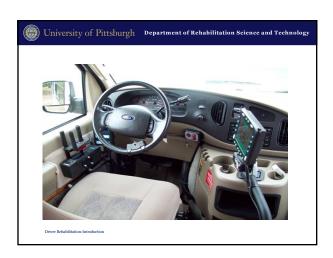














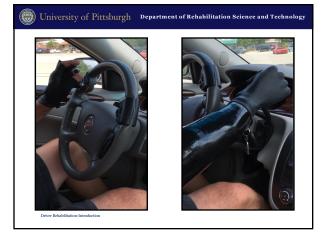
# **Orthopedic Conditions**

- Amputation
- Arthritis
- · Neck pain
- · Low back pain

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- What is cause of the amputation? And what is the functional loss?
- Secondary issues (diabetes, vision, sensory changes/phantom pain)
- Ambulation/transfer issues (LE)
- Loss of coordination/functional skills (UE)
- Depression







- Pain, fatigue
- Loss of range, strength
- Transfers/mobility
- Equipment is dependent on the severity of the symptoms and its impact on driving





Congenital/Developmental

Cerebral Palsy
Spina Bifida
Dwarfism
Learning Disability
Autism Spectrum

• ADHD, PDD-NS







#### **Chronic Health Conditions**

- Cardiovascular issues
- Diabetes
- Sleep apnea
- Chronic vision disorders

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