Older Driver Safety and Mobility: Research Interests and Initiatives

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University Approach to Maintaining Safe Senior Mobility

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UMTRI Background
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- Institute founded as Highway Safety Research Center in 1965
- Committed to interdisciplinary transportation-related research to increase driving safety and further transportation-systems knowledge
- Annual operating budget of about $17 million
- Funding from federal and state government agencies, motor vehicle manufacturers and suppliers, other organizations
Social and Behavioral Analysis Division

- Conducts research that enhances safety and efficiency of transportation by advancing expert and public understanding of social and behavioral issues important to transportation.
Promising Approaches

- Sponsored by AARP
- Builds on 2 complementary but interdependent goals for older adults
  - To help those who are able to drive safely continue to do so
  - To identify community mobility support for those who are unable or choose not to drive
Promising Approaches

- Update of 2003 guide Promising Approaches for Enhancing Elderly Mobility
- Original guide sponsored by Michigan Office of Highway Safety Planning
- Reprinted by AARP
Promising Approaches

- Driver Screening and Assessment
- Education and Training
- Vehicle Design and Advanced Technology
- Roadway Design
- Transitioning from Driving to Non-Driving
- Transportation Coordination
- Alternative Transportation Options
Promising Approaches

- Based on literature review/expert opinion
- Focus on US but other jurisdictions included
- Programs selection based on:
  - Available evaluation results
  - Incorporation of components important to promoting community mobility
Promising Approaches

- General background information
- Important components of a promising approach
- Especially promising programs/initiatives
- Full listing of promising programs with contact information
SAFER Driving: The Enhanced Driving Decisions Workbook

- Sponsored by NHTSA and UMTRI
- Web-based self-screening instrument for older adults with customized feedback
- Intended to simplify self-screening by focusing on health concerns common to various medical conditions and medications that directly affect critical driving skills
SAFER Driving

- Builds on the Driving Decisions Workbook (DDW), a paper and pencil instrument developed by UMTRI
- DDW sponsored by GM/USDOT
- DDW research published in 2003 (J Saf Res, 34, 371-381)
- DDW available in electronic format through U-M and other websites
SAFER Driving Development

- Review of literature and discussion with experts to identify common health concerns and critical driving skills
- Expert meeting to discuss linkages between health concerns and driving tasks at various levels of impairment
- Development of user-friendly web-based self-screening instrument with focus group input
SAFER Driving Development

- 27 common health concerns identified:
  - 13 cognitive; 7 motor; 7 visual
- 15 critical driving tasks identified
- Health concerns linked to driving tasks at low, medium, and high levels of impairment, depending on concern

<table>
<thead>
<tr>
<th>Health Concern</th>
<th>Level of Severity At Which Critical Driving Skill is Affected</th>
<th>Critical Driving Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>27 concerns</td>
<td>4 levels (none, low, med, high)</td>
<td>15 skills</td>
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</table>
Pre-Trip Planning

Effect at Low Level of Impairment
- Anxiety
- Confusion
- Visuospatial Deficits

Effect at Medium Level of Impairment
- Depression
- Endurance
- Forgetfulness
- Impulsivity/Emotionality
- Slowed Information Processing
- Cognitive Rigidity

Effect at High Level of Impairment
- Divided Attention Deficits
- Pain
- Impaired Judgment
SAFER Driving Feedback

- After completing self-screening instrument (3-5 questions for each health concern), individualized feedback is provided:
  - List of health concerns user may be experiencing with description and implications for safe driving
  - List of critical driving skills that may be affected
  - Recommendations in three areas:
    - See a professional for specialized assessment
    - Modify vehicle
    - Safe driving tips
  - General question and answer section
SAFER Driving Validation/Evaluation Study

- 68 licensed drivers recruited from patient pool referred to UM Drive-Ability Program and postings for volunteers
- Study administered at UM Drive-Ability Program by OT/certified driving rehabilitation specialist
- Participants completed web-based self-screening instrument and follow-up questionnaire
- Participants completed comprehensive driving assessment (clinical and on-road)
- Self-screening results compared to clinical evaluation and on-road assessment results
SAFER Driving Validation/Evaluation Study

- Positive feedback from study participants
  - 76% - made them more aware of changes affecting driving
  - 38% - discovered changes they had not been aware of before
  - 42% - planned to make changes in the way they drive
  - 11% - planned to consider modifying their vehicle
  - 33% - thinking about taking a driver refresher course
  - 36% - more likely to discuss health concerns with doctor
  - 92% - would recommend to older adult friends/family
  - 94% - would help older adults talk with family members

- Correlations between self-screening instrument and clinical and on-road evaluations
Early-Stage Dementia and Driving

- Two projects underway (Alzheimer’s Association – 2009 completion; NHTSA – 2008 completion)
- Collaborative effort between UMTRI (lead), University of Massachusetts, and University of Houston
- Instrumentation of vehicles of drivers with dementia to obtain objective measures of driving performance
Early-Stage Dementia and Driving

Background

- Research has yet to determine the level of cognitive impairment associated with an unacceptable driving risk
- Professionals are often asked to provide guidance about driving for those with dementia
  - Professionals, family members and the drivers themselves may be unaware of the extent of declines in driving skills
- It is unclear how real-world driving performance changes with the progression of dementia
Early-Stage Dementia and Driving Background

- Recent advances in technology make it possible to automatically collect detailed information about driving performance in a person’s own vehicle.
- Allows for the analysis of objective driving performance data in a naturalistic setting.
Early-Stage Dementia and Driving Project Aims

- Demonstrate the feasibility of using in-vehicle data collection to monitor driving actions of individuals with early stage dementia
- Compare multiple forms of assessment of driving skills with naturalistic driving
- Bring greater visibility to deficits in driving performance unique to people with early stage dementia
Early-Stage Dementia and Driving Project Aims

- Increase understanding of behaviors and issues of drivers with dementia and their families
- Inform decision-makers about appropriate intervals for assessing driving competency
Early-Stage Dementia and Driving
Critical Driving Skills

Addressing:
- Way finding
- Seat belt use
- Distance (headway) to vehicle ahead
- Appropriate speeds & stopping
- Excessive lane wandering
- Lane change
- Interaction with traffic control devices
- Left turns – gaps rejected
- Signaling (selected)
- Gear & pedal misuse
- Impacts & bumps
- Co-pilots & navigation aids

Not Addressing Directly:
- Pre-trip decisions & plans
- Alcohol use
- Headlight use
- Backing maneuvers
- Steering – fine control
- Lane-keeping except as noted
- Passing on 2 lanes roads
- Left turns – gaps accepted
- Accommodating pedestrians & pedacyclists