Longitudinal Research on Aging Drivers (LongROAD) Study: Project Overview

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Population Aging Globally

- US and world’s populations are older now than at any time in history
- Projections from the United Nations (2009) show:
  - Globally, proportion of people age 60 and older was 8% in 1950, 11% in 2009, expected to reach 22% in 2050
  - These proportions are even greater for more developed countries where by 2050 one-third of each country’s population is expected to be age 60 or older
Driving Likely to Remain Primary Mode of Travel for Older Adults

- Older adults prefer to maintain mobility through the use of a personal vehicle
  - Will likely be the case for next generation of older drivers
- Most older adults currently travel by car either as a driver or passenger
  - Recent Michigan study* found that 99% of older adults most often rely on driving or riding as a passenger to get around

* Eby, et al., 2011
Functiona l Declines in Older Adults

- As people age they are more likely to have medical conditions (and take medications) that can compromise driving safety.
- Three general classes of abilities that decline:
  - Psychomotor (movement)
  - Perceptual (primarily seeing)
  - Cognitive (thinking)
Study Background

- February, 2013: After a competition, AAAFTS announced that they were funding 3 groups who would combine their strengths to design and conduct a longitudinal study of aging and driving
  - UMTRI – driving-related research
  - Columbia University – health research
  - Urban Institute – survey research
- May, 2013 to June, 2015: preplanning, planning, and pilot testing
- Cohort study started in July, 2015
Study Goals

• To understand natural history, determinants, and mechanisms of driving behavior, safety and related outcomes among older drivers

• Generate extensive longitudinal data and knowledge base that will fuel future research and decision making

• Improve understanding of the safety needs of older drivers and support development of countermeasures to keep people driving for as long as they can do so
Research Questions

• What are the risks and protective factors in older driver safety?
• What are the effects of medications on driving behavior/outcomes?
• What are the effects of declining physical functioning on self-regulation of driving?
• What is the extent/use/effect of new vehicle technology and aftermarket vehicle adaptations?
• What are the determinants of driving cessation and the impacts of cessation on health and quality of life?
Study Details

• Management:
  • Principal Investigator (Dr. Guohua Li, Columbia)
  • Co-Principal Investigator (Dr. David W. Eby, UMTRI)
  • Co-Principal Investigator (Mr. Robert Santos, Urban Institute)

• Data Collection Sites:
  • Ann Arbor, MI
  • Cooperstown, NY
  • Denver, CO
  • Baltimore, MD
  • San Diego, CA

• Project is expected to continue through April, 2019
Research Design Overview

- Cohort study of 3,000 drivers age 65 to 79 years - 600 drivers at each of the 5 sites
- Participants followed for to 2-3 years and assessed annually
- Questionnaire (telephone) in alternate years
- Assessments and data collected measure key domains (i.e., driving, cognition, motor, perception, demographic, mental health, physical health, social health and psychosocial factors)
- Primary vehicle instrumented w/ Danlaw Datalogger (small, unobtrusive geographic positioning system [GPS] device) to collect detailed driving data
Participants

• Three older driver age groups with an equal number of men and women:
  • 65-69 years; 70-74 years; and 75-79 years

• Eligibility criteria:
  • Valid driver license
  • Driving at least once per week on average
  • Receiving primary care through site’s health system
  • Residing in study area 10 months per year
  • No plans to move outside of area in 5 years
  • Motor vehicle of model year 1996 or newer
  • Driving one vehicle ≥ 80% of the time
  • No significant cognitive impairment at the time of enrollment (six-item screener score ≥4)
Objective Health Data

• Medical record review:
  • Entire record at baseline and then annually.
  • Primarily used for medical diagnoses, procedures, and utilization of health care facilities.

• Brown bag medication review:
  • Participant brings in all medications and supplements at baseline and every other year.
  • Recording name, class, administration, and dosing data.
Objective Health Data

• In-person comprehensive assessment at baseline and every other year:
  • Height and weight
  • Vision: acuity and contrast sensitivity
  • Hearing (whisper voice test)
  • Motor-free visual perception test
  • Retrieval fluency
  • Trail making
  • Immediate word recall
  • Clock drawing
  • Digit symbol substitution test
  • Delayed word recall
  • Deary-Liewald reaction time task
  • Several balance/gait test (Short Physical Performance Battery)
  • Rapid pace walk
  • Marottoli method test (neck flexibility, peripheral vision)
  • Grip strength test
  • 9-hole peg dexterity test

Takes about 1 hour to complete
Questionnaire Data

- Two questionnaires will be administered each year (either in-person or by phone)
- Topics covered:
  - Demographics
  - Cognitive health
  - Driving behaviors
  - Health behaviors
  - Health utilization
  - Health conditions
  - Impairments and symptoms
  - Mental and social health
  - Physical health
  - Falls
  - In-vehicle technologies
  - Aftermarket vehicle adaptations

Takes about 1-1.5 hours to complete
Questionnaire Data

- We also plan to track general information about participants who cease driving during the course of the study.
  - Questionnaire to be completed by participant that covers:
    - Quality of life
    - Transportation use
    - Social isolation
    - Mental and physical health
    - Interactions with family/friends
Objective Driving Data

- Objective Driving Data
  - Crash and Driver History
- Bi-annual vehicle inspection
  - Maintenance and damage (scratches, dents, etc.)
  - Presence of in-vehicle technology
  - Presence of aftermarket vehicle adaptations
Objective Driving Data

- GPS-derived location and vehicle kinematics:
  - All GPS-data in the study is being managed by UMTRI.
  - UMTRI did extensive review of existing technologies with the following criteria:
    - Relatively low cost
    - Non technical installation
    - Able to identify the driver
    - Able to automatically send data to UMTRI
  - UMTRI selected the Danlaw, Inc. Datalogger and BLE beacons.
Enrollment by Site

N= 1530
As of May 26, 2016

UC Denver: 261
Bassett: 317
J Hopkins: 257
Michigan: 328
UCSD: 367
Current Exposure Statistics

- 1253 Participants (08 May 2016)
- 4.4 million miles in 690,000 trips and 9.9 million minutes
Outcomes

- Plan is for up to 10 research articles per year from the research team.
- Several papers have been developed and released by AAAFTS on the project website.
  - http://www.longroadstudy.org
Questions?