Road choices of low mileage older drivers
Findings from the Ozcandrive older driver cohort study

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Maintaining safe mobility into older age

- Importance of driving for older people – maintaining independent lifestyle (WHO 2015)
- Loss of license associated with negative consequences: social isolation, depression, loss of independence, greater reliance others for mobility.
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- Loss of license associated with negative consequences: social isolation, depression, loss of independence, greater reliance others for mobility.
- Focus of Candrive/Ozcdrive: to improve safe mobility of older drivers... by informing strategic management of the safe mobility of current/future cohorts of older drivers, as they enter older age
- Objectives:
  - to develop a screening tool for clinicians to identify unsafe drivers, &
  - to understand driving patterns of older drivers: how these change as drivers age & with changes in health and functional ability.
Analysis of driving patterns: data sources

PARTICIPANTS
- Ozcandrive cohort: 257 drivers
- Age (at Y1) = 75-94 years (72% male)

FUNCTIONAL ASSESSMENTS
- Cognitive: MMSE, MOCA, Trail-Making B;
- Sensory: Visual Acuity (LogMAR), &
- Physical: Rapid Pace Walk

HEALTH AND WELLBEING
- Medications, Health conditions and symptoms
- Health and wellbeing survey

PERCEIVED DRIVING MEASURES
- Perceived Driving Abilities scale
- Driving Comfort Scale (Day/Night)
Ozcan drive driving data collection to date

11.5 million kilometres
Ozcandrive driving data collection to date

OpenStreetMap\textsuperscript{[1]} road types:

- **motorway**: ‘M’ network, freeway-like roads
- **primary**: main arterial roads, major rural city connections
- **secondary**: major through routes within a local area
- **tertiary**: minor through routes, lead into residential streets
- **residential**: residential streets

[1] www.openstreetmap.org

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Problem
Older drivers with low annual mileages have an increased crash risk per kilometre driven compared with older drivers with high annual mileages.[1,2]

Postulate
This inflated crash risk is due, at least in part, to an increased proportion of time spent on roads with increased situational complexity.

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Methodology
- n=180, M age=79.7 years [SD=3.6, Range=75.0-94.0], male=71.1%,
- 1 year naturalistic driving recorded in participants cars
- Annual evaluations
- Data filtering (participant exclusion process)
- GPS outlier identification
- Map matching
- Analysis of naturalistic driving situations

Example 1: High mileage driver (20,401 km)
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Example 2: Low mileage driver (2,883 km)
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Lower mileage older drivers – associations with annual mileage

Naturalistic driving summary and self-reported measures:

- **fewer trips**
- **shorter trips**
- **situational driving frequency**
- **situational avoidance**
- **driving comfort scale – day/night**
- **OARS (functional status)**
- *perceived driving ability*
- *number of medications*
- *age*
- gender (F)

Correlations - two-tailed T:

**(p<0.01), *(0.01≤p<0.05)**
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Naturalistic driving detailed measures:
- **residential-like roads
- **motorway-like roads
- **average |acceleration|
- **‘strong’ braking
- **number of turns
- **right/left turn ratio (L)
- **motorway speed
- **residential speed
- **duration per km driven

Correlations - two-tailed T:
**(p<0.01), *(0.01 ≤ p<0.05)
Summary

- Low mileage drivers from the Ozcandrive study appear to experience an increased driving complexity, per kilometre, in terms of road choices.
  - Increased use of residential roads
  - Less motorway driving
  - Increased number of turning manoeuvres, more acceleration and braking
  - Longer time driving per kilometre

- No significant correlations were elucidated between annual mileage and cognitive performance (mini-mental state exam), physical evaluation (rapid pace walk), visual acuity or basic activities of daily living scores.
Summary

- For year 1 of the study, there was no significant evidence of low mileage bias with mileage groups ($\leq 5000\text{km}$, $> 5000$ and $< 13000\text{ km}$ and $\geq 13000\text{ km}$)$^{[1]}$

- Self-reported driving ability, comfort, and situational avoidance were negatively associated with annual mileage. They are older and on more medications.

Patterns suggestive increased situational complexity for low mileage drivers, per kilometre, and also of increased self-regulation (therefore indicative of improved safety).

Limitations:
- Majority of participants are based within the Metropolitan area (Melbourne region)
- As drivers are using their own vehicle, some naturalistic driving parameters may be bias by model of vehicle. The vehicles were required to be relatively new (2006 or later)
- Analysis is from year 1 where participants are in relatively good health, and satisfy the recruitment criteria (e.g. drive at least four times a week)

Further work could investigate how driving behaviour may change over time as participants’ age and potentially develop age-related declines and/or medical conditions.
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