Ageing and Driving: What the research shows us

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Older Drivers

• Fastest growing segment of the driving population
• Driving is important for maintaining independence and well-being
• Driving cessation associated with:
  – Isolation & depression
  – Functional impairment
  – Transition into care
Driving in Later Life

- Distance adjusted crash rates are highest for youngest and older drivers
  - Exponential increase after age 75, especially for males

![Graph showing serious injury crashes per billion km for different age groups]

- Similar pattern for fatalities
- Total accident & injury rates **increasing** for older drivers, **decreasing** for all other age-groups.
- Older drivers have fewer accidents as a result of infringements (speeding, alcohol etc), and more as a result of errors:
  - More than 50% of older driver accidents occur at intersections, or while merging.
  - Most involve multiple vehicles.
Age-Related Changes affecting driving

- **Visual function**
  - Visual impairment increases with age

- **Physical functioning**
  - Increased prevalence of systemic disease
  - Physical frailty, joint stiffness

- **Cognitive abilities**
  - Slower reaction time and processing speed
  - Poorer performance on visual spatial tasks and executive function measures

Factors Enabling Safe Driving Behaviour

- **Driving Behaviour**
  - Self-monitoring and beliefs about driving capacity
  - Capacity to Drive Safely

- **Cognition**
- **Vision**
- **Physical Function**

*Anstey et al, 2005*
Research POPI: Open Road Assessment – 270 older drivers

- In-traffic course of 19.4 km in length
- Dual brake vehicle
- Occupational Therapist and Driving Instructor derive quantitative driving performance scores

Open Road Assessment

- Course consists of a range of driving & traffic situations
  - City and suburban streets
  - Simple and complex intersections
- Directed (70%) and self-directed (30%) navigational instruction
- 147 locations at which driving performance was rated
Open Road Assessment

- Types of driving errors:
  - eg. observation, braking and acceleration, approach, merging
- Location of driving errors:
  - eg. traffic signals, roundabouts, lane changing
- Instructor interventions
- Global driver safety rating
  - 1-10
- Self-rating
  - Difficulty of course & ability

Critical errors increase with age in non-demented drivers

*Anstey & Wood, Neuropsychology 2011*

- Critical errors during an on-road driving test of normal drivers increased with age
- Participants were not demented, living in the community and drove regularly

See also *Dawson 2011 JAGS*
Normal cognitive ageing (Anstey & Low, 2004, Aust. Family Physician)

- Stable verbal ability (vocabulary, general knowledge, professional expertise)
- Slowing of processing speed
- Slowing of reaction time
- More variability in responding
- Some memory decline
- Reduced executive function
  - Co-ordination of higher level information
  - Planning responses
  - Response inhibition

Individual differences

- Different adults start with different abilities
- Adults age at different rates
- Some 90 year olds perform very well
- Individual assessment required to determine individual capacity
Cognitive abilities linked to driving errors – 2 studies using on-road

1. Anstey & Wood 2011 – Australia
2. Dawson et al. 2010 – USA

- Both studies evaluated errors on-road against cognitive function
- Both found poorer processing speed and visuo-cognitive abilities but not memory, associated with more errors in normal elderly

Not all aging of cognitive abilities affect driving

- Research shows that specific abilities are linked to increased crashes and errors while driving.
- Memory is NOT a major factor affecting driving capacity in normal ageing or even early dementia
- Slowed processing speed and reaction time, reduced visual processing, executive function, visual search are important
Older versus middle aged drivers  (Dawson 2010, US study)

- Older drivers 24% more safety errors overall
- Lane change, lane observance, turns, pulling away from curb, more serious errors
- 2.6 more errors per 5 year age increment
- Among older drivers, poorer cognition associated with more errors

Strategic issues – likely cognitive component

- Studies don’t evaluate decisions about where to drive (ie choosing safer route)
- When to drive – avoiding dangerous conditions
- Choices about which vehicle to drive, vehicle maintenance
- Priority placed on driving safety and maintaining skills
Insight reduces in normal ageing

Study 1: Wood, Lacherez, Anstey in press
270 drivers asked to rate their driving

Results

• No association between self rating and actual driving performance
• Those with self-reported crash history did not rate driving ability differently
• Those who committed critical errors did not report performance as worse

Conclusion: Drivers not necessarily able to accurately assess their own driving skill and safety
Other Measures of Driving Capacity

Hazard Perception Test

Self rating of Hazard Perception

*Horswill, Anstey, Hatherly, Wood, Pachana, 2011*

- 305 Drivers performed video based hazard perception task and asked to rate how well they did.

- Results: No correlation between performance and self-ratings

- Reason: Unless there is a crash, no feedback of missing a hazard, reduces opportunity to learn
ANU – QUT research

• Found that body sway, motion perception and choice reaction time with hands and feet are related to driving safety

Driving with dementia

• Dementia will cause unsafe driving as the disease progresses
• Crash risk proportional to severity of dementia
• Early stages driving may be OK
• Issue is how to identify when driving is no longer safe
Practical advice from research

- Plan ahead – when to drive, for how long, consider whether you have any health problems
- Maintain your vehicle – new vehicles have more safety features eg. reversing videos, sensors
- Add blind spot mirrors, remember to check blind spots
- Consider your skills in lane changing, merging, right hand turns, pulling out from curb
- Refresh your knowledge of road rules
- Be aware of medication you are taking that may affect driving
- Look after your health – fitness, strength, mobility, vision, cognitive function

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Publications
