Older driver safety in the Netherlands

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Some facts on the safety of older drivers

• Fatality rate of drivers > 75 is largest of all drivers

• This is mainly the result of their physical vulnerability/frailty

• Older drivers are overrepresented in crashes at intersections, particularly when turning left

• The number of older drivers will not only increase because of ageing of population but also because of increase in the percentage of licence holders among older drivers

• See [www.erso.eu](http://www.erso.eu) and [www.swov.nl](http://www.swov.nl)
Fatality rate per transport mode and age groups

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Pedestrians</th>
<th>Cyclists</th>
<th>Car drivers</th>
<th>Car passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 24</td>
<td>21</td>
<td>6</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>30 - 49</td>
<td>11</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>60 - 64</td>
<td>10</td>
<td>12</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>65 - 74</td>
<td>22</td>
<td>28</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>All 75+</td>
<td>97</td>
<td>124</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>All ages (18+)</td>
<td>20</td>
<td>12</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Fatality ratio: percentage of all injuries reported by the police
Modal shift for different age groups (NL)
Age, functional limitations and assistive devices

• Growing number of older drivers → growing percentage of drivers suffering from functional limitations

• Functional limitations can reduce the quality of driving performance

• How can assistive devices counterbalance the effect of functional limitations?
## Relevant functional limitations

<table>
<thead>
<tr>
<th>Reduced...</th>
<th>May result in...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception of movement, speed and distance</td>
<td>Difficulty perceiving conflicting vehicles and the speed at which they are approaching</td>
</tr>
<tr>
<td>Peripheral vision, neck flexibility</td>
<td>Not noticing other road users while merging or changing lanes</td>
</tr>
<tr>
<td>Selective attention</td>
<td>Not noticing traffic signs and signals</td>
</tr>
<tr>
<td>Information processing speed, performance under pressure of time</td>
<td>Increased reaction time in complex traffic situations</td>
</tr>
</tbody>
</table>
Our expectations regarding useful assistance for older drivers

Safety of older drivers can be improved by assistive devices that:

- Draw attention to approaching traffic
- Signal or provide view of objects in the driver’s blind spot
- Direct the driver’s attention to relevant information
- Provide knowledge on the next traffic situation
Types of assistance to make driving task easier

• Simplify traffic situations by adjusting road design

• Provide personal assistance in the car (ADAS)

• Other types of ‘assistance’ include:
  – Education and training (older drivers + others)
  – Drivers’ own compensation strategies
  – Assessing fitness to drive
Study design

- Driving simulator
- Older (70+) and younger (30-50) drivers
- Had to pass several types of intersections (including turning left on some of them)
- With and without the help of an advanced driver assistance system (ADAS)
- Questionnaire on acceptance of ADAS
- Effect on workload and driving performance
Research questions

• What is the influence of road design on workload and safety of driver decisions?

• Can ADAS make a difference?

• Is support from ADAS appreciated by drivers?
Main findings road design

• Intersection layout
• Priority regulation
• Driver manoeuvres

\[ \text{influence workload} \]

• Intersection layout best predictor
  – easiest: 3-way intersection, street at left side
  – most difficult: 4-way intersection with dual carriageway

• Reduction in complexity of intersections \( \Rightarrow \)
  shorter reaction times for older and younger drivers
Main findings ADAS

While driving, participants were informed about four aspects of the intersection they were approaching:

- Right-of-way or yield
- Safe to join or cross
- Obstructed view of the intersection

- Deviating traffic rules (one-way street)

=> fewer route errors
Main findings ADAS - continued

• Contrary to expectations messages did not decrease workload; some even increased workload

• Drivers who have more disorders or have more difficulties with manoeuvres were more positive about the messages

• Whereas 70% of the young participants considered timing to be correct or too soon, 60% of the old thought they came too late

  => system settings should be adjustable

Recent and ongoing studies on older drivers in NL

- Guidelines for road design to improve safety of older drivers (based on FHWA’s Highway design handbook for older drivers)
- Evaluation of older driver education
- Road safety effects of raising the minimum age from 70 to 75 for the medical examination for driving licences
- Improvement of the procedure to test fitness to drive of people with dementia
- Longitudinal study on older drivers with dementia (naturalistic driving)
- In-depth study on crashes involving older cyclists