Fitness to drive with Cognitive Impairments

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Your opinion?

People with dementia are **fit/unfit** to drive
Dutch regulation on requirements for fitness to drive before revision

“In case of a diagnosis of dementia, people are always unfit to drive; if there is doubt about dementia or supposition of early dementia, a tailor-made specialist assessment is needed and it is advised to conduct a driving test.” (d.d. november 1995)
Brouwer Commission (2008)

• At request of Alzheimer Netherlands
• Reconsideration of Regulations
• Grounds:
  – Diagnosing now possible at earlier stages
  – May lead to premature cessation of driving
  – People might avoid getting a diagnosis
  – Which may hinder good treatment
Prevalence of dementia by age

Netherlands (1995)
Driving test performance of older drivers with cognitive functional limitations – according to general practitioner (Withaar, 2000; n=90)

Percentage of drivers classified as fit (green), doubtful (orange) or unfit (red) by a professional assessor (CBR practical driving assessment)
Driving test performance of people with very mild or mild dementia of Alzheimer type (Brown et al., 2005)

Percentage of drivers classified as fit (green), doubtful (orange) or unfit (red) by a professional driving instructor (USA)
Revised Regulation on requirements for fitness to drive

“People with very mild (CDR 0.5) or mild dementia (CDR 1) can be fit to drive for group 1 licenses for personal use only. People with moderate (CDR 2) or severe (CDR 3) dementia are always unfit to drive.”

(Revision d.d. 21 December 2009)
Practical implications

• Practical driving assessment for people with very mild and mild dementia

• Valid for one year

• Longer period (max 3 years) only in case of very mild dementia + additional neuropsychological assessment
Motives for FitCI study

• Revised regulation results in extra driving assessments

• Assessment procedure should meet societal and scientific requirements

• Importance of safe independent mobility
FitCI study

Aim:
Development of a reliable, valid and rehabilitation oriented method to assess fitness to drive of people with dementia
Assessment procedure FitCI study

- Doctor
  - FitCI-screening
    - CBR
      - Practical driving test
        - Decision about fitness to drive
          - Conversation about other mobility options

NL:
- Medical examination at 75+
- Report changes in situation
- Own declaration
- CBR decides on fitness to drive
Assessment procedure FitCI study

Doctor

FitCI-screening

CBR Practical driving test

Decision about fitness to drive

Conversation about other mobility options

Elements (1-2-Drive):
• 1: Anamnesis and heteroanamnensis
• 2: Neuropsychological tests
• Drive: Rides in driving simulator
In future...

Doctor

FitCI-screening

Fit to drive

Doubtful

CBR Practical driving test

Unfit to drive

Conversation about other mobility options
Only if screening results are ...

- Good predictor of CBR decision after driver assessment
- Good predictor of long term driving performance
Steps to be taken (2011-2016)

• Criteria for medical doctors

• Selection of tests
  – Neuropsychological tests
  – Simulator tests

• Organization of assessment centres

• Validation

• Implementation
(Hetero)Anamnese & paper-pencil tests

Clinical Dementia Rating scale

Trail Making Test A & B
Schuhfried Vienna Test System

What did you see?
1) Pedestrians
2) Cars
3) Two-wheelers
4) Traffic signs
5) Traffic lights
Traffic rules

Do you have to yield for the cyclist?
Hazard perception test (Vlakveld)

Nothing  Throttle down  Brake
Driving simulator

- Swing drive (steering capability and speed adaptation)
- Intersections (use of priority regulations, reaction to dangers)
- Merging on motorways (merging, overtaking and changing lanes)
Partners involved

Project by:
• UMCG
• University of Groningen
• CBR
• SWOV

Hardware:
• STSoftware
• Schuhfried

Assessment centres:
• UMCG (Groningen)
• Sûnenz (Drachten)
• Old Wolde (Winschoten)
• VU (Amsterdam)
• UL (Maastricht)

Social partners:
• Ministry Transport
• Alzheimer NL
• Blijf Veilig Mobiel
Steps to be taken

- Criteria for medical doctors
- Selection of tests
  - Neuropsychological tests
  - Simulator tests
- Organization of assessment centres
- Validation
- Implementation
Validation

Can FitCl-screening predict decision of practical driving test?

- Using “old” set of predictors (Withaar)?
- Using optimal set of predictors?
- The same for all types of dementia?

Can FitCl-screening predict long term driving performance?
Available data

• 192 patients from 5 different centres
• About half have Alzheimer’s disease (AD)
• 48 healthy participants (control group)
• Screening data (CDR, np tests, simulator data)
• Performance on Practical driving test
On-road performance - FitCI

Healthy (n=48)
- Fit: 42
- Doubtful: 2
- Unfit: 2
- Missing: 2

Patients (n=192)
- Fit: 77
- Doubtful: 15
- Unfit: 81
- Missing: 19
Using previous set of predictors

- Brouwer (2006) was able to predict correct PDT-result for 80% of participants of Withaar (2000)
- Same set of predictors for total FitCl-dataset:

<table>
<thead>
<tr>
<th></th>
<th>MMSE (0.5)</th>
<th>Trail A (1)</th>
<th>Trail B (1.5)</th>
<th>Drawing (1.5)</th>
<th>ATAVT (1.5)</th>
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<td>+</td>
<td>&gt; 27</td>
<td>&lt; 90 s.</td>
<td>&lt; 240 s.</td>
<td>&gt; 5</td>
<td>&lt;5e perc.</td>
<td>≥ 3</td>
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<tr>
<td>-</td>
<td>&lt; 18</td>
<td>&gt; 120 s.</td>
<td>&gt; 270 s.</td>
<td>&lt; 5</td>
<td>&gt;15e perc.</td>
<td>≤ -3</td>
</tr>
</tbody>
</table>

Percentage correctly predicted

Doubtful left out (n=98)

(n=93)
Using optimal set of predictors

Based on patients with Alzheimer’s disease (n=81)

- FitCl-screening
- Heteroanamnese
- Neurops. tests
- Simulator tests

Pass (n=35)

Fail (n=46)
Using optimal set of predictors

Based on patients with Alzheimer’s disease

- FitCl-screening
- Heteroanamnese
- Neurops. tests
- Simulator tests

Best predictors from elements of heteroanamnnesis

XX %

Practical driving test
Using optimal set of predictors

Based on patients with Alzheimer’s disease

- FitCl-screening
- Heteroanamnese
- Neurops. tests
- Simulator tests

Best predictors from set of neuropsychological tests

XX%

Practical driving test
Using optimal set of predictors

Based on patients with Alzheimer’s disease

- FitCl-screening
- Heteroanamnese
- Neurops. tests
- Simulator tests

Best predictors from simulator tests

Practical driving test

XX %
Using optimal set of predictors

Based on patients with Alzheimer’s disease (n=81)

- Heteroanamnese
- Neurops. tests
- Simulator tests

FitCl-screening

Practical driving test

XX %
XX %
XX %
XX %
Next steps

• Validation for other types of dementia

• Validity for long term driving performance
  – In everyday traffic
  – Strategic decisions

• Implementation

• Mobility centres
Thank you for your attention
Any questions or remarks?

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