



EU MEDRIL Project:

Medical testing for the Driving Licence

FINAL REPORT, February 2006

**Co-financed by the European Union
(European Commission, DG TREN)**

Publishing details

The MEDRIL project was managed by CIECA, the international driver testing authority. The final report of the MEDRIL project was written and edited by the members of the project consortium and the project manager.

The MEDRIL project was co-financed by the European Commission, DG TREN

Main authors and editors:

Sanders, N. CIECA (International Commission of Driver Testing Authorities)
Hendrix, M., CIECA (International Commission of Driver Testing Authorities)
Martin, B. ASECEMP (Association of Driver Testing Centres), Spain
Pingarron, A. ASECEMP (Association of Driver Testing Centres), Spain
Ojala, M. INSURAMED, Finland
Koivukoski, M. AKE (Vehicle Administration), Finland
Bohler, A. Ministry of Transport, Luxembourg.
Bredewoud, R. CBR (Dutch Driver Testing Organisation), Netherlands
Heera, P. CBR (Dutch Driver Testing Organisation), Netherlands

ISBN: pending

© CIECA, Brussels, 2006.

All rights reserved. No part of this publication may be reproduced, copied, stored in a retrieval system, or transmitted, in any form or by any means, without the prior permission in writing of the publisher and indication of the source.

TABLE OF CONTENTS

INTRODUCTION	7
1. THE MEDICAL CONDITION OF THE CATEGORY B DRIVING POPULATION (SPAIN, NETHERLANDS, FINLAND AND LUXEMBOURG)	8
1.1 OBJECTIVE OF MEDRIL TESTS	8
1.2 DESCRIPTION OF THE MEDRIL TESTS	8
1.3 SAMPLE SIZES	8
1.4 STATISTICAL REPRESENTATIVENESS OF SAMPLES / RELIABILITY OF STUDIES	10
1.5 RESULTS PER COUNTRY	11
A) SPAIN	12
B) NETHERLANDS	13
C) FINLAND	14
D) LUXEMBOURG.....	15
1.6 RESULTS PER MEDICAL CONDITION	16
a) <i>Visual acuity</i>	16
b) <i>Restricted visual field</i>	18
c) <i>Problems with night vision (« glare »)</i>	19
d) <i>(Very) high blood pressure</i>	20
e) <i>Cardio-vascular disease</i>	22
f) <i>Neurological disorders</i>	23
g) <i>Mental health</i>	24
h) <i>Alcohol consumption</i>	25
i) <i>Consumption of psycho-active medicines</i>	28
j) <i>Sleeping disorders</i>	32
k) <i>Epilepsy</i>	33
l) <i>Diabetes</i>	34
m) <i>General health : strength, reflexes and balance</i>	35
n) <i>Cognitive impairment</i>	37
1.7 SUMMARY OF SURVEY RESULTS	39
1.8 CONCLUSIONS	41
1.9 DISCUSSION	42
1.9.1 <i>What potential impact do these medical conditions have on fitness-to-drive?</i>	42
1.9.2 <i>Relative risk with regard to fitness-to-drive</i>	46
2. DESCRIPTION & ANALYSIS OF ONGOING FITNESS TO DRIVE REQUIREMENTS IN EU MEMBER STATES	48
2.1 ONGOING FITNESS-TO-DRIVE REQUIREMENTS IN EUROPE	48
2.2 DESCRIPTION OF ONGOING MEDICAL TESTS FOR GROUP 1 DRIVERS IN MEDRIL COUNTRIES (SPAIN, LUXEMBOURG, FINLAND AND THE NETHERLANDS).....	50
2.2.1 <i>Spain</i>	51
2.2.2 <i>Luxembourg</i>	53
2.2.3 <i>Finland</i>	54
2.2.4 <i>The Netherlands:</i>	56
2.2.5 <i>Conclusions regarding withdrawal/non-renewal of licences for medical reasons</i> .	57
2.3 PROS AND CONS OF A RANGE OF FITNESS-TO-DRIVE SYSTEMS	58
2.4 MANAGING OLDER DRIVERS	60
3. A SCREENING TEST FOR CATEGORY B DRIVERS.....	62

3.1 THE MEDRIL SCREENING TEST.....	62
3.2 DISCUSSION	65
3.3 CONCLUSIONS.....	67
4. ON-ROAD FITNESS-TO-DRIVE ASSESSMENTS IN EUROPE	69
4.1 COUNTRY DESCRIPTIONS	70
4.1.1 Netherlands.....	70
4.1.2 Belgium.....	72
4.1.3 Germany.....	72
4.1.4 Great Britain.....	74
4.1.5 Switzerland.....	75
4.1.6 Norway.....	76
4.1.7 Sweden	76
4.1.8 Denmark.....	77
4.1.10 Other Countries	77
4.2 CONCLUSIONS.....	78
5. OVERALL CONCLUSIONS.....	80

Annexes

1. MEDRIL medical form
2. MEDRIL medical form- doctors' guidelines
3. MEDRIL survey- participating doctors
4. Statistical reliability test (Traffic Test, NL)
5. Medical examination forms / declarations (ongoing fitness-to-drive requirements) for:
 - Great Britain
 - Ireland
 - Denmark
 - Portugal
 - Italy
6. Medical examination forms: Spain
7. Samples of unfit drivers X 2 (Spain)
8. Medical examination forms: Luxembourg
9. Medical examination & doctors' guidelines: Finland
10. Personal declaration: the Netherlands
11. Medical examination forms: the Netherlands
12. Workshop II report (and Schmedding presentation)
13. AUDIT questionnaire
14. Cognitive impairment tests:
 - Mini-mental test
 - Trail making B
 - OPS
15. On-road protocols: the Netherlands (CBR)
16. On-road protocol: Belgium (CARA)
17. Workshop I report
18. TRIP on-road protocol
19. On-road protocol: Sweden (SRA)

Tables

Table 1: SPAIN, final sample (n=4026, ages 20-89)	9
Table 2: THE NETHERLANDS, final sample (n=425, ages 65-94)	9
Table 3: FINLAND, final sample (n=260, ages 65-89)	9
Table 4: LUXEMBOURG, final sample (n=345, ages 45-94).....	9
Table 5: Summary of survey results for all countries and all conditions	40
Table 6: Relative risks of accident involvement of medical conditions according to main categories in CD 91/439/EEC - Annex III	46
Table 7: Overview of ongoing fitness-to-drive requirements for private category B drivers in Europe.....	50
Table 8: Sample of unfit drivers based on 20226 drivers in Oviedo region, Spain, 2001	52
Table 9: Sample of unfit drivers based on 14500 drivers in Spain, 2003.....	52
Table 10: Estimate of total number of licences withdrawn as a result of medical test in Spain, 2003.....	52
Table 11: Licences withdrawn per year in Finland due to medical testing / physician-reporting requirement (2000-2005).....	55
Table 12: Withdrawn/non-renewed licences as a proportion of total licence holders, Finland.....	55
Table 13: Non-renewed licences in the Netherlands as a result of age-based medical testing.....	57

Figures

Figure 1: Final samples per age category (all countries combined)	10
Figure 3: MEDRIL test results, Spain.....	12
Figure 4: MEDRIL test results, Netherlands.....	13
Figure 5: MEDRIL test results, Finland.....	14
Figure 6: MEDRIL test results, Luxembourg	15
Figure 7: Abnormal visual acuity.....	16
Figure 8: Poor visual acuity in the 70+ age category	17
Figure 9: Restricted visual field	18
Figure 10: Restricted visual field in the 70+ age category	19
Figure 11: Problems with night vision	19
Figure 12: Night vision problems in the 70+ age category	20
Figure 13: High blood pressure.....	21
Figure 14: Very high blood pressure in the 70+ age category	21
Figure 15: Treatment for cardiovascular disease	22
Figure 16: Treatment for cardiovascular diseases in the 70+ age category.....	23
Figure 17: History of any disorder of the brain or nervous system.....	23
Figure 18: Neurological disorders in the 70+ age category	24
Figure 19: Treatment for mental health.....	25
Figure 20: consumption of 3 portions or more of alcohol. 4 or more times per week	26
Figure 21: consumption of 3 portions or more of alcohol. 4 or more times per week in the 70+ age category	27
Figure 22: consumption of psycho-active medicines	28
Figure 23: Consumption of psycho-active medication in the 70+ age category	29
Figure 24: consumption of analgesics	30
Figure 25: Consumption of sedatives.....	30
Figure 26: Consumption of narcoleptics	31
Figure 27: Consumption of hypnotics	31
Figure 28: Sleeping disorders.....	32
Figure 29: Sleeping disorders in the 70+ age category	33
Figure 30: Epilepsy or similar disorder.....	33
Figure 31: Treatment for diabetes	34
Figure 32: Treatment for diabetes in the 70+ age category.....	35
Figure 33: Abnormal (impaired) strength, balance or reflexes	36
Figure 34: Abnormal (impaired) strength, balance or reflexes in the 70+ age category	36
Figure 35: mild dementia	37
Figure 36: mild dementia in the 70+ age category	37

INTRODUCTION

The EU MEDRIL project is a 50% financed project from DG Transport & Energy of the European Commission, managed by CIECA, the international commission of driver testing authorities. MEDRIL took place between 2004 and early 2006, with a view to delivering the following reports:

1. A survey on the medical condition of category B drivers in Spain, Netherlands, Finland and Luxembourg, based on a sample of 10000 drivers (chapter 1)
2. Description of ongoing fitness-to-drive requirements for category B drivers in EU Member States (chapter 2)
3. Consideration of the contents and periodicity of an ongoing medical screening test for category B drivers (chapter 3)
4. The use of on-road assessments for drivers with 'borderline' medical conditions, where the doctor may be unable to determine fitness-to-drive on the basis of a medical diagnosis alone (chapter 4).

MEDRIL should be seen in the context of a range of EU studies on fitness-to-drive issues, such as:

- **IMMORTAL** (accident risk and tolerance levels associated with different forms of driver impairment)
- **AGILE** (older drivers)
- **QUA VADIS** (vehicle adaptations and services for drivers with disabilities)
- **CONSENSUS** (assessing driving ability of people with special needs)
- **LEHO** (evaluation of medical examination practices in 3 countries)
- **ROSITA** (methods and equipment for roadside testing of drugs and medicines)
- **DRUID** (driving under the influence of drugs, alcohol and medicine)

CIECA's project partners in MEDRIL consisted of:

- CBR, the Netherlands (Dutch Driver Testing Organisation)
- ASECEMP, Spain (association of psycho-technical driver testing centres)
- AKE/INSURAMED, Finland (Finnish Vehicle Administration and a private company specialising in medical testing of drivers and company employees)
- Ministry of Transport, Luxembourg

1. THE MEDICAL CONDITION OF THE CATEGORY B DRIVING POPULATION (Spain, Netherlands, Finland and Luxembourg)

1.1 Objective of MEDRIL tests

The primary objective of the MEDRIL project was to determine the medical condition of the category B driving population in Spain, Netherlands, Finland and Luxembourg.

1.2 Description of the MEDRIL tests

The assessment was carried out by executing a number of medical tests for category B drivers. The tests were carried out using a standardised medical form (see annex 1), accompanied by guidelines for the doctors participating in the tests (annex 2). The medical test covered general background information on the driver (age, sex, education, etc), an anamnesis (questions from the doctor to the patient regarding their medical history) and a basic medical examination. The tests were largely carried out in parallel with the medical tests already required by law for drivers in each respective country. Consequently, Spain was the only country to carry out tests over a wide range of ages (obligatory medical testing for cat. B drivers begins only at 50 yrs old in Luxembourg, 60/70 in Finland¹ and 70 in the Netherlands). See chapter 2 for a description of the medical testing procedures in each of these countries.

The content of the MEDRIL form and test was largely based on existing tests and declaration forms at national level, and, of course, on the requirements of Annex III of the EU driving licence directive.

The tests were carried out between autumn 2004 and autumn 2005.

1.3 Sample sizes

The intended sample sizes for each country were as follows:

Spain = 4000
Netherlands = 3000
Finland = 2000
Luxembourg = 1000

However, problems were encountered in convincing enough doctors to participate in the project in the Netherlands, Luxembourg and especially Finland. In addition, the relatively small number of drivers visiting individual general practitioners (NL, Lux, Fin) for their obligatory fitness-to-drive test hampered efforts to carry out a significant number of tests over a small timeframe.

¹ Finland's medical testing system for drivers changed in 2004, with the result that medical tests now become obligatory from 70 and not 60 years old.

As a result of these problems, the following sample sizes were finally achieved:

Spain = 4026
 Netherlands = 425
 Finland = 260
 Luxembourg = 345

These samples can be split up as follows (tables 1-4 below):

Table 1: SPAIN, final sample (n=4026, ages 20-89)

Age cat.	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59
Total	219	403	387	370	394	331	413	343
Male	108	213	184	198	197	168	202	192
Female	111	190	203	171	195	163	208	151
Age cat.	60-64	65-69	70-74	75-79	80-84	85-89		
Total	391	368	314	83	7	3		
Male	190	203	158	53	6	3		
Female	199	161	155	30	1	0		

Table 2: THE NETHERLANDS, final sample (n=425, ages 65-94)

Age cat.	65-69	70-74	75-79	80-84	85-89	90-94
Total	81	203	67	62	10	2
Male	49	138	47	38	8	2
Female	32	45	20	24	2	0

Table 3: FINLAND, final sample (n=260, ages 65-89)

Age cat.	65-69	70-74	75-79	80-84	85-89
Total	100	85	47	23	5
Male	60	56	34	16	5
Female	40	29	13	7	0

Table 4: LUXEMBOURG, final sample (n=345, ages 45-94)

Age cat.	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84
Total	30	72	47	39	23	47	40	28
Male	21	46	30	31	13	34	29	22
Female	8	25	17	8	9	13	11	6
Age cat.	85-89	90-94						
Total	17	2						
Male	14	2						
Female	3	0						

The final samples per age group (all countries combined) are presented in figure 1 below:

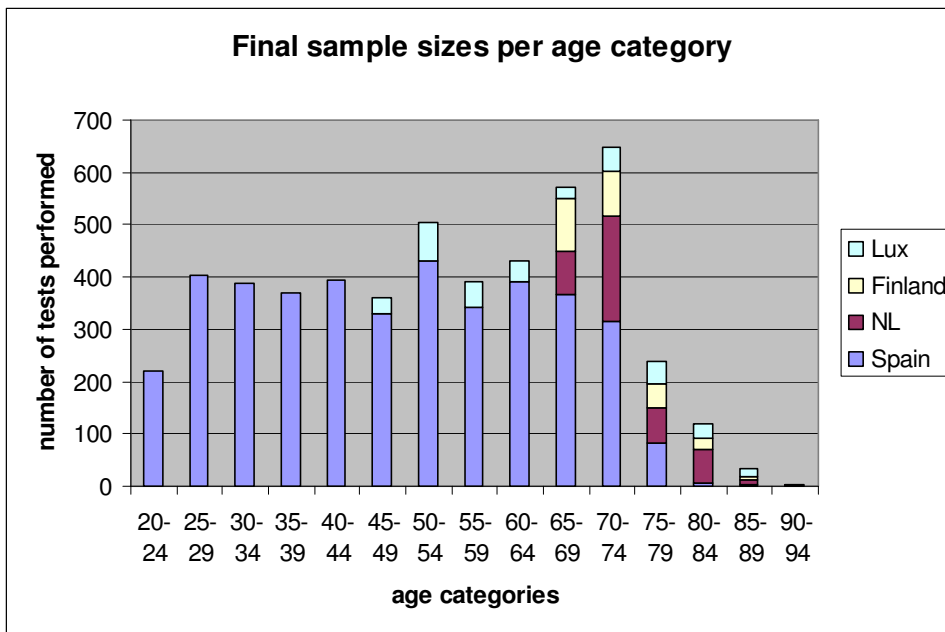


Figure 1: Final samples per age category (all countries combined)

1.4 Statistical representativeness of samples / reliability of studies

The doctors participating in the project did so on a voluntary basis. They were general practitioners in Luxembourg, Netherlands and Finland, and specialist fitness-to-drive doctors in Spain (from the ASECEMP association of fitness-to-drive centres). The national lists of participating doctors/clinics are available in annex 3. With regard to the geographical distribution of doctors, and therefore MEDRIL tests, in each country, the results were as follows:

- The Spanish tests were spread evenly over all main regions of Spain, using the ASECEMP network of driver testing clinics.
- The Dutch tests were spread evenly over all main regions of the Netherlands, using an established group of some 180 general practitioners who had previously taken part in an earlier (national) project.
- The Luxembourg tests were carried out by a approximately 30 doctors in different areas of Luxembourg (which is, after all, a very small country)
- The Finnish tests were carried out primarily in the south of the country. The south of the country is, however, also the most populated region. The northernmost clinic taking part in the MEDRIL tests was in Kuopio, some 340kms north of Helsinki.

The drivers attending the clinics for their obligatory fitness-to-drive tests were also asked to participate on a voluntary – and anonymous – basis in the MEDRIL test. No information is available on the number of patients who refused to undergo the MEDRIL test. Possible reasons for not taking part in the MEDRIL test include lack of time, a dislike of medical testing or a fear that the MEDRIL test may highlight a disorder, and possibly one(s) with an impact on fitness-to-drive². However, to repeat, the tests were carried out on a strictly

² This may especially have had an impact in Finland: perhaps drivers were unwilling to participate in the MEDRIL tests because a new physician-reporting requirement had just been introduced and drivers were afraid of being reported to the authorities.

anonymous basis and the results of the tests carried no legal effect on fitness-to-drive whatsoever.

A statistical reliability test (Traffic Test, NL – see annex 4) was carried out to determine whether the samples collected from Spain, Netherlands, Finland and Luxembourg were representative of their respective category B driving populations, in terms of age, and age + sex (m/f) distribution. Although the samples fulfilled many of the criteria of random sampling, the low number of samples for particular age groups, and in particular countries, justified more thorough analysis. Chi-square tests for reliability were carried out, based on the distribution of age and age+sex of the samples in comparison to the overall driving population.

The reliability tests showed that the samples of all countries were unrepresentative of their respective category B driving populations, although Finland's sample was very close. Consequently, each country's samples were re-weighted to produce statistically representative results for the medical tests, in terms of age and age+sex distribution. Group sizes under 10 persons in any given age category (and for any given country) were not taken into account in the results of the tests. All of the data presented in the following sections show the re-weighted results. Where possible, comparative data on the medical condition of the (driving) population was sought after, in order to corroborate the data obtained from the MEDRIL tests.

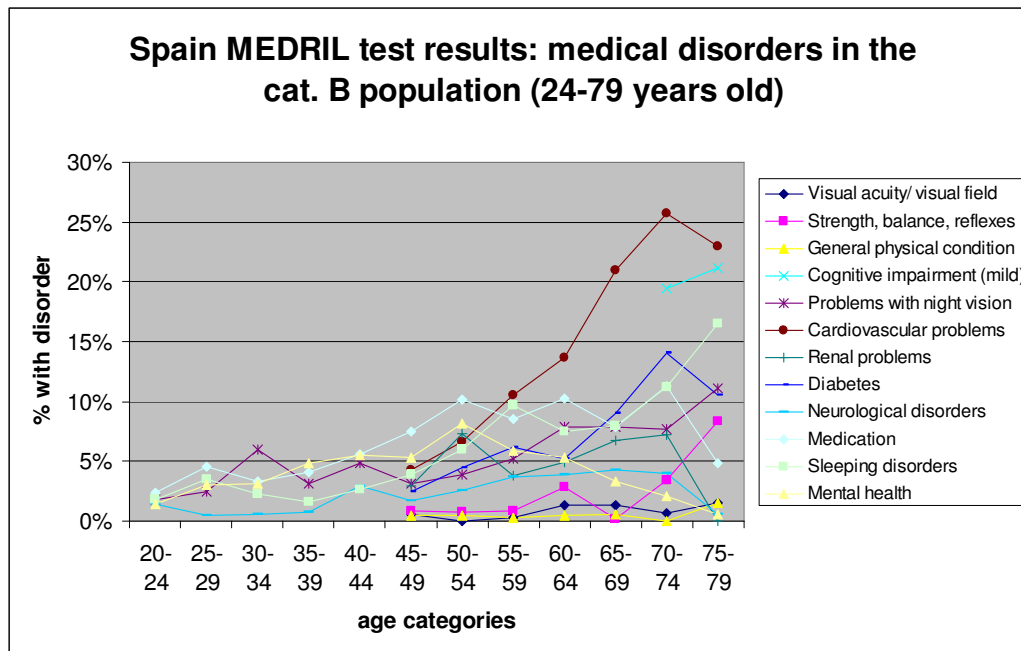
Additional background variables such as size of town of residence, living with a partner or not, and educational level were not analysed, despite featuring on the MEDRIL form. This was due to the small samples finally collected and the low statistical power that individual sub-groups would have if these variables were taken into account. A full report of the tests for statistical reliability can be found in annex 4.

1.5 Results per country

The results of the MEDRIL tests can be presented by country or by medical condition. This section presents the results by country.

a) SPAIN

Based on a total sample size of 4026 category B drivers, the results of the MEDRIL tests in Spain are as follows :



Age cat.	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79
Total	219	403	387	370	394	331	413	343	391	368	314	83

Figure 2: MEDRIL test results, Spain

b) NETHERLANDS

Based on a total sample size of 425 category B drivers, the results of the MEDRIL tests in the Netherlands are as follows :

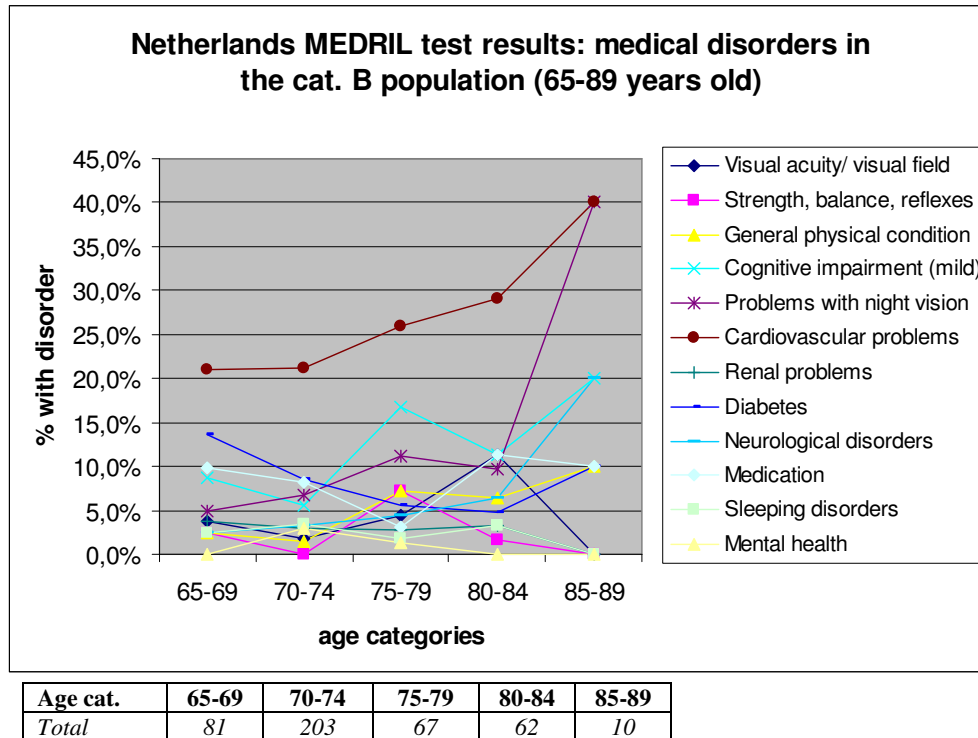
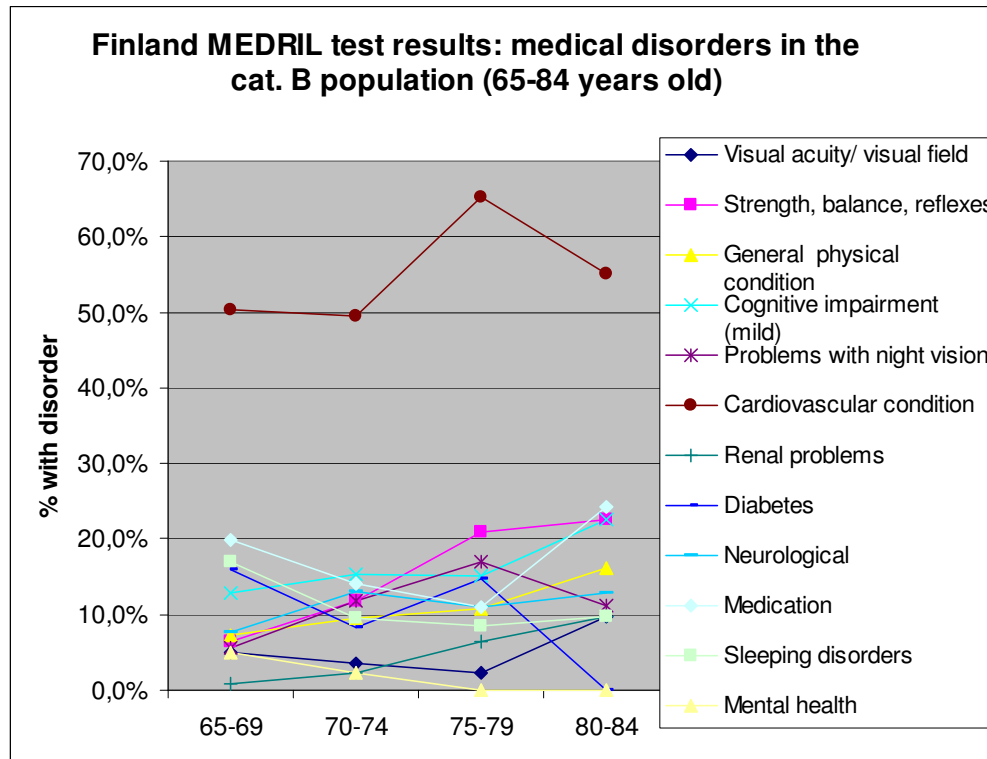


Figure 3: MEDRIL test results, Netherlands

c) FINLAND

Based on a total sample size of 260 category B drivers, the results of the MEDRIL tests in Finland are as follows :

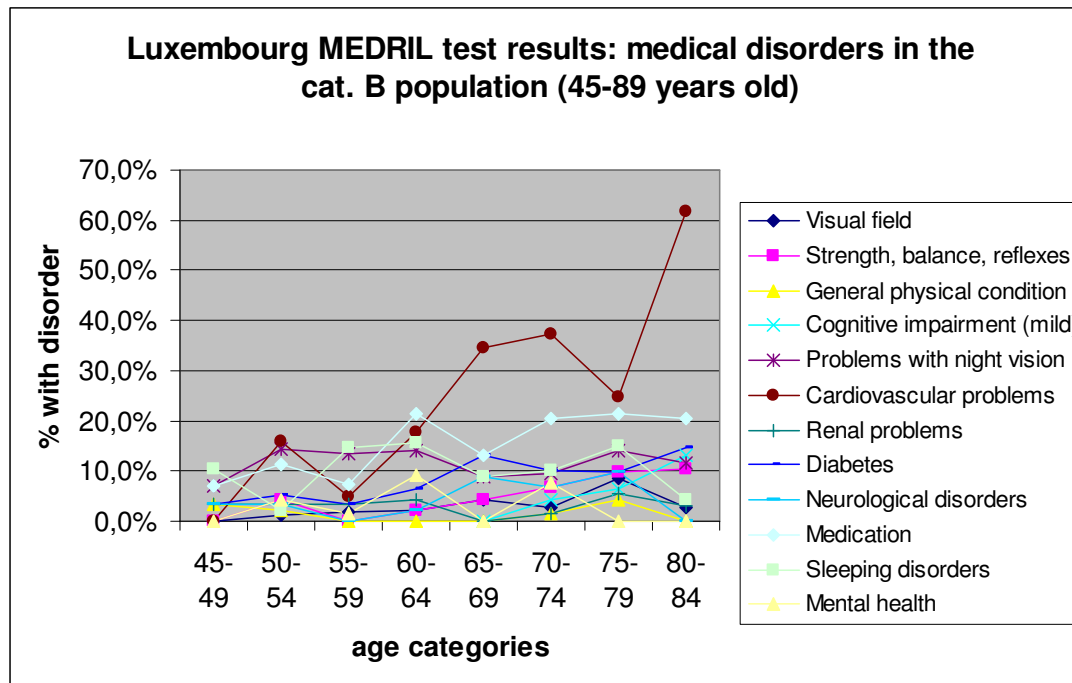


Age cat.	65-69	70-74	75-79	80-84
Total	100	85	47	23

Figure 4: MEDRIL test results, Finland

d) LUXEMBOURG

Based on a total sample size of 345 category B drivers, the results of the MEDRIL tests in Luxembourg are as follows :



Age cat.	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84
Total	30	72	47	39	23	47	40	28

Figure 5: MEDRIL test results, Luxembourg

1.6 Results per medical condition

In this section, the results per medical condition are presented. For logistical reasons, all countries are presented on the same graph for each condition. However, as the samples sizes from each country varied considerably, both in absolute terms and in proportion to the actual category B population, the results are not to be considered comparable. Moreover, the data was collected from different age groups according to the country, so this renders comparison all the more cumbersome.

The Spanish results, in particular, merit some attention. Many of the results pertaining to the incidence of a range of medical conditions show lower prevalence in the Spanish sample of the category B driving population. This may be partly due to the larger samples being gathered from Spain in comparison to the other countries, which may have a flattening effect on the results. It may also be due to the regularity of the Spanish medical test for category B drivers : a lower incidence of medical conditions in the older driving generations could be explained by the fact that many drivers have either been withdrawn from the driving population (i.e. failed the test at an earlier stage) or have received medical advice from earlier tests and, in the case of visual acuity for example, taken corrective action and had their spectacles corrected.

For each condition, its incidence amongst the age category '70 years old and above' is presented separately, where there is a known correlation between the condition and increasing age.

a) Visual acuity

Drivers had their eyes tested (both eyes with correction), using a standard eye chart. An abnormal result corresponds to a reading of under 0,5, which is currently the threshold stated in Annex 3 of the Driving Licence Directive. N.B. Luxembourg does not feature in the results as many of the tests were carried out incorrectly.

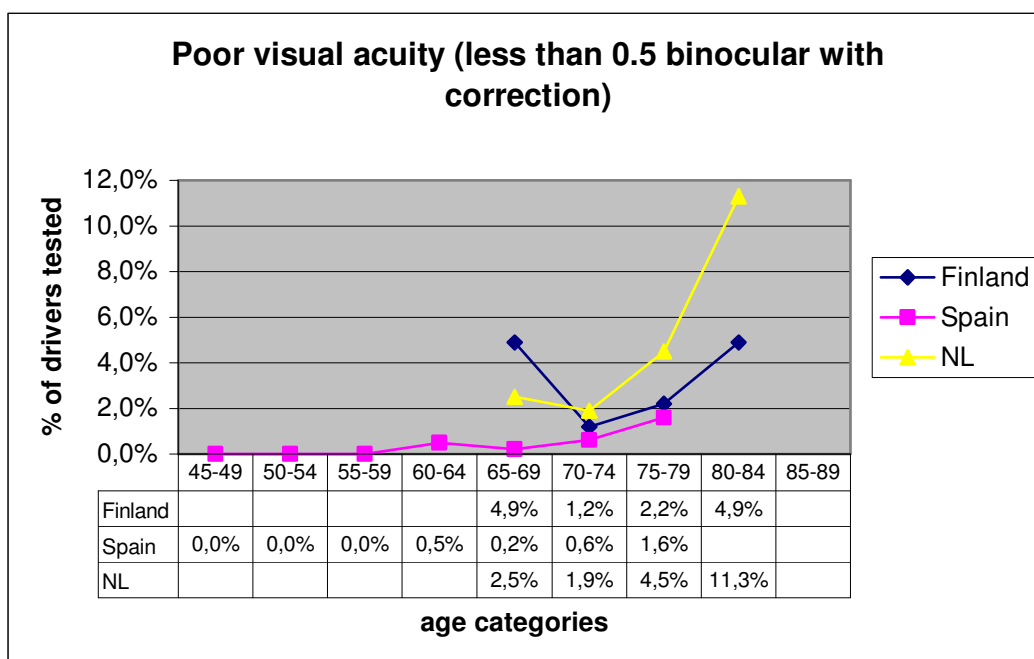


Figure 6: Abnormal visual acuity

The results show a correlation with increasing age. The results from Spain are lower than in the other two countries. Between 0,6% and 1,9% of the drivers in the 70-74 age category failed the acuity test, and this incidence increases in the older age categories, e.g. 1,6% to 4,5% in the 75-79 category.

Poor visual acuity amongst the 70+ age category in each country can be presented as follows:

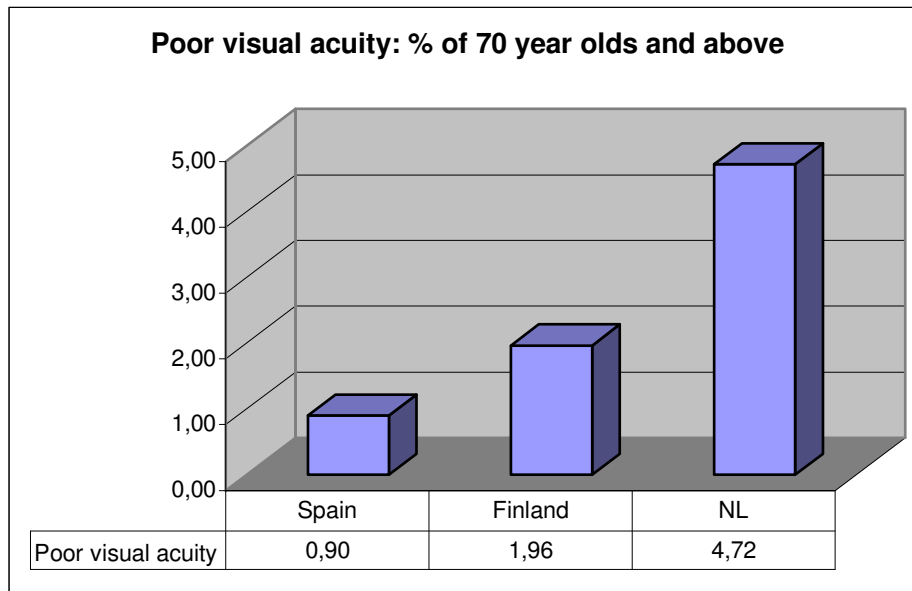


Figure 7: Poor visual acuity in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

In terms of comparative data, the ‘visual impairments in elderly European drivers study’ (A, B, D, ESP, NL)³ concluded that some 2,8% of the driving population between 65-74 years old failed the acuity test (using the same threshold as in the MEDRIL tests). The MEDRIL test results for the same age category were: 3,3% in Finland, 2,1% in Netherlands and 0,38% in Spain.

This other study also found that 5,3% of the 75+ driving population failed the acuity test. This figure of 5,3% can also be compared to the MEDRIL results, which concluded that 6,9% of a representative sample of the Dutch driving population over 75 years old failed, compared to 2,6% in Finland and 1,6% in Spain.

	65-74 years old	75+ years old
Visual impairments study	2,8%	5,3%
MEDRIL Finland	3,3%	2,6%
MEDRIL Netherlands	2,1%	6,9%
MEDRIL Spain	0,38%	1,6%

³ See New standards for the visual functions of drivers, Report of the Eyesight Working Group (expert group of the EU Driving Licence Committee), May 2005

b) Restricted visual field

Using the Donders method, patients were tested for visual field restrictions. The results in terms of restricted visual field are presented below:

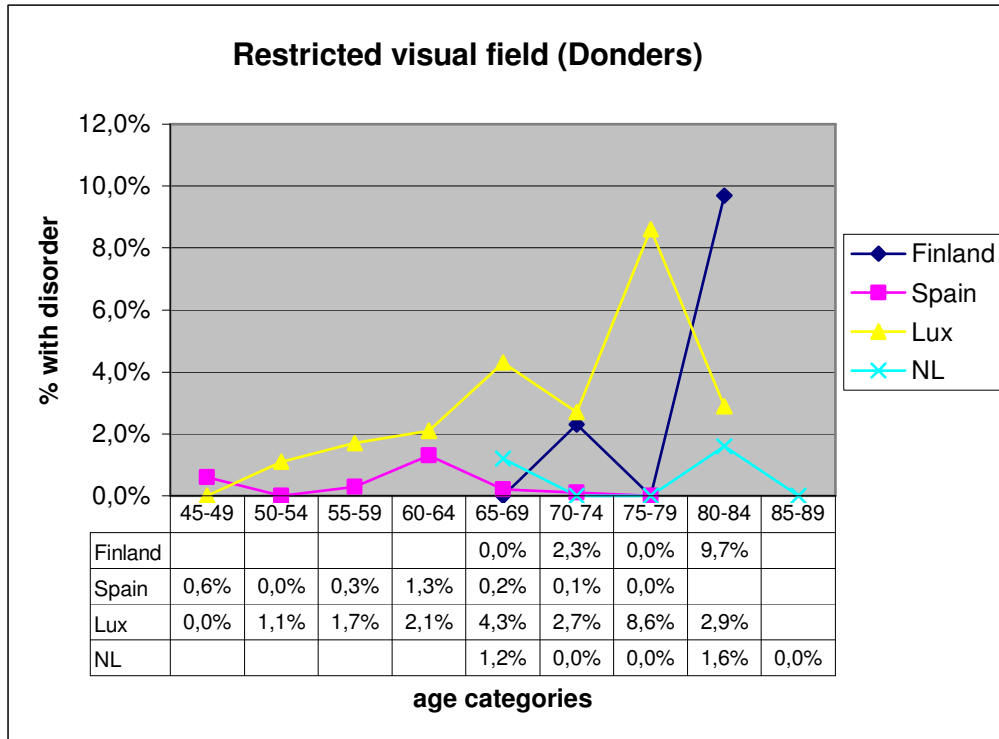


Figure 8: Restricted visual field

The data relating to restricted visual field is quite erratic, although there are indications of a correlation with age in Luxembourg, for example. The general trend in Finland and Luxembourg data suggests that between 2-4,5% of the 70+ driving population have restricted visual fields. In Spain and the Netherlands, on the other hand, results are closer to zero.

The incidence of restricted visual field amongst the 70+ age category in each country can be presented as follows:

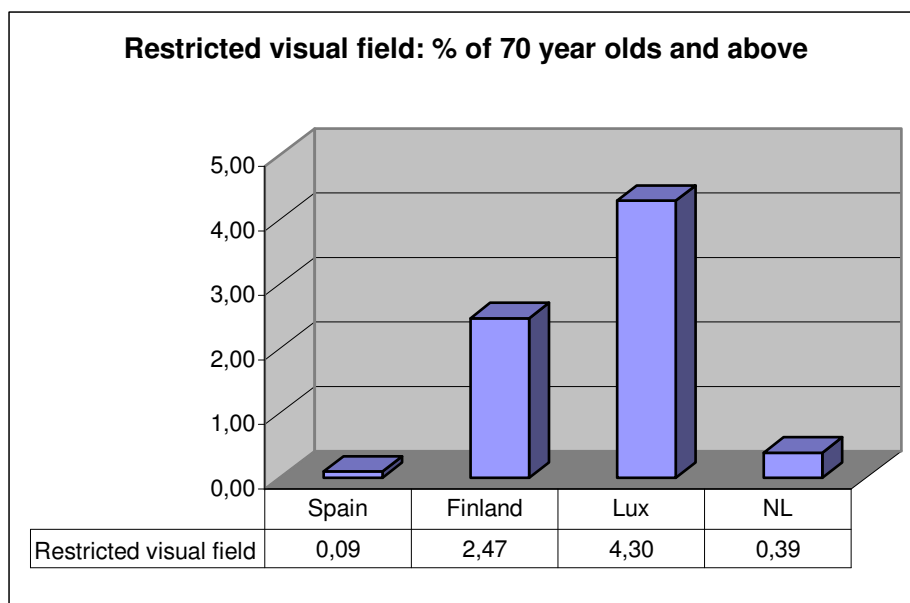


Figure 9: Restricted visual field in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

Comparative data, again from the visual impairments study, has suggested that 2,7% of over 75 year olds were ‘unsuited’ for driving in terms of restricted visual field, compared to 2,4% ‘questionable’. This compares to 0% failed in Spain, 2,63% in Finland, 2,7% in Luxembourg and 0,7% in the Netherlands for the same age category in the MEDRIL tests.

c) Problems with night vision (« glare »)

Drivers were asked if they had ”problems with night vision”. The results are presented below:

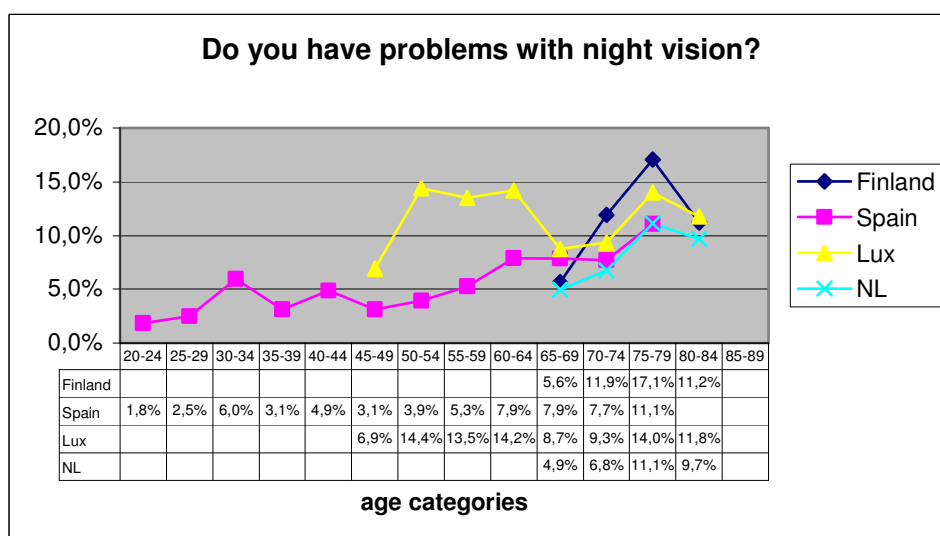


Figure 10: Problems with night vision

The MEDRIL show a clear correlation with increasing age, and a prevalence of between 11 and 17,1% of the 75-79 year old age category stating they have ‘problems with night vision’. The construction of the question leaves a certain amount of room for interpretation and it seems wise to suggest that responses will have been quite subjective. We have no idea, for

example, of how bad these problems are, and what the driving habits of these individuals are (do they in fact drive at night?).

The incidence of night vision problems amongst the 70+ age category can be presented as follows:

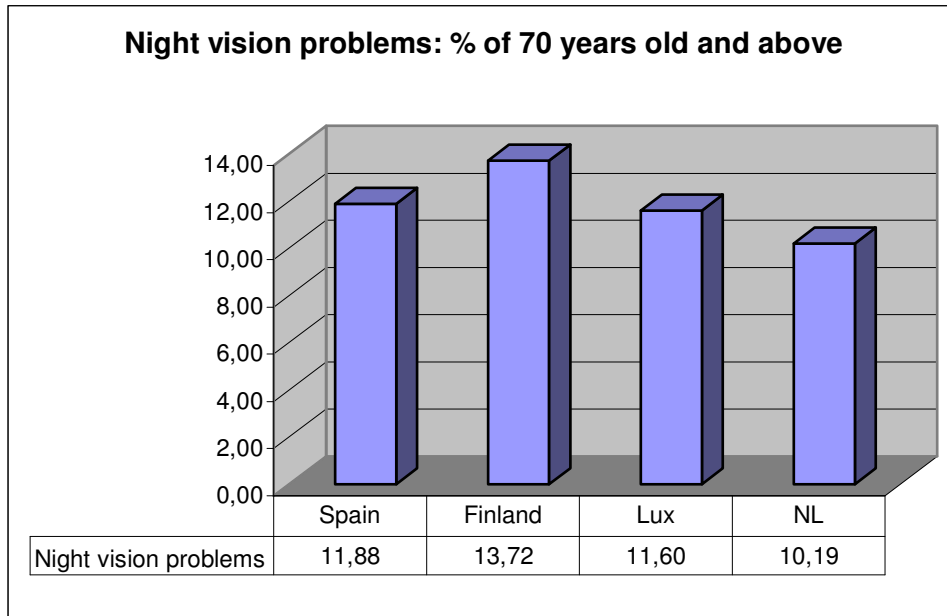


Figure 11: Night vision problems in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

The visual impairments study offers some hint of comparison, although problems with night vision, or 'stray light' was actually measured scientifically, rather than based on a simple question as in MEDRIL.

d) (Very) high blood pressure

Drivers had their blood pressure taken. The proportion of drivers with a reading of higher than 200 (systolic) or higher than 120 (diastolic) are presented below:

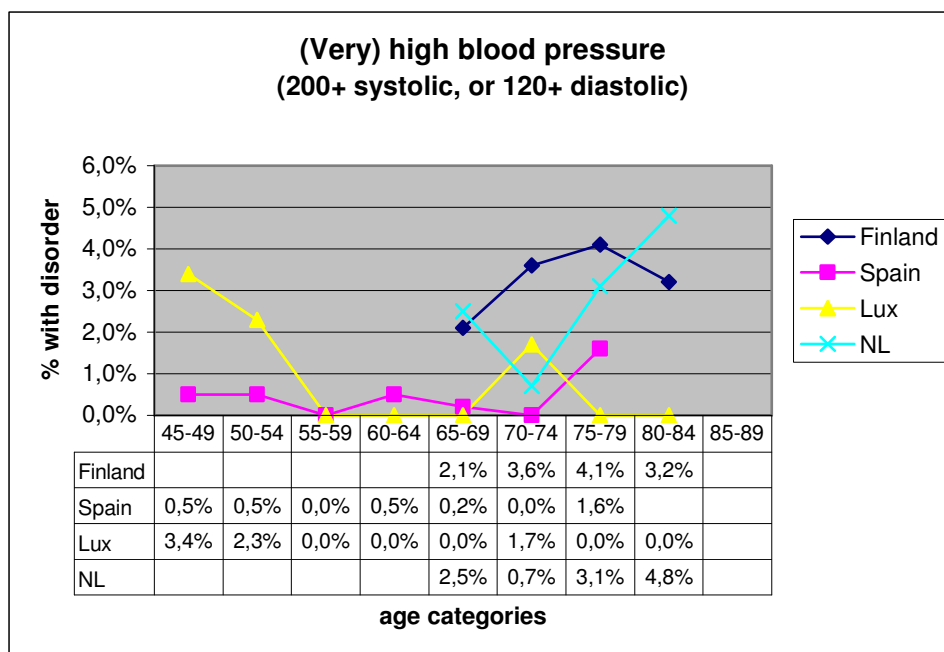


Figure 12: High blood pressure

The threshold for the blood pressure test was set at such a high level as to constitute a ‘risk’ of sudden incapacity while driving. Again, results differ considerably from one country to another. Spain has a very low incidence of such high blood pressure in its category B driving population, whilst data from Luxembourg is unclear and the results from the Netherlands and Luxembourg suggest an incidence rising with age. Around 4% of the 75-79 year old age category had such high blood pressure in Finland; this figure was 3% for the same age category in the Netherlands.

The incidence of such high blood pressure amongst the 70+ age category can be presented as follows:

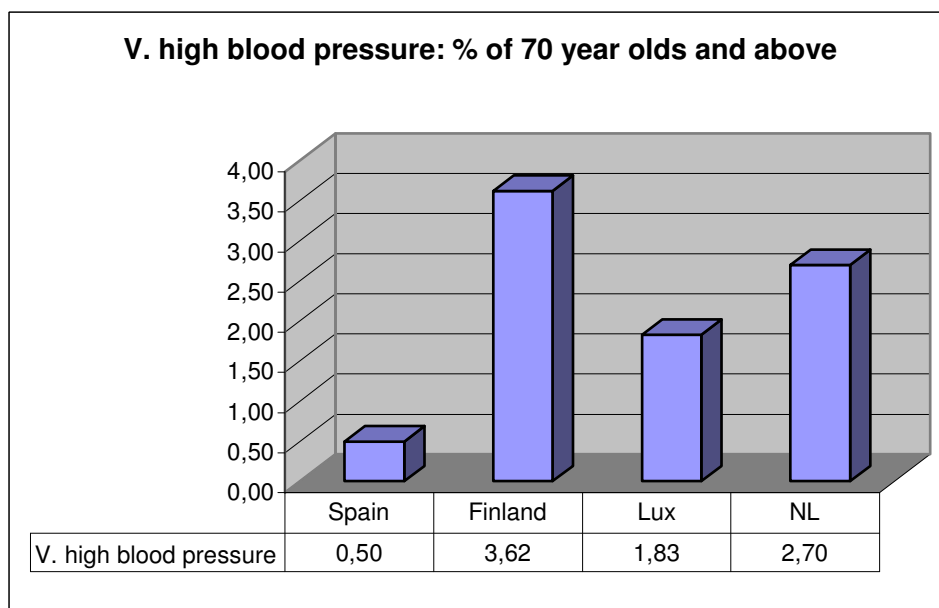


Figure 13: Very high blood pressure in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

Due to the very specific (and high) threshold level, no comparative data is available on this subject.

e) Cardio-vascular disease

Drivers were asked if they had ever received treatment for cardiovascular diseases. The results are presented below:

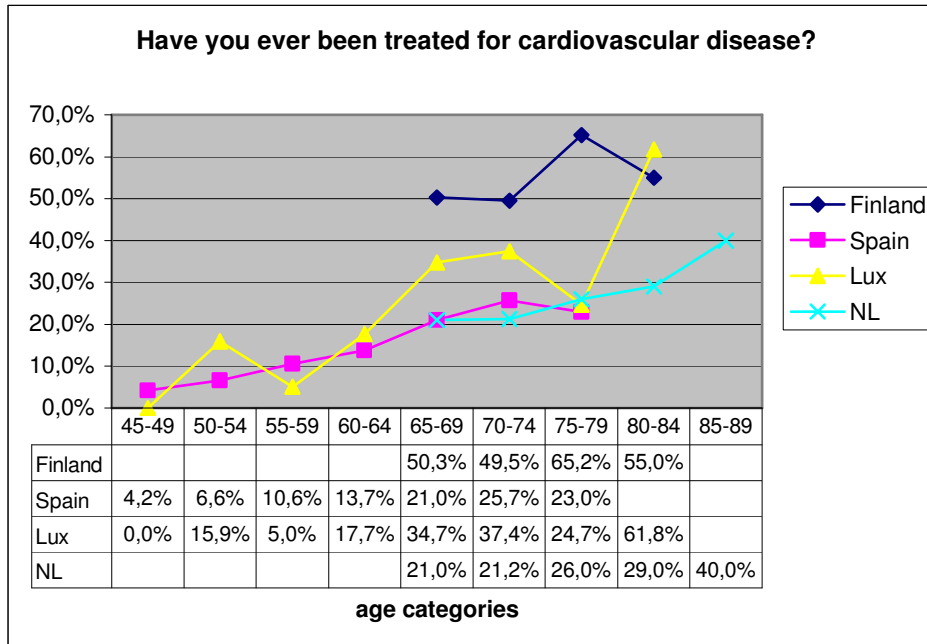


Figure 14: Treatment for cardiovascular disease

Cardiovascular disease is age-related and this is borne out by the MEDRIL test results. Between 24 and 57% of over 70 year olds have had such treatment, and considering the nature of the disease are likely to be currently following such treatment.

The prevalence of treatment for cardiovascular disease amongst the 70+ age group can be presented as follows:

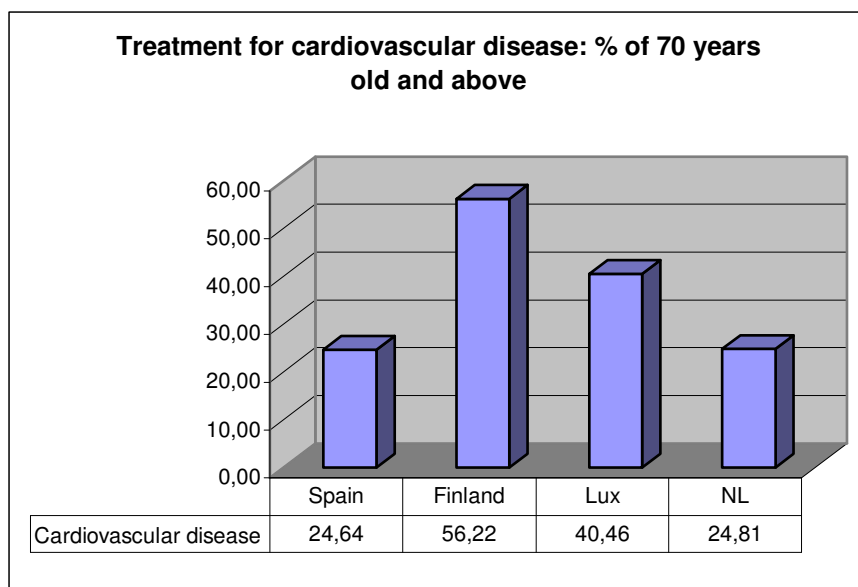


Figure 15: Treatment for cardiovascular diseases in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

The Finnish figures tally with the prevalence of cardiovascular disease in the general population in Finland⁴ and the Dutch results with data from the Netherlands, where coronary heart disease is suffered by between 20-30% of over 65 year old men, depending on the age category, and between 10-20% for women⁵.

f) Neurological disorders

Drivers were asked if they had ever suffered from any disorder of the brain or nervous system (Parkinson's, stroke, vertigo...). The proportion of them answering affirmatively are presented below:

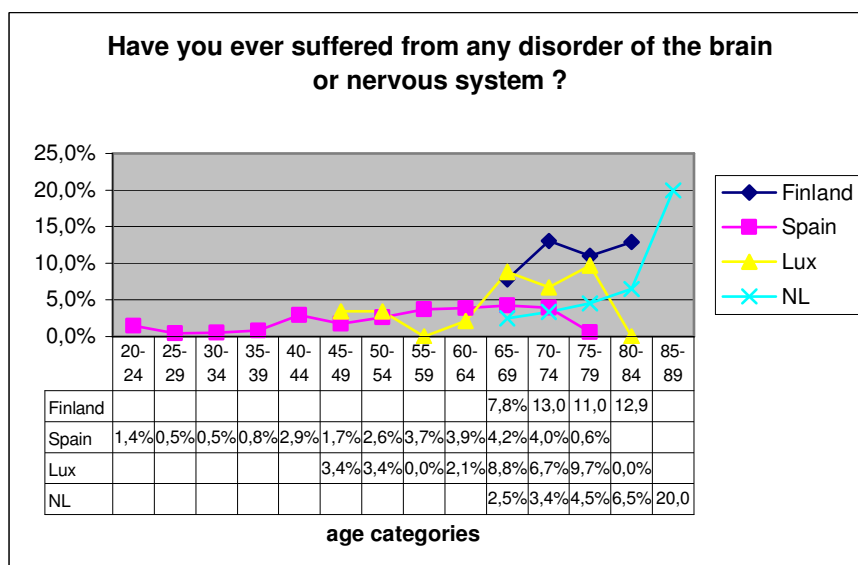


Figure 16: History of any disorder of the brain or nervous system

⁴ Health and Functional Capacity in Finland, survey 2000

⁵ Prevalence of diseases in the Netherlands, RIVM, 2000 (from website)

Neurological diseases can include such ailments as Parkinsons disease, strokes, Alzheimers, multiple sclerosis, vertigo and dementia. In all likelihood, strokes probably account for most of the conditions revealed here in the MEDRIL results.

The Spanish data suggests a growing incidence of neurological disorders with age, especially from the late 50s onwards, peaking at 4.2% of the driving population in the 65-69 year old age category. Up to 10% of the Luxembourg sample of category B drivers (75-79 year old age group) report a neurological disorder, and up to 13% in Finland (70-74 age category). Data from the Netherlands rises to 6.5% of the 80-84 age category, with a peak at 20% in the highest age category; this, however, is likely to be a statistical glitch due to the small sample size of this age group.

The incidence of neurological disorders in the 70+ age group can be presented as follows:

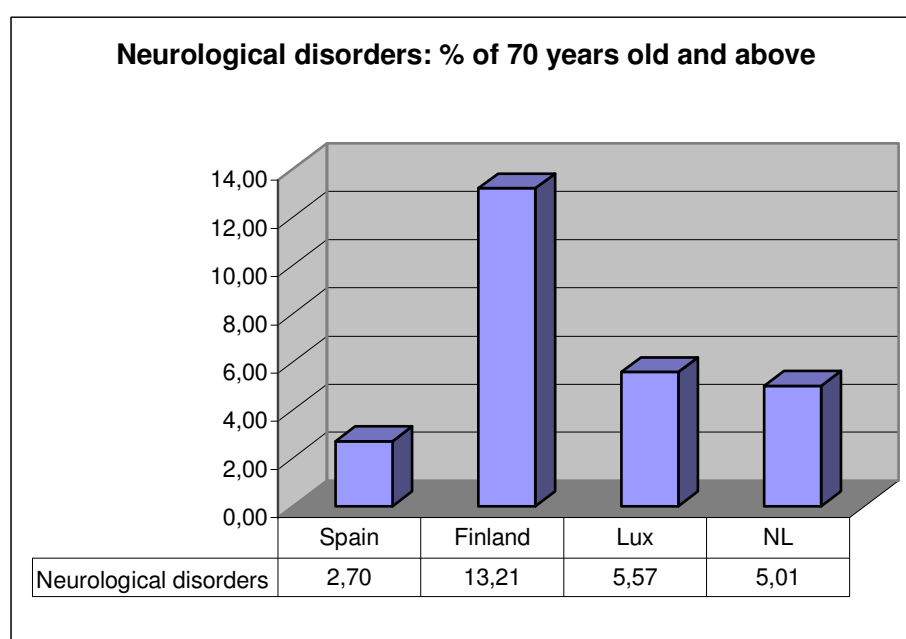


Figure 17: Neurological disorders in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

With regard to comparative data, the incidence of strokes in the general population in the Netherlands ranges between 6-10% in the 80+ bracket, according to specific age category⁶. In Finland, 9.6% of men and 6.7% of women over 65 have suffered strokes⁷.

g) Mental health

Drivers were asked if they had ever received treatment for their mental health. The results are represented in the graph below:

⁶ Prevalence of diseases in the Netherlands, RIVM, 2000 (from website)

⁷ Health and Functional Capacity in Finland, survey 2000

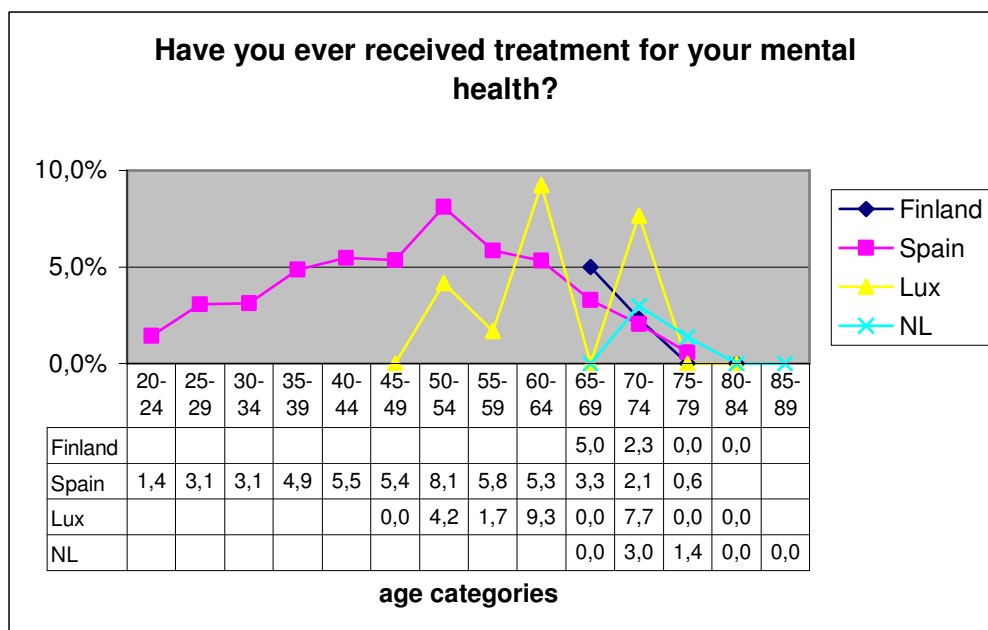


Figure 18: Treatment for mental health

Of these results on psychiatric problems, the vast majority of them are likely to relate to depression. This assumption is supported by the results on consumption of anti-depressants (see page 28), where the data mirrors the findings here. Schizophrenia is suffered by about 1% of the population but they would be unlikely to get a licence because the symptoms manifest themselves early.

Depression can be suffered by all age groups in the driving population. The Spanish results show a peak in treatment for mental health in the 50-54 age group. This is also the group where the highest consumption of alcohol was found amongst men, and the highest consumption of tranquilizers is found amongst women (see relevant section for further details).

Bouts of major depression are suffered by between 0 and 9% of the population in Finland, depending on the age category (decreasing with old age after approximately 60 years old).⁸ Figures from the general population in the Netherlands suggest that up to 4.9% of women and 2.8% of men suffer from depression, and there is a general upward trend as age increases.⁹

h) Alcohol consumption

Drivers were asked three questions regarding their drinking habits:

1. How often do you drink 3 portions of more of beer, wine, or other alcoholic beverages?
2. How many portions of alcohol do you generally consume each time you drink alcohol?
3. How often do you consume six or more portions?

If one or more of these questions is answered in the affirmative, above a certain threshold (see doctors' guidelines, annex 2), the participating doctors should have performed the CAGE test for alcohol abuse.

⁸ Health and Functional Capacity in Finland, survey 2000

⁹ Prevalence of diseases in the Netherlands, RIVM, 2000 (from website)

Relevant responses to the first question are presented in the graph below:

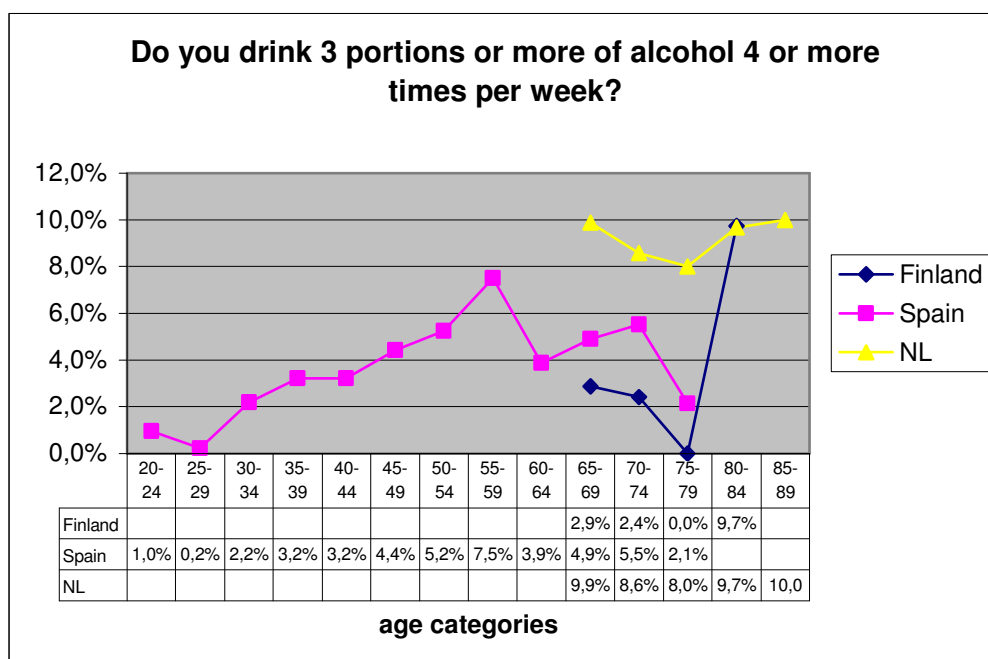


Figure 19: consumption of 3 portions or more of alcohol. 4 or more times per week

Alcohol consumption is typically under-reported in these types of tests. This is likely to be the case here too, and may explain the very low reporting for questions 2 and 3, and the CAGE results. Responses to question 1, however, do provide some interesting data, particularly in the case of Spain and the Netherlands. According to this criterion, Spanish alcohol consumption in the driving population appears to peak at around 8% of middle-aged car drivers (55-59, particularly men), whereas 8-10% of the Dutch sample over 65 years old drink more than 3 portions of alcohol 4 or more times per week. 3 portions of alcoholic beverages is equivalent to 30mg of pure alcohol. Daily consumption of 40 or more mgs of alcohol for men and 20mgs of alcohol for women is considered to constitute harmful drinking, and applies to approximately 12% of the adult population in Europe¹⁰. In the case of the Dutch over 65 MEDRIL sample, 12% of women declared this level of alcohol consumption compared to just over 6% of men.

This level of alcohol consumption amongst the 70+ age category can be presented as follows:

¹⁰ PHEPA Project: European clinical guidelines on the management of alcohol problems in primary care, 2005. www.phepa.net

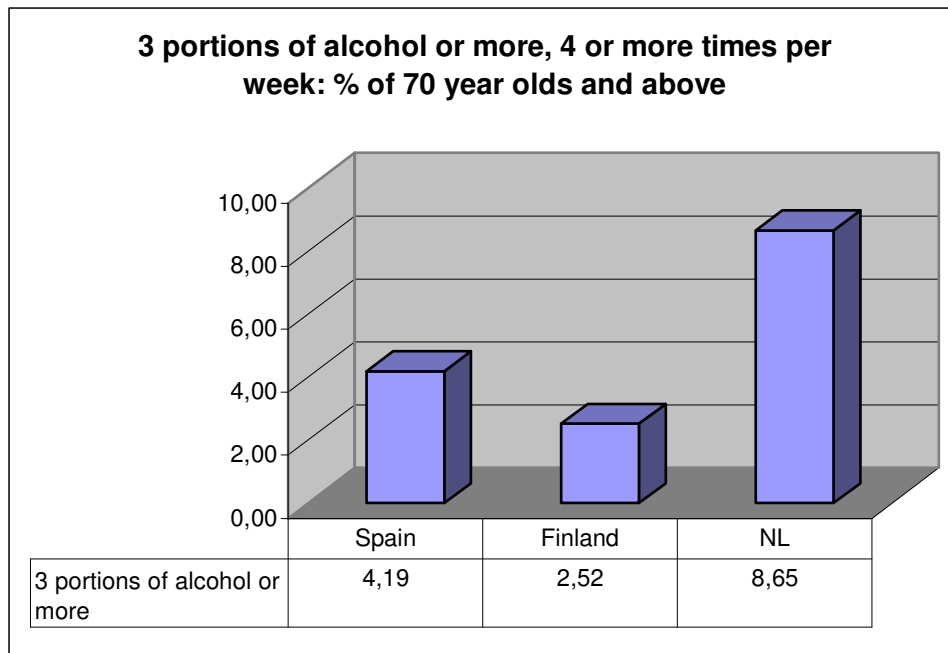


Figure 20: consumption of 3 portions or more of alcohol. 4 or more times per week in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

With respect to the second question, the following number of drivers stated that they drink 7 portions of alcohol or more at each sitting:

Spain: 0
 Netherlands: 2
 Finland: 2
 Luxembourg: 0

Concerning the third question, the following number of drivers stated that they drink 6 portions or more of alcohol consumed daily or almost daily:

Spain: 1
 Netherlands: 0
 Finland: 0
 Luxembourg: 0

The CAGE test was supposed to be performed on all drivers answering in the affirmative to one or more of the above 3 questions. The following number of drivers failed this test:

Spain: 2
 Netherlands: 3
 Finland: 1
 Luxembourg: 6

i) Consumption of psycho-active medicines

Drivers were asked if they "take any medicine that may influence your ability to drive, such as hypnotics, tranquillisers, antidepressants, anti-psychotics, stimulants or other similar drugs?" Results are presented in the graph below:

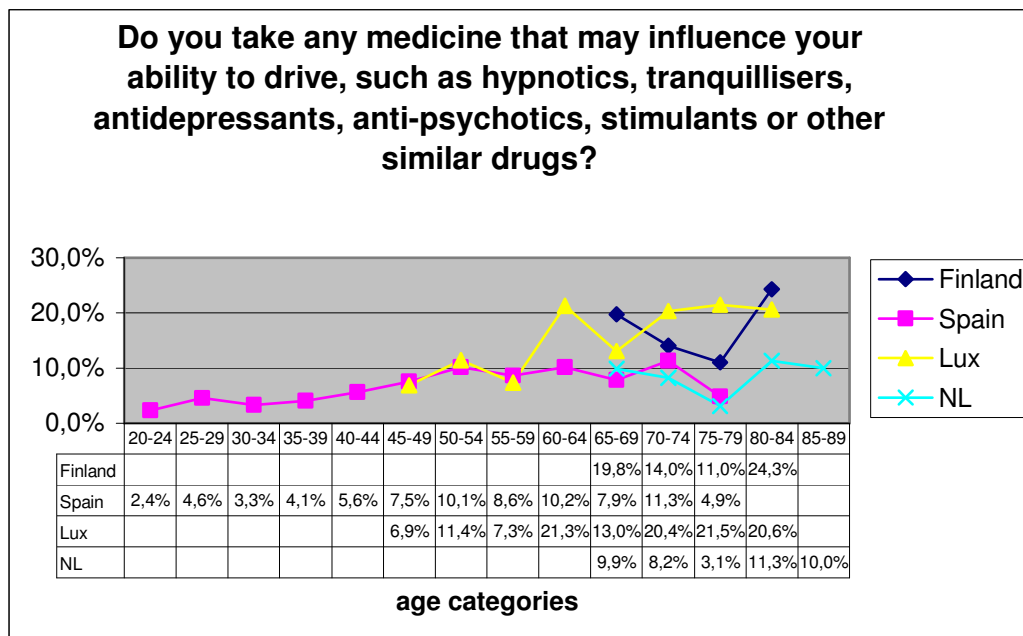


Figure 21: consumption of psycho-active medicines

These types of medications have been chosen because they are psycho-active medicines. They all affect the central nervous system. They include ‘downers’ such as analgesics (painkillers), hypnotics (sleeping pills) and sedatives (tranquilisers), and ‘uppers’ such as anti-depressants and narcoleptics.

The MEDRIL results suggest that up to 20% of the elderly driving population ((70+) regularly consumes one or more of these medicines, although the rates vary considerably from one country to another. The consumption of psycho-active medicines amongst the 70+ age group can be presented as follows:

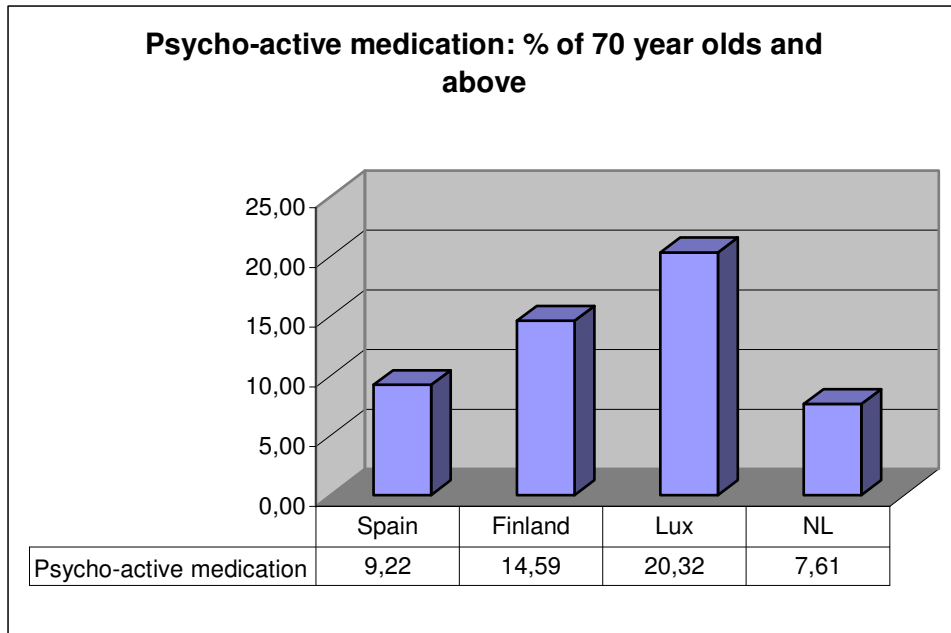


Figure 22: Consumption of psycho-active medication in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

Some comparative data can be gleaned from the LEHO project¹¹ which analysed the results of the normal medical tests for category B drivers in three of the four MEDRIL countries (Luxembourg, Netherlands and Spain). The sample sizes were much bigger in the LEHO project in the case of Spain and Luxembourg (22232 over the age of 40 in Spain and 2154 over 45 in Luxembourg) but were similar in the case of the Netherlands. Overall, reported consumption of (the same) psycho-active medicines in the LEHO project was considerably lower than in the MEDRIL tests: consumption of medication rose to 7,4% in Spain in the 80+ category and to between only 1-5% in the Dutch and Luxembourg populations in LEHO. However, the LEHO results were based, in the case of the Netherlands and Luxembourg, on responses on personal declaration forms, which generally allow for more scope of under-reporting than the method used in MEDRIL: direct questions from the responsible doctor.

The EU IMMORTAL project¹² concluded that psychoactive medicines are consumed particularly in 50+ age category of women (IMMORTAL, 4.2), and in men in early retirement (IMMORTAL, Danish study). These results are reflected out in the Spanish results (former conclusion) and the Luxembourg results (latter conclusion).

Figures 23 to 26 below present the data for each of the 5 types of medication referred to.

¹¹ EU LEHO project, part of the EU AGILE project, 2005. Managed by ASECEMP, Spain.

¹² IMMORTAL project: driver impairments and their implications for road safety. 5th Framework Programme project of the European Union, see www.immortal.or.at

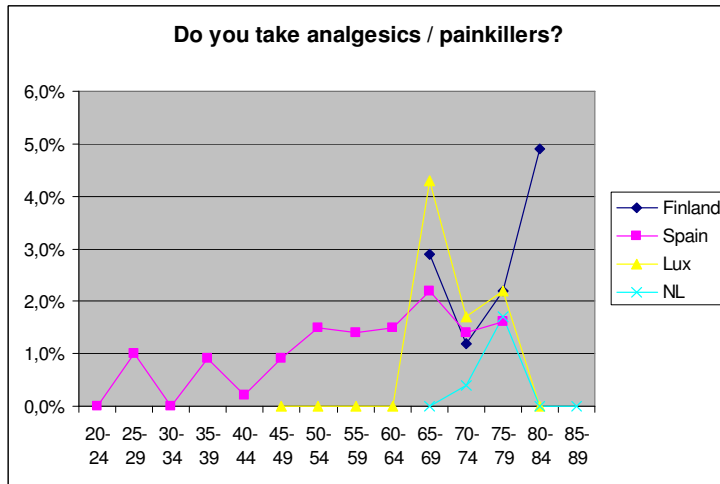


Figure 23: consumption of analgesics

Results from Spain, for instance, suggest that 1-2% of the elderly population regularly consume analgesic medication.

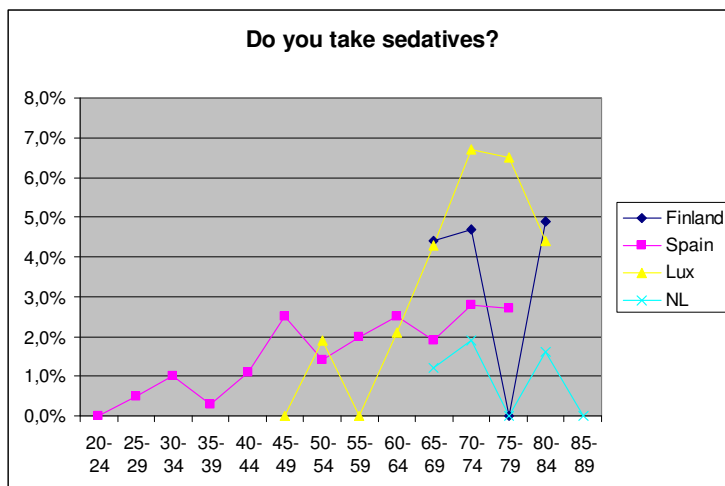


Figure 24: Consumption of sedatives

Consumption of sedatives (tranquilisers) ranges between 1-3% of the Spanish over 45 population, with a small peak already in the 45-49 year old age group. The Luxembourgish data suggests that up to 7% of the elderly (70-74 age category) use such medication.

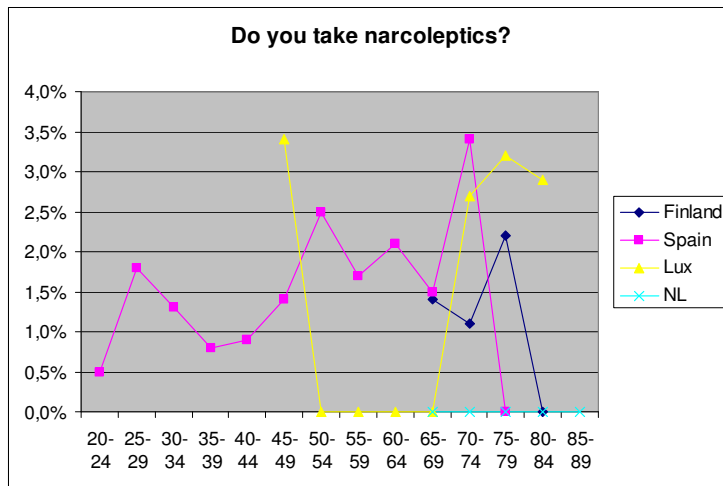


Figure 25: Consumption of narcoleptics

There is a clear correlation with increasing age with regard to the use of narcoleptic medication in Spain, peaking at 3.5% of the elderly population. Luxembourgish data is erratic, suggesting that up to 3-3.5% of the elderly population take such medication. No consumption of narcoleptics was reported in the Netherlands.¹³

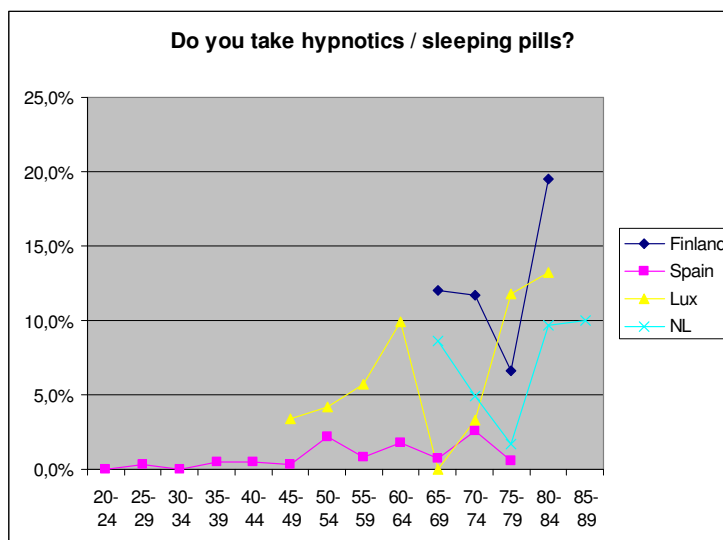


Figure 26: Consumption of hypnotics

Of the various psycho-active medicines covered in the MEDRIL tests, consumption of hypnotics (sleeping pills) accounts for the vast majority of usage overall. Usage in Spain remains under 3% even in the higher age groups, but there are indications that around 10% of the elderly driving population in the other 3 countries regularly use sleeping pills.

¹³ Narcoleptics are not used in Finland so the Finnish results are an anomaly and should be disregarded.

j) Sleeping disorders

Drivers were asked if they suffered from any sleeping disorders, as follows:

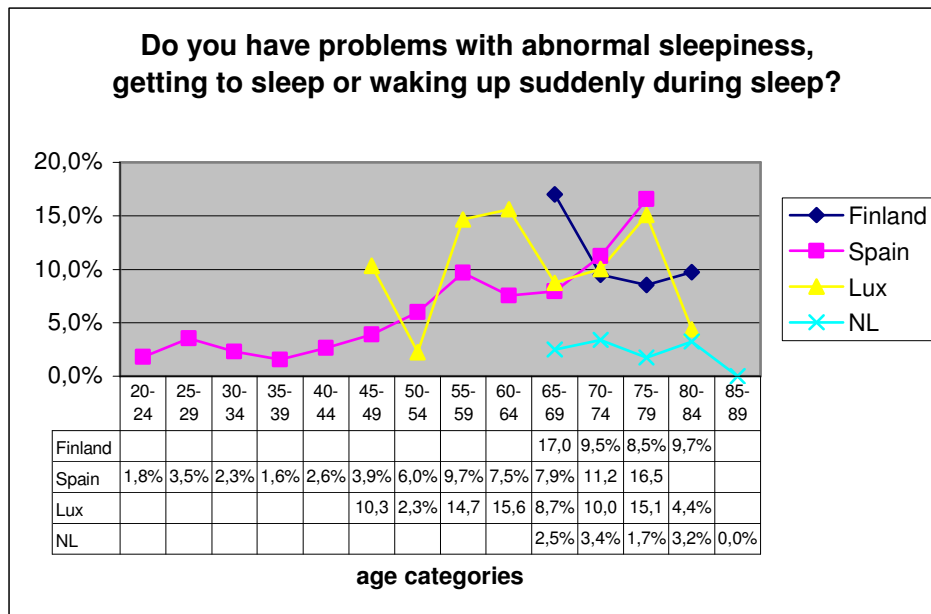


Figure 27: Sleeping disorders

Sleeping disorders include:

- narcolepsy (very unusual)
- sleep apnoea, mainly affecting overweight middle-aged men
- sleeping problems for older people, most likely related to getting to sleep

The Spanish results, and to a certain extent the Luxembourgish results, show a correlation with increasing age in the incidence of sleeping disorders. Some 10-15% of the older age categories (55+) in Spain and Luxembourg, and similar amounts from Finland over 65 regularly consume such medication. In contrast, sleeping disorders peak at under 4% of the elderly driving population sample in the Netherlands.

The incidence of sleeping disorders in the 70+ age group can be presented as follows:

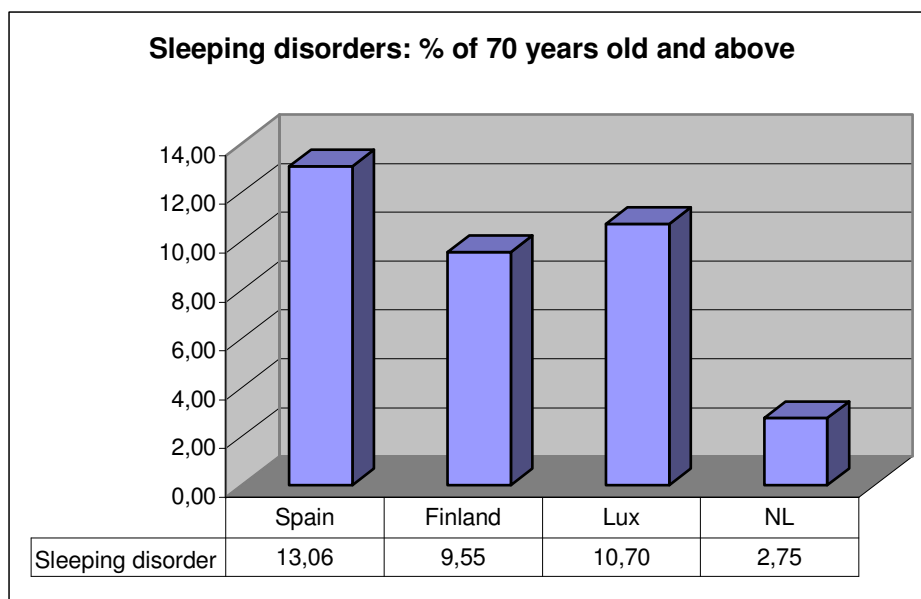


Figure 28: Sleeping disorders in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

k) Epilepsy

Drivers were asked if they have suffered from epilepsy or a similar disorder. The results are presented in the graph below:

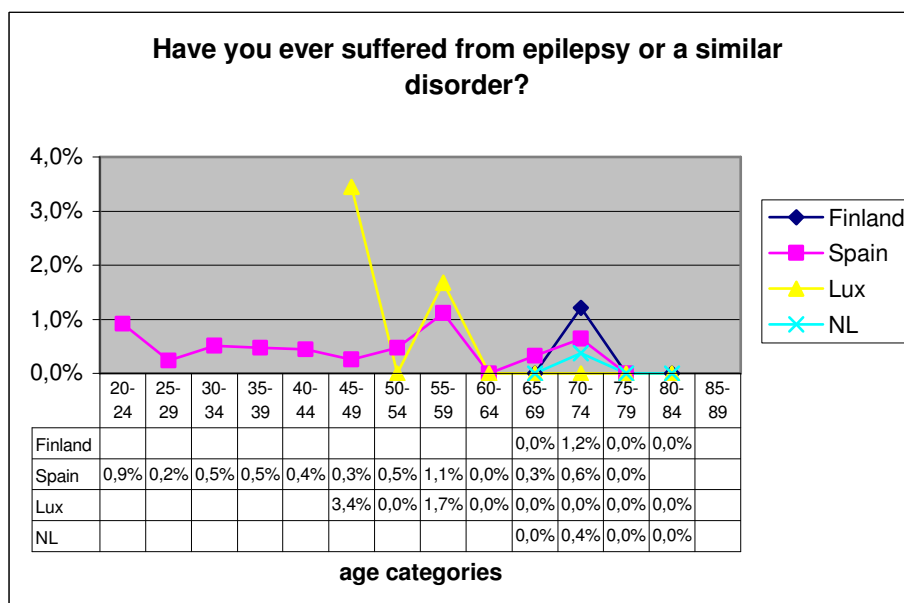


Figure 29: Epilepsy or similar disorder

One of the sub-groups of the EU Driving Licence Committee, the expert medical group on Epilepsy, concluded in 2005 that approximately 0,6% of the adult population suffered from active epilepsy. “Of these patients, a substantial number hold a driving licence” (Sonnen, 1995). This data is borne out by the MEDRIL results, with the exception of Luxembourg (possibly due to small sample sizes). Respondents to this question in the MEDRIL tests may also have been referring to an isolated episode of epilepsy or another similar disorder, which

strictly speaking does not constitute epilepsy (defined as having suffered more than one seizure). This should be taken into account in the interpretation of the data.

1) Diabetes

Drivers were asked if they have been treated for diabetes. Those who have been – or are being - treated are presented in the graph below:

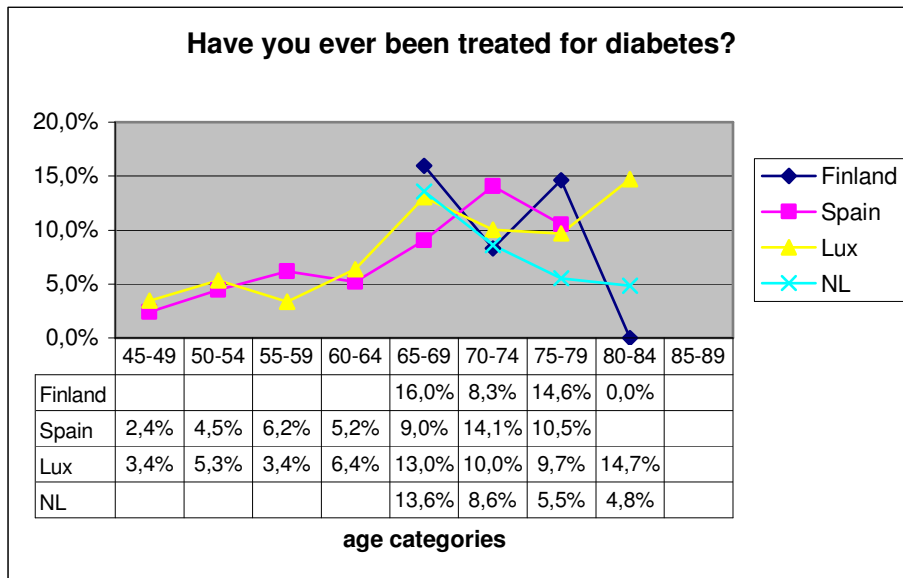


Figure 30: Treatment for diabetes

This data applies to both types of diabetes. Data from Luxembourg and Spain show a clear correlation between the incidence of diabetes and increasing age. Data from Finland and the Netherlands suggest that the incidence of diabetes in the category B driving population may decrease into old age. This may be due to the (self-)removal of such drivers from the driving population. Overall, the MEDRIL results suggest that 6-13% of drivers over the age of 70 years old have or are being treated for diabetes.

The incidence of diabetes in the MEDRIL 70+ age group can be presented as follows:

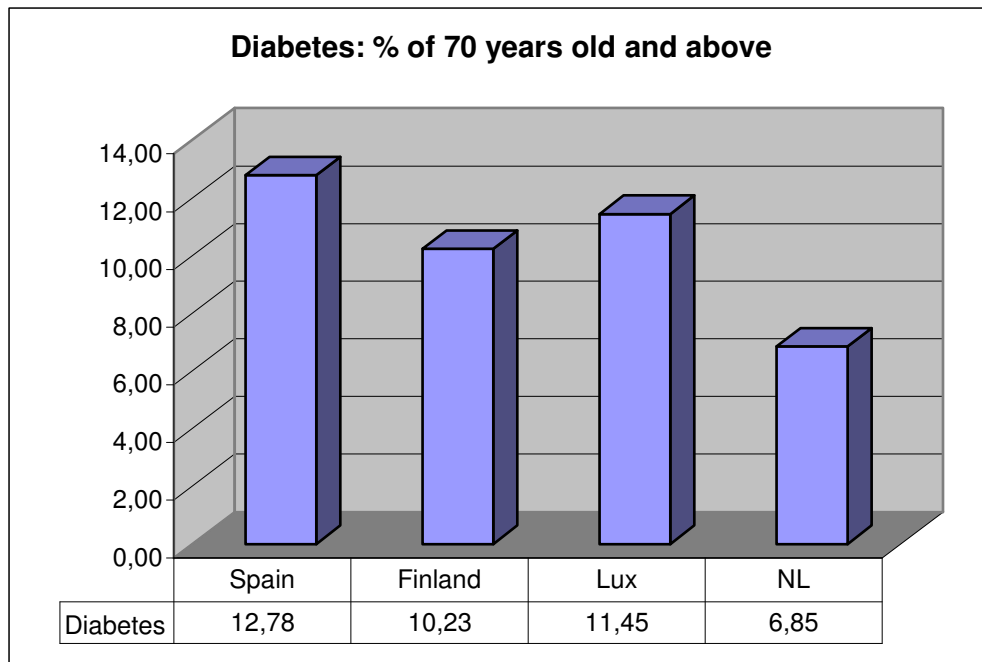


Figure 31: Treatment for diabetes in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

Data from two sources in the Netherlands corroborates this data: 15-17% of 75+ age bracket was reported with diabetes in a 2003 study¹⁴ and the Hoorn study from 1989-91¹⁵, referring to type 2 diabetes, found 15,9% of 70-74 yr olds suffering from diabetes.

m) General health : strength, reflexes and balance

As a means of testing the general health condition of the drivers, they were tested for strength, reflexes and balance. The tests were standardised from one country to another, but some variation in implementation may have occurred (particularly in the case of the strength and reflexes tests, where the doctor has to use his/her own judgement as to what constitutes normal or abnormal).

The results are presented in the graph below:

¹⁴ See www.rivm.nl

¹⁵ Hoorn study, 1989-91 (NL). See report of the Diabetes working group, sub-group of the EU Driving Licence Committee (2005).

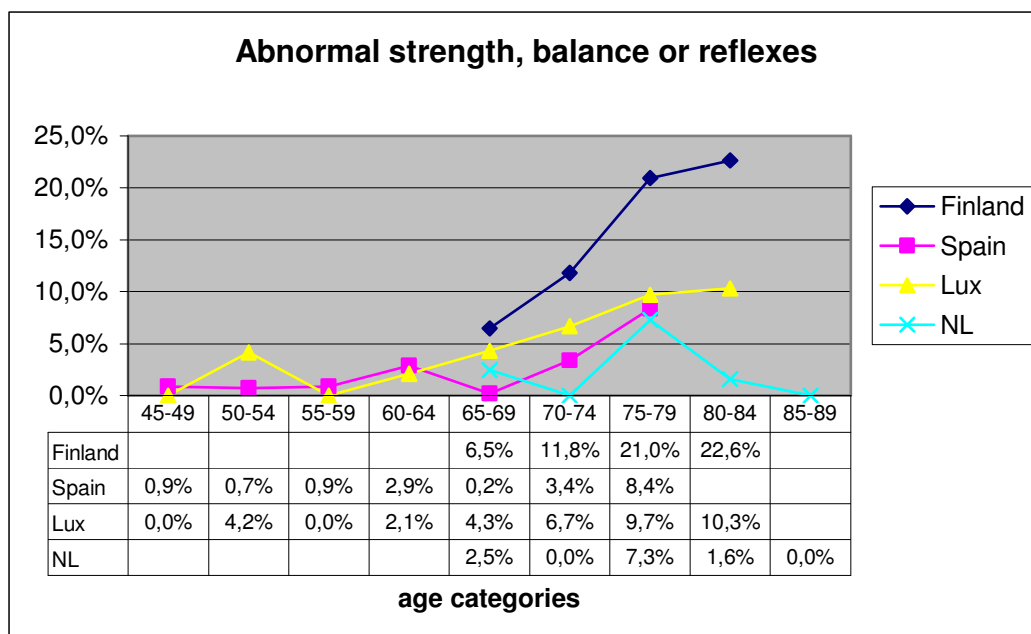


Figure 32: Abnormal (impaired) strength, balance or reflexes

Predictably, loss of strength, reflexes and balance seems to be correlated with increased ageing. The MEDRIL results do, however, indicate some considerable differences in the incidence of such conditions between the 4 MEDRIL countries.

The incidence of abnormal strength, balance and reflexes amongst the 70+ age category as a whole is presented below:

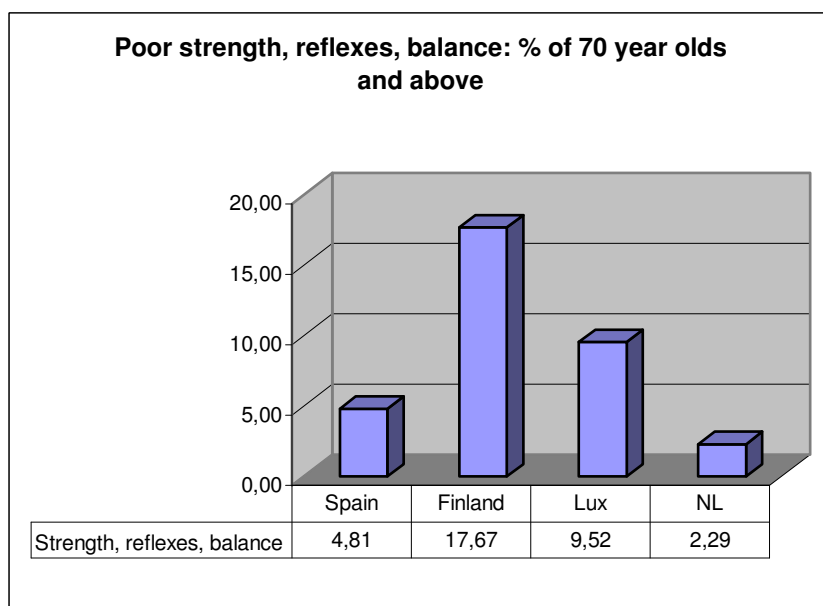


Figure 33: Abnormal (impaired) strength, balance or reflexes in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

n) Cognitive impairment

Signs of cognitive impairment were supposed to be measured, using the mini-mental test, for all drivers above 70 years old and for any other driver where such impairment is suspected. The results for mild dementia are as follows :

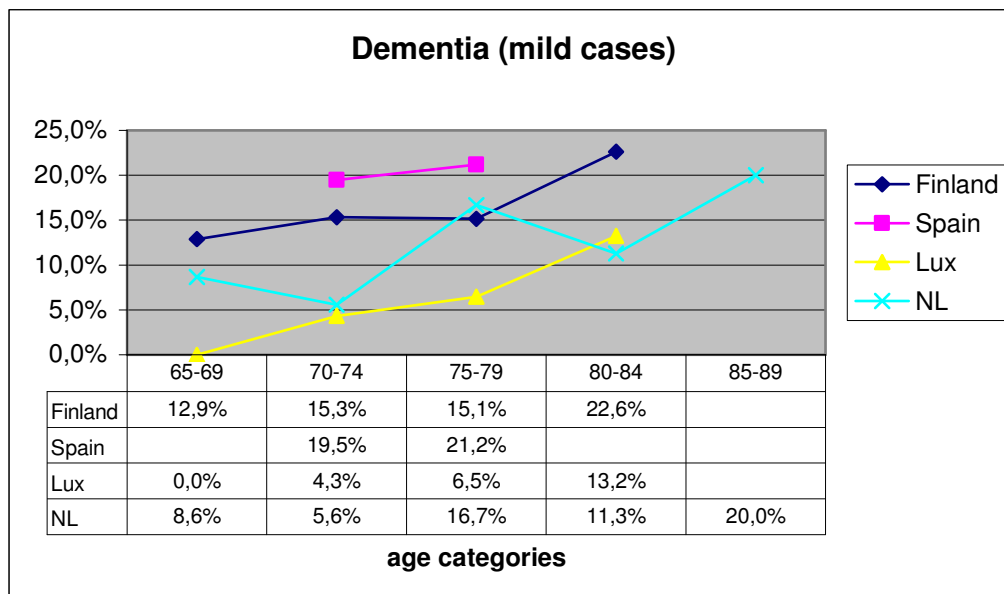


Figure 34: mild dementia

This data provides an indication that up to 20% of the elderly driving population may suffer from mild dementia.

The incidence of mild dementia amongst the 70+ age group overall is presented below :

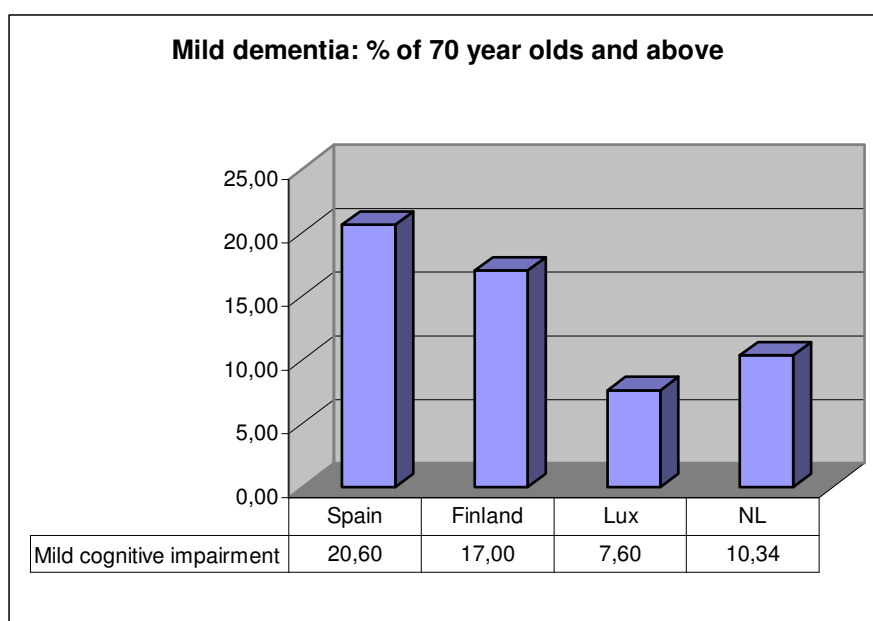


Figure 35: mild dementia in the 70+ age category

(Sample sizes 70+ age category: Spain = 407, Finland = 160, Luxembourg = 134, Netherlands = 344)

Comparative data from the general population in the Netherlands suggests that between 10 and 35% of the 80+ age bracket suffer from dementia, defined as moderate or worse cognitive impairment.

A small number of cases of drivers with more considerable cognitive impairment was also found, as presented below :

- **SPAIN:** Serious dementia was found in one case (77 year old). Spain also had 1 moderate to serious case (72 yrs) and 2 moderate cases (71 and 76).
- **NETHERLANDS:** The Netherlands results show 4 cases of moderate dementia (70, 71, 74 and 86 years old) and no cases worse than that.
- **FINLAND:** no cases of moderate or serious dementia
- **LUXEMBOURG:** 1 case for both serious dementia and moderate-to-serious dementia were found in Luxembourg (77 and 81 years old respectively).

The dementia test used in the MEDRIL countries was the mini-mental test. Cut-off values are as follows:

Maximum possible score: 30

Score 21-26: mild dementia

Score 10-20: moderate dementia

Score 10-14: moderate-serious dementia

Score <10: serious dementia

1.7 Summary of survey results

	Examination /Anamnesis?	Method / Scope	Pass criteria	Main results (abnormalities / failure)
Poor visual acuity	Examination	Method (eyesight): letters, circles, figures or combination Scope: binocular with correction only	Minimum 0,5 vision	Positive correlation with increasing age. 70+ age group – Spain 0,9%, Finland 1,96%, NL 4,72% 20-59 age group (Spain): 0%
Restricted visual field	Examination	Method (visual field): Donders Both eyes open	normal / abnormal	Positive correlation with increasing age. 70+ age group – Spain 0,09%, Finland 2,47%, Lux 4,30%, NL 0,39%
Problems with night vision (glare)	Anamnesis			Positive correlation with increasing age 70+ age group – Spain 11,88%, Finland 13,72%, Lux 11,60%, NL 10,19% 50-60 age group – 4-8% in Spain, ~15% in Luxembourg
High blood pressure	Examination		Threshold: higher than 200 (systolic) or higher than 120 (diastolic)	Positive correlation with increasing age 70+ age group – Spain 0,5%, Finland 3,62%, Lux 1,83%, NL 2,7%
Cardiovascular disease	Anamnesis			Positive correlation with increasing age 70+ age group – Spain 16,64%, Finland 56,22%, Lux 40,46%, NL 24,81% Rising above 10% from 50 yrs old onwards (Spain, Lux)
Neurological disorders	Anamnesis			Positive correlation with increasing age 70+ age group – Spain 2,7%, Finland 13,21%, Lux 5,57%, NL 5,01%
Mental health problems	Anamnesis			Peaking at 8,1% of 50-54 yr old age category. Signs of decreasing problems thereafter (Spain, Finland, NL) Results over total samples: Spain (20-89): 4,3% Finland (65-89): 2,7% Luxembourg (45-94): 3,5% Netherlands (65-95): 1,4%
High alcohol consumption	Anamnesis	3 portions or more of alcohol, 4 or more times per week		70+ age group (relevant due to potential combination with psycho-active medicines) – Spain 4,9%, Finland 2,52%, NL 8,65% Peaking in Spain at 7,5% of the 55-59 yr old age group
Consumption of psycho-active	Anamnesis	Sedatives, hypnotics, narcoleptics,		Positive correlation with increasing age 70+ age group – Spain 9,22%,

medicines		anti-depressants, analgesics		Finland 14,59%, Lux 20,32%, NL 7,61% Growing incidence from 40 yrs old (Spain) and around 10% by 50 yrs old (Spain, Lux)
Sleeping disorders	Anamnesis			Positive correlation with increasing age 70+ age group – Spain 13,06%, Finland 9,55%, Lux 10,7%, NL 2,75% Increasing incidence from 50 yrs old (Spain = 6%+)
Epilepsy	Anamnesis			Spain sample (20-89 yrs old): 0,5% Finland sample (65-89 yrs old): 0,4% Luxembourg sample (45-94 yrs old): 0,6% Netherlands sample (65-94 yrs old): 0,4%
Diabetes	Anamnesis			Positive correlation with increasing age 70+ age group – Spain 12,78%, Finland 10,23%, Lux 11,45%, NL 6,85% 65-69 age group: 9%+ (all countries)
Poor strength, reflexes, balance	Examination	Strength: pulling arm Reflexes: hammer Balance: standing on one leg	normal /abnormal normal /abnormal Remaining balanced for 5 seconds or under = abnormal	Positive correlation with increasing age 70+ age group –Spain 4,81%, Finland 17,67%, Lux 9,52%, NL 2,29%
Cognitive impairment	Examination	Mini Mental Test (test used in each respective country <u>for all patients of 70 years old or above</u> , and for any other patient where there is suspicion of cognitive impairment)	- score 21-26: mild dementia - score 10-20: moderate dementia - score 10-14: moderate-serious dementia - score <10: serious dementia	Positive correlation with increasing age 70+ age group (mild impairment only ¹⁶): Spain 20,6%, Finland 17%, Lux 7,6%, NL 10,34%

Table 5: Summary of survey results for all countries and all conditions

¹⁶ The recordings of more serious cases are as follows:

- SPAIN: Serious dementia was found in one case (77 year old). Spain also had 1 moderate to serious case (72 yrs) and 2 moderate cases (71 and 76).
- NETHERLANDS: The Netherlands recorded 4 cases of moderate dementia (70, 71, 74 and 86 years old).
- FINLAND: no cases of moderate or serious dementia.
- LUXEMBOURG: 1 case of both serious dementia and moderate-to-serious dementia (77 and 81 years old respectively).

1.8 Conclusions

Despite the small samples, and the lack of information on drivers who refused to participate in the tests, the MEDRIL results were statistically re-weighted for representativeness in terms of age and age+sex distribution and many of the results are supported by data on medical disorders in the general population (primarily provided by Finland, the Netherlands and the EU expert medical working groups of the EU Driving Licence Committee). The most striking result regarding the health of the drivers in the survey was the level of mild dementia present in the older age groups. Up to 20% of drivers over 70 years old showed signs of mild dementia on the basis of the mini-mental test. Cases of moderate or serious dementia were, however, extremely rare.

The results can thus be added to the body of evidence on medical impairments and incapacities in the category B driving population, at least with respect to the countries in the study¹⁷. The results do, however, refer only to general disorders which may not necessarily affect fitness to drive. A given condition may affect an individual's fitness to drive in different ways and to varying degrees. In many cases, moreover, there is little indication of the severity of the conditions in question, nor of the presence of a combination of disorders; this is clearly relevant in terms of assessing one's ability to drive safely. In addition, even if a given disorder does have a potential impact on fitness to drive, the driver in question may be able to compensate through adapting his/her driving style and habits (slower speeds, sticking to familiar routes, using extra caution, not driving at night or during peak traffic periods, only driving short distances, etc). Ultimately, when a health problem is identified, the question of whether to continue driving should depend not only on a medical diagnosis but also an assessment of the functional consequences of the illness on fitness-to-drive and counselling relating to strategic mobility choices for the person in question. Tests are needed which have an established correlation with driving, such as UFOV (Useful Field of Vision) tests which combine visual-attentional factors, or on-road assessments may be used in unclear cases.

In conclusion, the MEDRIL results alone cannot be used to determine if and when periodic, ongoing fitness to drive testing should be recommended for category B drivers. Such a recommendation would need to be based on evidence:

- related to functional impairment with regard to fitness-to-drive, not just the presence of medical conditions
- based on a sufficiently large population
- where the proportion of unfit-to-drive persons exceeds an accepted threshold
- that medical testing can effectively identify and remove unfit drivers (and unfit drivers only).

None of these pre-requisites have been fulfilled in the MEDRIL project, nor indeed were the majority intended to be.

Greater analysis into fitness-to-drive issues is being carried out by parallel projects or working groups, such as the EU IMMORTAL and AGILE projects, and the EU Driving Licence Committee's expert medical groups (Epilepsy, Diabetes, Alcohol/Drugs/Medicine, Vision...).

¹⁷ Many conditions vary considerably from one country to another, due to socio-cultural reasons such as diet, or simply genetic heritage. This is particularly visible in terms of cardiovascular diseases, for instance.

1.9 Discussion

1.9.1 What potential impact do these medical conditions have on fitness-to-drive?

Ultimately, fitness-to-drive may be called into question if the person has difficulty:

1. *Controlling the vehicle*, due, for example, to physical handicaps, sudden incapacity (seizure, cardiac arrest, attacks of dizziness) or neurological conditions such as multiple sclerosis or motor neurone disease.
2. *Perceiving hazards*, due, for example, to vision problems, neck restrictions, etc
3. *Decision-making*, due, for example, to dementia / cognitive impairment through ageing or trauma.

The conditions covered in the MEDRIL tests either constitute potential direct risk factors with regard to safe driving, or are indicators of another potentially relevant condition. They all feature in Annex III of the Driving Licence Directive. Whilst the individual expert medical groups operating under the EU Driving Licence Committee have explored these issues in more depth, as has the EU IMMORTAL project, the following section provides a short overview of the potential impact of specific medical conditions, or combinations of conditions, on fitness-to-drive. It should be stressed that these are potential impacts which may be very low risk in reality and depend heavily on the severity of the condition, co-morbidity, treating medication and operational, tactical and strategic choices of the driver.

The list of conditions below is not exhaustive.

- VISION

Visual problems relate not only to 'visual acuity', but also to 'visual field', 'contrast sensitivity' and 'glare sensitivity'. Only basic visual acuity and visual field examinations were conducted in the MEDRIL tests, in addition to a question on night-time driving (related to glare sensitivity) but yet contrast sensitivity (the ability to distinguish properly between one object and another) is also considered a vital element for safe driving. While visual field is also considered particularly important for driving (e.g. crossroads require peripheral field and not central vision) as the basis of a warning system in driving), restricted visual field may not necessarily lead to less road safety: people can learn to compensate for both low visual acuity and limited visual field.

- STRENGTH, REFLEXES AND BALANCE

In terms of the risks posed by poor strength, reflexes and balance on safe driving:

- Abnormal reflexes can cause steering problems. Following a stroke, for example, persons may have a lack of control over their reflexes (as well as affecting cognitive abilities)
- Braking is often more difficult, namely controlling and especially stopping a car. Persons with inadequate strength can require stronger braking assistance;
- Balance problems could be related to neurological disease (even if not directly related to ability to drive a car safely). What is more important here is that a balance problem could be an indication that the driver is suffering from some kind of disease.

- BLOOD PRESSURE

Blood pressure problems can be treated with medication, if the problem is recognised and action is taken. High blood pressure can cause heart attacks and strokes. It is also often an indicator of more serious problems. Anyone exceeding the blood pressure thresholds set in the MEDRIL tests is in a very serious condition.

- COGNITIVE FUNCTIONING

Cognitive impairment is strongly correlated with ageing, although strokes, for instance, can also occur at a relatively young age and this may effect cognitive functioning. Even mild cases of dementia can pose risks, in terms of diminished awareness and weaker decision-making capacities.

- ALCOHOL CONSUMPTION

In terms of alcohol consumption, there is an extra tendency to lie when related to the driving license. However, drinking and driving is known to be a big problem. Statistics suggest that people with an alcohol problem find it difficult not to drink and drive. For chronic alcoholics, blood tests would indicate that there is a problem. Other indications include physical signs such as high blood pressure in young people, liver conditions. Blood tests may reveal signs of alcohol abuse but otherwise it is quite difficult to check in a medical screening test.

Alcohol induces lack of awareness, over-confidence, tunnel vision and other, as listed below:

Visual:	Mental:	Motor skills:
<ul style="list-style-type: none"> - Weaker observation - Double vision - Tunnel vision - Less colour distinction - Problems estimating distances 	<ul style="list-style-type: none"> - Overconfidence - More risk relativisation - Poorer distribution of attention - Less reaction speed - Sleepiness 	<ul style="list-style-type: none"> - Less hand-eye coordination - Less control of muscles

A combination of alcohol and drugs poses an even greater potential risk.

- ILLICIT DRUGS / PSYCHO-ACTIVE MEDICATION

Illicit drugs and various forms of psycho-active medication can influence the following functions while driving:

- Arousal (e.g. fatigue, mood)
- Perception (e.g. visual performance, sensitivity to light)
- Attention (e.g. vigilance, divided attention, distraction)
- Cognition (e.g. risk taking, decision-making)
- Psychomotor performance (e.g. balance, stability, co-ordination)

The use of illicit drugs, such as amphetamines, opiates, cocaine, cannabis and methadone, were not subject to questioning or examination in the MEDRIL tests. Psycho-active medication, including benzodiazepines, vary in terms of their potential impact on fitness-to-drive. Sometimes any medication used is not as significant as the illness that lies at its basis.

A study in 2000 (Tunbridge et al) developed a risk ranking based on impairment, exposure and likelihood of outcome of illicit and licit drugs, with the following results:

- High priority for alcohol, benzodiazepines
- Medium priority for amphetamines, opiates, cocaine, cannabis
- Low priority for methadone, antihistamines, antidepressants

A combination of alcohol and drugs poses an even greater potential risk.

- CARDIOVASCULAR SYSTEM

Cardiovascular diseases increase the risk of heart attack or stroke. Medication can help considerably offset the problem, if it is recognised and action is taken.

- RENAL FUNCTIONS

Renal disorders may be an indicator of diabetes or alcohol abuse, as well as persons with high blood pressure. Diabetes often results in renal disorders (can improve after kidney transplants). Renal disorders per se are not such a problem for Group 1 drivers although kidney dialysis can cause short-term fatigue which would have an effect on driving ability. Renal disorders are often an indication that something else is wrong in the body. There is a role for education and campaigning here, rather than medical testing.

- DIABETES

Type 2 diabetes (which is far more common than type 1) is age-related, although obesity in younger age groups has meant that it is now possible to develop type 2 diabetes in ones teens. Diabetics are often not fully aware or informed about how they can treat the problem.

With regard to diabetes and driving, diabetes can cause renal and vision problems, strokes and heart problems. There is a risk of a hypoglycaemic episode (often related to insulin use) which occurs when the blood sugar level drops, and can result in loss of consciousness. Hyperglycaemic episodes (too high blood sugar) can occur as a result of a lack of insulin. Hyperglycaemia mainly occurs in diabetic type 2 patients, often being the first symptom of so far undiagnosed diabetes.

- NEUROLOGICAL SYSTEM

Neurological diseases include:

- Parkinsons
- Strokes
- Alzheimers
- Multiple sclerosis
- Dementia
- Vertigo

Most of these are age-related (with multiple sclerosis as a notable exception).

Parkinsons can affect driving in terms of slower reactions, physical tremor, cognitive impairment, reactions and trouble with multi-tasking. Dementia and driving can result in

insufficient recognition of other road users, problems with divided attention (crossroads are a typical problem) and problems with multi-tasking. Strokes can affect the visual field, lead to some forms of paralysis, cognitive impairment and increase the risk of epileptic seizures or another stroke.

- EPILEPSY

The driving risk related to epilepsy is clearly the risk of seizure/loss of consciousness while at the wheel.

- MENTAL HEALTH

The vast majority of mental health issues, especially when related to driving licence holders, are likely to be depression. Schizophrenia is suffered by about 1 % of the population but they would be unlikely to obtain a licence because the symptoms manifest themselves early. Other psychiatric disorders include personality disorders (e.g. aggression, paranoia). Due to improved medication these problems are easier to control than they once were. New antidepressants (SSRI-type antidepressants) are more road-safe than old ones (such as tricyclic antidepressants), but the old ones – which can cause sleepiness – are still being prescribed.

- SLEEPING DISORDERS

The main issue here is tiredness or a sudden loss of consciousness (e.g. sleep apnoea). Crashes due to driver fatigue could be the result of medical problems but also simply because of lack of sleep.

1.9.2 Relative risk with regard to fitness-to-drive

The MEDRIL tests focused on a number of medical conditions and issues which are accepted – to one extent or another - to have a potential impact on fitness-to-drive. As stated above, the exact significance of the impairment on fitness to drive depends on the severity of the condition, how it combines and interacts with other impairments, how effectively it is treated and how and if the driver is able to compensate in terms of driving style and strategic mobility choices. Risk levels for various impairments have been calculated, for instance in the EU IMMORTAL project, and compared to a driver without the impairment. Here, a meta-analysis was carried out of mainly case-control studies (62 studies based on 298 results) to estimate the relative risk of accident involvement of a range of impairments:

Table 6: Relative risks of accident involvement of medical conditions according to main categories in CD 91/439/EEC - Annex III.

Results from meta-analysis (Relative risk of drivers not having a given medical condition = 1,00)

Impairment	Relative risk
Vision impairment	1,09
Hearing impairment	1,19
Arthritis/locomotor disability	1,17
Cardiovascular diseases	1,23
Diabetes mellitus	1,56
Neurological diseases	1,75
Mental disorders	1,72
Alcoholism	2,00
Drugs and medicine	1,58
Renal disorders	0,87
Sleep apnoea / narcolepsy	3,71

Source: IMMORTAL project, deliverable R1.1¹⁸

These relative risk levels were then compared to young male drivers (aged 16-19), who ‘have a relative risk of being involved in an injury accident of about 7, compared to the group with the lowest risk (male drivers aged 45-54)’.

These results can only be described as rough estimates, as they are mostly based on the self-reporting of drivers involved in accidents and rarely take into account the severity of the disorder or combinations of disorders. Going one step further is the *Société de l'assurance automobile du Québec* which is currently working with insurance companies to establish the crash involvement risk levels of drivers with varying severities of medical impairments in Canada. Other attempts at establishing risk levels amongst drivers with medical conditions include the ‘risk of harm’ formula devised by the Canadian Cardiac Society¹⁹ for cardiovascular diseases and the relative risk formula devised for epilepsy by the Epilepsy Working Group of the EU Driving Licence Committee²⁰. Both these formulae were designed to establish risk levels for medical conditions resulting in incapacitation (sudden loss of

¹⁸ “Estimates of relative risks which are based on few results must be interpreted with caution. This concerns especially hearing impairment, alcoholism, angina, depression, sleep apnoea/narcolepsy, and use of cannabis, analgesics/opiates, antidepressants. Including more results in these groups may change the estimates and confidence intervals.”

¹⁹ Final report on the Assessment of the Cardiac Patient for Fitness to Drive, Consensus Conference, 2003. See www.ccs.ca/download/Consensus_Conference_Main_Draft.pdf

²⁰ See annex for presentation by Dr Eric Schmedding, MEDRIL Workshop II.

functional capabilities / unconsciousness due to seizures related to epilepsy, diabetes or cardiac arrest for example) rather than impairment.

References

Bekiaris, A. EU AGILE Project (AGed people Integration, mobility, safety and quality of Life Enhancement through driving), 2005 (<http://www.agile.iao.fraunhofer.de/indexi.html>)

Hakamies-Blomqvist, L. Ageing Europe: The challenges and opportunities for transport safety (VTI), speech at ETSC, 22-01-2003 (www.etsc.be)

HEALTH AND FUNCTIONAL CAPACITY IN FINLAND. Baseline Results of the National Public Health Institute B12 / Helsinki 2004

Hockey, B. EU IMMORTAL project (EU R&D framework programme), 2005 (www.immortal.or.at)

Martin, B. EU LEHO Project (sub-project of AGILE), DG TREN of the European Commission, 2005

OECD (2001): *Ageing and transport: Mobility needs and safety issues*. Paris: Organisation for Economic Co-operation and Development, OECD.

PHEPA Project: European clinical guidelines on the management of alcohol problems in primary care, 2005. www.phepa.net

RIVM (Rijksinstituut voor Volksgezondheid en Milieu): Prevalence of diseases in the Netherlands www.rivm.nl

Schmedding, E. Epilepsy and driving in Europe. Report of the second working group of the EU Driving Licence Committee, 2005

Sonnen, A and the European working group: Epilepsy and Driving Proceedings First European Workshop epilepsy and Driving Licences Group 1. IBE May 1995

Tunbridge, R.; Clark; A.; Ward, B.N.; Dye, L. and Berghaus, G.(2000): Prioritising Drugs and Medicines for Development of Roadside Impairment Testing. Certified, EU Research Project, Deliverable 1, 2000.

Van Crombrugge, P. Diabetes and Driving. Report of the Diabetes working group, sub-group of the EU Driving Licence Committee (2005).

Van Rijn, L. J. on behalf of the GLARE research group. Prevalence of impairments of visual function among European drivers. In: Van den Berg T. J. T. P.; Van Rijn, L. J.; Grabner, G; Wilhelm, H, and Michael, R and others. Relevance of glare sensitivity and impairment of visual function among European drivers. Joint research project supported by the European Commission SUB-B27020B-E3-GLARE-2002-S07. 18091. 2005b; pp. 6-44.

Van Rijn, L.J. New standards for the visual functions of drivers, Report of the Eyesight Working Group (expert group of the EU Driving Licence Committee), May 2005

2. DESCRIPTION & ANALYSIS OF ONGOING FITNESS TO DRIVE REQUIREMENTS IN EU MEMBER STATES

This chapter provides an overview of the different ongoing fitness-to-drive requirements for group 1 drivers across the European Union. Case studies are provided in the form of the MEDRIL participating countries (Spain, Luxembourg, Finland and the Netherlands), where ongoing medical testing is required by law (albeit starting at different ages). The medical test forms used in other EU countries are provided in annex 5 (Great Britain, Ireland, Denmark, Portugal and Italy). Based on a MEDRIL workshop, there follows an analysis of the different fitness-to-drive systems in place in the EU and their relative advantages and disadvantages. Finally, a brief summary is provided of the findings of a recent OECD report on managing older drivers.

2.1 Ongoing fitness-to-drive requirements in Europe

The overview of ongoing fitness-to-drive requirements for category B drivers in Europe on the following page (see table 7) shows that a vast majority of European countries impose medical testing requirements on category B licence holders (Czech Republic, Denmark, Estonia, Finland, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Slovenia, Spain and Switzerland). Of these countries, 5 (Hungary, Italy, Latvia, Lithuania and Spain) have periodic medical tests throughout the licence holder's driving career; the others start at late middle-age or above.

On the other hand, Austria, Belgium, France, Germany and Poland have no formal ongoing fitness-to-drive requirements for this category of driver at all. Other countries, mostly Nordic, have physician-reporting requirements, whereby general practitioners are obliged by law to report any of their patients to the authorities who pose a risk to themselves and others while driving. Great Britain works with self-declaration forms rather than obligatory medical tests.

The obvious conclusion to make on this topic is that each country has very different rules on the subject of fitness-to-drive for normal car drivers. Even those with mandatory testing start at different ages and with different periodicity. Spain is notable in the depth of its medical examination, whereas in other countries the medical form/examination is very short.

Overview of ongoing fitness-to-drive requirements for category B non-professional drivers in Europe

Country	Validity	Age of first ongoing fitness-to-drive assessment	Periodicity	Physician-reporting requirement ²¹	Remark
Austria	Unlimited	-	-	-	-
Belgium	Unlimited	-	-	-	-
Czech Republic	Limited	60	60, 65, 68, every 2 years thereafter	Yes	-
Denmark	Limited	70	70, 74, every 2 years thereafter. From 80, every year thereafter	Yes	Dementia test expected to be introduced in 2006
Estonia	Limited	65	From 65 years, every 5 years thereafter		
Finland	Limited	45: eyesight 70: full test	At 70, and every 5 years thereafter	Yes	Full test at 60 replaced by physician-reporting requirement in 2004
France	Unlimited	-	-	-	
Germany	Unlimited	-	-	-	-
Great Britain	Limited	*	-	-	* Medical self declaration when renewing the licence at the age of 70 and every 3 years thereafter
Greece	Limited	65	65 and every 3 years thereafter	-	-
Hungary	Limited	Starting every 10 years	Every 10 years until 40, every 5 years between 40 and 60, every 3 years between 60 and 70, every 2 years thereafter	Yes	
Iceland	Limited	65	Between 65 and 70, max 5 years, From 70 to 71 years, max 4 years, etc. From 80, every year thereafter	-	-
Ireland	Limited	70	70 and max. every 3 years thereafter	-	-
Italy	Limited	Starting every 10 years	Every 10 years until 50. Every 5 years between 50 and 70. Every 3 years thereafter		
Latvia	Limited	Starting every 10 years	Every 10 years . At 65 every 3 years thereafter	Yes	-
Lithuania	Limited	Starting every 5 years	Every 5 years At 60 every 3 years At 70 every 2 years At 80 every 1 years	-	System to be reviewed in 2006-
Luxembourg	Limited	50	50, 60, 70 and every 3 years thereafter. From 80, every year thereafter	-	-

²¹ Is a medical practitioner legally bound to inform the authorities of any important relevant change in their patients/driving licence holders' health?

Malta	Limited	70	70 and every 2 years thereafter	-	
The Netherlands	Limited	70	70 and every 5 years thereafter	-	The 70+ medical testing requirement will be replaced by a personal declaration from 2007
Norway	Limited (100!)	70	70 and every 5 years thereafter	Yes	The licence is valid until 100 years old. From 70 onwards, the holder must also possess a valid medical certificate
Poland	Unlimited	-	-	Yes	-
Portugal	Limited	65	70 and every 2 years thereafter	Yes	-
Slovakia	Limited	60	60, 65 and 68 and every 2 years thereafter		Legal changes expected in 2006
Slovenia	Limited	80	80, and then depending on medical decision of doctor		
Spain	Limited	Starting every 10 years	Every 10 years until 45, every 5 years between 45 and 70, every 2 years thereafter	-	-
Sweden	Unlimited	-	-	Yes	
Switzerland	Limited	70	70 and max. every 2 years thereafter	-	-

Table 7: Overview of ongoing fitness-to-drive requirements for private category B drivers in Europe

Source: CIECA

2.2 Description of ongoing medical tests for Group 1 drivers in MEDRIL countries (Spain, Luxembourg, Finland and the Netherlands)

This section describes the ongoing fitness-to-drive requirements for group 1 drivers in Spain, Luxembourg, Finland and the Netherlands. All 4 countries are EU Member States and therefore the content of their respective tests adheres to the minimum requirements laid down in Annex III of the 2nd Driving Licence Directive. At the time of writing, periodical medical testing for group 1 drivers is obligatory in these countries. However, the age at which ongoing testing is required differs from country to country, as does the content of the test itself. The following passages describe in detail the content and procedure of the fitness-to-drive assessments in each MEDRIL country.

In addition, information is added where available on the number or proportion of category B / group 1 licences that are not renewed, or withdrawn, for medical reasons as a result of the fitness to drive assessment system in each country. These figures relate primarily to drivers who have failed their medical tests at the requisite ages, rather than drivers who have been caught/stopped by the police and then referred to a doctor for a medical check-up. Ultimately, the requirement to renew one's licence at a certain age can also be considered a form of 'filter system' related to fitness-to-drive. Namely, drivers may choose not to renew their licence, or to attend the accompanying medical test and may simply allow their licence to lapse for medical or fitness to drive reasons.

2.2.1 Spain

For questions relating to the ongoing medical test for group 1 drivers in Spain, please contact Dr Bonifacio Martin at asociados@asecamp.org.

a) Content and Procedure

The current system of ongoing medical testing for group 1 drivers in Spain began in the early 1980s following entry into force of the first EC Directive on the driving licence.

Group 1 drivers must attend a medical examination:
every ten years after obtaining the driving licence up to the age of 45.
every 5 years between 45 and 65
every 2 years from 70 onwards.

The philosophy of the system is not to deny drivers of their right to drive (withdraw the license). The aim is to detect problems that may have an influence on road safety, and to correct them. Only a very small proportion of drivers have their licences withdrawn as a result of the medical checks. In Spain, 7,5% of drivers incur some kind of driving restriction as a result of the tests; only 0,9% of drivers have their licences withdrawn.

The examination is carried out by specialist medical centres for drivers. The periodicity of the tests can be increased as a result of certain medical conditions. The examinations are carried out by 3 specialists: 2 doctors – an ophthalmologist and a general practitioner – and a psychologist. A sub-component of each individual test (the eye test performed by the ophthalmologist, the general medicine examination performed by the GP and the psychomotoric tests performed by the psychologist), consists of questions to the driver on his/her relevant medical history. Each driver is also required to make a general health declaration. See annex 6 to see the relevant forms.

The final medical report includes each individual report and must be signed by all 3 doctors. The report determines whether the driver is fit to drive, fit to drive with restrictions, or unfit to drive. Further tests may also be called for. An evaluation meeting is held, involving all 3 specialists, in cases of rejection or serious doubt.

Most decisions are final. However, in the case of a negative decision, the driver is free to repeat the tests at another specialist centre. If the result of the second centre is positive, either the provincial health authority or the central General Directorate of Traffic makes the final decision on fitness-to-drive.

The medical examination takes 20 to 30 minutes for all the tests to be performed. Prices vary from centre to centre but the current cost to drivers is around 30 EUR.

There is no obligation on general practitioners to report their patients to the authorities if they suspect they are no longer fit to drive. There is no formal use of on-road assessments for drivers with 'borderline' medical conditions.

In the experience of our project member, ASECEMP, the early detection of medical problems provides a preventative function not only with regard to driving but also regarding life in general. A number of studies have been carried out that demonstrate the preventative function of these medical checks and show that patients are grateful for this service.

b) Licence withdrawals as a result of fitness-to-drive procedure

There is no data available at national level in Spain to show the number or percentage of licences withdrawn as a result of a medical examination. However, there have been two large scale studies performed in Spain which can be extrapolated to estimate the proportion of drivers found unfit-to-drive:

- A sample of 20226 group 1 drivers, tested in Oviedo in 2001
- A sample of 14500 group 1 drivers, tested in Madrid, Zaragoza, Pamplona, Cadiz and Lérida.

In the Oviedo sample (n=20226), a total of 0.94% of these drivers were declared unfit to drive. The distribution of unfit drivers according to age is presented below:

Age:	15-20	21-25	25-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75	76-92	total
Sample	1012	900	2279	1687	2887	1894	2389	2064	1369	1317	986	1002	440	20226
Unfit	1	3	11	12	18	16	21	25	20	18	16	17	12	190
% Unfit	0.1	0.33	0.48	0.71	0.62	0.84	0.88	1.21	1.46	1.37	1.62	1.70	2.73	0.94%

Table 8: Sample of unfit drivers based on 20226 drivers in Oviedo region, Spain, 2001

In the sample of 14500 drivers (7100 male, 7400 female), a total of 0.86% of these drivers were declared unfit to drive. The distribution of unfit drivers according to age is presented below:

Age	< 21	21-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	> 74	total
Sample	462	1371	2149	2035	1984	1768	1487	1161	891	503	346	218	125	14500
Unfit	1	5	11	14	14	15	14	15	13	7	6	5	4	124
% Unfit	0,22	0,36	0,51	0,69	0,71	0,85	0,94	1,29	1,46	1,39	1,73	2,29	3,20	0.855

Table 9: Sample of unfit drivers based on 14500 drivers in Spain, 2003

In the sample of 14500 drivers, the results were extrapolated to estimate the number of unfit-to-drive results in 2003 on a national basis, taking into account the total number of tests carried out in 2003 (n=2907535). Distribution per age group was not known for the total number of tests carried out in 2003, so the distribution per age group of the total number of licence holders in Spain (n=14497942) was used as a basis. On this basis, the total number of unfit-to-drive results in 2003 per age group – and as a result the total number of licences withdrawn – can be estimated as follows:

Age	< 21	21-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	> 74	total
Unfit (national)	200	1003	2206	2808	2808	3008	2809	3008	2605	1404	1195	1003	800	24858

Table 10: Estimate of total number of licences withdrawn as a result of medical test in Spain, 2003

The full results tables of these two studies, including the distribution of unfit drivers according to medical disorder, can be found in annex 7.

2.2.2 Luxembourg

For questions relating to the ongoing medical test for group 1 drivers in Luxembourg, please contact Alain Bohler at alain.bohler@tr.etat.lu.

a) Content and Procedure

Ongoing medical checks are required for all group 1 drivers at the age of 50 and afterwards every 10 years until the age of 70. From 70 onwards, a medical check is requested every 3 until the age of 80. From 80 onwards, a check must be carried out every year. The check itself is carried out by a specially accredited general practitioner. This accreditation has been given to almost all general practitioners in Luxembourg. The check can be carried out by the driver's personal doctor.

The medical examination consists of a medical questionnaire, in the form of an anamnesis whereby the questions are asked by the doctor, and a medical examination. The questions relate to medical history (illness, surgery, accidents) and any specific medical disorders the driver may have. The questionnaire must be signed by the applicant on completion. The examination consists of a range of general health tests (see annex 8 for relevant forms), including a urine test.

If the doctor diagnoses a medical problem or otherwise questions the driver's fitness to drive, the applicant has to undergo a further medical test at the ministry of transport. The committee responsible for this is composed of 1 doctor and 2 civil servants (for administrative purposes). If the committee doctor requires more information regarding the illness of the participant, the applicant will be asked to provide detailed medical certificates from either his family doctor, from a specialist or based on a blood test. The applicant must attend the medical committee in person if the diagnosis is bad or unclear. There are 3 possibilities at this stage:

- a practical on-road assessment can be requested, to be carried out by the chief driving examiner
- a medical expert can be called upon for further examination
- a police investigation can be instigated (in the case of possible drug abuse, for example).

A uniform decision is made by all 3 members of the committee to decide on the applicant's fitness to drive.

b) Licence withdrawals as a result of fitness-to-drive procedure

There is no data available in Luxembourg on the proportion of group 1 licences withdrawn as a result of the medical testing process, according to age category. The only existing information is absolute figures on the total number of withdrawals for medical reasons per year, as below, all ages and all licence categories (years 2000-2004):

2000 : 202	2003 : 180
2001 : 160	2004 : 239
2002 : 236	

2.2.3 Finland

For questions relating to the ongoing medical test for group 1 drivers in Finland, please contact Sami Mynttinen at Sami.Mynttinen@ake.fi

a) Content and Procedure

All group 1 drivers are required to undergo an eyesight test at the age of 45 and to submit the results to the police (the body responsible for overseeing fitness to drive and driving licence renewal in Finland). The test can be performed either by an optician or a general practitioner.

The previous requirement of a full medical test at the age of 60 years old was abolished in September 2004 and replaced by a legal requirement for all doctors to report patients to the police if they suspect they are permanently unfit to drive. No permission is needed by the patient for the doctor to do so, but the doctor must inform the patient of this obligation to notify, and of the impact of the patient's medical condition on his or her ability to drive a vehicle. The doctor may also inform the police that either a driving test or a specialist's consultation is needed.

Medical testing is next required at the age of 70 and above, when the driving licence must be renewed. The tests take place at 70 and a maximum of every 5 years thereafter (the licence can be issued for a shorter period). The driver must therefore submit his/her application for licence renewal and a valid medical certificate to the police if he/she wants to continue driving.

The test consists of a basic medical examination, questions on medical history and alcohol use and simple cognitive tests.

The examining doctor sends his/her conclusion, based on guidelines and thresholds laid down by law, to the police²². The doctor can recommend the patient seeing a specialist or undergoing a 'driving test'. See annex 9 for the Finnish medical forms and guidelines for examining doctors.

b) Licence withdrawals as a result of medical examination/ physician reporting system

The doctor reporting requirement entered into force in Finland in September 2004, so this procedure has only been in effect for the latter part of 2004 and the whole of 2005. There is no data available on the proportion of licences withdrawn as a result of the medical test in comparison to the doctor reporting requirement.

²² For some of these diseases, such as diabetes and epilepsy, there is a national consensus, for others (dementia, heart problems) there is an international consensus but other problems such as psychiatric disorders lack clear guidelines. The eyesight thresholds are based on the European directive.

Number of category B, AB and BE licences per age withdrawn each year in Finland as a result of the medical test or doctor reporting requirement (2000-2005, 20yrs old+):

	Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99		
Year																			Total
2000		39	25	31	19	25	44	27	22	31	7	6	14	6	3	0	0		299
2001		46	39	27	37	35	69	43	25	41	14	17	29	20	10	2	0		454
2002		58	28	33	26	42	64	34	18	40	12	18	33	24	13	2	0		445
2003		40	50	30	33	33	60	37	30	53	23	28	37	37	26	6	0		523
2004		59	35	22	38	36	59	52	54	65	44	58	74	79	31	8	0		714
2005		67	57	46	41	49	94	67	83	64	76	129	197	167	56	14	1		1230

Table 11: Licences withdrawn per year in Finland due to medical testing / physician-reporting requirement (2000-2005)

In terms of withdrawn/non-renewed licences as a proportion of total licence holders²³ in each age category, the figures are as follows (2004, cat. B, AB and BE licence holders, 20+):

Age	20-24	25-29	30-34	35-39	40-44	45-49	50-54
Total licence holders	203417	206544	152697	149414	153364	157293	163494
N. of licences withdrawn	59	35	22	38	36	59	52
% of licences withdrawn	0,03	0,02	0,01	0,03	0,02	0,04	0,03

Age	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90-94	95-99	total
Total licence holders	165631	106331	92717	58655	37709	18001	4622	622	27	1670538
N. of licences withdrawn	54	65	44	58	74	79	31	8	0	725
% of licences withdrawn	0,03	0,06	0,05	0,10	0,20	0,44	0,67	1,29	0,00	0,043

Table 12: Withdrawn/non-renewed licences as a proportion of total licence holders, Finland

N.B. These figures do not exclusively apply to licences withdrawn as a result of the driving test. They also include licences that are ultimately withdrawn as a result of being stopped initially by the police, or as a consequence of a disability notified to the authorities by drivers outside of the mandatory age-related tests.

²³ The total number of persons undergoing the tests, per age category, was unavailable for Finland, so here the number of those losing their licence as a result of the tests is compared to the total number of licence holders in each age category. As a result, these % are not comparable with Spain or the Netherlands.

2.2.4 The Netherlands:

For questions relating to the ongoing medical test for group 1 drivers in the Netherlands, please contact Dr Ruud Bredewoud at ruud.bredewoud@cbr.nl.

a) Content and Procedure

The validity of the driving licence is limited to ten years in the Netherlands up until the age of 65. Thereafter it is limited to five years. Renewal of a driving licence at the town hall is an administrative procedure until the age of 70. The applicant for renewal of his driving licence who is 70 years, and every 5 years thereafter, has to produce an official medical certificate, declaring he/she is still physically and mentally fit to drive²⁴. The certificate is based on a personal declaration and a medical examination. The personal declaration can be found in annex 10. The medical examination, includes questions on medical history, general physical and mental condition, functioning of vital limbs and spinal column and visual acuity. The OPS score is used to determine cognitive impairment. This is a practical tool designed by the University of Groningen which measures Orientation, Practical skills and Social skills. Please see annex 11 for the medical report itself.

The doctor performing the test is a general practitioner but cannot be the family doctor of the person in question.

The results of the medical test are sent to the CBR, where the medical advisor may choose to ask for a further medical examination. Usually, the additional examination is done by a medical specialist.

An on-road test can also be called for. This test is commonly used in the Netherlands as a means to determine fitness to drive for drivers with handicaps, cognitive impairment or visual perception problems, for example. The CBR uses a range of on-road protocols or assessment forms, depending on the medical issue in question. The result of the on-road test is final.

NB. In 2007, the extra medical testing requirements for drivers over 70 will be abolished in the Netherlands. This came about following lobbying by senior citizens' organisations who claimed these requirements were discriminatory. Drivers over 70 will thus no longer need to undergo systematic medical testing but will simply need to submit self-declaration forms to the authorities in order to renew their licences. This self-declaration must be co-signed by the family doctor, who declares that all questions are answered truthfully.

b) Licence withdrawals/non-renewals as a result of fitness-to-drive procedure

The table below shows the number and proportion of applicants who failed to renew their licence as a result of the medical testing procedure in 2004. This includes the on-road assessment.

²⁴ It is important to note that the obligatory medical examinations for 70+ drivers will be abolished from 2007.

Applicants						
age category	65-69	70-74	75-79	80-84	85-89	TOTAL
male	387	46425	10534	18737	2859	78942
female	246	27579	19349	8852	1274	57300
total	633	74004	29883	27589	4133	136242
Not renewed						
age category	65-69	70-74	75-79	80-84	85-89	
male	10	2148	804	675	193	3830
female	0	173	137	122	52	484
total	10	2321	941	797	245	4314
%	1,6	3,1	3,1	2,9	5,9	3,2

Table 13: Non-renewed licences in the Netherlands as a result of age-based medical testing

These figures do not include those losing their licences for medical reasons as a result of an offence or otherwise being stopped by the police.

2.2.5 Conclusions regarding withdrawal/non-renewal of licences for medical reasons

Recent data from Spain, based on samples of 14500 drivers and 20226 drivers, suggests that between 2 and 2,62% of category B drivers over 70 years old have their licences withdrawn as a result of the mandatory medical test (at 70 and every two years after). About 0,3% of the 21-25 year old age group are refused a licence on medical grounds, and this percentage steadily increases through the age categories to its peak in the 74+ age group.

Actual figures from the Netherlands (2004) reveal that 3,17% of the 70+ age group are refused renewal of their driving licence as a result of the mandatory medical test at 70 and every 5 years after. This percentage rises to 5,9% of the 85-89 (highest) age category.

Data from Finland and Luxembourg is not comparable.

These proportions of licence withdrawals/non-renewals as a result of the mandatory medical test can be compared to the proportion of licence revocations for 70+ category B drivers in Great Britain. The British fitness-to-drive system starts with a screening questionnaire, to be filled in at home by the applicant for licence renewal, rather than a formal medical test. Any follow-up deemed necessary takes the form of specialised questionnaires related to specific medical conditions and/or to referral to specialist doctors. In the financial year 2004-2005, 3616 licence applications were refused for medical reasons in category B drivers over 70 (i.e. all renewals at 70,73,76 etc). This figure includes both drivers undergoing the above standard process and those with an already diagnosed medical condition and with a restricted licence as a result. The 3616 refusals can be seen as a proportion of the 987740 standard applications for licence renewal, namely 0,37% of the 70+ category B applications²⁵. In addition, a 'not insignificant' number of drivers also surrender their entitlement to drive rather than have the licence formally refused.

It should also be borne in mind in the case of the Dutch and Spanish data that their figures do not take into account drivers who, similarly, decided to let their licence lapse rather than undergo the mandatory medical testing.

²⁵ Of these 987740 applications, 67276 were followed-up by the medical branch of DVLA, GB's central driver licensing agency, ultimately leading to the 3616 refusals.

2.3 Pros and Cons of a range of fitness-to-drive systems

MEDRIL workshop II (see annex 12) focused *inter alia* on a range of typical fitness-to-drive assessment systems in EU member states. The countries and systems under examination were:

Country	System
Great Britain	Self-reported questionnaires for category B drivers from 70 years old onwards
Sweden	A physician-reporting requirement by law
Netherlands	Self-reported questionnaires under 70 years old, medical testing and questionnaires above 70 years old. Regular use of on-road fitness to drive assessments in borderline cases.
Spain	Mandatory medical testing throughout the driving career (starting 10 years after the licence is obtained)

Provided that the Annex III requirements of the EU Driving Licence Directive are met, member states of the EU face a choice on how best to approach the issue of fitness-to-drive. Theoretically, these choices include the following options (or combination of options), ranging from ‘soft’ measures to increasingly interventionist measures:

- INCREASINGLY
INTERVENTIONIST

↓

 - Relying on individual choice and/or informal networks (family, friends) to determine fitness to drive
 - Providing information to drivers on fitness-to-drive issues, their rights and legal obligations (at a distance, for instance in health clinics or on the internet)
 - Ensuring that general doctors and specialists are fully informed and trained to deal with fitness-to-drive issues, and to advise their patients
 - Information sent directly to licence holders, for instance at a certain age
 - Physician-reporting requirements, whereby doctors are required to inform the authorities or any patient they consider to be unfit-to-drive
 - Questionnaire-based reporting requirements for all drivers (e.g. at renewal of the licence, or at certain age)
 - Medical screening for all drivers, e.g. basic medical examination and check of medical history,
 - Comprehensive medical testing for all drivers, possibly including further means for determining fitness-to-drive, such as on-road driving assessments, driving simulators, etc.

It is worth mentioning that although some member states of the European Union have no obligatory fitness-to-drive measures for category B drivers (other than the Annex III rules of the EU Driving Licence Directive), they may have intricate and well-developed fitness to drive services offered on a referral or voluntary basis. Germany, for example, offers (through TÜV) full counselling and guidance services for elderly drivers and full rehabilitation and testing services for alcohol offenders.

Based on the MEDRIL workshop, the advantages and disadvantages of the more interventionist options were discussed and identified as follows:

System / screening method	Advantages	Disadvantages
1. Questionnaires	<ul style="list-style-type: none"> • Non-invasive mechanism for determining fitness to drive / simple in the vast majority of cases 	<ul style="list-style-type: none"> • May lead to under-reporting • Not suitable for drivers who do not recognise they have a problem (e.g. cognitive impairment) • Central body processing questionnaires can be perceived as 'distant' and not sufficiently taking into account the individual case
2. Physician-reporting requirement	<ul style="list-style-type: none"> • No formal requirements for category B drivers themselves 	<ul style="list-style-type: none"> • Decisions weigh heavily on doctors • Difficult for doctors in light of doctor-patient confidentiality • Drivers may avoid doctors due to fear of being reported / drivers may not go to doctor anyway
3. On-road fitness to drive assessments	<ul style="list-style-type: none"> • Decision based on functional ability of driver, not medical diagnosis alone 	<ul style="list-style-type: none"> • On a logistical level, may be difficult to process large numbers of drivers • Only effective if designed specifically for persons with medical conditions – drivers should not be treated as taking 'another driving test'
4. Medical examination	<ul style="list-style-type: none"> • Potential for consistent and thorough application of fitness to drive rules for all drivers. • Anamnesis (of medical history of driver) more effective than self-reporting questionnaires 	<ul style="list-style-type: none"> • Medical diagnosis alone is unlikely to be able to determine driving ability in all cases • May encourage drivers to give up driving prematurely rather than face tests • Can be seen as discriminatory if introduced only for the elderly • Can be expensive and bureaucratic if independent driver testing centres are set up for 'captive market' • General practitioners may not have the time or necessary equipment to carry out effective screening • System is reliant on full cooperation of a large number of general practitioners (if GPs are responsible for screening)
5. Counselling services (psychological, strategic counselling)	<ul style="list-style-type: none"> • Takes into account individual needs and situation of driver in question 	<ul style="list-style-type: none"> • Significant resources needed if availability to be assured on a national level

Assuming that compulsory periodic medical testing is necessary for category B drivers, a further issue relates to which doctor should perform the medical examination / anamnesis. In the Netherlands, for example, a general practitioner performs the medical test, but this doctor must be 'independent', i.e. he/she cannot be the regular family doctor of the driver in question. In Spain, where specialised medical testing centres for drivers operate, there is no question that the doctors will be independent and unfamiliar with the drivers being tested. In Luxembourg, for example, the driver may not choose to be tested by his/her family doctor; as long as the doctor has the necessary accreditation from the Ministry of Transport, the driver has the choice.

Independent doctors have the advantage of being more objective and more detached than a regular family doctor who may be very reluctant to 'fail' the driver or question his/her fitness to drive if the person is well known to them or if there is a risk that the driver will change family doctors as a result of a negative outcome to the test. However, independent doctors must rely on information from the driver to determine the patient's medical history, whereas this information is likely to be well documented and well known to the family doctor, who may then be in a better position to determine if there any reasons to query the person's fitness to drive.

2.4 Managing Older Drivers

The question of how to manage older drivers and the effectiveness of fitness-to-drive systems for this category of driver is a whole scientific field in itself; it is not MEDRIL's task to expand upon this field. Suffice to say that the OECD report on Ageing and Transport (2001) provides a sound assessment and critical analysis of the fundamental question of how to balance the mobility needs of elderly drivers with a need to minimise risk of road accidents. The report concludes *inter alia* that:

- A fitness-to-drive system for elderly drivers must not only be able to identify drivers who pose an acceptable risk to the public, but at the same time avoid mistaking fit drivers for unfit drivers (and depriving them of the right to drive)
- Many age-based mandatory assessment programmes are recognised by researchers as being 'unlikely to produce road safety benefits' and may have 'counter-productive results' (e.g. by encouraging drivers to voluntarily stop driving rather than undergo the medical controls)
- Considering an elevated – but still low – level of risk attached to some elderly drivers with impairments, many elderly drivers would have to be deprived of a licence to prevent one single accident from occurring
- Older drivers in general are likely to be more 'at risk' than 'risky': statistics tend to exaggerate the crash risk of older drivers, for example through various sampling biases which can distort the big picture. One is the 'frailty bias', which refers simply to the fact that older drivers are more likely to be killed or seriously injured in a collision due to their relative frailty compared to younger, fitter individuals. Another is that accidents do not increase linearly with miles/kms driven; so a low mileage group such as elderly drivers will tend to have relatively high accidents per mile just by virtue of their low mileage.
- Driving is usually a self-paced task and many drivers can adjust their driving style to compensate for declining abilities, even in relatively severe cases.

- Although medical assessment seldom provides sufficient grounds for an absolute assessment of driving ability, it does play a role when there are genuine reasons to question the drivers' functional capabilities.
- The decision to stop to drive where it is necessary should be 'one component of a package of mobility options that allow an older person to continue to lead an independent life'.

Whilst this OECD report questions the current effectiveness and validity of medical checks for older drivers, it should be remembered ultimately that the purpose of a medical check is not to deny drivers the right to drive, but rather to detect and correct potential problems (in the form of treatment, remedial action, advice on strategic mobility choices, adaptations, geographical restrictions, etc). But regardless of intentions, the question is to what extent the idea of such tests are acceptable to elderly drivers (or to younger drivers for that matter) – and there is evidence to suggest that this level of acceptability varies considerably from one country to another.

On a parallel note, an alternative or complementary route to promoting the safety and mobility of elderly road users is via education. For example, a voluntary course of training for elderly drivers in Norway (65+ programme) has shown recent positive effects, not only in terms of satisfaction rates but also accident rates.

3. A Screening test for category B drivers

The following chapter focuses on a general screening test for category B drivers. Although MEDRIL is not able to take a position on whether or not to introduce such age-based screening, it can at least provide a framework for the content of such a test.

The following points should be noted at this stage:

1. These recommendations are for a screening test only, namely a basic medical examination and doctor's anamnesis designed to be used at the first stage of diagnosing any potential lack of fitness-to-drive, and to be carried out by general practitioners. Any queries regarding fitness to drive at this stage would then lead to referral to specialists in the medical field / on-road assessors.
2. There is considerable research and activity in the field of screening of older drivers (TØI 2003, AGILE 2005, Monash 2004); this MEDRIL screening test is therefore a general one which is relevant to all ages, and not just to older drivers. Examples of well-tested screening systems for older drivers can be found elsewhere and are not within the scope of the MEDRIL project.
3. The recommendations refer primarily to the content (i.e. scope) of the screening test; some guidelines on methodology are put forward.
4. Cut-off values for each condition (what is acceptable and what constitutes a query, and therefore referral to the following stage of the fitness to drive process) should be determined by the specialists in each specific disorder, as is currently being done by the EU expert medical groups.

3.1 The MEDRIL screening test

See next page.

MEDICAL SCREENING TEST FOR CAT. B DRIVERS



MEDical testing for the DRiving Licence
EU project 2003-2006

I. PATIENT INFORMATION

Full name:

Reference (e.g. driving licence number):

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Sex: Male Female

Date & year of birth:.....

II. DOCTOR'S ANAMNESIS (ideally to be read out to the patient)

A. MEDICAL HISTORY: current or previous conditions	YES	NO
1. MEDICAL EXAMINATION in the last 3 years? <i>If "Yes", please specify why:</i>	<input type="checkbox"/>	<input type="checkbox"/>
2. TAKING MEDICATION? <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
3. EYE PROBLEMS (treatment / surgery / night blindness / double vision) <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
4. CARDIOVASCULAR PROBLEMS <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
5. RENAL PROBLEMS <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
6. DIABETES <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
7. NEUROLOGICAL DISORDERS (including dizziness/fainting) <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
8. EPILEPSY (or other fits/blackouts) <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
9. MENTAL HEALTH <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>
10. SLEEPING DISORDERS <i>If "Yes", please specify:</i>	<input type="checkbox"/>	<input type="checkbox"/>

B. HABITS (current or previous)	YES	NO
11. CONSUMPTION OF PSYCHO-ACTIVE MEDICINES Hypnotics <input type="checkbox"/> Sedatives <input type="checkbox"/> Narcoleptics <input type="checkbox"/> Analgesics <input type="checkbox"/> Anti-depressants <input type="checkbox"/> If "Yes", please specify:	<input type="checkbox"/>	<input type="checkbox"/>
12. SUBSTANCE ADDICTIONS If "Yes", please specify:	<input type="checkbox"/>	<input type="checkbox"/>
13. ALCOHOL CONSUMPTION :AUDIT questionnaire + biological marker, if necessary	QUERY? <input type="checkbox"/>	

III. MEDICAL EXAMINATION

	NORMAL	QUERY
1. Full use of limbs, neck and spinal column	<input type="checkbox"/>	<input type="checkbox"/>
2. Visual acuity (corrected) <i>Score:</i>	<input type="checkbox"/>	<input type="checkbox"/>
3. Visual field <i>Degree:</i>	<input type="checkbox"/>	<input type="checkbox"/>
4. General physical condition: blood pressure <i>Result: /</i>	<input type="checkbox"/>	<input type="checkbox"/>
5. General physical condition: stethoscope	<input type="checkbox"/>	<input type="checkbox"/>
6. Cognitive impairment: if appropriate (mini-mental test / OPS / Drawing a clock-CERAD)		

7. Other conditions which may affect ability to drive a motor vehicle?

.....

IV. Overall Decision: <i>Pass</i> <i>Query</i> (circle as appropriate)
--

Reason(s) for query:.....

.....

V. Additional comments:

.....

VI. Doctor's name and stamp:

Date:

VII. Signature of licence holder/patient:

3.2 Discussion

Such screening tests first need to be effective in terms of filtering out fit drivers and identifying potentially unfit ones. For general practitioners to be able to carry them out efficiently, the tests must also be relatively simple. GPs are busy professionals who cannot afford to divert too much of their time away from their normal duties. If the tests are too complicated or burdensome, there is likely to be a risk of doctors not carrying out the tests properly. The tests then constitute a ‘bureaucratic obstacle’ for doctors to overcome in their daily working lives. The question must therefore be asked: to what extent is it possible, in the light of current knowledge on fitness to drive, for such screening tests to be both effective and simple?

Anamnesis:

In terms of the anamnesis, there was consensus in the MEDRIL working group that questions directly posed by the doctor are more likely to elicit honest responses than a questionnaire on medical history to be filled in by the driver him/herself. However, many conditions can be concealed, especially if the doctor is not familiar with the patient’s medical history. Questions on illicit drug use, for example, are unlikely to be answered honestly. The obligation for the driver to sign his/her own medical form may encourage drivers to answer truthfully.

In terms of **alcohol consumption**, there was also consensus that the objective of questions in this area should be to identify hazardous drinking or alcohol abuse, rather than harmful or heavy drinking, as alcoholics are much more likely to drink and drive than heavy drinkers. The 3 questions used in the MEDRIL survey²⁶ were, in retrospect, considered to be too short to elicit honest responses. The AUDIT questionnaire, for example, is longer and is considered to be more reliable²⁷ (see annex 13) than other alcohol questionnaires. If the AUDIT questionnaire is deemed too long, a shorter version is also available.

Nevertheless, members of the EU Alcohol, Drugs and Medicines’ expert medical group concluded that ‘Drinking problems and alcoholism is a disease which among other characteristics include denial and concealment. This makes it extremely difficult to rely upon short questionnaires for the diagnosis of the problem. We can only support testing with biological markers for diagnosis’. With this in mind, MEDRIL proposes that the AUDIT questionnaire be used as a basis for providing suspicion of alcoholism, and in such cases the doctor would be able to take blood tests (for example GT and MCV tests used together) to establish a full diagnosis. It should be remembered, however, that blood tests are not very practical in rapid screening tests.

Medical examination:

With regard to vision, there are some clear methodological problems. **Visual acuity** can be measured properly by general practitioners, but there remains, nevertheless, some suspicion

²⁶ How often do you drink 3 portions of more of beer, wine, or other alcoholic beverages? How many portions of alcohol do you generally consume each time you drink alcohol? How often do you consume six or more portions?

²⁷ A systematic review of the literature in (Fiellin 2000) concluded that the AUDIT is the best screening instrument for the whole range of alcohol problems in primary care, as compared to other questionnaires such as the CAGE and the MAST. Cultural appropriateness and crossnational applicability were important considerations.

amongst the MEDRIL working group that many doctor's clinics are not sufficiently equipped for a standardised test (rooms may be too dark; eye charts may be old and faded). The EU expert medical group on vision recommends the Landholt C or ETDRS methods for visual acuity.

According to the Vision committee, the Donders method of determining **visual field** is 'too uncertain' but 'there is no readily available alternative'. UFOV (Useful Field of Vision) tests have proven to be relevant for predicting fitness to drive, but the equipment necessary for the tests and problems interpreting the results render such tests impractical for general practitioners²⁸. Visual field is a vital area for driving and is an area where shortcomings can be compensated for by the driver. It is therefore an area where clear cut-off values are difficult to establish and where practical training and on-road assessment may more easily determine fitness to drive.

Contrast sensitivity and **glare** (straylight) have also been identified as major visual impairments likely to impact on fitness to drive. Glare can be measured effectively by the C-Quant instrument which is readily available but impractical for use in every general practitioner's clinic. For this reason, glare is included in the doctor's anamnesis. Contrast sensitivity can be measured by the so-called Pelli Robson tests, but its added value is limited if visual acuity and glare are tested.

With regard to **general physical condition**, standard medical tests (blood pressure and stethoscope) may provide an indication of further medical conditions worth identifying. The same applies to full use of arms, limbs and spinal column.

There are a number of tests available to identify **cognitive impairment**; the question is which one is most appropriate for support in determining fitness to drive. The Mini-Mental Test differs slightly in content from one country to another and has been criticised for having too much emphasis on memory-related tasks which are not relevant enough to fitness to drive (see annex 14). It is, however, relatively short to complete (~10 minutes). CERAD²⁹ consists of 9 tasks, including the mini-mental test and takes 20-30 minutes to complete. One of the tasks is 'drawing a clock' – a test used in isolation in Finland in the medical screening test of elderly drivers³⁰. Denmark is currently trying to introduce a cognitive impairment test for all category B drivers over 70, which also uses 'drawing a clock', but includes other items:

- Is the applicant orientated in time and with regard to his/her personal data?
- Drawing of a clock with the numbers and hands placed correctly: 10 min. past 11, or 20 min. to 4
- Prior to the examination the applicant is asked to remember 3 words. How many does he now recall?
- Has the applicant retained his full judgmental faculties and insight into his own situation?

²⁸ UFOV tests the ability to perform simultaneous detection tasks (divided attention) in a visual surrounding crowded with visual distractors. By doing so, it combines a purely visual task with a neuropsychological task of attention. It is tested by a custom-made programme on a personal computer, or by a custom-made test device.

²⁹ Includes: Verbal fluency test; Boston Naming Test; MMSE; ten-item word recall; constructional praxis; and delayed recall of praxis items. Typically takes 20-30 minutes.

³⁰ The Clock Draw Test is a simple test to assess cognitive or visuo-spatial impairment. There are slightly different versions of the test. In general, the subject is asked to draw the face of a clock with all the numbers and is then asked to draw the hands to set at a certain time.

If an applicant fails in this test he will be required to undergo an on-road assessment.

Trail Making B (see annex 14) is another possibility but it is generally only used by neuropsychologists. The test used in the Netherlands on elderly drivers is the OPS scale (Orientation and memory, Praxis and attention and Social interaction – see annex 14). This test has been identified as a potentially valuable clinical assessment tool that may assist in identifying individuals with cognitive impairment that could place them at risk of crashing (Withaar 1998)³¹.

Queries / Referral:

Fitness to drive should be determined upon the presence of functional impairment with regard to safe driving. In the absence of clearly defined cut-off values for a specific medical condition, general practitioners should be encouraged to query any ‘borderline’ cases rather than failing them outright. This is the function of a screening test – as a first port-of-call, not a last port-of-call. Encouraging GPs to refer drivers to specialists has two advantages: first, specialists are likely to be able to make a more informed judgement regarding fitness to drive; second, general practitioners are relieved of the burdensome task of having to make the final fitness to drive decision.

Signature of licence holder:

The requirement for the driver to sign the medical form is designed to encourage the licence holder to fully cooperate in the screening test and for the medical form to have legal power, whether theoretical or practical.

3.3 Conclusions

This test form offers a means for screening category B drivers of all ages by general practitioners. Some parts may not apply to specific types of drivers: for instance cognitive impairment testing may not be appropriate for most young drivers. However, there are clear methodological problems related to effective screening of drivers by GPs. Considerable time is needed to conduct a thorough screening, particularly in terms of identifying alcoholism and cognitive impairment. With regard to vision, for instance, the equipment and methods for identifying problems related to straylight or visual field are impractical for use by general practitioners. Ultimately, moreover, the system is reliant on full compliance of the GPs with the rules and proper execution of the tests.

Alternatives to GPs carrying out such screening are discussed in chapter 2.

³¹ Withaar, Brouwer and van Zomeren (1998) reported that drivers who passed the on-road driving test received significantly higher scores on the OPS scale compared to those who failed the on-road driving test.

References

Bekiaris, A. EU AGILE Project (AGed people Integration, mobility, safety and quality of Life Enhancement through driving), 2005 (<http://www.agile.iao.fraunhofer.de/indexi.html>)

Monash University Accident Research Centre. Model Licence Re-Assessment Procedure for Older Drivers: Stage 2 Research. © Austroads Inc. 2004

Ulleberg, P & Sagberg, F. Vision and cognitive functioning among drivers aged 70 years and older. TØI report 668/2003, Oslo

Fiellin, D.A., Carrington, R.M. and O'Connor, P.G. Screening for alcohol problems in primary care: a systematic review. Archives of Internal Medicine 160: 1977-1989, 2000.

Withaar, F., Brouwer, W. & Van Zomeren, A. (1998). Re-licensing of cognitively impaired older drivers. Paper presented at the Older Driver: Health and Mobility Conference, Dublin, Ireland, 18-19 September.

World Health Organisation (WHO). AUDIT: The Alcohol Use Identification Disorders Test. Guidelines for Use in Primary Care. WHO. 2001

4. On-road fitness-to-drive assessments in Europe

The use of on-road assessments in determining fitness-to-drive currently varies considerably from one country to another. Its relevance to fitness to drive has, however, been highlighted in recent years as a fair and objective means of establishing whether a person with specific medical conditions can drive safely or not. Such assessments have a role to play where medical examination alone cannot determine fitness to drive, i.e. 'borderline cases'. Whereas medical examinations may diagnose the presence of medical conditions, they may be unable in certain cases to establish whether these conditions impair driving sufficiently to justify that person losing their licence. A driving assessment will often be able to do so, or can at least support the full fitness to drive process.

There is criticism of the use of general medical diagnoses alone (with, debatedly, arbitrary cut-off values) to determine fitness to drive. If the tests are not sufficiently geared towards testing functional impairment in relation to driving, there is a risk of depriving drivers of their licence, despite them being fit to drive. Tests are needed which have an established correlation with driving, such as UFOV (Useful Field of Vision) tests which combine visual-attentional factors, or on-road assessments. Driving simulators are another option and simulators are being developed for persons with specific medical conditions (e.g. Groningen University, Netherlands).

On-road assessments also empower the driver to demonstrate his/her ability to drive safely, rather than having their licence removed by a doctor alone. In borderline cases, the driver may be able to compensate for the medical condition through treatment with medicine, a modified car or through psychological qualities (e.g. special prudence, attention and conscientiousness).

It is commonly accepted that on-road assessments are primarily useful in determining fitness-to-drive in borderline cases of drivers with cognitive, visual or locomotor problems: namely factors influencing how the driver takes in and acts upon information, and how he/she controls the vehicle in operational and tactical terms. Cognitive problems may arise as a result of a trauma or early dementia, for example, and can lead to the brain not receiving, processing and acting upon external stimuli. Visual problems refer especially to impairments regarding visual acuity and especially visual field limitations. Locomotor problems include physical handicaps, general frailty and loss of physical coordination as a result of a stroke.

In terms of practical experience, both the Dutch and the Belgians have considerable experience with on-road assessments involving drivers with the above borderline conditions. Moreover, an informal group of on-road assessment organisations 'Portare' is currently working towards developing common standards and approaches with regard to on-road assessment of drivers with borderline cases of cognitive, visual or physical impairment³².

³² The Portare group is led by the CBR (Netherlands) and includes the following parties:

- WORD, Poland
- Kerpape rehabilitation centre, France
- TÜV Medizinisch-Psychologisches Institut, Germany
- Mobilita Servizi, Italy
- Swedish Road Administration (SRA)
- MAVIS (UK Dept. of Transport)
- FORUM of Mobility Centres in the UK

In terms of scientifically-founded on-road assessments, AGILE (2005) refers in some detail to the TRIP protocols designed by the University of Groningen in the Netherlands (see annex 18), and to North American designs such as the Californian Driving Performance Evaluation, the Washington University Road Test and the Sepulveda Road Test which are mostly designed for elderly drivers or drivers with conditions that are typically associated with the elderly.

The following section examines the different on-road assessment cultures in the following European countries:

- The Netherlands
- Belgium
- Germany
- Great Britain
- Switzerland
- Norway
- Sweden
- Denmark
- Luxembourg
- Finland
- Austria

4.1 Country descriptions

4.1.1 Netherlands

The Dutch system of on-road assessments is the most formalised and systematic system currently used in Europe. Some 13000 on-road assessments were carried out in 2005 to establish the fitness to drive of category B drivers with (mostly) borderline cognitive, visual or locomotor impairments. The CBR's (Dutch driver testing organisation) chief medical officer will request that an on-road assessment is undertaken in any case where fitness to drive is unclear at the previous stages of the fitness-to-drive process. This happens in a number of cases because the Dutch medical advisory board has established that "because there are no scales for disabilities or other measurement instruments specific for fitness to drive, the report of the medical specialist is not designed to determine fitness to drive."

On-road assessments can be used in the case of the following conditions:

- Visual field limitations
- Poor eyesight at dusk
- One eyed drivers
- Diabetes Mellitus (its consequences)
- Chronic lung disease
- Progressive diseases such as:
 - Parkinsons
 - Alzheimer
 - MS
 - ALS

- Brain tumours
- Strokes
- Conditions such as
 - Major trauma with brain damage
 - Traumatic paralysis
 - Spasticity
 - Residual effect of hemiplegia
 - Hyperkinetic syndrome
- Cognitive impairment
- Physical handicaps
- Use of psycho-stimulation for ADHD

The on-road assessments are carried out by specially trained assessors at the CBR (all qualified driving examiners) and the outcome of the assessment is final in determining fitness to drive. As in the case of the normal driving test in the Netherlands, there is no system of points scoring to reach a final pass-fail decision. The decision is based on a global appreciation of the safety level of the driver. Different protocols are used, according to the medical condition in question. Examples of these protocols can be found in annex 15.

The assessment is 60 minutes long and is a free service for clients. It takes place in the client's car, unless the driver is still a learner, or the assessor deems it too risky, in which case a car with dual controls is used.

For cognitive / visual field limitations, for instance, there is a focus on both the operational and tactical components of driving. An on-road assessment is not only fair for a person with cognitive problems, but is also cheaper and more decisive than being referred to a neurologist for batteries of tests. For locomotor problems, the emphasis is more on operational issues (vehicle control: brakes, steering, gears, accelerator, use of indicators, etc). This includes emergency braking.

For persons with locomotor problems, computerised equipment is used to show braking force and steering force and speed, for instance.

The assessments have been designed internally at the CBR, based on a number of years experience. They are currently being modified again.

In summary, the fitness-to-drive process in the Netherlands is as follows:

- Specialist report provides information to the CBR
- On road test *individual* assessment is requested if minimum requirements are met but there are doubts about the person's ability to drive safely
- Medical doctor CBR determines fitness to drive (although the outcome of the on-road test is decisive).

4.1.2 Belgium

There are no ongoing testing requirements for all category B drivers in Belgium, following an initial health declaration when obtaining the licence for the first time, although drivers are required by law to notify a doctor if they no longer meet the Belgian criteria for fitness to drive. A specialist doctor is allowed to use any tool to determine fitness to drive; this often includes an on-road assessment to be performed by CARA, the only Belgian agency responsible for on-road assessments and vehicle adaptations. Some 4000 on-road assessments were carried out in Belgium in 2005. On-road assessments are carried out for drivers with the following types of impairments: cognitive, visual and locomotor problems (where vehicle adaptations are required). Refusal to undergo an on-road assessment when deemed necessary by the responsible doctor in charge is equal to failure and licence withdrawal. The test is carried out in a CARA vehicle, with dual controls, if the driver does not have a driving licence already or if he/she does not meet the medical criteria laid down for fitness-to-drive in Belgian law.

The assessors are not driving examiners but receive specialised training in on-road assessment. They are required to have specific skills for the job, including medical, technical (vehicle), road traffic knowledge, interpersonal and observation skills, objectivity and consistency. Only one centre carries out the on-road assessments for the whole of the country, so the number of assessors is small. However, unless there is a specific study underway, there are no standardised routes used. Some standard road features such as crossroads are of course covered in each assessment. Drivers are allowed to be assessed in their own familiar area, if necessary.

A protocol is used to record the assessment, but this protocol is standard for all on-road assessments and drivers (and based on the TRIP protocol, see annex 16). The principle is that all drivers should meet a basic level of safe driving, regardless of their specific impairments or shortcomings. The assessment is a qualitative one and has a similar rating system to the standard Belgian driving test (the driver is given a rating of Insufficient, Doubtful, Sufficient or Good for each assessment criterion), with extra space for comments and conclusions from the assessor. The final decision on fitness to drive is left to the doctor, not to the on-road assessor or a psychologist who may be involved in certain cases, but the approach is a multi-disciplinary one.

4.1.3 Germany

The example here for Germany is provided by the TÜV (one of the two driver testing organisations in Germany). The on-road assessment fits into a 3 tier system which is primarily used in the case of traffic offenders:

1. An expert medical assessment
2. A medical-psychological assessment
3. A practical fitness-to-drive assessment (including on-road observation)

The on-road assessment can also be used in an advisory capacity for drivers with medical conditions, or elderly drivers, or as a test of vehicle adaptations for a driver with a disability.

The on-road observation can be applied if prior test results are just under the necessary threshold for fitness-to-drive (provided there is no major medical impairment), but there are otherwise favourable findings in the medical examination and psychological exploration (and

the driver is motivated to continue to drive). It focuses largely on cognitive functioning, at least in the case of drivers with medical conditions, elderly drivers or drivers with a history of drug/alcohol abuse. A protocol is used, but it is the same protocol in all these cases.

The observation of driving behaviour respects the following parameters:

- It is carried out in the car of a driving school
- with a driving instructor sitting next to the driver
- observation of driving behaviour by a psychological expert (sitting in the back, as does the examiner in a normal driving test in Germany)
- the driving instructions, behaviour of observer and of driving instructor, the route, and recording of notes and evaluation are standardised
- the psychologist evaluates the driving behaviour in a general manner
- duration 60 minutes (5 minutes pre-conversation, 45 minutes driving, 10 minutes post-conversation)

The observation is based on the following variables:

1. speed behaviour
2. distance behaviour
3. tracking behaviour
4. protecting behaviour
5. endangering behaviour
6. communication behaviour

Within each variable are sub-variables. Each sub-variable can be marked with a 1 (= uncertainty) or 2 (=error). In addition, a general observation is made. The final report from the psychologist will record whether the driver has committed no – single – numerous – significant or severe driving errors.

This report will be combined with the reports from the expert medical assessment and the medico-psychological assessment and presented to the authorities.

For drivers with physical handicaps, vehicle adaptations will be required. The practical driving assessment aims to determine if the driver can drive with the adapted vehicle safely. It is carried out by a driving examiner, in the presence of the driving instructor (in the same way as the normal driving test in Germany).

The procedure is as follows:

1. there is an operating test before the driving test
2. course and duration: similar to the practical part of the official driving test
3. identical to official driving examination when the handicapped person is applicant for driving licence
4. expert report contains the results of driving test together with the results of the operating test
5. expert report contains necessary limitations and conditions

TÜV MPI also offers a voluntary service to the elderly and to those with medical conditions. The service includes:

1. An introductory conversation
2. Psychological tests of traffic-related abilities and/or an observation of driving behaviour
3. Medical / psychological consulting
4. Report and recommendations

These recommendations may include the following:

- continuous active participation in traffic in order to maintain traffic-related functions
- using possibilities of compensation like route selection, choice of time, driving only in familiar region
- some practical driving lessons for refreshing
- informing about decrease of performance (leading to a more realistic evaluation of one's own capabilities)
- renunciation of driving licence or of driving

The outcome of this service is not submitted to the authorities.

4.1.4 Great Britain

Individual driver rehabilitation centres operate on-road and private terrain driving assessments around the country. However, the assessments are not standardised from centre to centre and the area is unregulated. They also play no legal role in the fitness to drive system, although certain centres may be asked by the DVLA (central licensing agency) to perform a driving assessment on a person with a disability.

What process has occurred prior to the individuals taking the functional driving test differs from person to person. If someone has a physical disability, they are legally obliged to inform the licensing agency (DVLA). Not all need to undergo practical assessment. They will be examined by a GP who then refers the information to the DVLA, who may then refer the individual for a functional driving assessment. Others may come from rehabilitation centres (as part of rehabilitation) so they may not have been medically screened. Those referred by family or friends come directly, and again no medical screening has taken place. MAVIS (the Mobility Advice and Information Service, a branch of the Department of Transport) operates some mobility centres and has a 'duty of care' → if MAVIS decides someone is likely to be a risk, it passes this information on to the DVLA for the medical procedure to be initiated.

The driving assessment aims to assess the cognitive, sensory and physical functions of the driver and is composed of two parts:

1. 60 minutes out of traffic (on a private area), including a slalom cone test and other manoeuvring exercises
2. 45 minutes in traffic

The first section is designed to assess the operational skills of the driver and the relationship between reaction time, thinking time and driving performance. It involves a battery of functional exercises. Each exercise has standardised instructions and scoring – based on driver norms. Instructions can be given in different ways (verbal, auditory, visual) to ensure that they are understood. The purpose is to observe trends in driver performance and to determine if the trend is safe or unsafe.

The part of the test in traffic looks at more tactical level behaviour, including:

- Placing the car correctly in time and space at speed
- Making appropriate decisions
- Interacting with other road users
- Performing all of the above in high work load situations.

4.1.5 Switzerland

On-road checks or ‘course de contrôle’ for determining fitness to drive of existing driving licence holders have a legal basis in Switzerland, although implementation varies considerably from one canton to another. Article 29 of the OAC (law pertaining to admission of persons to road traffic) states that:

The canton administration can order an on-road check to determine what measures to take if there are doubts concerning the fitness-to-drive of a driver. If the driver in question fails the on-road check, the check cannot be repeated and the decision is final: the driving licence is withdrawn. In some cases, these persons are able to request a learner’s licence in order to restart the whole driver education and testing process.

The on-road check involves the presence of both a doctor (in the back) and a qualified driving examiner (in the passenger seat). The car used normally belongs to the driver.

The Zurich canton is the only area in Switzerland where the on-road check is systematic and formalised³³. The on-road check has been developed by the traffic medicine unit of the Legal Medicine Institute in Zurich (see www.irm.unizh.ch). The on-road check can be used only when a thorough medical examination has already taken place and where fitness to drive cannot be solely determined on this basis (‘borderline’ cases). It must be requested formally by the local authority. Medical conditions which may be subject to investigation in an on-road check include:

- Early signs of dementia
- Neurological conditions (following brain trauma, Parkinsons, etc)
- Vision problems (especially visual field)
- Psychiatric conditions (especially schizophrenia)
- Locomotor limitations
- Limitations in neck and head movements

The choice of route must be appropriate for assessing the particular condition identified. The start of the drive should be easy (light traffic, local neighbourhood of driver) and should increase thereafter in difficulty and include: residential areas, main roads inside and outside of urban areas, bends, changing of lanes, junctions with and without traffic lights, priority to the right, pedestrian crossings, turning to the right across a cyclist path, and entering a motorway. The trip takes 45-60 minutes, during which time the doctor in the back is assessing the driver on the presence of safe driving competencies and the examiner in the front is noting driver errors. A joint decision is reached at the end of the on-road check and the result is formally announced by the authorities.

³³ See *Handbuch der verkehrsmedizinischen Begutachtung*, M. Haag et V. Dittmann, Hans Huber 2005

Geneva canton rarely employs on-road checks and any checks which do take place use different assessors, according to the problem. An ergotherapist will be used in the case of locomotor problems, and a neuropsychologist will be used in the case of cognitive problems. An official representative of the authorities, in the form of a driving examiner, is always present too. A detailed assessment protocol is currently being developed by the University Hospital of Geneva (see www.creaca.ch).

Neuchâtel canton focuses only on elderly drivers with signs of dementia and when prior medical examinations have been inconclusive. Valais canton deals primarily with locomotor conditions and the on-road check is carried out by a driving school instructor and an ergotherapist.

4.1.6 Norway

The on-road assessment has no systematic role in the fitness to drive procedure in Norway but can be requested in special cases by the medical authorities or by the police. The on-road assessments are used when medical problems such as cognitive impairments and visual defects have been identified and to resolve the issue of fitness to drive. In addition, practical driving capability for persons with locomotor disabilities is always evaluated by the road authorities.

Generally speaking, the assessment is carried out by the road authorities (Norwegian Public Roads Administration). Some medical rehabilitation centers also have driving assessment programmes, and may be used. For visual field defects, the driving simulator at SINTEF, Trondheim, together with a specially designed driving test is used. As a result, the assessor will vary according to the organisation performing the assessment (an examiner in the case of an assessment carried out by the road authorities, or an instructor / health professional if done in a rehabilitation centre). The car used is a special one with dual controls. The testing itself is not standardised, but rather tailored towards the client and the suspected disability in question. No standardised form is used during the assessment either – following the assessment, a report is made based on the conclusions of the assessor. The final decision on fitness to drive is made by the health authorities, with the exception of non-progressive locomotor disabilities where drivers are considered fit/unfit by the road authorities. If the test was voluntary, as recommended by a doctor, the result is an advisory one unless the doctor decides that the person is unfit to drive and therefore reports the case to the health authorities.

4.1.7 Sweden

Some 325 on-road assessments are carried out each year on existing driving licence holders with handicaps, cognitive impairment or locomotor problems. Visual impairment is not tested on-road; if the vision requirements are not met the driving licence is revoked immediately. The assessments are carried out by driving examiners appointed by the Swedish Road Administration, following a request by the County Authority for such a test to be carried out. The examiners have preferably received special medical courses, in addition to the usual training and qualifications. The protocol used during the assessment is essentially the same as the one used in the normal driving test for licence candidates (see annex 19), but some examiners use their own appendices in order to focus on specific medical problems. The SRA realises there is work to be done here to standardise the assessment approach. There is no scoring system; as in the normal driving test in Sweden, the final result is reached by the examiner following a global appreciation of the driver's ability to drive safely. The duration of the tests is 45-60 minutes (60 minutes in urban areas and 45 minutes in more rural areas).

The assessment is advisory in nature; the county authority makes the final decision regarding driving licence revocation or restrictions. Some research is ongoing with regard to the assessment of disabled persons who require vehicle adaptations.³⁴

4.1.8 Denmark

Category B drivers in Denmark must renew their driving licence every few years after the age of 70. This renewal process is accompanied by a medical test. Following this examination, if the doctor is not sure about the fitness to drive of the driver in question, he/she may request that driver to undergo an on-road test. The on-road test is assessed by a driving examiner from the Danish police force (as is the case for the standard category B driving test).

New rules on this fitness-to-drive process are likely to be introduced in Denmark in the very near future. These rules include a special dementia test for elderly drivers and more detailed requirements on the implementation and assessment of on-road fitness-to-drive tests.

4.1.10 Other Countries

On-road assessments are used in other European countries but are less formalised and systematic. They tend to resemble more the driving test rather than requiring specific assessor skills or specific focuses during the test according to the medical condition in question.

Luxembourg

As part of Luxembourg's fitness to drive system, some 50 category B drivers per year are asked to perform an on-road assessment. The assessment is carried out the Chief Driving Examiner using the same protocol as used in the standard driving test. The chief driving examiner is also a member of the Ministry of Transport's medical committee responsible for overseeing the fitness to drive process. The outcome of on-road assessment is final in determining fitness to drive.

Finland

A doctor can recommend a driving assessment, usually in borderline cases where fitness to drive is unclear on the basis of a medical examination. However, there are no official guidelines on how to perform the assessment. Standardisation is required here: the length and content of the test varies and it tends to concentrate more on the cognitive and motor skills than the technical operation of the vehicle. The assessment can be carried out by either a driving examiner or a driving instructor, but only an assessment by a driving examiner carries official weight. If the driver passes the assessment, he/she must submit the certificate to the police in order to retain his/her licence.

Austria

A standardised on-road assessment has been developed (1985) and since modified (2006) by the Kuratorium für Verkehrssicherheit (Austrian Road Safety Board). The test is carried out by KfV and is normally used for older drivers of category B vehicles to determine if they can compensate for age-related impairment. It is used within a psychological diagnosis and is preceded by a personality test which is designed to determine the risk awareness and level of responsible behaviour of the driver. If the personality test scores are insufficient, the on-road

³⁴ Björn Peters, VTI. www.vti.se

assessment can then be called for, but only when no more than 3 serious 'threshold violations' have been incurred in the previous psychological tests. The on-road assessment is carried out by a specially trained psychologist and a driving instructor, following a standardised assessment protocol and standardised route. The result of the assessment is not definitive; it is an advisory tool for the medical examiner.

Only about 20 such on-road assessments are carried out each year in Austria. The on-road assessment itself has been used as an external criterion in three validity studies.

4.2 Conclusions

On the basis of a workshop held in the framework of the EU MEDRIL project (see annex 17 for full report), and information from the above European countries, it can be concluded that:

- On-road assessments can and should play a more systematic role in determining the fitness to drive of persons with borderline medical conditions. In the absence of total knowledge regarding the impact of certain medical conditions on fitness to drive, and sufficient means to test these conditions in a purely medical environment, on-road assessments should be considered in cases where medical diagnosis alone is not sufficient. A basic survey conducted during the MEDRIL project of the use of on-road assessments shows that this option can be used in a more systematic and standardised manner in both Western and Eastern European countries.
- On-road assessments are only useful in the case of drivers with impairments, not incapacities. Incapacities such as epilepsy, heart attacks or any other condition which may give rise to fits or loss of consciousness can clearly not be reliably tested by an on-road assessment.
- On-road assessments should not simply be a reproduction of a standard driving test. Drivers undergoing on-road assessments are registered licence holders and should be treated accordingly.
- On-road assessments should above all focus on the particular condition in question and the potential repercussions this condition may have on functional impairment. General safe driving on an operational and tactical level should also be assessed, with a view to determining overall safe driving ability.
- On-road assessors should be properly trained so that they understand the potential implications of a medical condition on driving ability, can assess the driver in a systematic and standardised manner, and can interact appropriately with the driver on a human level. The possibility exists for two assessors to be in the car (medical specialist + assessment specialist).
- Such on-road assessments attempt to bridge the gap between medical diagnosis and functional assessment. These two approaches involve professionals from totally different backgrounds and experience has shown that cooperation can sometimes be difficult. Countries where both medical and assessment specialists assess the driver in an on-road assessment do, however, demonstrate that cooperation can be beneficial and fruitful.
- A standardised assessment protocol is necessary, specific to the driving behaviour under observation and giving clear descriptions of items in such a way that any assessor can understand and score it in the same way.
- Use should be made of tried and tested on-road assessment protocols such as the TRIP protocols designed in the Netherlands.

- There should be a possibility for the participants to familiarise themselves with the controls of the car itself (if not his/her own), before entering in traffic or commencing the test
- For elderly drivers, the possibility of being assessed in their own neighbourhood should be considered (with the possibility of restricting the licence geographically).

5. Overall Conclusions

- The incidence of specific medical conditions found in the MEDRIL survey (chapter 1) were in line with data pertaining to the general population, although based on low samples.
- The most striking result regarding the health of the drivers in the survey was the level of mild dementia present in the older age groups. Up to 20% of drivers over 70 years old showed signs of mild dementia on the basis of the mini-mental test. Cases of moderate or serious dementia were, however, extremely rare.
- As a result of these low samples, and other factors³⁵, MEDRIL is unable to make recommendations with regard to the need and periodicity of ongoing medical testing for group 1 drivers. Moreover, the added value of age-based obligatory medical testing remains unclear at this stage and so recommendations for the introduction of such tests at EU level would be premature³⁶.
- There are a range of different approaches currently in place with regard to ongoing fitness to drive and screening of group 1 drivers in the EU-25 (no ongoing requirements at all, periodic screening at a range of different ages, physician-reporting requirements, self-reported questionnaire-based screening...). MEDRIL provides an overview and analysis of these different approaches (chapter 2). Only 5 of the 28 European countries surveyed had no formal screening of such drivers at all: Austria, Belgium, France, Germany and Poland.
- Ultimately, it does not matter what approach is used as long as it is effective. Each different approach has advantages and disadvantages. In short, in the absence of ongoing fitness to drive requirements, there is a risk that unfit drivers continue driving. Screening based on questionnaires risks under-reporting, so that unfit drivers again may continue to drive. Physician-reporting requirements rely on general practitioners, above all, to refer their patients to the authorities. How systematically this is done in practice is unknown, but it is likely that many doctors are reluctant to comply in the light of the traditional client confidentiality respected with patients. Also, some drivers may not visit general practitioners.
- The advantage of periodic screening in the form of a medical examination is, in theory, the promotion of driving safety by a reduction of the number of fatalities and injuries attributable to functional impairment of the driver. This advantage can only be gained in reality if the screening is effective and efficient in identifying functional impairment and avoiding incorrectly identifying fit drivers as unfit.

³⁵ Research is ongoing with regard to the cut-off values for acceptable/non-acceptable levels for specific medical conditions and to the relative risk of specific conditions, according to severity, combinations of problems, etc.

³⁶ It should be noted that ASECEMP (Spain) does not share the opinion expressed by the rest of the project consortium that there is insufficient evidence to recommend the introduction of periodical checks for Group 1 drivers in the European Union. ASECEMP considers that the MEDRIL survey samples were large enough to be relied upon, especially in the case of Spain, and that the incidence of certain medical conditions was sufficiently high to justify a recommendation for the introduction of such periodical checks across the EU. ASECEMP's positive experience in Spain with the daily application of such periodical checks is, moreover, another factor which leads it to believe that these checks can effectively contribute to road safety without imposing an unnecessary burden on group 1 drivers.

- The disadvantage of such screening lies in the costs that are involved and the effort that is required of the driver. The costs involved are not just financial, whether on the part of the State or on the driver. There is evidence to suggest that medical testing requirements for older drivers, for instance, can deter them from taking the tests altogether, thereby potentially depriving fit elderly drivers of their right to drive³⁷. Individual mobility, it should be remembered, is a key factor in a healthy later life. GPs may not be appropriate for initial screening, due to a lack of training in fitness-to-drive issues, facilities for effective screening and a reluctance to devote so much time towards drivers and away from their regular patients. Specialised driver testing centres, on the other hand, constitute a costly exercise. The cost of these centres must be compared to the benefits their services realise in correctly identifying unfit drivers.
- Ultimately, the decision on whether to impose ongoing fitness to drive requirements for drivers is not only medical, it is socio-political. At its core, this decision depends on to what extent drivers should be entrusted to decide for themselves if they are fit-to-drive or whether the interests of society as a whole in terms of road safety are considered to be significant enough for the State to intervene.
- A general screening test for category B drivers, to be carried out by a general practitioner, is presented in chapter 3. As stated above, MEDRIL is unable to recommend the introduction of such screening tests at EU-level, but such a screening test (its strengths and limitations) is nevertheless presented, in line with the commitment and objectives of the MEDRIL project.
- In the absence of a full range of fitness-to-drive services, and reliance solely upon general medical examinations, medical staff will be unable to turn to other services in the event of borderline or questionable cases, and will thus be obliged to make sweeping judgements based on what they have available.
- On-road assessments in borderline cases are used to varying degrees in some EU member states as a practical way of determining fitness to drive (albeit in combination with medical diagnosis). Such assessments (see chapter 4), if properly designed and executed, provide an opportunity for individual drivers to prove their own ability to drive safely, rather than having to accept their fate based on a medical diagnosis alone. In this regard, many drivers with specific impairments have been known to be able to compensate for their impairments through training, medical care or vehicle adaptations. Such practice should be encouraged, building on research and experience already widespread in some EU member states (e.g. Belgium and the Netherlands).
- Regardless of whether fitness to drive requirements are imposed on licence holders, facilities, expertise and services should exist to support drivers in this area and to accurately determine their ability to drive safely. However, this is easier said than done. In the absence of compulsory periodic screening where the ‘consumer pays’, drivers will be left to choose for themselves whether they use these voluntary fitness-to-drive services (unless they are referred following an incident or traffic offence, for example). The facilities must either be provided by the State or through private enterprise. This is a costly undertaking when the ‘market’ for such services cannot be relied upon. The

³⁷ How readily acceptable the idea of compulsory screening is seems to depend on the country. Whereas there is evidence to suggest that such screening may represent a barrier to mobility in Scandinavia, the situation is regarded as an accepted ‘norm’ in Spain, where studies have shown that drivers are grateful for the feedback and consider the tests to enhance their overall quality of life.

potential market is, however, constantly growing when one considers the ageing of the European population.

- Current moves at EU level – through the proposal for a 3rd driving licence Directive – to restrict the validity of driving licences to 10 years, would, at least in theory, allow for some form of screening to take place at the same frequency across the European Union. Such screening would not necessarily have to involve medical testing, but may be limited to self-reported questionnaires (as is currently the case in the Netherlands). Regular screening which is not limited only to elderly drivers would appease lobbies representing this age group that feel they are being discriminated against. It should be noted, however, that some EU countries clearly feel that self-reported questionnaires do not suffice, especially with regard to screening of cognitive impairment (primarily in the older generations).

ANNEX 1: MEDRIL medical test form



I. PATIENT INFORMATION

Sex: Male Female

Age:

Length of education (school-leaving age): 16 or lower 17-19 higher education

Location of residence (population):

<2000	<input type="checkbox"/>	40001-100000	<input type="checkbox"/>
2001-10000	<input type="checkbox"/>	100001-500000	<input type="checkbox"/>
10001-40000	<input type="checkbox"/>	500001+	<input type="checkbox"/>

Living status:

Living alone Living with a partner

II. DOCTOR'S ANAMNESIS

	YES	NO
14. Eyes: Are you being treated (or have you ever been treated) by an ophthalmologist?	<input type="checkbox"/>	<input type="checkbox"/>
Do you have problems with night vision? (If "no"): do you ever drive at night?	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
15. Cardiovascular: have you ever been treated for cardiovascular diseases?	<input type="checkbox"/>	<input type="checkbox"/>
16. Renal: have you ever been treated for kidney problems?	<input type="checkbox"/>	<input type="checkbox"/>
17. Diabetes: have you ever been treated for diabetes?	<input type="checkbox"/>	<input type="checkbox"/>
18. Neurological: have you ever suffered from any disorder of the brain or nervous system (Parkinson's, stroke, vertigo...)?	<input type="checkbox"/>	<input type="checkbox"/>
19. Surgery: have you ever had surgery on your eyes or brain, or have you ever had an organ transplant?	<input type="checkbox"/>	<input type="checkbox"/>
20. Epilepsy or similar: have you ever suffered from epilepsy or a similar disorder?	<input type="checkbox"/>	<input type="checkbox"/>
21. Psychiatric conditions: have you ever received treatment for your mental health?	<input type="checkbox"/>	<input type="checkbox"/>
22. Medication affecting driving: Do you take any medicine that may influence your ability to drive, such as hypnotics, tranquillisers, antidepressants, anti-psychotics, stimulants or other similar drugs? Hypnotics <input type="checkbox"/> Sedatives <input type="checkbox"/> Narcoleptics <input type="checkbox"/> Analgesics <input type="checkbox"/> Anti-depressants <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Sleeping disorders: do you have problems with abnormal sleepiness, getting to sleep or waking up suddenly during sleep?	<input type="checkbox"/>	<input type="checkbox"/>

24. Alcohol consumption

a) How often do you drink 3 portions of more of beer, wine, or other alcoholic beverages?

- | | | | |
|--------------------|--------------------------|------------------------|--------------------------|
| Never | <input type="checkbox"/> | 2-3 times a week | <input type="checkbox"/> |
| About once a month | <input type="checkbox"/> | 4 times a week or more | <input type="checkbox"/> |
| 2-4 times a month | <input type="checkbox"/> | | |

b) How many portions of alcohol do you generally consume each time you drink alcohol?

- | | | | |
|--------------|--------------------------|--------------|--------------------------|
| 1-2 portions | <input type="checkbox"/> | 7-9 portions | <input type="checkbox"/> |
| 3-4 portions | <input type="checkbox"/> | 10 or more | <input type="checkbox"/> |
| 5-6 portions | <input type="checkbox"/> | | |

c) How often do you consume six or more portions?

- | | | | |
|--------------|--------------------------|-----------------------|--------------------------|
| Never | <input type="checkbox"/> | Once a week | <input type="checkbox"/> |
| Once a month | <input type="checkbox"/> | Daily or almost daily | <input type="checkbox"/> |

25. Other (please specify):

III. MEDICAL EXAMINATION

	PASS	FAIL
1. Eyesight (minimum 0.5)	<input type="checkbox"/>	<input type="checkbox"/>
2. Visual field (normal / abnormal)	<input type="checkbox"/>	<input type="checkbox"/>
3. Strength (normal / abnormal)	<input type="checkbox"/>	<input type="checkbox"/>
4. Reflexes (normal / abnormal)	<input type="checkbox"/>	<input type="checkbox"/>
5. Balance (normal / abnormal)	<input type="checkbox"/>	<input type="checkbox"/>
6. General physical condition: blood pressure (>200 systolic, or > 120 diastolic)	<input type="checkbox"/>	<input type="checkbox"/>
7. General physical condition: stethoscope (normal / abnormal)	<input type="checkbox"/>	<input type="checkbox"/>
8. Cognitive impairment: mini-mental test SCORE (max. 30):	
9. Alcohol abuse test (CAGE) if appropriate	<input type="checkbox"/>	<input type="checkbox"/>
Have you ever felt you ought to cut down on your drinking? Y <input type="checkbox"/> N <input type="checkbox"/>		
Have people annoyed you by criticizing your drinking? Y <input type="checkbox"/> N <input type="checkbox"/>		
Have you ever felt bad or guilty about your drinking? Y <input type="checkbox"/> N <input type="checkbox"/>		
Have you ever taken a morning eye opener to steady your nerves? Y <input type="checkbox"/> N <input type="checkbox"/>		

10. Other (please specify):

Annex 2: Guidelines for participating doctors

**EU MEDRIL PROJECT:
Medical Testing of Drivers (Category B)**

MEDRIL

*MEDical testing for the DRiving Licence
EU project 2003-2006*

Participating EU countries:
Spain, Netherlands, Finland and Luxembourg

A. Background leaflet (to be translated and given to each patient to read in the doctor's waiting room)

MEDRIL is a European project on medical testing for drivers. The aim of the project is to see what percentage of the driving population suffers from medical problems which could affect their ability to drive.

Would you be willing to participate in this project? Your participation would involve a short series of extra tests which take about **10** minutes to complete. This test is carried out in parallel with the normal test you have in your country.

The medical test results are strictly anonymous and are only being used for scientific purposes: there is no reference to the patient's name, social security number or any other code which could identify that person. Participation is strictly voluntary. Patients choosing to participate must be prepared to state their age, sex and location of residence. Patients may refuse to state their school-leaving age and/or living status (living alone / with someone).

The tests are non-invasive, i.e. there is no requirement to give a blood, urine or stool sample.

MEDRIL covers 4 countries in the European Union: Spain, Netherlands, Finland and Luxembourg. A total of 10000 medical tests are being carried out during the project.

Thank you for your assistance.

B. Inclusion Criteria

- Category B drivers (car drivers)
- Men and women
- From 20 years old and above
- Samples per age group: **to be decided by each country, according to the proportion of drivers in the age group in question**

C. Exclusion criteria

- Applicants for the driving licence for the very first time
- Patients who were originally denied a licence on medical grounds are now reapplying
- Drivers without a Category B driving licence
- Patients refusing to participate in the MEDRIL test
- Patients exceeding the individual age samples already collected by the doctor in question.

D. Doctors' guidelines

I. PATIENT INFORMATION

Patients must be willing to state their age, sex and location of residence.
Patients may refuse to state their school-leaving age and/or living status (living alone / with someone).

II. DOCTORS ANAMNESIS:

The doctor should ask these questions orally to the patient. Responses should be noted in the form of YES or NO (with a tick or cross in the relevant box). No further details are required unless stated on the form. For instance, Question 9 on medication should be supplemented with the group of medication being used. Question 11 on alcohol consumption is also more detailed. For information, a portion of alcohol is equivalent to:

- A bottle of beer or cider (33cl)
- A glass of wine (12cl)
- A small glass of sherry (8cl)
- A measure of liquor (4cl)

II. 5 Neurology: if patient has had a stroke or brain surgery, the doctor should pay particular attention to the visual field during the medical examination.

Question 12: "Other" can be used by the doctor to make any observations not included on the rest of the form which he/she considers relevant.

III. MEDICAL EXAMINATION:

The doctor should record only PASS or FAIL – OR NORMAL or ABNORMAL - (with a tick or cross in the relevant box) for each measurement.

TEST	METHOD AND SCOPE	PASS CRITERIA
1. Eyesight	Method (eyesight): letters, circles, figures or combination Scope: binocular with correction only	Minimum 0,5 vision
2. Visual field	Method (visual field): Donders Both eyes open	normal / abnormal
3. Strength, 4. Reflexes 5. Balance	Strength: pulling arm Reflexes: hammer Patient stands with hands on hips and eyes open. One leg raised about 10cms from floor. Instructions are given to the patient to stay balanced for at least 10 seconds. One practice allowed before actual test. The patient passes the test if he/she remains balanced for longer than 5 seconds. If patient remains balanced for 5 seconds or under, he/she may have another attempt. The longest balance time of the two is the final result.	normal /abnormal normal /abnormal Remaining balanced for 5 seconds or under = abnormal
6. Blood pressure	Blood pressure	Threshold: higher than 200 (systolic) or higher than 120 (diastolic)
7. Heart and lungs	Stethoscope	normal / abnormal
8. Cognitive impairment	Mini Mental Test (test used in each respective country <u>for all patients of 70 years old or above</u> , and for any other patient where there is suspicion of cognitive impairment)	- score 21-26: mild dementia - score 10-20: moderate dementia - score 10-14: moderate-serious dementia - score <10: serious dementia

<p>9. Alcohol abuse test (CAGE) if appropriate</p>	<p>Only to be used if the results of Q.11 of the anamnesis are <u>one or more</u> of the following:</p> <ul style="list-style-type: none"> a) 4 times per week or more OR b) 7-9 portions, or 10 or more portions OR c) daily or almost daily <p>CAGE test: A: Have you ever felt you ought to cut down on your drinking? B: Have people annoyed you by criticizing your drinking? C: Have you ever felt bad or guilty about your drinking ? D: Have you ever taken a morning eye opener to steady your nerves?</p>	<p>Failed, if YES is the response for 2 or more of the CAGE questions</p>
--	---	---

Question 10: "Other" can be used by the doctor to make any observations not included on the rest of the form which he/she considers relevant.

Completed forms should be returned by post to:

INSERT ADDRESS HERE

For further information regarding the project, please contact:

INSERT CONTACT NAME AND DETAILS HERE

For Annex 3 onwards: please contact CIECA at nick.sanders@cieca.be