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OF PSYCHOLOGY
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PALACKY UNIVERSITY IN OLOMOUC
CZECH REPUBLIC

Fitness to drive

Traffic psychology 1
PCH/DP1

Matus Sucha

Presentation 4

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I. Psychological and medical assistance for safe mobility – PASS

The causes of fatal and non-fatal accidents are to be found **primarily in the behaviour and subjective experience of the participants in road traffic**. Models of accident risk are based not on technical but on **human factors,** and it is here that **traffic psychology and traffic medicine** can and will contribute to stable progress.

The central concept in the assessment of fitness to drive is **mobility competence**, which denotes the sum of *mental, physical, attitudinal, and behavioural bases* for the *safe and co-regulated operation of motor vehicles*. The objective of Psychological and medical assistance for safety mobility (PASS) is to strengthen the individual driver's responsibility for his own and others' safety (Allhoff-Cramer, 2009).

I. Psychological and medical assistance for safe mobility – PASS

Behavioural problems (e.g. mental, physical, age-related) are **assessable** and can be **treated** to effectively improve road users' competence in coping with the challenges of traffic participation.

An interdisciplinary approach is needed in comprehensive assessment. An assessment of fitness to drive combines **traffic psychology and traffic medicine** in an interdisciplinary approach.

Three levels of prevention aimed at improving and securing mobility competence:

1. Primary level of prevention

The primary level of prevention comprises *traffic participants who conform to traffic laws* and restrictions without essential deviations from the requisites of safe driving.

The great majority of drivers are found at this level. Pre-school instruction, driving instruction, and the sum of positive influences during socialisation (e.g. through parents, teachers, and peer groups) have contributed to the development of sufficient mobility competence in these traffic participants.

I. Psychological and medical assistance for safe mobility – PASS

2. Secondary level of prevention

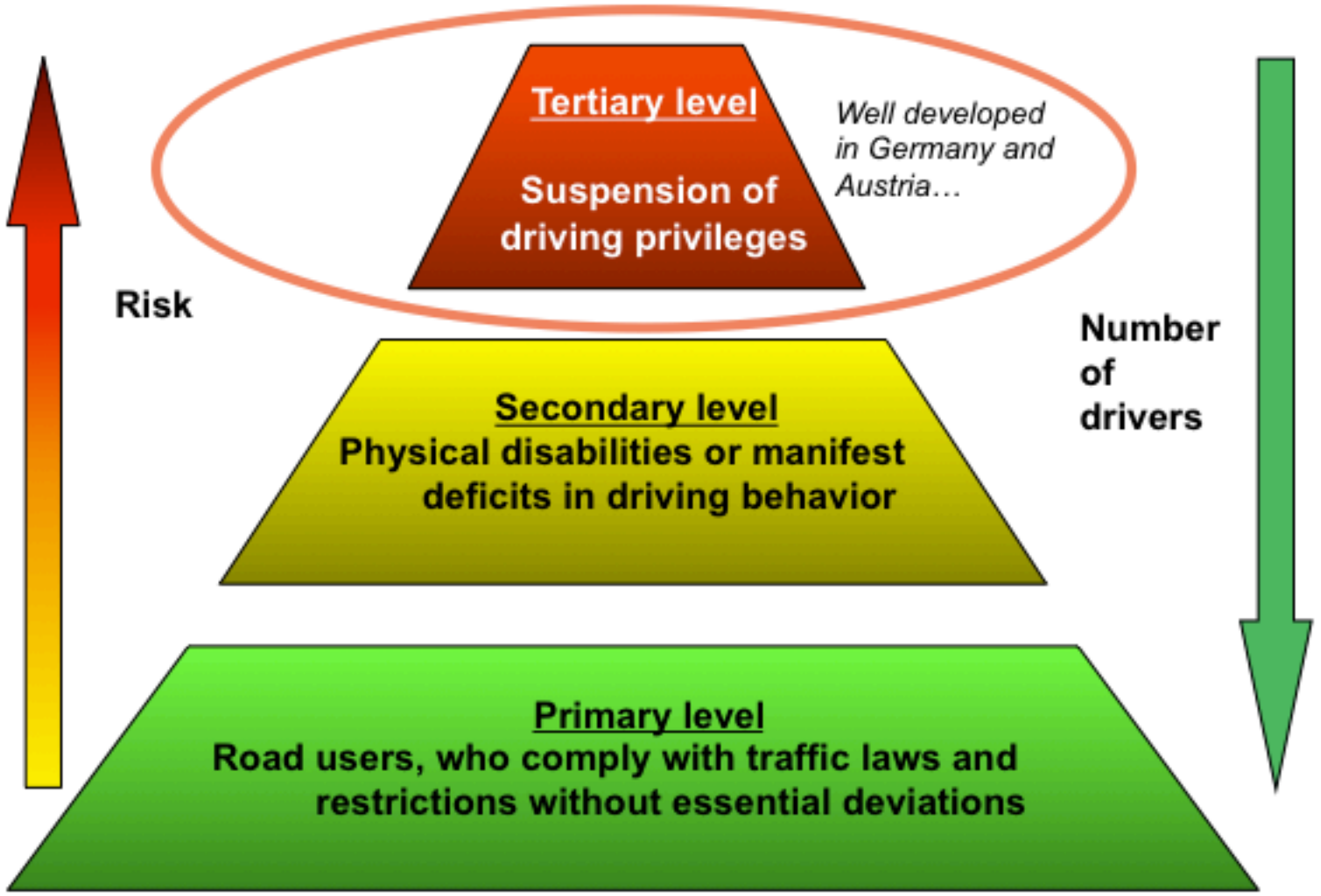
Traffic participants at the secondary level have **retained their driving privileges after deviating from traffic regulations**. Such persons are either restricted by **physical disabilities** or have manifested **deficits in their driving behaviour**. The risk of their participation in traffic is elevated and their average mobility competence is considerably **lower than that of motor vehicle operators at the primary level.**

3. Tertiary level of prevention

Operators at the tertiary level have been sentenced to **suspension of driving privileges** after deviating from traffic norms, on the basis of physical disabilities, because of severely deviant behaviour **associated with personality and/or behavioural deficits**, or because of **criminal behaviour**. These persons cannot legally participate in road traffic. They are characterised by a highly elevated risk of dangerous behaviour in traffic and by a deficient development of mobility competence.

Assessment of fitness to drive is present on the 2nd and 3rd levels of prevention.

I. Psychological and medical assistance for safe mobility – PASS



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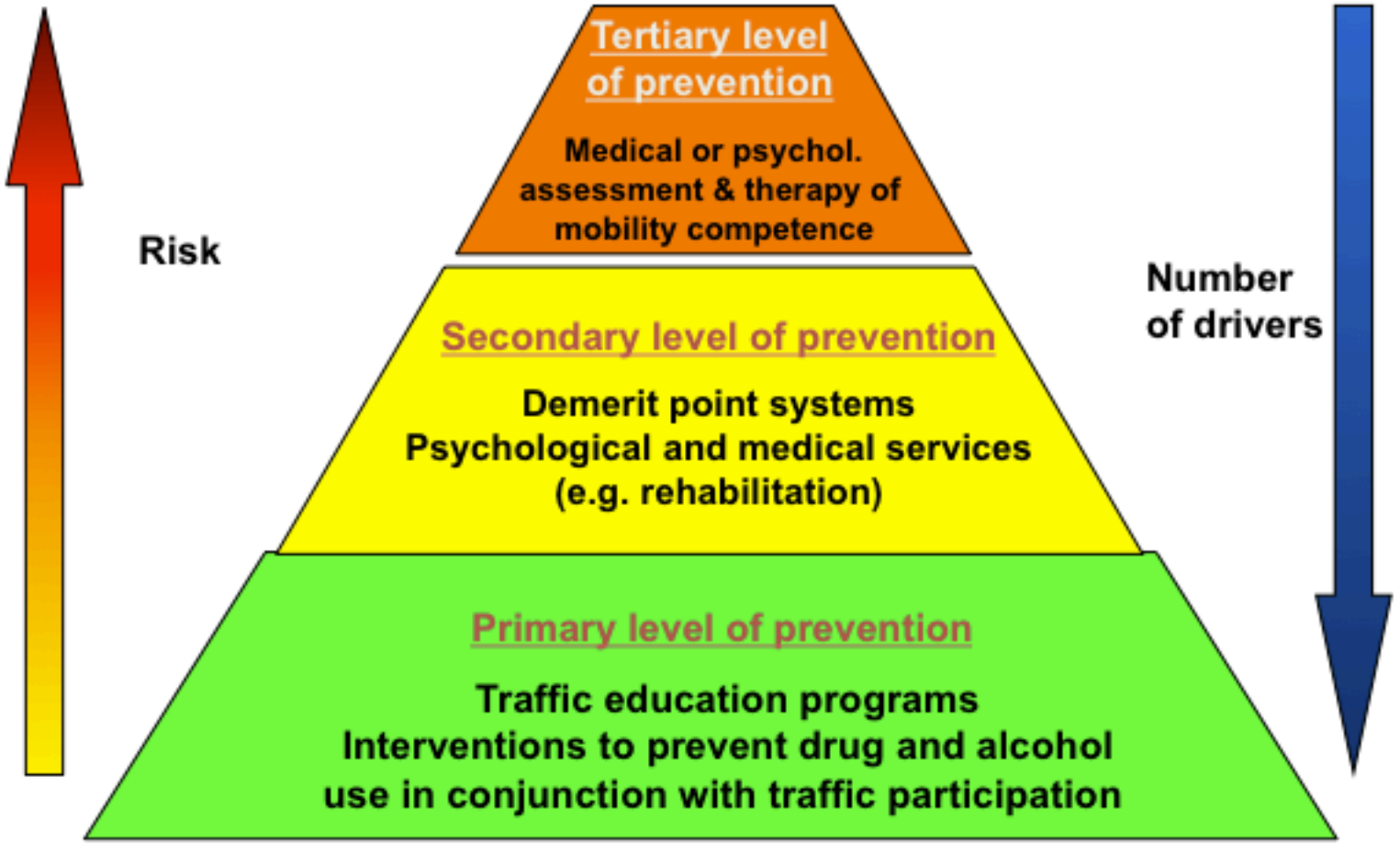

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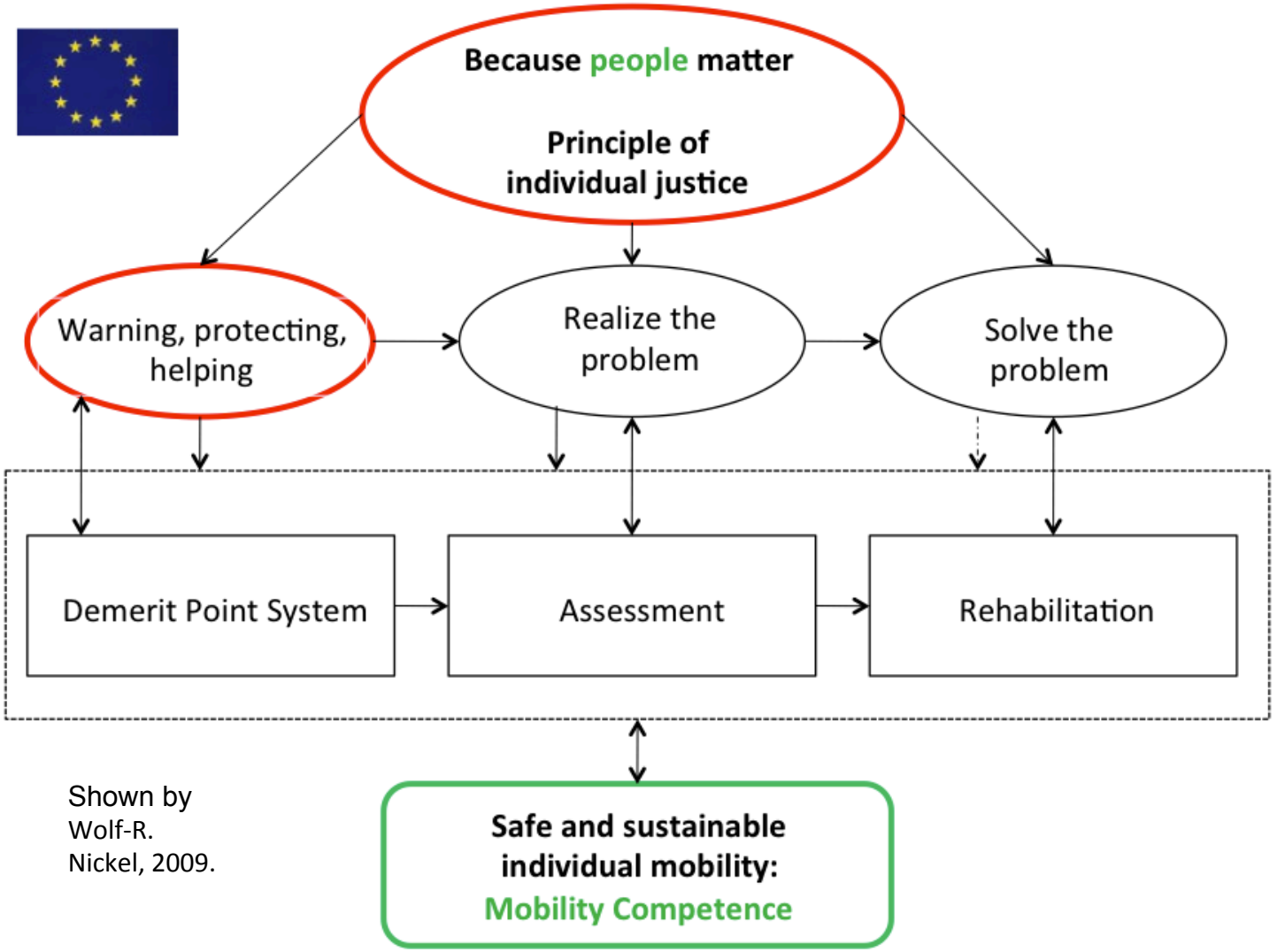

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II. Fitness to drive

Definition of fitness to drive: “Those persons considered fit for operating a motor vehicle must meet the necessary physical and mental requirements and may not have severely or repeatedly transgressed against traffic regulations or penal law.” (Laub & Müller, 2006)

In the process of the assessment of fitness to drive the responsibilities of drivers, examining health professionals, and licensing authorities must be clearly outlined.

Different states have different laws about reporting health conditions that might affect a person’s ability to drive safely. Basically, it can be stated that these laws have been created to protect public safety. States differ greatly in terms of who is responsible for the final decision and different parties’ (driver, health professional, state/licensing) obligations and rights.

Most states use two sets of standards for the assessment of fitness to drive – private vehicle driver standards and commercial/professional vehicle driver standards.

II. Fitness to drive

Health professionals who might be involved in assessing a person's fitness to drive:

- medical practitioners (general practitioners and specialists)
- optometrists
- occupational therapists
- psychologists
- physiotherapists.

The aim of determining fitness to drive is to achieve a balance between minimising any driving-related road safety risks for the individual and the community posed by the driver's permanent or long-term injury or illness, and maintaining the driver's lifestyle and employment-related mobility independence.

II. Fitness to drive

Consideration of the requirements of the driving task is fundamental to assessing a person's fitness to drive.

The driving task involves a **complex and rapidly repeating cycle** that requires a level of skill and the ability to interact with **both the vehicle and the external environment** at the same time.

Information about **the road environment** is obtained via the **visual and auditory senses**. The information is operated on by many **cognitive processes, including short- and long-term memory and judgement**, which leads to **decisions** being made about driving.

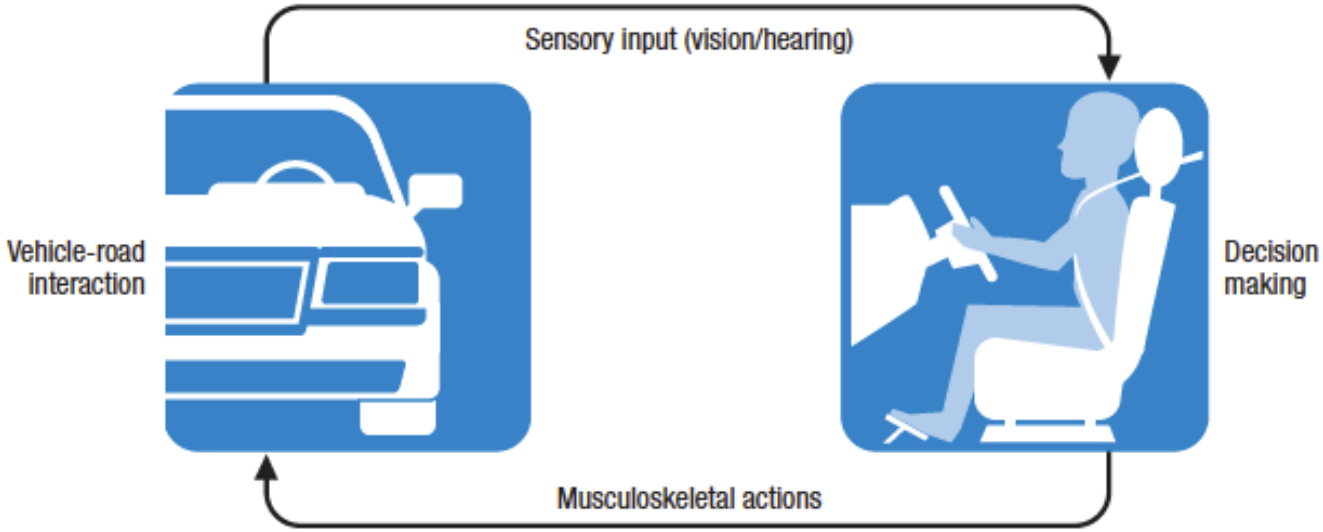
Decisions are put into effect via the **musculoskeletal system**, which acts on the steering, gears, and brakes to alter the vehicle in relation to the road.

II. Fitness to drive

This repeating sequence depends on:

- vision
- visuospatial perception
- hearing
- attention and concentration
- memory
- insight
- judgement
- reaction time
- sensation
- muscle power
- coordination

Assessing fitness to drive standards, Australia, 2012



II. Fitness to drive

Driving tasks occur within a dynamic system influenced by complex **driver, vehicle, task, organisational, and external road environment factors that include**:

1. the driver's experience, training, and attitude
2. the driver's physical, mental, and emotional health, including fatigue and the effect of prescription and non-prescription drugs
3. the road system, for example, signs, other road users, traffic characteristics, and road layout
4. legal requirements, for example, speed limits and blood alcohol concentration
5. the natural environment, for example, night, extremes of weather, and glare
6. vehicle and equipment characteristics, for example, the type of vehicle, braking performance, and maintenance
7. personal requirements, purpose of the trip, destination, appointments, time pressures, etc.
8. passengers and the potential for their distracting the driver

II. Fitness to drive

Driving tasks occur within a dynamic system influenced by complex **driver, vehicle, task, organisational, and external road environment factors that include**:

For commercial or heavy vehicle drivers there are a range of additional factors including:

1. business requirements, for example, rosters (shifts), driver training, and contractual demands
2. work-related multi-tasking, for example, interacting with in-vehicle technologies such as GPS, job display screens, or other communication systems
3. legal requirements, for example, work diaries and licensing procedures
4. vehicle issues including size, stability, and load distribution
5. passenger requirements/issues, for example, duty of care, communication requirements, and the potential for occupational violence
6. risks associated with the carriage of dangerous goods
7. additional skills required to manage the vehicle, for example, turning and braking
8. endurance/fatigue and demands for vigilance associated with long periods spent on the road.

Assessing fitness to drive standards, Australia, 2012

II. Fitness to drive

Medical conditions likely to affect fitness to drive

Given the many causal factors in motor vehicle crashes, the extent to which medical conditions contribute is difficult to assess. There is, however, recognition of the potential for certain conditions to cause serious impairments. Examples of such conditions include:

1. *Blackouts*
2. *Cardiovascular conditions*
3. *Diabetes*
4. *Dementia and cognitive impairment*
5. *Seizures and epilepsy*
6. *Other neurological conditions*
7. *Musculoskeletal conditions*
8. *Psychiatric conditions*
9. *Sleep disorders*
10. *Alcohol and other substance misuse*
11. *Vision and eye disorders*

Just because people have a **disease or condition that might affect their driving** doesn't mean that they **won't be able to drive at all**. It might mean that they have to see their doctor more often to check that their illness is well managed and it might mean that there are some restrictions placed on their driving.

II. Fitness to drive

A relative risk of 1.09 means that drivers with the mentioned medical condition have a 9% higher crash rate than drivers without any medical condition.
** The relative risk is statistically significant at a level of alpha 0.05.

Relative risks of selected medical conditions. Source: Vaa, 2003

Medical condition	Relative risk*	95% Confidence Interval	Number of results
Vision impairment	1.09**	(1.04; 1.15)	79
Field of vision	0.90	(0.69; 1.17)	4
Progressive eye diseases	0.86	(0.50; 1.49)	4
Binocular visual acuity	1.13**	(1.05; 1.22)	39
Hearing impairment	1.19**	(1.02;1.40)	5
Arthritis/Locomotor disability	1.17**	(1.00;1.36)	12
Cardiovascular diseases	1.23**	(1.09;1.38)	48
(Serious) arrhythmia	1.27**	(1.09; 1.47)	14
Abnormal arterial blood pressure	1.03	(0.86; 1.22)	8
Suffering from angina	1.52**	(1.10; 2.09)	3
Myocardial infarction	1.09	(0.62; 1.92)	2
Diabetes mellitus	1.56**	(1.31;1.86)	25
Neurological diseases	1.75**	(1.61;1.89)	22
Diseases affecting central nervous system (incl. stroke, Parkinson's disease)	1.35**	(1.08; 1.67)	11
Epilepsy/other seizures	1.84**	(1.68; 2.02)	8
Mental disorders	1.72**	(1.48;1.99)	33
Dementia	1.45**	(1.14; 1.84)	18
Alcoholism	2.00**	(1.89; 2.12)	3
Drugs and medicines	1.58**	(1.45; 1.73)	68
Renal disorders	0.87	(0.54; 1.34)	3
Weighted average across all main groups	1.33**	(1.28; 1.37)	298

III. Psychological fitness to drive

In some states the assessment of psychological fitness to drive (PFTD) is a part of a comprehensive assessment of fitness to drive (for example in Germany – MPA: Medical-Psychology Assessment); in others (for example, in the Czech Republic) the psychological assessment of fitness to drive is conducted separately.

The reasons for undergoing PFTD differ greatly among countries. We can observe 2 groups of attitudes:

1. *PFTD must be undergone by drivers who committed a serious offence (usually repeatedly), sometimes connected to a demerit point system.*
2. *PFTD must be undergone by those drivers in Group 1 and all (or some) professional (commercial) drivers.*

In both groups, PFTD for elderly drivers is common.

III. Psychological fitness to drive

Assessing fitness to drive in elderly persons

The assessment of an older person's fitness to drive can take place both as part of the renewal of the driving **licence at a certain age**, and when a **health problem has been identified.**

Practices in European countries governing the licensing of older drivers vary. Some countries require the renewal of the driving licence at a certain age, others do not. Those countries that do often require some sort of medical examination.

Increasingly, researchers recognise that age-based mandatory assessment programmes targeting older drivers are **unlikely to produce safety benefits and may have counter-productive results**.

III. Psychological fitness to drive

Assessing fitness to drive in elderly persons

One of the few evaluations of existing driver testing programmes compared Finnish and Swedish licensing practices. Finland requires regular medical check-ups in conjunction with licence renewal starting at age 70, whereas Sweden has no such age-related control. A comparison of Finland and Sweden shows **no apparent reduction in crashes** as a result of the Swedish programme.

However, Finland had a **higher rate of fatalities among unprotected older road** users than Sweden, arguably the result of an increase in the number of older pedestrians who had lost their driving licence. An Australian study reached a similar conclusion (ERSO, 2013).

III. Psychological fitness to drive

In the Czech Republic PFTD assessment is obligatory for:

1. all professional drivers (before obtaining their licence and repeated each 5 years)
2. instructors in driving schools
3. elderly drivers – upon the request of a medical doctor
4. drivers whose driving licence was withdrawn (because of a serious offence – mostly speeding and DWI, aggressive behaviour, or they reached 12 points in the demerit point system).

III. Psychological fitness to drive

An example of a question for PFTD can be:

"Can it be expected that Mr Smith will again drive under the influence of alcohol in future and/or are there any impairments as a result of uncontrolled alcohol consumption which would affect his safe handling of a vehicle?"

Again, countries differ in the sense of what the outcome of PFTD should be. In some countries (for example, the Czech Republic) the outcome of PFTD is a clear statement as to whether the driver is fit or not fit to drive. In other countries the outcome is rather a description of *the mental status praesens and assumptions about future behaviour,* which other authorities (medical doctors, state authorities) can take into account, but don`t have to.

In all cases psychologists must bear in mind that assessment covers not only skills (cognitive functions and performance capacity) but also the will to drive safely.

III. Psychological fitness to drive

PFTD assessment consists of:

1. psychological “objective” tests for determining the performance capacity and personality
2. medical examination (optional)
3. exploration (interview and anamnesis)
4. practical driving assessment – observation of behaviour in the field (optional).

Psychological testing is focused on:

1. assessment of cognitive functions
2. assessment of performance capacity (psychophysical characteristics)
3. assessment of personality traits and attitudes
4. hazard perception assessment

III. Psychological fitness to drive

Assessment of cognitive functions includes these functions:

1. attention, resilience to monotony, attentiveness flexibility, concentration, stress resistance
2. memory (short-term memory, working memory)
3. IQ (screening)
4. peripheral visual perception, visual orientation
5. reaction time, reaction capacity, ability to decide and react in a dynamic environment

Assessment of personality focuses on:

1. the personality of the driver in the view of risky behaviour
2. attitudes (e.g. willingness to cooperate in traffic, attitudes toward other road users (especially vulnerable road users, towards the car, drinking habits)
3. sensation seeking, readiness for risk taking
4. anger, aggression, and hostility

Hazard perception is assessed.

**Concrete diagnostic methods and PFTD processes are discussed extensively during classes and practice.*

III. Psychological fitness to drive

Exploration – interview

A crucial part of PFTD which leads to the formulation of outcomes.

In this part of PFTD psychologists consider all the relevant information they have (from tests, anamnesis, other health professionals' reports, police records etc.) and combine them.

In the interview psychologists ask for information which is missing or where conflict or ambiguity occurs.

The interview should be semi-structured – which guides the psychologist through the process but lets him/her individualise the interview.

The main aim of the interview is to understand all the data we have about the driver in detail, to make connections, and to create a coherent outcome as to whether the driver is fit or is not fit to drive and whether he or she is motivated and willing to behave in a non-risky manner.

III. Psychological fitness to drive

Exploration – interview

It is will, not skill, that is the problem.

Psychologists focus on **attitudes, motivation, values, or lifestyle**.

Questions dealing with **attitudes towards other road users**, especially vulnerable ones, must be covered. This is usually connected to attitudes towards the car or driving in general. *What is the role of the car for the driver? What are his/her attitudes to other road users?*

We do not really have *validated tests and procedures to test personality and attitude issues*. But we do have **good approaches in our theories**, for instance the GDE matrix.

Within the exploration part of PFTD assessment (interview, anamnesis, observation) the psychologist uses his/her psychological abilities, which are based on approaches and theories which are well documented and known.

III. Psychological fitness to drive

Practical driving exam – on road assessment (observation of behaviour)

For assessing driving ability/fitness to drive: older drivers, less educated persons, persons with language problems (problems with laboratory tests).

The exam should be standardised and validated – an example from Austria is the Wiener Fahrprobe (AAP 1985).

- Development between 1980 and 1985
- Behaviour usually observed by two persons inside the car
- Standardised variables: coding observer
- Non-standardised variables free observer
- Standardised route
- 20 to 40 km long, 30 to 60 min
- Test route representative of the road network
- Divided into sections (intersections, motorway entrances & exits, etc.)
- 2 observers (coding observer, free observer)

Observation can be used as:
- a criterion: a mark is given after the driving test (apt subdivided in 2 to 4 steps, or not apt)
- a set of predictors: observation results can be used for completing assessment, for improving prognoses, etc. (e.g. compensation for bad test results) (Risser, shown 2013)

III. Psychological fitness to drive

Variables tackled by the free observers (Risser, shown 2013)

Approaching a place of interaction
– checks the situation
– does not check the situation
– inappropriate speed
– inaccurate lane choice
– drives anticipatorily
– does not drive anticipatorily and does not take in necessary information

Overtakes & changes lane
– cuts
– too small lateral distance
– interrupts

Conflict
– testee provokes conflict
– testee does not provoke conflict

Interaction
– lets others pass
– does not let others pass
– reduces speed
– does not reduce speed to let cross
– pressures other cars (flashing lights, driving with short headway, etc..)
– obstructs others (e.g., at crossings, etc...)
– others move into the safety distance of the testee
– insists on right of way
– does not insist on right of way
– turns left close in front of an oncoming car
– obstructs other road users when turning left
– obstructs other road users when turning right
– makes other road users decelerate
– makes other road users accelerate
– communicates (gesture, using indicator, etc.)

III. Psychological fitness to drive

Coding observer: standardised variables (Risser, shown 2013)

Overtaking or lane change
– correctly
– not correctly
– in spite of oncoming traffic
– without sufficient vision
– while forbidden
– because of an obstacle
– late lane change before an obstacle
– lane change in time

Use of the indicator
– indicates in time
– does not indicate
– does not indicate in time
– indicates ambiguously

Lane use
– inaccurate, winging
– extremely on the right side of the lane
– extremely on the left side of the lane
– cuts curves

Lane choice for proceeding
– correct
– in time,
– at the last moment
– chooses wrong lane

Behaviour when having to yield
– correct
– not correct

Speed
– too fast for pedestrians/cyclists
– above speed limit
– in the queue
– not driving in convoy
– at/below the limit
– considerably slower than the limit
– brakes abruptly
– unsteady speed

Distance to the road user ahead
– correct
– too short

Behaviour at traffic lights
– goes through red light
– goes through yellow light
– does not start when it is green

Checks the situation with respect to other road users
– yes
– no

Thank you for listening!