



FIRST FACULTY OF MEDICINE
CHARLES UNIVERSITY IN PRAGUE

Medical fitness and drug use: Railroad safety standards

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EUROPE



10 million inhabitants
5 million working
population



INTRODUCTION



UNION INTERNATIONALE
DES CHEMINS DE FER
INTERNATIONALER
EISENBAHNVERBAND
INTERNATIONAL UNION
OF RAILWAYS



UNION INTERNATIONALE DES SERVICES
MÉDICAUX DES CHEMINS DE FER
INTERNATIONALER VERBAND
DER SAHNÄRZTLICHEN DIENSTE
INTERNATIONAL UNION OF
RAILWAY MEDICAL SERVICES

The **UIMC** (**U**nion **I**nternationale de **S**ervices **M**édicaux des **C**hemins **f**er), the **I**nternational **U**nion **R**ailway **M**edical **S**ervices, is an **autonomous special group of the UIC** (**U**nion **I**nternationale des **C**hemins **d**e **f**er), the **I**nternational **U**nion of **R**ailways based in Paris.



FUNCTION

According to its constitution (1948),
the **function** of the UIMC was to establish
and develop relationships intended
to **promote the progress of the medical
service in its application in the operation
of the railways,**
which was to be achieved by the holding
of regular congresses, the publication
of a magazine and the international
strengthening of relations between medical
officers in the various railways
administrations.



RAILWAY COMPANY POLICY

The reliability of judgement and performance of railway workers must not be influenced by physical, mental and/or behavioural disturbances.

The responsibility of the railway company is to define and implement a policy for alcohol, drugs and psychotropic medication.

Railway workers have to respect this policy.

THE ORIGINAL UIMC VADEMECUM

**Original UIMC working group
was established in 1996**

- to define **minimum interoperability criteria** for European railway staff
- **concerning medical fitness**
- published in 3 languages English, German, French
- available on www.uic.org



MEDICAL GUIDELINES UPDATE 2012

Guidelines for medical fitness of railway personnel in safety critical functions are based on expert opinion and consensus of experts from around the globe because of the lack of high quality studies concerning the relationship between diseases and railway safety.

Alcohol, drugs and psychotropic medication guidelines with disqualifying criteria and testing recommendations are one of the most important.

MEDICAL GUIDELINES UPDATE 2012

In 2012 the UIMC decided to update the railway medical guidelines.



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MEDICAL FITNESS STANDARDS

Medical fitness standards are divided into chapters

- **cardiovascular disorders,**
- **diabetes mellitus,**
- **disorders of the central nervous system,**
- **syncope,**
- **sleep disorders,**
- **vision and hearing criteria,**
- **mental disorders.**

Special attention is focused on alcohol, drugs and other psychotropic substances.

Special chapter Risk assessment calculation was implemented.

MAIN CRITERIA

Minimal interoperability medical fitness standards are prepared to minimize the risk of railway accidents.

Important factors:

- **loss of functional capabilities (vision, hearing, adequate cognitive functioning and physical capacity) and**
- **risk of sudden incapacity caused by diseases**

MAIN CRITERIA

2 risk groups in operating services demanding partially different criteria:

Group A:

high safety risk, i.e. a single person's responsibility for traffic safety not fully compensated by technical means

Group B:

safety risk, i.e. responsibility for operational safety controlled by group work, supervision by another skilled person or by technical equipment that can maintain a sufficient safety level

EXAMPLE: HYPERTENSION

Group A

Strong disqualifying criteria



Immediately when blood pressure $\geq 200/110$ mm Hg (with or without treatment)

Persistent blood pressure $> 180/110$ mm Hg (with or without treatment)

Blood pressure $> 140/90$ mmHg combined with secondary organ damage

EXAMPLE: DIABETES

Group A

5 - 10% of the workforce suffer from diabetes.

Night and shift work are risk factors for adipositas, metabolic syndrome and diabetes.

The main risks concerning operational safety are the risks of sudden or severe hypoglycemia, lack of awareness of hypoglycemia or prolonged hyperglycemia.

Diabetes Mellitus type 1

only acceptable in high safety duties in highly exceptional cases. Some countries do not allow it.

Selected cases must be monitored intensively by a physician experienced in diabetes.

Diabetes Mellitus type 2

The risk of hypoglycemia depends on the kind of therapy.

Conditions for performing safety duties are always an adequate understanding and awareness of the disease, regular self-monitoring and periodic evaluations.

ALCOHOL (under revision)

Strong disqualifying criteria

Alcohol-use disorders :

regular abusive consumption and dependence (DSM, *Diagnostic and Statistical Manual of Mental Disorders*)

Relative disqualifying criteria

Unhealthy use : problem drinking (binge drinking) and risky use

Remarks

Alcohol consumption can be estimated via a medical history, an examination, the use of validated scales (Fast Alcohol Consumption Evaluation , Alcohol Use Disorders Identification Test ,.....) and biological tests (mean corpuscular erythrocyte volume MCV, gamma-glutamyltransferase GGT, transaminases SGOT and SGPT, carbohydrate-deficient transferrin CDT and/or ethyl glucuronide ETG).

ALCOHOL (under revision)

Particular attention is requested for **“risky consumers”** or **“binge-drinking”**.

In case of chronic alcoholism, a specific medical follow-up must be organized. It is recommended also to check the psychological aptitude. The follow-up need regular medical and laboratory controls at least during the first year. The alcohol relapse is more frequent during the first six months. For this reason, **the fitness of safety functions can be discussed after a validated abstinence of at least 6 months.**

It is recommended to control the abstinence with ethyl glucuronide ETG measurements (blood, urine or hair), which is a direct marker for alcohol intake before recovering the ability for safety tasks.

Measurement of ETG in hair is a sensitive and specific marker of high and repeated doses of alcohol consumption.

DRUGS AND OTHER PSYCHOTROPIC SUBSTANCES (under revision)

Because of its consequences on mental and/or physical function and on the behaviour, **it is not allowed to be under influence of drugs on duty**. For that reason **drugs consumption is forbidden** (zero tolerance).

It is recommended to systematically screen **in urine** the following substances:

Test	Calibrator	Cut-off (EWDTS)*
Amphetamine (AMP)	d-Amphetamine	500 ng/mL
Cocaine (COC)	Benzoyllecgonine	150 ng/mL
Cannabis (THC)	11-nor- Δ^9 -THC-9 COOH	50 ng/mL
Methamphetamine (MET)	d-Methamphetamine	500 ng/mL
Morphine (MOP)	Morphine	300 ng/mL

* European Guidelines for Workplace Drug Testing in Urine, 2015-11-01
Version 2.0

DRUGS AND OTHER PSYCHOTROPIC SUBSTANCES (under revision)

The **test in the urine** (immunoassay) is the standard screening test.

The **saliva testing** (immunoassay) or the **blood test** could be used to check an acute influence.

In case of a positive test, it is also possible **to confirm** the results (LC,GC/MS).

The **cut-off of the blood levels** are the following :
1,5 ug/l for THC and 15 ug/l for morphine, cocaine
and amphetamine.

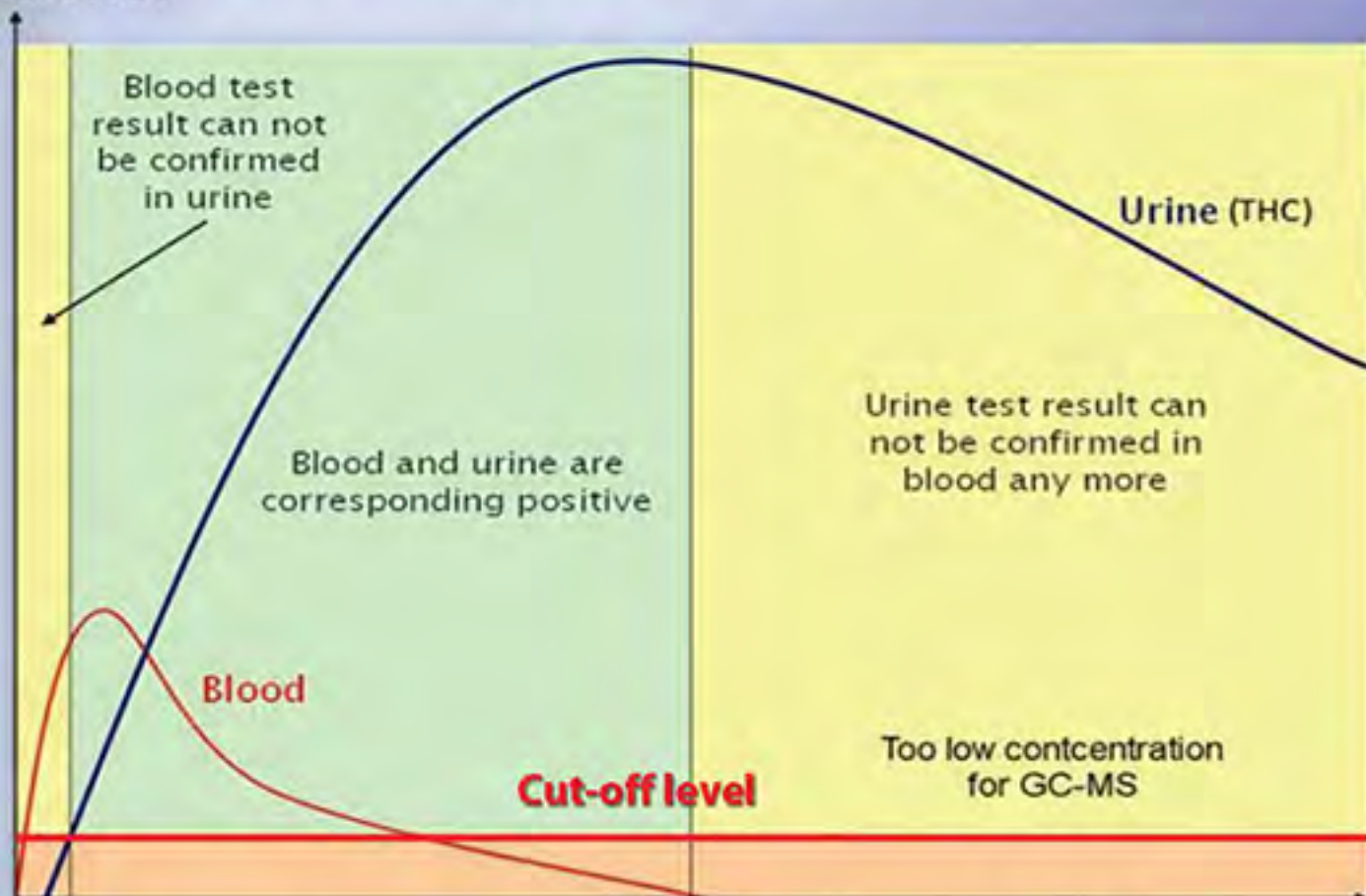
*COOH THC in blood is recommended to make the difference between a sporadic and a regular cannabis consume. Indeed, a very high concentration of **COOH THC > 40 µg/ml in whole blood or 64 µg/l in plasma indicates regular and important cannabis consumption.***



DRUG TESTING

THC CONCENTRATION (MARIJUANA) IN URINE AND BLOOD

Concentration





DRUG TESTING

THC CONCENTRATION (MARIJUANA) IN SALIVA AND BLOOD

Concentration

Saliva test result can not be confirmed in blood any more



DRUGS AND OTHER PSYCHOTROPIC SUBSTANCES (under revision)

Strong disqualifying criteria

Any use of drugs, except sporadic cannabis consume?????
**Any use of psychotropic drugs not in accordance with a
doctor's prescription????**

Relative disqualifying criteria

Sporadic cannabis consume or occasional consumption??????
**Use of psychotropic drugs in accordance with a doctor's
prescription????**

Remarks

***Drugs consumption can be estimated via a medical history,
an examination, the use of validated scales (Cannabis Abuse
Screening Test ...) and biological tests (urine, blood, hair)***₂₀

DRUGS AND OTHER PSYCHOTROPIC SUBSTANCES (under revision)

In specific cases , it is possible to test

Test	Calibrator	Cut-off (EWDTS)*
Benzodiazepine	Oxazepam	100 ng/mL
Methadone	Methadone	250 ng/mL
Buprenorphine	Buprenorphine	5 ng/mL

* European Guidelines for Workplace Drug Testing in Urine,
2015-11-01 Version 2.0

DRUGS AND OTHER PSYCHOTROPIC SUBSTANCES *(under revision)*

In any case, a **specific medical follow-up must be organized**. The follow-up needs **regular medical and laboratory at least during the first year**. The recovery of the fitness can be discussed after a validated abstinence of at least 12 months and is based on an individual evaluation. A test to assess the abstinence of drugs consume could be performed on the keratin matrix.

Concerning the consumption of cannabis, it is a necessity to make difference between a sporadic and a regular (usual) consume.???? For that reason, it is recommended to test the COOH THC in the blood. The differentiation appears decisive for appreciation of the fitness. In case of sporadic cannabis consumption, the abstinence should be controlled by regular urine testing.

Consume of cannabidiol (legal in different countries) is forbidden because of potential psychoactive effects.

FINAL RECOMMENDATIONS

Railway workers may not perform safety work under the influence of psychoactive substances.

Because of its consequences on mental and/or physical function, it is not allowed to be under influence of alcohol and drugs on duty.

It is relevant to respect zero alcohol and drug tolerance because of individual susceptibility.

FINAL RECOMMENDATIONS

The procedure for collection and **detection of illicit drugs in the saliva** in comparison with other collection methods is accepted as a more convenient procedure to the donor's privacy. Testing devices are available for on-site testing provided by purpose-trained safety technician.

Confirmatory testing procedures using blood of tested persons should be provided exclusively by specialized laboratories of toxicology or forensic medicine.



TESTING RESULTS

National carrier Czech Railways

ALCOHOL										
YEAR	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TOTAL	225 389	266 177	272 533	280 551	180 641	163 326	168 597	142 799	157 925	139 068
POSITIVE	23	10	20	17	13	5	3	7	5	15
DRUGS										
YEAR	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
TOTAL	x	x	28	33	30	27	56	57	39	74
POSITIVE	x	x	0	0	0	1	0	0	0	0



***Thank you for your
attention***

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