

Alcohol, Drugs, Medication Testing in Class I Pilots

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Disclosure Information

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I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation

Problematic Alcohol/Drugs use may be a stand-alone problem, consequence, cause, or accompanying symptom of ill mental health

EASA - Background and reasoning of the Task Force

‘The use/abuse of drugs and alcohol is one of the few disorders that has the potential to affect the mental health of pilots, for which screening by means of biochemical tests is available’

Testimonium Paupertatis ?

Aeromedical doctors, psychologists and pilots have many – non-biochemical – methods to identify alarm signs and symptoms of ‘problematic’ mental health of pilots

Alcohol and Aviation: acute intoxication ?

Use of alcohol by commercial pilots within a short time period before their flight is rare, due to:

- Bottle to Throttle time 8 – 10 – 12 - 24 hours
- Safety awareness / education of pilots
- Social control by other crewmembers



Alcohol - Hangover Effects

- BAC = 0.00% or 0.0‰
- effects may not be noticed by other crewmembers
- may cause subtle incapacitation



Hangover effects: a bigger threat to safety than acute intoxication

author(s)	evening BAC	type of tasks	effect on performance	measured after	BAC%
Yesavage & Leirer (1986)	0.1 %	simulated flight	impairment	14 hrs	0
Morrow et al. (1990)	0.1 %	radio communication	impairment	8 hrs	0
Morrow et al. (1991)	0.1 %	simulated flight	impairment	8 hrs	0
Morrow et al. (1993)	0.1 %	simulated flight	increased variability	8 hrs	0
Taylor et al. (1994)	0.08 %	ATC communication	impairment	8 hrs	0
Yesavage et al. (1994)	0.08 %	simulated flight	impairment	8 hrs	0
Taylor et al. (1996)	0.08 %	simulated flight	no effect	8 hrs	0
Simons & Valk (2003)	0.07 %	tracking & vigilance	impairment	9 hrs	0

- IFALPA Occupational Health Survey (1990)
 - 8% of 697 Dutch pilots considered they drank too much
≈ self-defined problematic alcohol use (\pm 24 U/week)
- TNO Survey 1999
 - 5% admitted adverse effects next morning when they had to fly
≈ self-defined problematic alcohol use [Simons & Valk, 2003]

‘Problematic’ alcohol use in Dutch pilots: estimated at 5-8 %

‘Problematic’ alcohol use in Dutch working population: 5-8 %

Problematic alcohol users will be missed by random testing

[Simons & Valk, 2003]

Yield of Random Alcohol Testing is very low: 3 in 10.000 pilots

[Li et al. Aviat Space Environ Med. 2007; 78(5):510-3]

Yield of Random, Pre-employment, Reasonable Cause
Drug Testing is very low: 8 in 1000
Highest Yield: Reasonable Cause

[Antuñano, 2009]

False Positives

Selected False Positives Reported in UDS ^{2,3,6}		
Substance	False Positives	
Alcohol	Isopropyl alcohol	
Amphetamine/ methamphetamine	Amantadine, brompheniramine, bupropion, chlorpromazine, desipramine, dextroamphetamine, ephedrine, isometheptene, labetalol, methylene dioxymethamphetamine, methylphenidate, phentermine, phenylephrine, phenylpropanolamine, promethazine, pseudoephedrine, ranitidine, selegiline, thioridazine, trazodone, trimethobenzamide, trimipramine	demonstrable 1 - 2 days
Barbiturates	Fenoprofen, ibuprofen, naproxen	1 - 4 days
Benzodiazepines	Oxaprozin, sertraline	1 - 30 days
Cannabinoids	Dronabinol, efavirenz, fenoprofen, ibuprofen, naproxen, pantoprazole	1 - 30 days
Opiates	Dextromethorphan, diphenhydramine, gatifloxacin, ofloxacin, rifampin, verapamil	1 - 4 days
Methadone	Clomipramine, chlorpromazine, diphenhydramine, doxylamine, quetiapine, thioridazine, verapamil	1 - 4 days
Phencyclidine	Dextromethorphan, diphenhydramine, doxylamine, ibuprofen, imipramine, ketamine, meperidine, mesoridazine, thioridazine, tramadol, venlafaxine	4 - 7 days

Hair Testing: not (yet) validated for a number of drugs

Finding cannabinoids in hair does not prove cannabis consumption

[Moosmann et al. - Sci Rep. 2015; 5: 14906. Published online 2015 Oct 7]

All three cannabinoids can be present in hair of non-consuming individuals because of transfer through cannabis consumers, via their hands, their sebum/sweat, or cannabis smoke.



Aircrew should never
take a walk
in Amsterdam

Random/Pre-employment Testing may be useful to enforce the law

It is not suited to identify / prevent
problematic alcohol/drug use
or ill mental health



Do we only want to enforce the law ?

Or, do we also want to prevent and identify mental health problems
and support pilots to fly healthy and safely throughout their career ?

The usefulness of pre-employment testing is limited, because dependency on alcohol/drugs and mental problems mostly evolve during the professional career.

[Simons & Valk, 2003]



TNO NL Pilots Survey: 14% used prescription drugs and 5% used OTC drugs that are considered to affect pilot's performance

[Simons & Krol, 2003]

Identification of these drugs and new smart drugs/nootropics needs very specific methods and will be missed in general test programmes.



We live in 2015

Social climate and job conditions of pilots have changed

- Increasing job and financial stresses
- Increasing social demands
- Increased social acceptance of smart drugs and party drugs
- Trend: less alcohol, more smart and party drugs ?



Anecdotal evidence: 'New Age' Pilots using Psychostimulants – 'Smart Drugs' – 'Neuroenhancers'

- Modafinil
- Adrafinil
- Methylphenidate
- Amphetamines
- Ephedra
- Piracetam
- Noopept
- Phenibut
- Pitolisantand what next?



Stimulants are used to boost performance and are easy to get

- Methylphenidate (Ritalin[®], Concerta[®]): even in minor ADHD cases, youngsters grow up with methylphenidate
- Amphetamines (Adderal[®], various dexamphetamines)
- D-amphetamine as 'escape and evade pills' in military survival kits
- Modafinil (Provigil[®], Modiodal[®]) used in Air Forces
- Caffeine 200-400 mg used in Air Forces



Methylphenidate / amphetamines

Long-Term use: impairment of learning and memory tasks



All Stimulants

Dangerous combination: Fatigue + Stimulants

Fatigue : may lead to Risky behaviour

[e.g. Frings, 2012]

Stimulants: Over-confidence

[e.g. Killgore et al., 2008]

Modafinil is used instead of sufficient sleep

Is that a problem for flight safety?

After sleep deprivation modafinil improves vigilance – statistically significant but not operationally relevant. Subjects still had impaired performance compared to non-sleep deprived subjects.



Is use of modafinil to stay awake, a threat to flight safety ?
(e.g. in case of early starts, night flying, sleep deprivation)



Should we test for use of smart drugs, such as modafinil ?

We should focus on PREVENTION

Aim of prevention programme:

- Early identification and treatment of risk cases
- Stimulate safety awareness of aircrew concerning alcohol, drugs (illicit, prescription, OTC), and life style
- Educate Doctors and Pilots

ICAO Manual on Prevention of Problematic Use of Substances in the Aviation Workplace – 1995 gives a strategy to develop a program

Tools for Prevention: all stakeholders

- Support 'anti-skid' teams / HIMS approach:
 - identification, counseling by colleague pilots
 - peer identification and referral
 - assistance: 'pilots for pilots'
- Employee Assistance programmes



Tools for Prevention: Flying Schools and Airlines

- inter-active training:
 - start at flying schools: catch them young
 - periodical inter-active training within airlines
 - ✓ information on risks and healthy professional life style
 - ✓ low threshold for reporting of risk cases (Just Culture)



Tools for Prevention and Identification for AMEs

➤ Individual risk-analysis during mandatory medical:

Ask how the pilot is coping with the demands of the job, family and friends, relationships, alcohol/drugs, sleeping problems and fatigue (both may also be symptoms of depression), financial situation: **show interest and make clear that your aim is to keep pilots flying healthy and safely.**

Give guidance concerning professional life style, preventive health measures, use of medication, coping strategies.



In case of alarm signals pointing at cognitive impairment or substance abuse: neuropsychological testing, biochemical test (γ GT, MCV, CDT), drug screen, on the job testing.

In case of (occasional) use of smart drugs to improve alertness and performance: do not just ground the pilot – discuss how one can cope without drugs and consider an anti-skid approach

In case of a worrisome psycho-social development
(i.e. depression, burn-out, problematic alcohol use, drug use):

- 1) **involve an aviation psychologist or psychiatrist, and**
- 2) 'keep a finger on the pulse' by using a 'buddy' approach.
The buddy can be a pilot from an anti-skid group





The **Pilot/AME** Relationship



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Thanks for your attention



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