

Effects of engine oil fumes on neurobiological outcome measures

Published: 03-03-2011

Last updated: 03-05-2024

To assess the usefulness (sensitivity) of magnetic resonance imaging (MRI) in detecting TCP-induced changes in neurobiological markers induced by engine oil fumes.

Ethical review	Approved WMO
Status	Pending
Health condition type	Demyelinating disorders
Study type	Observational non invasive

Summary

ID

NL-OMON34165

Source

ToetsingOnline

Brief title

BRAINAIR

Condition

- Demyelinating disorders

Synonym

engine oil fumes; tricresylphosphates

Research involving

Human

Sponsors and support

Primary sponsor: Academisch Medisch Centrum

Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: cabinecrew, cognition, MRI, neurotoxicity

Outcome measures

Primary outcome

Differences between both groups in: NPO (cognition, depression and anxiety).

MRI outcome: brain volume, neurometabolites (Cho/Cr, NAA/Cr), white matter

integrity (FA), brain perfusion (CBF), and difference in brain activation

during an executive functioning task measuring planning abilities (Tower of

London) and a paired associates task measuring episodic memory.

Secondary outcome

N.a.

Study description

Background summary

The outside air supplied to the cabin/flight deck on commercial aircraft ("bleed air") may sometimes be contaminated with tricresylphosphates (TCPs). TCP is a neurotoxin, and a potent inhibitor of the enzyme acetylcholinesterase, resulting in accumulation of acetylcholine at synapses with overstimulation of neurotransmission. Various air sampling cases have been conducted on single flights and observed airborne TCPs and a wide range of aliphatic and aromatic hydrocarbons. Medical record review of airline crew members who were examined after exposure to contaminated bleed air found acute respiratory and/or central nervous system symptoms among the most commonly reported. Pilot impairment or incapacitation in flight has been attributed to exposure to oil fumes. The potential contamination of aircraft cabin air by engine oil fumes is thus a serious aviation safety concern for both aircrew and passengers. However, the effects of engine oil fumes on neurobiological markers in flight attendants have not been well studied.

Study objective

To assess the usefulness (sensitivity) of magnetic resonance imaging (MRI) in detecting TCP-induced changes in neurobiological markers induced by engine oil fumes.

Study design

Cross-sectional pilot study

Study burden and risks

MRI itself is a non-invasive imaging modality. The nature of the burden is classified as mild, considering that subjects will have to come to the AMC for 3 hours. The risks involved are negligible, as all the techniques employed are registered for their use and/or routinely performed at the AMC.

Contacts

Public

Academisch Medisch Centrum

Meibergdreef 9
1105 AZ
NL

Scientific

Academisch Medisch Centrum

Meibergdreef 9
1105 AZ
NL

Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

Flight attendants with cognitive complaints as determined by Nederlands Centrum voor Beroepsziekten (NCvB), aged between 35 and 50 years (M/F).

Control group: healthy volunteers, aged between 35 and 50 years, who have attended less than 1-2 flights lifetime (M/V).

Exclusion criteria

A history of neuropsychiatric disease, alcohol abuse. Contraindications for MRI (e.g. osteosynthetic material, pacemaker, artificial cardiac valves); claustrophobia.

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)

Primary purpose: Other

Recruitment

NL	
Recruitment status:	Pending
Start date (anticipated):	01-01-2011
Enrollment:	24
Type:	Anticipated

Ethics review

Approved WMO	
Application type:	First submission
Review commission:	METC Amsterdam UMC

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL34359.018.10