

## FOR CREW AND PASSENGERS



### FOLLOWING A SMELL OR VISIBLE FUMES EVENT ON AIRCRAFT HELPFUL INFORMATION FOR ER-DOCTORS AND PHYSICIANS

If you have experienced visible fumes on board or strong chemical type smells and pungent odors (*often likend to: wet dog, smelly socks, burnt oil, , exhaust' fumes*) followed by feeling sick, with any or all of these: dizziness, neausea, headache, blurry vision, focussing problems, concentration issues, tingling in hands/ feet, balance problems ... you should present at an ER/ doctor within 24 hours: you may have a poisoning from inhaling contaminated cabin air.

#### **What happens when a patient shows up at the emergency room exhibiting signs and symptoms of poisoning?**

The attending ER physician will not immediately know what type of toxin the patient was exposed to. Exposure to toxic compounds may be due to a variety of agents; in our case it may well be from contamination by toxic compounds entering the cabin air from 'bleed-air' via the aircraft engines and other sources onboard of an aircraft.

So, if you are presenting as a crew member or passenger who has just experienced a fume event with or without visible mist/ smoke and feel sick after inhaling chemical fumes-smells, explain that scenario and mention these **three main leads:**

1. **Pyrolised jet engine oils/ hydraulic oils** (which incl. **organophosphates**)
2. **Aircraft exhaust fumes/ kerosene fumes poisoning (CO)**
3. **Pesticide/ insecticide poisoning** (from 'desinsection' and residual spraying)

Carbon monoxide occurs also from incomplete combustion of any or all of the engine oil compounds that leak out of the engine lubricating system and pass through the engine compressor

## FOR CREW AND PASSENGERS

section.

The **CO** from jet engines can occur both from ingestion of **jet engine exhaust** outside of the aircraft and **internally from thermal breakdown and incomplete combustion of lubricating oil that bypasses (leaks) from engine bearing seals.**

### **Aircraft ,exhaust' fume/kerosene compounds:**

The following are substances to look for in „biomonitoring“ and are specific to jet-engine pollution from kerosene, jet-oils and hydraulic fluids which entered via bleed-air/ incomplete combustion ( see above) outside airport air in to the cockpit and cabin breathing air, plus insecticides etc (these are only some of them!):

- *2-butanone\**
- *isopropanol\**
- *n-heptane\**
- *isohexane/ 2-methylpentane\**
- *n-hexane\**
- *n-octane\**
- *n-decane\**
- *2-heptanone\**
- *toluole\**
- *acetone*
- *acetylcholinesterase*
- ***pesticides/insecticides:***
  - *d-phenotrin*
  - *permethrin and metabolites*

*\* NOTE: these compounds have been determined by the bio monitoring of several hundred crew members who have been exposed to such fume events by Dr Heutelbeck/ University Göttingen-Germany.*

## FOR CREW AND PASSENGERS

### Urine

Day 1: Sample the first 3 urines after the event (each sample in a separate clean container). Over the next 5 days one sample first thing in the morning. Urine sampling containers can be purchased ahead in every drugstore or pharmacy at low prices and readily stored in your personal on board flight kit. **Keep them deep frozen or at least refrigerated ASAP when home or at a hotel.**

- *2,5-hexandion (metabolite of n-hexan)*
- *o-cresol (metabolite of toluol)*
- *acetone*
- *tricresyl phosphate (-m-, -p-, -o-, mmp, MPP, ppp)*
- *triphenyl phosphate*
- *tributyl phosphate*
- *permethrin metabolites*

### Organs

Have all symptoms (listed below) examined and documented by specialized physicians:

1. Heartrhythm disorders\*
2. ECG recording\*
3. Shortness of breath\*
4. Lung function disorders\*

### Brain related\* symptoms (cognitive test) :

5. Confusion/ wordfinding issues/memory and concentration issues
6. Dizziness/ brainfog
7. Hearing problems/sudden tinnitus
8. Vision problems/ i.e.tunnel vision/ blurred vision

## FOR CREW AND PASSENGERS

Note \*: as performed by University Göttingen-Germany

*Body fluid tests should be done straight after, or latest within 48 hours of exposure to contaminated aircraft air. At least get blood drawn (2 samples at 5ml) and save (3) samples of urine. Store them in the deep freeze of your fridge until you can get them tested*

**The CO tests must be done within 2 – 3 hours of exposure.**

*Request copies of all testing done for your personal file! Note the aircraft type, tail number, flight number and date of flight. And don't forget to report to the aviation authorities such as FAA (USA), CAA (UK), LBA (Germany) etc., and write a formal complaint to the airline!*

More tests after exposure can be done at a later stage, please refer to [www.aerotoxiceam.com](http://www.aerotoxiceam.com) ,Laboratory'. Scientific articles can also be found under ,Science'.

## GENERAL INFORMATION

### Some examples of first step actions

Physicians generally evaluate the patient right off for certain basic body functions. Some assessments include the degree to which airways are open or closed, the rate and depth of breathing and circulation (heart rate, blood pressure, etc.). If the patient appears to have been exposed to a toxin externally (i.e. via the skin) measures are taken immediately to decontaminate the skin of the toxic substance.

### Looking for Clues

Once basic body functions have been deemed stable, the doctor may be able to determine what class of toxin is responsible for the poisoning – for this the above lists will help! Patients who are showing clear signs of altered mental status are given a test to determine glucose level, since this is the brain's only nourishment. If the glucose level is low, then doctors will give the patient an IV drip of fluid containing dextrose, a sugar solution. We have found that giving oxygen (O<sub>2</sub>) also helps!

Electrocardiograms (ECG or EKG) are performed on all patients who exhibit exposure to toxic compounds, as they may be good indicators of the type of toxin involved.

### Low Blood Pressure and Poisoning

While many people may be familiar with the risks of hypertension in everyday life, hypotension "or low blood pressure" is a common symptom in poisoned patients and can result from a variety of factors, including dehydration or anaphylaxis (severe allergic reaction). In cases of hypotension, doctors will begin a specific type of IV drip and monitor the patient closely. If the patient does not respond to the IV, a vasopressor "a compound that constricts the blood vessels to increase blood pressure" should be administered.

## FOR CREW AND PASSENGERS

### Seizures

Some toxins may cause seizures. Since the stability of our bodies depends on the balance of excitatory and inhibitory neurotransmitters, if this delicate balance is upset by poisoning then seizures can occur. For example, toxins that either decrease the production of GABA (the brain's most popular inhibitory neurotransmitter) or that interfere with GABA's receptors in the brain can cause seizures. Additionally, if a drug interferes with the neurotransmitter adenosine, which is a naturally occurring anticonvulsant, then severe and protracted seizures can occur.

Patients who have been exposed to toxic compounds can show a variety of symptoms, depending on the type of toxin involved and the amount that has been inhaled. There are some antidotes that exist for certain toxins, but doctors always begin by adhering to some of the basic treatment principles as described in this article. Often doctors will consult with their local Poison Control Centers, in order to make absolutely sure that they are treating the patient in the most effective way possible.

### **NOTE:**

You are welcome to print out this leaflet for personal use and to have handy to give to a physician. If published or shared elsewhere (websites, social media, print media etc), please make reference to:

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