CABIN AIR CONTAMINATION INFORMATION SHEET FOR PATIENTS

Where does the cabin air supply come from?

In almost all modern commercial jet aircraft the cabin air supply is drawn from the engines. The hot, pressurised air taken from the engines, referred to as 'bleed air', is cooled and conditioned in the aircraft's air-conditioning system before being supplied to the aircraft cabin.

What are the causes of contamination of the cabin air supply?

The cabin air may be contaminated when an oil seal fails, allowing jet oil or hydraulic fluid to leak into the bleed air supply. This can result in an oil mist or odour in the aircraft which is sometimes described as smelling like 'sweaty socks'. However, most odours or fumes detected within an aircraft cabin do not arise from oil contamination of the air supply. For example, they can also originate from faulty electrical equipment, galley areas and the toilets.

What are the concerns regarding contamination of the cabin air supply in commercial jet planes?

Concerns have been raised that contamination of aircraft cabin air with oil/hydraulic fluid may cause both short and long term adverse effects on health. Research in a number of countries has shown that short term health effects can occur, but so far has not confirmed the existence of any long term health effects. However, the research findings to date have not conclusively ruled out the possibility of long term health effects and further work is being carried out to try and resolve this.

Which chemicals might contaminate bleed air?

It is difficult to determine exactly what substances are present in contaminated bleed air. When jet oils and hydraulic fluid are subjected to very high temperatures, they break down to produce other compounds including potentially harmful substances such as carbon monoxide, aldehydes (that can irritate the airways) and various acidic compounds (that produce unpleasant odours). Aircraft engine oils also contain small amounts of organophosphates, a large group of chemicals which have many uses, but some of which may have toxic effects, particularly on the nervous system. Although there is only a very small amount of potentially toxic organophosphate in engine oil, well below that which is known to cause harmful effects, some people are concerned that exposure to these compounds in contaminated bleed air may be responsible for long term health effects.

What are the short term health effects?

Symptoms that have been reported at the time of contaminated air events include irritation of the eyes, nose and throat, headache, dizziness and tingling in the hands, feet and face. These symptoms, which may be caused by the irritancy of chemicals or through a 'nocebo' response[1], normally resolve quickly, either on leaving the aircraft or once the fumes or smell disappears during the flight. There is no evidence that these short term health effects can lead to long term health problems, and therefore no further investigation or treatment is necessary if the symptoms have gone away.

[1] Illness, often with physical symptoms and signs, which is triggered through psychological processes in response to a perceived harmful exposure.

What are the long term health effects?
In some cases, symptoms that start at the time of exposure to a contaminated air event may persist, while in others symptoms develop some time after an event or where there is no history of exposure to a specific contaminated air event. Symptoms that have been reported include:

- neurological symptoms such as headaches, fatigue, weakness, problems with balance, pain, numbness, memory problems
- psychological symptoms such as depression, anxiety, poor concentration
- skin problems, respiratory or gastro-intestinal symptoms are also occasionally reported

However, it is unclear whether any form of long-term illness occurs more often in people with such exposures, and if so, whether it arises through toxic or nocebo mechanisms. From what is currently known about the concentrations of potentially toxic chemicals in contaminated air, long-term toxic effects would not be expected, but this remains an area of scientific uncertainty.

How should persistent or long term symptoms be investigated?
It is important to consider the possibility of underlying disease that is unrelated to exposure to contaminated cabin air, since the symptoms described are generally non-specific and can occur in a range of conditions. People with symptoms should have the same investigations and, if necessary, specialist referral as would be the case for someone with the same symptoms but who had not been exposed to contaminated cabin air.

If necessary, the doctor who is looking after you may wish to contact the National Poisons Information Service in the UK (for UK residents) or an equivalent service in other countries, for advice on any additional tests that might help in the investigation of your symptoms. If a cause for the symptoms is found and they respond to treatment, or if they get better over time without treatment, no further investigation or treatment is required. However, if your symptoms persist and/or you or your treating doctor are concerned, they may consider referral to a specialist clinical toxicology service such as the clinic at St Thomas' Hospital, London (you have to be referred by your doctor for an appointment to be arranged).