

Are you working in aviation?

Participate in the preliminary research now

More and more aviation personnel are falling ill long-term after fume events at the airport or during flight. Yet Aerotoxic Syndrome is not recognized. That's why we want to conduct large-scale research to demonstrate what happens to our cells when we inhale toxic substances from aircraft engines. The preliminary research has begun, but we can use many more candidates!

We've Started! Although we still need much more money to conduct the full research into Aerotoxic Syndrome, the preliminary research has begun. In this preliminary research, we assess blood parameters and tissue parameters. We look at elements of the nerve cell responsible for transmission from outside to inside. If that transmission is blocked, the cell eventually dies. With this preliminary research, we want to find out if this transmission is indeed being hindered. After that, we want to demonstrate what causes the blockage.

Several pilots and cabin crew have already signed up to participate in the preliminary research. They see the necessity of the research and have decided to pay for the required blood tests themselves. They have blood drawn before starting a flight and do so again immediately after the flight. We're making the research as accessible as possible. Participants receive an envelope with vials sent to their home beforehand. With these, they go to a location close to home to have blood drawn. The vial with blood is then sent to a laboratory in Eindhoven that performs neuronal blood tests.

Two weeks after the second blood sample is sent, we receive the results from the laboratory. If this preliminary analysis shows what we suspect, we can start the second analysis.

Do you work in aviation and do you also believe there should be more clarity around Aerotoxic Syndrome? Participate in the preliminary research! You only need to have blood drawn twice and help us enormously. Of course, the privacy of our participants is 100% guaranteed. You can voluntarily sign up for this research by sending a message to <neuro-toxicity@fninstitute.com>. We look forward to your response!

Why you want to participate as well:

- *Discover whether or not you have abnormal parameters that could indicate Aerotoxic Syndrome*
- *Low cost: €136 excluding VAT per blood test*
- *Results within 14 days*
- *100% privacy guaranteed*



Image: g-stockstudio/istock

Tristan Loraine: “Aviation has a design flaw”

During the Aircraft Cabin Air Conference 2024, Tristan Loraine gave an impassioned opening speech that we'd like to share with you. You can read it here.

Tristan Loraine is a former airline pilot, documentary filmmaker, and advocate for aviation safety, particularly concerning contaminated cabin and cockpit air in aircraft. He is a central figure in the debate about “fume events” and the potential health consequences of exposure to contaminated air during flights. After a 20-year flying career with a major airline, Loraine stopped flying after developing health problems related to exposure to potentially contaminated air in the cockpit.


Speech content

“I organized the conferences from 2017 to 2023 and the 2005 conference for the British Pilot Union (BALPA) before that. Nineteen years after the first conference, the landscape has changed. Humidification technologies and lower cabin pressure altitudes have improved the flying experience. Regarding the contaminated air problem, while some disagreements may still exist, the science and understanding of the cabin environment have improved enormously. Today, we are much closer to effective solutions and acceptance of the need to solve the contaminated air problem in aircraft.

“Just go on medical retirement”

I became involved with this issue in 2001 when I was a captain at British Airways, flying the Boeing 757 and Boeing 767. At that time, I was a health and safety representative for the British pilots' union BALPA, and part of my duties involved dealing with long-term sick pilots. A fellow pilot, Dave Hopkinson, called me and told me he had been exposed multiple times to





contaminated air in the aircraft he flew and that he was being sent on medical retirement by the company. He believed that the exposure to oil fumes we experienced was a serious health and flight safety problem. He mentioned the word organophosphate, a word I had never heard, and asked me to investigate the problem. That's something I've been doing ever since. Dave passed away in December 2019 and sadly never saw the solutions he hoped for.

Concerns about flight safety

During my 23-year journey, I have interviewed more than a thousand crew members and passengers across six continents who have been exposed to contaminated air. I have heard their concerns about compromised flight safety; their reluctance to report incidents, pilots not using emergency oxygen when contaminated air was suspected, crews becoming impaired and unfit for work, their desire for a definitive medical test to confirm exposure to one or more of the contaminated air components, and their collective wish for this problem to be solved for everyone's wellbeing in aviation.

Denial and fear

I have seen the disinformation spread by those who fear the consequences of contaminated air. I have seen the interests at play - the denial and fear of lawsuits. I have participated in aviation and government committees, informed regulators and safety authorities, met and discussed the issue with lubricant manufacturers, politicians, airlines, aircraft and engine manufacturers, the press, doctors, scientists, the military, union leaders, and countless others. I have also made five documentaries and a feature film about the subject.

Global mass hysteria?

I have heard all sides of the debate. I have met many people who lack the expertise and knowledge of the problem, yet are authorized to make important corporate or operational decisions in these matters. I have heard people say that contaminated air incidents are a form of global mass hysteria, that it's all related to birth control pills, hyperventilation, a tree fungus, or something consumed in food. On the other hand, I have heard an aviation regulator employee say it's like asbestosis and that the problem will never be solved.

It's a real problem

After experiencing the flight safety consequences of exposure, suffering the health effects myself, and losing my own career due to repeated exposure to contaminated air at age 44, I know it's a very real problem and one that needs to be addressed.

It took 13 years before I got my medical certificate back and could fly again, but I was lucky. Some crew members and passengers have lost their health and jobs due to exposures, and many are no longer with us.

A sensible solution

I love aviation and what it has achieved. However, the simple reality is that aviation had a design flaw: delivering breathing air in aircraft as unfiltered 'bleed air' from engines. The original passenger aircraft such as the Boeing 707, DC-8, Convair 880/990, and VC-10 designed their aircraft so they didn't use bleed air directly for pressurization and air conditioning, and as with many things in life -- the first ideas are often the best.

The Boeing 787, with its revolutionary bleed-free architecture, is undoubtedly the only sensible solution for future aircraft design. The crews working on the 787 tell me it's a completely new world compared to other aircraft. I believe all current aircraft with bleed air should have an effective filter system and warning systems to minimize the health and flight safety consequences of exposure as much as possible. I believe less hazardous oils need to be urgently brought to market by engine manufacturers.

Ethically irresponsible

In my opinion, it is not morally or ethically responsible to continue discussing the health and safety effects of exposure to contaminated air while crew members, paying passengers (some pregnant), and others are still being exposed to contaminated air. In my career, I have seen aviation improve flight safety with many new technologies: ADS-B, TCAS, EGPWS, CRM, the glass cockpit, and the advent of fly-by-wire, to name just a few. Aviation has the capacity to solve this problem. All that's needed is the will to do it.





Leadership is needed

Most passengers I've met would pay for clean air if given the choice. Every shareholder I've met believes airlines should solve the problem, yet the problem persists. All that's needed is leadership from the airlines. Stop denying, solve the problem, and make flying as safe as possible: minimize the risk, apply the precautionary principle.

15 Years of standstill

More than a dozen aviation accident departments worldwide have made more than 50 recommendations and findings about the contaminated air problem. The British Air Accidents Investigation Branch (AAIB) has twice recommended to EASA and the FAA that all aircraft should have contaminated air warning systems, but more than 15 years later, nothing has been installed on any aircraft. Is the reason there are no sensors on jet aircraft because some in the industry are terrified of lawsuits or because the industry is unable to design an effective sensor? When President Kennedy outlined his plans for a man on the moon in 1961, the US hadn't even put a person in Earth orbit, yet it happened within 9 years. Man walked on the moon. The aviation industry can do anything if it wants to. All that's needed is the will to do it.

A matter of time?

United Airlines took the lead decades ago by being the first airline in the world to install HEPA filters in all their aircraft for recirculated air. DHL introduced a Pall Aerospace Cockpit Filter (CFU) almost 10 years ago to filter the air their pilots breathe on their Rolls Royce-powered Boeing 757 aircraft. Pall Aerospace came up with an almost perfect solution with their MaVE filter system. Today, the world waits for an effective bleed air filter system for aircraft and less hazardous engine oils and hydraulic fluids. It's just a matter of time.

That's why I'm pleased that the Aircraft Cabin Air Conference 2024 will provide an arena for delegates to better understand the challenges of the cabin environment and have productive discussions towards a positive solution to these problems."

Captain Tristan Loraine BCAi
Conference Director / GCAQE Spokesperson
September 2024



Image: kurmyshov/istock

Research into chemical substances in the aircraft cabin

In aircraft cabin air, chemical substances may be present that could be harmful to the health of pilots and cabin crew. Research is currently ongoing into the consequences of this.

Surrounded by chemical substances

The cabin environment is a mix of different chemical substances: the upholstery and materials are treated with fire retardants, and pesticides are often used to prevent unwanted insects or diseases from traveling along.

Important to know is that in most commercial aircraft, air from the engines provides fresh air to the cabin. This air can carry small amounts of engine and hydraulic oil into the cabin, which can have consequences for the health of people on board.

Wipe samples

To better understand which chemical substances are present in the cabin and how these can vary between different flights, researchers have taken wipe samples on 67 flights of different lengths and aircraft types. These samples were then analyzed with advanced equipment that can identify substances, even in very small quantities. Both “hard” and “soft” ionization techniques were used to better separate and detect the chemical compounds.

Ventilation with and without engine air

Additionally, researchers have made a comparison between aircraft that do and do not use engine air to ventilate the cabin. The collected data was then analyzed using special software to determine exactly which substances were found in the cabin and where they come from.

When the results of this research are released, we will naturally keep you informed.

More research is needed

What do toxins do to our body?

Aerotoxic Syndrome is a proposed occupational condition that primarily affects people working in aviation. Despite increasing evidence of harmful effects on people exposed to this condition, the syndrome is still not officially recognized.

During recent conferences in Galway and London (August-September 2024), scientists and industry professionals came together to discuss the latest research. However, they emphasized that little progress has been made in understanding the basis of this syndrome.



Image: Central Alliance

Uncertainty about the cause

Aerotoxic Syndrome includes symptoms such as concentration problems, neurological problems, and disruptions in organ function. Although these symptoms are being increasingly well documented, little is known about the cause. There is particular uncertainty about how toxins behave at the cellular and tissue level once they enter the body. So far, studies have only scratched the surface, without delving deep into the chemical reactions that occur in the body after toxins are inhaled.

The harmful reactions

More research is needed to understand how these toxins react in the body. Particularly at the level of receptors – which are the “receivers” on the cell surface that can transmit signals – scientists want to know how these toxins potentially cause harmful reactions. These reactions can then cause a chain reaction in the cells, ultimately leading to a disruption of multiple systems in the body.

Help us in this research

It is essential to increase this knowledge so we can better understand the cause of the syndrome and alleviate the impact on people in the aviation sector. However, for truly groundbreaking results, substantial financial support and special sponsorship are needed so researchers can conduct more in-depth and precise research to answer these important questions.

R.A. van der Kuil

Researcher PhD, Manchester Metropolitan University (MMU, UK)

In collaboration with Amsterdam UMC (NL), Radboud UMC (NL), Jena University (DE), and Clinica Crue Blanca (SP)

Another fume event?

Odor alarm on KLM aircraft: passengers examined

On November 20, flight KL676 reported a ‘strange smell’ on board. Several passengers felt unwell during the flight, and the pilots wore oxygen masks during landing. Firefighters and ambulances were on standby upon landing to examine passengers and crew. No irregularities were found.

The aircraft was en route from Edmonton, Canada, to Amsterdam. The unusual odor was detected in both the cabin and cockpit. KLM is still investigating the cause. While the exact details remain unclear, all signs point to another fume event. This occurs when toxic substances enter the aircraft through the breathing air.

What makes this case remarkable is that the flight was operated by a Dreamliner, which does not take its breathing air from the aircraft engines. This raises concerns. The question now is: where is the ‘leak’ in this aircraft?