



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **April 11, 2022**

Michelle Watters, MD, PhD, MPH
Medical Officer

A. ACCIDENT: CEN21LA096 – Grand Prairie, Texas

Date/Time: December 21, 2020; 2:52 p.m. (CST)
Aircraft: Express CT, N772BM
Injuries: 2 Fatal
Flight conducted under Part 91 personal flight.

B. GROUP IDENTIFICATION

No group was formed for the medical evaluation in this accident.

C. DETAILS OF INVESTIGATION

Purpose

This investigation was performed to evaluate the pilot and pilot-rated passenger for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

Methods

The Federal Aviation Administration (FAA) medical case review, the pilot's autopsy and FAA Forensic Sciences Laboratory toxicology¹ reports, and the pilot-rated passenger's autopsy report were reviewed. Other pertinent scientific and regulatory issues were reviewed.

Pilot

FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 65-year-old male pilot had an expired medical certificate. He had completed the BasicMed course on 5/8/19. His most recent FAA medical certification exam was in 2010 where he received a third class medical certificate with the limitation that he must have available glasses for near vision. At the 2010 exam, the pilot was 71 inches tall and weighed 225 pounds. The pilot had reported no medications or medical conditions.

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1,300 substances including toxins, common prescription and over-the-counter medications, and illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

Autopsy

According to the Office of the Chief Medical Examiner, Tarrant County Medical Examiner's District, Fort Worth, Texas autopsy report, the cause of death of the pilot was blunt force injuries with thermal trauma due to plane crash and the manner of death was accident. The examination was limited by trauma, the brain was not available for examination. His heart weighed 475 grams and was described as enlarged. No other significant natural disease was identified.

Toxicology

Toxicological testing performed by the FAA Forensic Sciences Laboratory identified the sedating antihistamine diphenhydramine in the pilot's cavity blood at 68 nanograms per milliliter (ng/mL); diphenhydramine was also detected in his urine and liver tissue. Toxicology performed by the Medical Examiner's Office detected diphenhydramine at 116 ng/mL in the pilot's heart blood and in his urine.

Diphenhydramine, commonly marketed as Benadryl, is available over the counter in many products used to treat colds, allergies, and insomnia. Diphenhydramine carries the warning that use of the medication may impair mental and physical ability to perform potentially hazardous tasks, including driving or operating heavy machinery. The therapeutic range is 50 to 100 ng/mL, and it has a half-life of 3 to 14 hours.² Diphenhydramine undergoes postmortem distribution and central levels may be two to three times higher than peripheral levels.³ FAA provides guidance on wait times before flying after using this medication; post-dose observation time is 60 hours and the medication is not for daily use.^{4,5}

The nasal decongestant pseudoephedrine was detected in the pilot's cavity blood and urine and the opioid cough suppressant dihydrocodeine was detected in his urine at 12 ng/mL. Toxicology performed by the Medical Examiner's Office detected ephedrine/pseudoephedrine at 264 ng/mL in the pilot's heart blood and in his urine. Pseudoephedrine is generally non-impairing and dihydrocodeine can cause drowsiness. Pseudoephedrine and dihydrocodeine are often found in over-the-counter cold and allergy medications often in combination with an antihistamine.⁶

Pilot-rated Passenger

FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 71-year-old male pilot-rated passenger had an expired medical certificate. He had completed the BasicMed course on 7/9/20. His most recent medical certification exam was on 7/7/16 where he received a third class medical certificate with the limitation that he must wear corrective lenses. At the 2016

² Schulz, M, A Schmoldt, H Andresen-Streichert, and S Iwersen-Bergmann. 2020. Revisited: Therapeutic and toxic blood concentrations of more than 1100 drugs and xenobiotics. Additional File 1. *Critical Care* 24(1):195 doi: 10.1186/s13054-020-02915-5.

³ Han, E, E Kim, H Hong, S Jeong, J Kim, S In, H Chung, and S Lee. 2012 Evaluation of postmortem redistribution phenomena for commonly encountered drugs. *Forensic Sci Int.* 219(1-3):265-271.

⁴ FAA. 11/13/19. What over-the-counter (OTC) medications can I take and still be safe to fly? OK-20-0302 https://www.faa.gov/licenses_certificates/medical_certification/media/OTCMedicationsforPilots.pdf

⁵ FAA. 7/2/21. [AllergyAntihistamineImmunotherapyMedication.pdf \(faa.gov\)](#)

⁶ [Chlorpheniramine, dihydrocodeine, and pseudoephedrine Uses, Side Effects & Warnings - Drugs.com](#) Accessed 4/5/22.

exam, the pilot-rated passenger was 74 inches tall and weighed 197 pounds. The pilot-rated passenger had reported taking loratadine for allergies and simvastatin to treat high cholesterol.

Autopsy

According to the Office of the Chief Medical Examiner, Tarrant County Medical Examiner's District, Fort Worth, Texas autopsy report, the cause of death of the pilot-rated passenger was blunt force injuries with thermal trauma due to plane crash and the manner of death was accident. No significant natural disease was identified by the medical examiner.

Toxicology

Toxicology performed by the Medical Examiner's Office detected diphenhydramine at 132 ng/mL in the pilot-rated passenger's chest cavity blood. No toxicology testing was performed by the FAA Forensic Sciences Laboratory.

D. SUMMARY OF MEDICAL FINDINGS

Pilot

The 65-year-old male pilot had an expired medical certificate. He had completed the BasicMed course on 5/8/19. His most recent FAA medical certification exam was in 2010. According to the autopsy report, the cause of death of the pilot was blunt force injuries with thermal trauma due to plane crash and the manner of death was accident. Although the examination was limited by trauma, other than an enlarged heart (475 grams), no other significant natural disease was identified.

Toxicological testing identified the antihistamine diphenhydramine in the pilot's cavity blood at 68 nanograms per milliliter (ng/mL), heart blood at 116 ng/mL, and in his urine and his liver tissue. The decongestant pseudoephedrine was detected in the pilot's cavity blood, heart blood at 264 ng/mL, and urine and the opioid cough suppressant dihydrocodeine was detected in his urine at 12 ng/mL.

Pilot-rated passenger

The 71-year-old male pilot-rated passenger had an expired medical certificate. He had completed the BasicMed course on 7/9/20. His most recent FAA medical certification exam was on 7/7/16 where he received a third class medical certificate with the limitation that he must wear corrective lenses. According to the autopsy report, the cause of death of the pilot-rated passenger was blunt force injuries with thermal trauma due to plane crash and the manner of death was accident. No significant natural disease was identified. Toxicology testing detected diphenhydramine at 132 ng/mL in the pilot-rated passenger's chest cavity blood.