



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **February 10, 2022**

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Medical Officer

A. ACCIDENT: WPR21FA352 – Page, Arizona

Date/Time: September 22, 2021; 4:24 p.m. (MST)
Aircraft: Piper PA-28R-200, N3906X
Injuries: 1 Fatal, 1 serious
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 for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

Methods

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

FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 57-year-old male pilot held a third class medical certificate with the limitation that he must wear corrective lenses for near and distant vision. At the time of the most recent exam (10/26/20), the pilot was 72 inches tall and weighed 174 pounds. He reported having 410 total flight hours. He reported taking no medications and no medical conditions. No significant medical concerns were identified.

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1300 substances including toxins, common prescription and over-the-counter medications as well as illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

Autopsy

According to the autopsy performed by the Coconino County Arizona Medical Examiner's Office, Flagstaff, Arizona, the cause of death in the pilot was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified by the medical examiner.

Toxicology

Toxicological testing performed by the FAA's Forensic Sciences Laboratory identified the sedating antihistamine diphenhydramine at 70 nanograms per milliliter (ng/mL) in the pilot's cavity blood and in his urine. The sedating antihistamine cetirizine was detected at 109 ng/mL in cavity blood and 7,607 ng/mL in urine. The non-impairing non-steroidal pain medications ibuprofen and naproxen were detected in his urine, naproxen was also detected in his blood.²

Diphenhydramine is a sedating antihistamine (commonly marketed as Benadryl) and 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 25 to 100 ng/mL and it has a half-life of 3 to 14 hours.³ Diphenhydramine undergoes postmortem distribution and central levels may be two to three times higher than peripheral levels.⁴ 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.^{5,6}

Cetirizine is a second-generation antihistamine used to relief hay fever and allergy symptoms. It is available over the counter, commonly marketed as Zyrtec. Although designed to be less sedating, cetirizine does have some sedating properties. The therapeutic range is between 190 and 1,450 ng/mL; the elimination half-life is between 6.5 and 10 hours. FAA provides guidance on this medication of a post-dose observation time of 48 hours and the medication is not for daily use.^{7,8}

D. SUMMARY OF MEDICAL FINDINGS

The 57-year-old male pilot held a third class medical certificate with the limitation that he must wear corrective lenses for near and distant vision. At the time of the most recent exam (10/26/20), he reported no medical conditions or medications. According to the autopsy, the

² FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Ibuprofen. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=77>

Naproxen. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=182>

³ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Diphenhydramine.

<https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50>.

⁴ 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.

⁵ 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

⁶ FAA. 7/2/21. [AllergyAntihistamineImmunotherapyMedication.pdf \(faa.gov\)](#)

⁷ FAA. Updated 1/16/19. Forensic Toxicology Toxicology's WebDrugs. Cetirizine.

<https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=131>

⁸ FAA. 7/2/21. [AllergyAntihistamineImmunotherapyMedication.pdf \(faa.gov\)](#)

cause of the pilot's death was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified by the medical examiner.

Toxicology testing detected diphenhydramine at 70 ng/mL in the pilot's cavity blood and in his urine, cetirizine at 109 ng/mL in cavity blood and 7,607 ng/mL in urine, ibuprofen in urine, and naproxen in cavity blood and urine.