

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

November 20, 2025

A. CASE

NTSB ID: ERA24FA069
Location: Hammonton, New Jersey
Date: December 19, 2023

B. MEDICAL SPECIALIST

Specialist Turan Kayagil, MD, FACEP
National Transportation Safety Board
Washington, DC

C. DETAILS

1.0 Description of Review

For purposes of evaluating the pilot for potentially impairing substances and potentially impairing medical conditions, the above Medical Specialist reviewed the following sources of medical information, along with selected relevant regulation, medical literature, and National Transportation Safety Board (NTSB) investigator reports.

- Federal Aviation Administration (FAA) medical case review
- Autopsy report (with death investigation information and NMS Labs toxicology) – pilot
- FAA Forensic Sciences Laboratory toxicology report – pilot

2.0 Summary of Medical Facts

2.1 Information from Reviewed Records

The 68-year-old male pilot's last aviation medical examination was July 18, 2023. At that time, he was 73 inches tall and weighed 208 pounds. He reported medical history including prediabetes and high blood pressure.¹ His high blood pressure was noted to be qualified under Conditions Aviation Medical Examiners Can Issue (CACI) criteria. He reported using the medications metformin (a prescription oral medication commonly used for blood sugar control in diabetes and prediabetes), valsartan (a prescription medication that can be used to treat high blood pressure and heart failure), nifedipine (a prescription medication that can be used to treat high blood pressure, angina, and certain other conditions), carvedilol (a prescription medication that can be used to treat high blood pressure and heart failure), simvastatin (a prescription medication commonly used to control cholesterol and reduce cardiovascular risk), and alfuzosin (a prescription alpha blocker medication commonly used to treat symptoms of an enlarged prostate). He was issued a second-class medical certificate limited by a requirement to use corrective lenses to meet vision standards at all required distances. According to the FAA medical certification file, the pilot had a diagnosis of new onset diabetes not on medication in 2000, and had a 2015 FAA Letter of Eligibility for second-class medical certification with prediabetes and high blood pressure.

The Burlington County Medical Examiner's Office performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was multiple injuries, and his manner of death was accident. Due to the extent of his injuries, his autopsy was severely limited for evaluation of natural disease. Structural evaluation of his heart and lungs was not possible, and structural evaluation of his brain was markedly limited.

Postmortem toxicological testing of chest cavity blood performed by NMS Labs at the request of the Medical Examiner's Office identified only a presumptive positive result for caffeine (unverified positive screening test without a confirmation test).

Postmortem toxicological testing by the FAA Forensic Sciences Laboratory detected chlorpheniramine at 18 ng/mL in cavity blood and at 15 ng/mL in urine. Metformin, telmisartan, hydrochlorothiazide, alfuzosin, tadalafil, and salicylic acid were detected in cavity blood and urine. Carvedilol was detected in cavity blood and was not detected in urine. Chlorothiazide was detected in urine; cavity blood testing for chlorothiazide was inconclusive. Trimethoprim was detected in urine and was not

¹ Prediabetes is a term for elevated blood sugar that does not meet criteria for diabetes, but that indicates increased risk of developing diabetes and related complications in the future.

detected in cavity blood. Glucose was not detected in urine or vitreous (normal results).

2.2 Descriptions of Detected Substances

Chlorpheniramine is a sedating antihistamine medication that is available over the counter (OTC) in a variety of cold and allergy products, and that sometimes also may be used for motion sickness or as a sleep aid. Chlorpheniramine can cause psychomotor slowing and drowsiness.^{2,3} It often carries warnings that drowsiness may occur, and that users should use caution when driving a motor vehicle or operating heavy machinery.⁴ The FAA lists chlorpheniramine as “No Go” OTC medication and a “Do Not Fly” medication, and states that pilots should not fly within 5 days of using chlorpheniramine, to allow time for it to be cleared from circulation.^{5,6,7} In living individuals, the typical elimination half-life of chlorpheniramine is about 12-43 hours and the therapeutic range of chlorpheniramine in plasma is about 3-20 ng/mL, with chlorpheniramine levels in blood being about 1.2-1.3 times those in plasma.^{8,9} Chlorpheniramine may undergo postmortem redistribution, affecting measured drug

² Baselt RC. *Drug Effects on Psychomotor Performance*. Biomedical Publications; 2001.

³ Moskowitz H, Wilkinson CJ. *Antihistamines and Driving-Related Behavior: A Review of the Evidence for Impairment*. National Highway Traffic Safety Administration. DOT HS 809 714. May 2004. <https://www.nhtsa.gov/sites/nhtsa.gov/files/antihistamines20text.pdf>. Accessed November 20, 2025.

⁴ National Institutes of Health National Library of Medicine. Chlorpheniramine maleate. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=4d974959-25fc-4707-9b72-9afbf47b76f1>. Updated November 14, 2017. Accessed November 20, 2025.

⁵ Federal Aviation Administration. Over-the-Counter (OTC) Medications Reference Guide: What OTC Medications Can I Take and Still Be Safe to Fly? Guide for Aviation Medical Examiners. https://www.faa.gov/pilots/medical_certification/media/OTCMedicationsforPilots.pdf. Updated July August 28, 2024. Accessed November 10, 2025.

⁶ Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) do not issue - do not fly. Federal Aviation Administration website. https://www.faa.gov/ame_guide/pharm/dni_dnf. Updated July 10, 2023. Accessed November 10, 2025.

⁷ Federal Aviation Administration. Allergy - antihistamine & immunotherapy medication. Guide for Aviation Medical Examiners. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/media/AllergyAntihistamineImmunotherapyMedication.pdf. Updated October 26, 2022. Accessed November 10, 2025.

⁸ Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*. 11th ed. Biomedical Publications; 2017.

⁹ Schulz M, Schmoldt A, Andresen-Streichert H, Iwersen-Bergmann S. Revisited: therapeutic and toxic blood concentrations of more than 1,100 drugs and other xenobiotics. *Crit Care*. 2020;24(1):195. doi:10.1186/s13054-020-02915-5.

levels.^{8,10} Furthermore, comparing drug levels in postmortem cavity blood to reference ranges in living individuals generally is unreliable.¹¹

Metformin is a prescription oral medication commonly used for blood sugar control in diabetes and prediabetes. Unlike some other diabetes medications, metformin has low potential to cause symptomatic low blood sugar.¹² Metformin is not typically impairing. A pilot on metformin may be granted FAA medical certification depending on the status of the pilot's underlying condition and response to treatment.¹³

Telmisartan is a prescription angiotensin receptor blocker (ARB) medication commonly used to treat high blood pressure; it may also be used in the treatment of heart failure.

Hydrochlorothiazide (HCTZ) is a prescription thiazide diuretic medication used very commonly to treat high blood pressure. Using a thiazide diuretic together with an ARB also is common, and combination medication containing both HCTZ and telmisartan is available. Chlorothiazide may be present as an impurity in HCTZ, and also may occasionally be prescribed as a thiazide diuretic medication, primarily to treat edema.

Carvedilol is a prescription beta blocker medication that can be used to treat high blood pressure and heart failure.

Alfuzosin is a prescription alpha blocker medication commonly used to treat symptoms of an enlarged prostate.

Telmisartan, HCTZ (and chlorothiazide), carvedilol, and alfuzosin are not generally considered impairing. The combination of telmisartan, HCTZ, and carvedilol can be acceptable under CACI criteria for high blood pressure if all criteria are met.¹⁴ The FAA states that daily use of telmisartan, HCTZ, carvedilol, or alfuzosin

¹⁰ Han E, Kim E, Hong H, et al. Evaluation of postmortem redistribution phenomena for commonly encountered drugs. *Forensic Sci Int.* 2012;219(1-3):265-271. doi:10.1016/j.forsciint.2012.01.016.

¹¹ Dinis-Oliveira RJ, Vieira DN, Magalhães T. Guidelines for collection of biological samples for clinical and forensic toxicological analysis. *Forensic Sci Res.* 2017;1(1):42-51. doi:10.1080/20961790.2016.1271098.

¹² Wexler DJ. Initial management of hyperglycemia in adults with type 2 diabetes mellitus. In: Connor RF, ed. *UpToDate*. Wolters Kluwer. <https://www.uptodate.com/contents/initial-management-of-hyperglycemia-in-adults-with-type-2-diabetes-mellitus>. Updated June 12, 2025. Accessed November 20, 2025.

¹³ Federal Aviation Administration. Decision Considerations – Aerospace Medical Dispositions Item 48. General Systemic – Diabetes, Pre-Diabetes, Metabolic Syndrome, and/or Insulin Resistance. Guide for Aviation Medical Examiners. https://www.faa.gov/ame_guide/app_process/exam_tech/item48/amd/diabetes. Updated September 27, 2023. Accessed November 20, 2025.

¹⁴ The FAA's [CACI Hypertension Worksheet](#) allows a combination of up to three acceptable medications

requires pilots to first pass a 7-day ground trial when beginning the medication, to monitor for side effects.^{15,16}

Tadalafil is a prescription medication commonly used to treat erectile dysfunction, as a sexual enhancement aid, and to treat symptoms of an enlarged prostate.¹⁷ It also is sometimes used to treat other conditions, including pulmonary hypertension. Tadalafil is not typically impairing, although the FAA states that pilots who use it on an as-needed basis should wait 24 hours after use before flying, and that otherwise-qualified pilots who use it daily should undergo a 7-day ground trial before flying, to monitor for side effects.¹⁶ Additionally, tadalafil typically carries a warning that use in combination with alpha blocker medication (like alfuzosin) may cause symptomatic low blood pressure or fainting in some individuals.¹⁷ The FAA states that, if a pilot uses tadalafil with an alpha blocker, the pilot should not fly until verification that no low blood pressure episodes or other side effects occur.¹⁶

Trimethoprim is a prescription antibiotic medication. Trimethoprim is not typically impairing.

Salicylic acid is the primary active metabolite of aspirin, a widely available over-the-counter medication that can be used to control pain and fever and to reduce cardiovascular risk. Salicylic acid also is a metabolite of some other drugs and is used as a topical skin exfoliant in a variety of retail products. Salicylic acid is not typically impairing.

Submitted by:

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Chief Medical Officer

(including ARBs, beta blockers, calcium channel blockers, and diuretics). In this case, the three medications that the pilot reported using at his last aviation medical examination were an ARB (valsartan), a beta blocker (carvedilol), and a calcium channel blocker (nifedipine); his hypertension was noted to be CACI-qualified at that time. Compared to those medications, the three hypertension medications detected by postmortem toxicologic testing were a different ARB (telmisartan), the same beta blocker (carvedilol), and (instead of a calcium channel blocker) a thiazide diuretic (HCTZ). This different set of medications had not been reported to the FAA; notably, if this represented a change in the pilot's blood pressure medication since his last FAA medical examination, he was not necessarily required to report it to the FAA until his next application for medical certification.

¹⁵ Federal Aviation Administration. Pharmaceuticals (Therapeutic Medications) Antihypertensive. Guide for Aviation Medical Examiners. https://www.faa.gov/ame_guide/pharm/antihyp. Updated March 11, 2025. Accessed November 20, 2025.

¹⁶ Federal Aviation Administration. Pharmaceuticals (Therapeutic Medications) Erectile Dysfunction and Benign Prostatic Hyperplasia Medications. Guide for Aviation Medical Examiners. https://www.faa.gov/ame_guide/pharm/ed. Updated August 25, 2017. Accessed November 20, 2025.

¹⁷ National Institutes of Health National Library of Medicine. Cialis. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=bcd8f8ab-81a2-4891-83db-24a0b0e25895>. Updated November 13, 2024. Accessed November 20, 2025.