

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

September 20, 2024

A. CASE

NTSB ID: WPR23FA047
Location: Torrance, California
Date: November 30, 2022

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 and pilot-rated passenger 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 investigator reports.

- Final Federal Aviation Administration (FAA) medical case review
- Autopsy report - pilot
- Toxicology report - pilot
- Autopsy report - pilot-rated passenger
- Toxicology report - pilot-rated passenger

2.0 Summary of Medical Facts

2.1 Pilot

The 81-year-old male pilot's last aviation medical examination was October 22, 2008. At that time, he reported using the medications metformin (a prescription oral medication commonly used for blood sugar control in diabetes), lisinopril (a prescription medication commonly used to treat high blood pressure), rosuvastatin (a prescription medication used to control cholesterol and reduce cardiovascular risk), and niacin (a vitamin available over the counter as a supplement or by prescription for cholesterol control). He reported a history of coronary artery disease and coronary artery bypass graft in 1980 and 1991, coronary artery stenting in 2001, diabetes, and high cholesterol. The FAA had granted him Authorization for Special Issuance of medical certification, first in 1999 and most recently in 2006 (the most recent Authorization had been for 6 years). At his last aviation medical examination, he was issued a third-class medical certificate with interim issuance, limited by a requirement to have available glasses for near vision, and not valid after October 31, 2009. The pilot subsequently completed a BasicMed education course, most recently in February 2021, and reported completing a BasicMed Comprehensive Medical Examination Checklist (CMEC), most recently in January 2021.¹

The County of Los Angeles Department of Medical Examiner-Coroner performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was blunt trauma and his manner of death was accident. Due to the extent of the pilot's injuries, examination of his coronary arteries and brain was limited. Moderate aortic atherosclerosis was present. Within its limitations, the remainder of the autopsy, including visual examination of the heart muscle, did not identify other significant natural disease.

The County of Los Angeles Department of Medical Examiner-Coroner Forensic Sciences Laboratories performed postmortem toxicological testing of chest cavity blood from the pilot; no tested-for substances were detected. The FAA Forensic Sciences Laboratory also performed toxicological testing of postmortem specimens from the pilot. FAA testing detected pregabalin at 3156 ng/mL in cavity blood and 302,757 ng/mL in urine. Doxylamine was detected in urine; doxylamine testing in

¹ BasicMed provisions allow pilots who meet certain requirements to fly (as pilot in command or as a required flightcrew member) without current medical certification. Among those requirements, a pilot must have completed a BasicMed education course within 24 calendar months and must have had a medical examination with a state-licensed physician using the CMEC within 48 months. Aircraft and operating restrictions apply. For details, see [14 Code of Federal Regulations \(CFR\) Part 68](#), [14 CFR 61.113\(i\)](#), [14 CFR 61.23\(c\)\(3\)](#), and https://www.faa.gov/licenses_certificates/airmen_certification/basic_med/. Prohibitions on operations during medical deficiency ([14 CFR 61.53](#)) and while using drugs that affect faculties in a way contrary to safety ([14 CFR 91.17\(a\)\(3\)](#)) also apply.

cavity blood was inconclusive. Atorvastatin and tamsulosin were detected in cavity blood and urine. Glucose was measured in urine at 65 mg/dL.²

Pregabalin is a prescription medication that can be used to treat nerve-related pain, certain types of seizures, and other conditions.³ Pregabalin typically carries a warning that it may cause dizziness and sleepiness and impair users' ability to drive or operate machinery, and that users should not operate a motor vehicle or do other dangerous activities until they know how the drug affects them. The FAA considers pregabalin to be a "Do Not Issue/Do Not Fly" medication.⁴

Doxylamine is a sedating antihistamine medication that is available over the counter as a sleep aid and as an ingredient in various cold and allergy products.⁵ Sedating antihistamines can cause cognitive and psychomotor slowing and drowsiness, and products containing doxylamine may carry a driving warning. The FAA states that pilots should not fly within 60 hours of using doxylamine, to allow time for the drug to be cleared from circulation.⁶

Atorvastatin is a prescription medication that can help control cholesterol and lower cardiovascular risk. Tamsulosin is a prescription medication commonly used to treat symptoms of an enlarged prostate. Atorvastatin and tamsulosin are not generally considered impairing.

² According to [the FAA Forensic Sciences Laboratory's website](#), the laboratory considers glucose (sugar) levels above 100 mg/dL to be abnormal in urine. The choice of this value is discussed in FAA Aerospace Medicine Technical Report [DOT/FAA/AM-00/22](#).

³ National Institutes of Health National Library of Medicine. Lyrica. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=60185c88-ecfd-46f9-adb9-b97c6b00a553>. Updated June 15, 2020. Accessed September 10, 2024.

⁴ 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 September 10, 2024.

⁵ National Institutes of Health National Library of Medicine. Unisom SleepTabs. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f591d52f-5610-4517-a96f-1ed63deb00bc>. Updated April 26, 2023. Accessed September 10, 2024.

⁶ 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 September 10, 2024.

2.2 Pilot-Rated Passenger

The 59-year-old male pilot-rated passenger's last aviation medical examination was June 7, 1993. At that time, he reported no medication use and no active medical conditions. He was issued a second-class medical certificate without limitation. That certificate subsequently expired; the pilot-rated passenger did not hold active FAA medical certification at the time of the crash.

The County of Los Angeles Department of Medical Examiner-Coroner performed the pilot-rated passenger's autopsy. According to the pilot-rated passenger's autopsy report, his cause of death was blunt trauma and his manner of death was accident. His heart was large, weighing 700 g (normal heart weight for a male of the pilot's autopsy body weight of 243 pounds is roughly 310-540 g).⁷ Examination of his coronary arteries was limited due to injuries. An insulin pump was identified; according to death investigation information accompanying the autopsy report, a family member of the pilot-rated passenger stated that he had a history of diabetes and used an insulin pump. The remainder of the autopsy, including visual examination of the heart, did not identify significant natural disease.

The County of Los Angeles Department of Medical Examiner-Coroner Forensic Sciences Laboratories performed postmortem toxicological testing of chest cavity blood from the pilot-rated passenger; no tested-for substances were detected.⁸ Vitreous chemistry was also performed; vitreous glucose was below 20 mg/dL, and no other findings of specific significance were identified.⁹

The FAA Forensic Sciences Laboratory also performed toxicological testing of postmortem specimens from the pilot-rated passenger. Methamphetamine was detected at low levels in cavity blood and liver tissue. Amphetamine was detected at 10 ng/g in liver tissue; cavity blood testing for amphetamine was inconclusive. Loratadine and its metabolite desloratadine were detected in liver tissue; in blood, loratadine was not detected and testing for desloratadine was inconclusive. Losartan and metoprolol were detected in cavity blood and liver tissue. Vitreous glucose was not detected.¹⁰

⁷ Kitzman DW, Scholz DG, Hagen PT, Ilstrup DM, Edwards WD. Age-related changes in normal human hearts during the first 10 decades of life. Part II (maturity): a quantitative anatomic study of 765 specimens from subjects 20 to 99 years old. *Mayo Clin Proc.* 1988;63(2):137-146. doi:10.1016/s0025-6196(12)64946-5.

⁸ The results included "not detected" results for methamphetamine and amphetamine.

⁹ Vitreous glucose (sugar) below 20 mg/dL is a low level, which is not necessarily abnormal, because of how glucose decreases in vitreous after death.

¹⁰ According to [the FAA Forensic Sciences Laboratory's website](#), the laboratory considers glucose (sugar) levels above 125 mg/dL to be abnormal in vitreous. The choice of this value is discussed in FAA Aerospace Medicine Technical Report [DOT/FAA/AM-00/22](#). The vitreous glucose reported as "not detected" corresponds to a level below 10 mg/dL. This is a low level, which is not necessarily abnormal, because of how glucose decreases in vitreous after death.

Methamphetamine is a central nervous system stimulant drug. Amphetamine is a metabolite of methamphetamine and is also a central nervous system stimulant. Both methamphetamine and amphetamine are available as controlled substance prescription medications used to treat attention deficit hyperactivity disorder, narcolepsy, and occasionally obesity; each may also be a metabolite of certain other medications. At low doses used as part of appropriate medical treatment, the drugs may improve reaction time, cognitive function, and fatigue, but may cause people to make higher-risk choices. At higher doses, the drugs may have a variety of impairing effects on psychomotor function, cognition, and perception. As medicines, the drugs typically carry warnings that they may impair the ability to engage in potentially hazardous activities. In addition to being used medicinally, methamphetamine and amphetamine are frequently produced illicitly and abused recreationally by ingestion, snorting, smoking, rectal insertion, or injection. Seeking an intense euphoric effect, abusers typically use much higher doses than are used medicinally. Impairment related to methamphetamine or amphetamine use can result from drug or withdrawal effects.^{11,12,13} The FAA considers methamphetamine and amphetamine medications to be “Do Not Issue/Do Not Fly” medications.⁴

Loratadine is a non-sedating antihistamine medication that is available over the counter and can be used to treat allergy symptoms and hives. Desloratadine is an active metabolite of loratadine and is available as a prescription medication with similar uses as loratadine. Losartan is a prescription medication commonly used to treat high blood pressure. Metoprolol is a prescription medication that can be used as part of treatment for high blood pressure, certain arrhythmias, and certain types of heart failure. Loratadine, desloratadine, losartan, and metoprolol are not generally considered impairing.

Submitted by:

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Medical Officer

¹¹ Couper FJ, Logan BK. Drugs and Human Performance Fact Sheets. National Highway Traffic Safety Administration. DOT HS 809 725. April 2014 (Revised). <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>. Accessed September 10, 2024.

¹² National Institutes of Health National Library of Medicine. Methamphetamine hydrochloride. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f31f580f-1f08-4a0f-b078-0b9e3308f712>. Updated July 5, 2023. Accessed September 10, 2024.

¹³ National Institutes of Health National Library of Medicine. Amphetamine sulfate. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=79b9db39-7cdc-5607-f0ce-ac2a2cfd59d5>. Updated June 8, 2023. Accessed September 10, 2024.