National Transportation Safety Board
Office of Research and Engineering
Washington, DC 20594

Medical Factual Memorandum for Record

March 25, 2025

A. CASE

NTSB ID: ERA23FA209
Location: Watkinsville, Georgia
Date: April 26, 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 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 reports (external examinations) – pilot and pilot-rated passenger
- Toxicology reports – pilot and pilot-rated passenger
- Pharmacy records (for 1 year before accident date) – pilot
- Photographs of medications and medication packaging at crash site

2.0 Summary of Medical Facts

2.1 Pilot

The 76-year-old male pilot's last aviation medical examination was August 22, 2021. At that time, he reported using the medications timolol (a prescription topical eye drop medication commonly used to lower eye fluid pressure in conditions where this pressure is elevated, including glaucoma and ocular hypertension) and omeprazole (a medication available over the counter for stomach acid suppression, commonly used to treat conditions including acid reflux); neither of these medications is generally considered impairing. The pilot also reported a history of seasonal allergies corrected by "allergy shots." He was issued a third-class medical certificate limited by a requirement to wear corrective lenses, and not valid for night flying.[1]

The pilot had previously reported a history of cataract surgery with intraocular lenses in both eyes (first reported at the pilot's first aviation medical examination in 2011), as well as a history of glaucoma (first reported in 2015). According to the FAA medical case review, in 2012, the pilot received authorization to take an operational color vision test (the medical case review does not indicate that such a test was done), and in 2015 he received a letter of eligibility for glaucoma.

The Georgia Bureau of Investigation, Division of Forensic Sciences, performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was extensive blunt impact injuries, and his manner of death was accident. The extent of the pilot's injuries severely limited examination; only an external examination was performed.

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem muscle and liver tissue specimens that were identified by the Georgia Bureau of Investigation as belonging to the pilot.[2] Ethanol was detected in liver tissue at 0.012 g/hg.[3] Ethanol was not detected in muscle tissue. Gabapentin was detected at 1142 ng/g in liver tissue. Gabapentin was not detected in muscle tissue. Dextromethorphan was detected in liver tissue and muscle tissue. Dextrorphan was detected in liver tissue and was not detected in muscle tissue. Loratadine was detected in liver tissue and muscle tissue. Desloratadine was detected in liver tissue and was not detected in muscle tissue. Timolol was detected in liver tissue; testing for

[1] The "not valid for night flying" restriction may be used for pilots with color vision deficiency or other conditions that interfere with night vision.

[2] The FAA Forensic Sciences Laboratory has the capability to test for around a thousand substances including toxins, prescription and over-the-counter medications, and illicit drugs. The Georgia Bureau of Investigation used DNA analysis to identify to whom tested specimens belonged.

[3] In tissue, concentrations in g/hg are approximately equivalent to concentrations in g/dL.

timolol was inconclusive in muscle tissue. Atorvastatin, acetaminophen, and pramoxine were detected in liver tissue and muscle tissue.

Notably, except for ethanol, all substances detected by the pilot's postmortem toxicological testing were also detected by the pilot-rated passenger's postmortem toxicological testing. The autopsy and toxicology reports in this case indicated that the specimens from the pilot and pilot-rated passenger were comingled and were identified using DNA analysis. Medications and medication packaging were photographed at the crash site.

The pilot's reviewed pharmacy records included prescribed timolol eye drops, consistent with his reported use of this medication. A crash site photograph showed a label for timolol eye drops bearing the pilot's name. No detected substances other than timolol were explicitly associated with the pilot's name in reviewed prescription records or crash site photographs.

2.2 Pilot-Rated Passenger

The 75-year-old female pilot-rated passenger's last examination by an aviation medical examiner (AME) was May 25, 2016. At that time, the pilot-rated passenger reported a medical history including high blood pressure, diabetes, and seasonal allergies. Her high blood pressure was noted to be qualified under Conditions AMEs Can Issue (CACI) criteria. According to the FAA medical case review, she had a 2014 Authorization for AME-Assisted Special Issuance (AASI) for diabetes treated with oral medication.[4] At the time of her last aviation medical examination, she reported using the medications liraglutide (a prescription injectable diabetes medication), omeprazole (a stomach-acid-suppressing medication available over the counter), metronidazole gel (a prescription antibiotic ointment), loratadine (a non-sedating antihistamine available without a prescription, commonly used for treatment of cold and allergy symptoms), loperamide (an opioid anti-diarrheal medication available without a prescription), lisinopril (a prescription medication commonly used to treat high blood pressure), atorvastatin (a prescription medication commonly used to control cholesterol and reduce cardiovascular risk), aspirin (an anti-inflammatory medication widely available for treatment of pan and fever, and commonly used to help reduce cardiovascular risk), and vitamin E. She was issued a third-class medical certificate, limited by a requirement to have available glasses for near vision, and not valid after May 31, 2017. She completed a BasicMed education course, most recently in May 2021, and reported completing a BasicMed Comprehensive Medical Examination Checklist (CMEC), most recently in April 2021.[5] Neither active medical

[4] AASI is a process by which an AME may issue a medical certificate under the provisions of an applicant's FAA Authorization for Special Issuance if the applicant provides specific required medical information from treating physician(s). AASI determinations are subject to review by the FAA.

[5] 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

certification nor qualification for BasicMed are required to act as a passenger or non-required flight crew.

The Georgia Bureau of Investigation, Division of Forensic Sciences, performed the pilot-rated passenger's autopsy. According to the pilot-rated passenger's autopsy report, her cause of death was extensive blunt impact injuries, and her manner of death was accident. The extent of the pilot-rated passenger's injuries severely limited examination; only an external examination was performed.

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem muscle and liver tissue specimens that were identified by the Georgia Bureau of Investigation as belonging to the pilot-rated passenger.[2] Gabapentin was detected at 360 ng/g in liver tissue and at 3514 ng/g in muscle tissue. Dextromethorphan was detected in liver tissue; testing for dextromethorphan was inconclusive in muscle tissue. Dextrorphan was detected in liver tissue and was not detected in muscle tissue. Loratadine was detected in muscle tissue; testing for loratadine was inconclusive in liver tissue. Desloratadine was detected in liver tissue and in muscle tissue. Timolol and acetaminophen were detected in liver tissue and were not detected in muscle tissue. Atorvastatin and pramoxine were detected in liver tissue and muscle tissue.

Crash site photographs showed a medication bottle labeled as gabapentin bearing the pilot-rated passenger's name. No other detected substances were explicitly associated with the pilot-rated passenger's name in reviewed crash site photographs. Medication bottles were photographed bearing the pilot-rated passenger's name and labeled as omeprazole and lisinopril (consistent with the pilot-rated passenger's previously reported medications) as well as empagliflozin (a prescription oral diabetes medication). An injection pen labeled as liraglutide (the pilot-rated passenger's previously reported injectable diabetes medication) was photographed but no patient name was visible in the photograph.

2.3 Descriptions of Detected Substances

Ethanol is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.[6] FAA regulation imposes strict limits on flying after consuming ethanol, including a prohibition on piloting a civil aircraft while having a blood ethanol level of 0.04 g/dL or greater.[7] Alcohol consumption is not the only possible source of ethanol in

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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.

[6] Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

[7] [14 *Code of Federal Regulations* § 91.17](14 Code of Federal Regulations § 91.17).

postmortem specimens. Ethanol may sometimes be produced by microbes in a person's body after death, potentially elevating ethanol levels in some postmortem specimens but not others.[8]

Gabapentin is a prescription medication that can be used to treat nerve pain (including diabetes-associated nerve pain), certain types of seizures, restless legs syndrome, and other conditions. Gabapentin may cause sedation and dizziness and can impair coordination and performance of tasks such as operating motor vehicles and heavy machinery. The drug typically carries a warning that users may not be able to accurately assess how sleepy or impaired it makes them, and that they should not operate motor vehicles or complex machinery until they have gained enough experience to determine whether the drug impairs their ability to do so.[9,10] The FAA considers gabapentin to be a "Do Not Issue/Do Not Fly" medication.[11] According to the FAA medical case review for this accident, regular use of gabapentin for any reason is disqualifying for pilot medical certification.

Dextromethorphan is a cough suppressant medication that is available over the counter in a variety of cold and allergy products. Dextromethorphan is not typically impairing at levels associated with medicinal use.[10] The FAA states that pilots who use dextromethorphan should observe a waiting period for the drug to be cleared from circulation before flying.[12] Dextrorphan is an active metabolite of dextromethorphan.

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. Timolol is a prescription medication that is commonly used as a topical eye drop to lower the pressure of the fluid within the eye in conditions where this pressure is elevated, including glaucoma. Acetaminophen is a medication

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[8] Kugelberg FC, Jones AW. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Sci Int*. 2007;165(1):10-29. doi:10.1016/j.forsciint.2006.05.004.

[9] National Institutes of Health National Library of Medicine. Neurontin. DailyMed. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ee9ad9ed-6d9f-4ee1-9d7f-cfad438df388. Updated July 12, 2022. Accessed January 13, 2025.

[10] Couper F, Huestis M, Fulford J, et al. *Drugs and Human Performance Fact Sheets: 2024*. National Highway Traffic Safety Administration. DOT HS 813 650. December 2024 (Revised). https://rosap.ntl.bts.gov/view/dot/78924. Accessed January 13, 2025.

[11] Federal Aviation Administration. Pharmaceuticals (therapeutic medications) do not issue - do not fly. Guide for Aviation Medical Examiners. https://www.faa.gov/ame_guide/pharm/dni_dnf. Updated July 10, 2023. Accessed January 13, 2025.

[12] Federal Aviation Administration. Pharmaceuticals (therapeutics) medication guidelines for pilots. Federal Aviation Administration website. https://www.faa.gov/pilots/medical_certification/medications. Updated August 5, 2024. Accessed January 13, 2025.

available without a prescription in a wide variety of products as a pain and fever reducer. Atorvastatin is a prescription medication commonly used to control cholesterol and reduce cardiovascular risk. Pramoxine is a topical anesthetic medication available over the counter in a variety of products for temporary relief of skin pain and itching. Loratadine/desloratadine, timolol, acetaminophen, atorvastatin, and pramoxine are not generally considered impairing.

Submitted by:

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